MATHEMATICS AND 5D

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Nt. We have reduced the II Book, eliminating most of Calculus, and existential algebra on the 5 Dimotions of reality, and its closer mathematical mirror, as the whole calculus will make the paper exceed the 1000 pages.

So this paper will deal after an introduction to ΔST laws, with Geometry, Philosophy of mathematics, the first age of Algebra, arithmetics and the trinity of social operands and its 'sentences', polynomials, probability and statistics; and the 3rd age group, set theory and Boolean algebras, with emphasis on Group theory at an introductory level as the aim of those papers is to show the correspondence between classic sciencea and the law of ΔST they mirror, in the case of mathemagtics with scalar numbers, spatial points and dimotional operands.

As always this is a work in progress copycat first from 30 years of research in 5ÐST sciences, corrected and expanded as time goes by, from here to my eternity.

So my apologies for all parts not yet corrected up to the standards of scholarship.

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BOOK I. ¬E-GEOMETRY

Abstract. This article introduces mathematics as an experimental mirror language of the 5D Universe, and its 3 ΔST essential elements, studied by its 3 main sub-disciplines. Spatial fractal points studied by geometry; Scalar numbers studied by Algebra, and time=change dimotions studied by analysis. As the 3 elements, ΔST are entangled into 'planes of space-time', so are the 3 sub-disciplines of science. As *scales of space-time include the other two elements, so Algebra includes all other elements and numbers become the main substance of mathematics. As entanglement means a huge number of different possible,* ¡logic mirror symmetries between all those elements, when a 'mind' creates a language to observe it, mathematics has multiple forms to perceive Δst.

How to put a sequential order to all this? We don't beyond using the simplest 'age scheme' of growing complexity that provides the best sequential progression that mimics the worldcycle of any existence, mental or physical. But the true 'jump' of understanding is to force your mind into parallel, synchronous, simultaneous thinking and perceive the 'symmetries', dualities, trinities, pentalogic structures that cross between disciplines.

Consider the operands that grow in complexity, from ± social sums, to products and inverse divisions, to $\sqrt{x^a}$, to the crown of $\int\partial$ operands *that include all others to study change between time-space planes of finitesimal, derivative parts and integral wholes… We cannot study thus them isolated, but we will* in the books on algebra and analysis build as a stair of growing complexity because the Universe also builds the different dimotions in sequences of growing complexity to achieve the 'higher scalar' dimotions of reproduction and social evolution.

Moreover ΔST real elements of Nature, its co-existing planes of space-time, which form every 3 Δ±¡ units a supœrganism, *are accessed not fully beyond our own T.œ (Timespace supœrganism) but through 'limited minds', which select information, by entropically erasing 'dark spaces' into a continuum; reducing inner properties into points without parts, etc.*

So we add to the reality of ΔSt, the ¬ (entropy) and @-mind mirrors to form, ¬Δ@st, the 5 elements of reality.

So we must regain back the erase information – those forgotten properties to improve the Æ-mirror (Aristotelian, single time causality and Euclidean points) into ¬Æ maths, with the handicap of being this a single humind in declining health. So I will also as an ¬@ reduce what I say and repeat as old men do the essence of it. Since at the beginning and the end of all, there is indeed just an infinite repetition of ¬Δ@st.

Thus this as all papers are just a final seed for future researchers to grow on better foundations human 'stiences' of timespace planes. To do so you have first to forget sequential, lineal single time causality, as reality is an entanglement of 5 causes, which can be seen in many mirror views. The simplest one though is as a tug of war of the mathematical unit – a fractal point, which 'holds a mind in itself' (a Leibnizian monad, or non-euclidean point traversed by infinite parallels). This Fractal point in still mind-mood is SS, and it tries to 'stop' the flow of entropic time, TT, to form mind images of momentum, Ts, dominant in Time-motion and information, St, dominant in Spatial mental form. And when it achieves it, St=Ts, a balanced S=T wave of energy is born, which 'connects' fractal points into networks, which become vital topological planes, according to its degree of congruence, similarity, enhanced by the constant transfer of St-information and Ts-momentum. *This is the game of exist¡ence, which an easy-upgrading of the Axioms and postulate of Euclidean Geometry studies in depth.*

As such ¬E Geometry is by far the simplest, easiest mode to mirror the world of those 5 'dimensional motions' of space and time and its scales, and SS-minds/points that gauge its St-information within the entropic limits of their inner worlds; reason why it is our first paper on 5D Mathematics.

But the whole ΔSt is represented in mathematics by 'algebra of scalar numbers', 'geometry of spatial points', and 'analysis of the best $\int\partial$ time operands' and its entropic inverse functions, put in mental space through @-frames of reference. All this, as I assume readers will know more than I do of mathematics, is the essence of it. I repeat – my task is to establish a simpler Copernican more truthful foundations for future scholars to recast all what they

know better than I do in the more focused transparent image. Forgive then my errors, drink on the strengths of the mirror, because if you do as those who developed the seed of Planck, the new field of 5D is ginormous and largely unexplored. I can't even order the huge GBs of 30 years of research now in declining physical and mental health. I'll just do what I can from here to my entropic eternity. This said this is the best thing that has happened to Mathematics since Riemann and Lobachevski, jumping over Mr. Cantor's idealist sets, just a lesser mirror of the Δ-planes of space-time that include it all (reason why sets can include it all, but why to use a foggy mirror when we shall provide the real one, of scalar algebraic numbers, spatial fractal points with parts and dimotion operands?) *If the mirror we offer is not good enough is my fault, NOT the fault of the substance of the mirror – remember that; blame the old man, not the vision he once had and you can improve with youth and energy I lack.*

We concentrate on the S@, spatial mental geometric elements, keeping for a second volume the study of time algebra. Our aim is to prove the experimental nature of mathematics, which along logic is the main science of space and time. Its content is a small part of my research in the field in a discipline that if ever completed by future researchers will recast the entire subject of mathematics as set theory did in the XX c. in terms of its experimental power to describe the ultimate laws of 'mental spaces' and 'time motions'.

Scalar spacetime has 3 units, time operands, studied in algebra, social scalar numbers and Non-Euclidean fractal space points, whose symmetry is study by non-E geometry completes with 5 postulates of points, lines and planes with breath and relative congruence. Once we complete ¬E geometry; we define the main duality between subjective **mental phase spaces** as still mirrors of the world that select the information minds need to act and survive in the game of exisțence, that creates objective 'vital, **topologic organisms'** and projecting its geometric mind in its territorial local order as geometry 'informs' the underlying timespace we are all made of.

5D mathematics *returns to the mature experimental age of the discipline that went as all systems do through 3 ages from a simple* lineal age of Greek Geometry to its curved realist age of calculus that added motion & scales of 5D finitesimal derivatives and 4D wholes to better mirror the fractal Universe, to a 3rd age of excessive informative fictions, when it abandons its realist foundations, when during the German creationist ego-trip of Hilbert and his Cantorian paradises, he says, 'I imagine points, lines and planes' thinking he shares the only language 'God' uses to create reality. Hence mathematics is no longer considered an a posteriori mirror of scalar timespace but its 'generator' and as the first 'Aristotelian cause', needs no experimental proof but rather the opposite: reality exists only if it can be casted into mathematical models ('only what we measure is real' Planck). So mathematicians abandon space points, scale numbers and time operands as the 3 mathematical images generated by the Δst Universe, using instead 'Cantorian' sets as its 'imagined' units nowhere to be seen in reality. And Hilbert affirms the self-contained Axiomatic method of proof, NOT connected to the world, despite Gödel's incompleteness theorem- *a baroque inward looking 3rd age of excessive form proper of all systems* we abandon to return to its empirical foundations, now formulated in terms of those 5 structural elements that create reality, mimicked by the main mathematical elements. Since mathematics reflect the properties of scalar space and cyclical time in its main elements, points numbers and operands entangled in feed-back ≤=≥ equations. So we define mathematics as an experimental language that mirrors in a simplified manner as all languages do to fit the mind, the elements and structures of the generational space-time, we are all made of. As such mathematics is only 2nd to ¡logic and its fractal, ternary Universal grammar, as the fundamental formal, experimental language of the Universe and its generational time space that creates all its super-organisms (ab. T.œs). The Math's pro must be humble to value this work that is not so much on new theory but *on entangling maths with the vital Reality it mirrors & set theory cut off from.*

We study how mind languages mirror supœganisms made of scalar space and cyclical time. So we introduce the metric equation that describes the scales of the 5th Dimensional Universe: SxT (max.s=t) = C. Then we couple the 5D elements of reality (entropy, scales, minds, space and time) in its 3 'relative scales of size and time duration', as fast 5 Dimotions=actions (short view), superorganisms tracing worldcycles (medium view) and ¬Δ@st elements (long view) with the 5 disciplines of mathematics as experimental mirrors of those 5 elements:

Space=geometry, Δ: Scales: Number theory, S<=>T Dimotions and Symmetries=algebra; which analysis is best for time motions; @-minds = Analytic geometry (Frames of reference) and philosophy of mathematics; while entropy, negation of information appears in the limits of calculus, inverse operands and exponential functions.

Since, as scalar space includes scales & 'still mind mappings' and Time the entropic limits of death and all its motions; we can reduce mathematics to spatial geometry and temporal algebra, which indeed were the original disciplines, from where all others branched, and to its minimal units, points of space and numbers of time, which appeared even earlier in the human consciousness. We shall thus consider the S=T symmetries between fractal Non-Euclidean space points (ab.•) and numbers (ab.Nº); and latter on between Topology and Algebra; and couple the internal elements of S-geometry (dimensions) and T-algebra (operands) with the 5 Dimotions (dimensional motions) of the fractal Universe.

So mathematics is only 2nd to ¡logic in the quality of its experimental mirror expressing the Disomorphisms (equal dimensional laws) of all systems of Nature. As each of its 2->5 subdisciplines reflect those 5 Dimotions of the Universe, which all stiences expresses in different forms. In mathematics geometry does so through 3±¡ topologic bidimensional varieties and classic 3 dimensions (1D: height, 2D: Length, 3D: width; 4-5D: fractal dimensions and topologic networks). While algebra mirrors the 5 Dimotions with its 5 operands & inverse entropic functions (1D: sin/cos, 4D:±, 3D: x÷, 4D: x^{a} √, 5D:∫∂). So finally we focus on the medium view of 'entangled supœrganisms, in simultaneous space', as expressed by vital topology, tracing 'worldcycles' as expressed by Existential algebra, which become the new 'integrated' 2 polar disciplines of 5D mathematics that should make it a better mirror of the fractal Universe.

Vital topologic Geometry vs. mental subjective spaces.

The essential duality of geometry is between mental spaces which are continuous, as they erase the holes between forms, still geometry that eliminate motions and scalar planes, reduced to a mind and with a distorted @-centered frame of reference vs. real vital geometries of discontinuous T.œs and fractal scales:

Mental geometry: single plane, no motion, 0-point center vs. Vital topology, Δ±¡ co-existing planes, motion.

The paper thus deals with vital geometry, *the experimental stience that describes the fundamental laws of Time-Space Supœrganisms, seen in simultaneity as a synchronous, stable form of space.*

When dealing with space, we do have to differentiate two main type of spaces and laws:

- Objective, vital topological spaces, made of the 3 bidimensional varieties of topology as adjacent organs, which we can define with the 'Generator equation' of Timespace organisms, which in geometric terms writes:

Lineal-limbs/fields<Ø-hyperbolic Bodywaves>O-spherical Particle/heads

As those 3 geometries maximize the efficiency of motion, the line being the shortest distance between two points, iteration, the hyperbole the more complex form summoning all others, and the sphere the highest volume of minimal perimeter. The example shows the essence of vital topologic spaces: The forms that are more symmetric with the motion and survival action=function they represent in the real world survive and are therefore repeated in clone T.œs (Timespace supœrganisms). The objective rules of *geometry are thus about vital space, about the symmetry between S-form and T-function, S=T and merge abstract geometry and biologic laws of survival and reproduction and physical laws of motion.* They are easy to understand and the tautological truth derived from them is indeed the obvious truth that we are the vital space we occupy whose functions in time the geometric laws of vital non-Euclidean topology maximize.

Subjective, mental spaces, mirrors of the outer world. This second great field of geometry was ill understood till the Lobachevski->Riemann R=evolution, which definitely understood that 'spaces' are distorted mind mappings in simultaneity of the 'flows of timespace cycles and organisms' perceived outside our membrain. But again, the

vital laws of survival play here a clear role, as mind mirrors which are unfocused and distorted in their judgment of the outer forms do not survive as a correct perception of reality is needed to make it in the existential game.

A key difference between both type of geometries however is the fact that the laws of non-euclidean vital geometry that describe the outer world are all the same regardless of the observer, as they are objective laws of construction of efficient superorganisms. *But the mind spaces are infinite, one for each 'monad', each point that is a world in itself (Leibniz) even when they belong to the same species, because their self-centered perspective will differ.* The duality of objective single Universe v. subjective individual mind-*point makes thought languages inflationary in its kaleidoscopic multiplication of different views over the same object such as:*

Objective laws of vital topology > ∑ ∝ (relative infinity symbol) mental mirror spaces.

It is important to stress from the beginning this inflationary nature of mind spaces, as many of them are 'entropy', disordered unfocused mirrors that do not survive and shouldn't be study. This is not the case. Mathematicians sponsor an egocy paradox (ego=idiocy) as all huminds do, believing all mathematical forms are worth to explore. But that is not really the case. As in Borges' Babylonian Library where monkeys type ∞ books writing by chance a Bible; all books exist in Sets, but what matters to us is to distinguish mathematial forms that do exist, **to apply them without errors** to the next layer of mathematical understanding of the Universe, the praxis of mathematical physics and any application of mathematics to stience that reinforces with a 3rd layer of experimental evidence the 1st - ΔST laws of generational space-time and 2nd layer of non-AE mathematics.

An example will suffice. There are infinite curves described by polynomials but all curves of the second order can be reduced to the canonical conics, which we find in Nature because they are efficient.

So the very essence of 5D mathematics, in the 2 introductory courses of those papers; is to connect the laws of vital space and cyclical time with the forms of the mathematical mirror, spatial geometry and temporal algebra, while time permitted the 3rd part of this method – the examples in all sciences, notably mathematical physics of those laws, will come in further papers[1].

We start then with geometry because it is far more evident to the visual mind of the modern age that temporal algebra, and so we shall introduce first the very basic of 5D space-time laws and the consider the basic upgrading 5D makes of geometry – the rewriting of the postulates and axioms of Euclidean geometry, completing the work of Gauss, Lobachevski and Riemann who only upgraded the 5th postulate. And then with those more solid basis, put in relationship to the Gst laws of fractal organisms, slowly review the simplest elements of Geometry at the level of an Introductory university course of mathematics, with those new postulates. My goal is to interest enough a few professional mathematics for this Copernican revolution not to die with me as I don't know how long I will remain in exist;ence.

You have then to understand the nature of scientific r=evolutions, whose pioneers always start with the basics, even if they seem very simple for a scholar who has learned a previous model, which despite its relatively less accurate first principles and postulate has built a mirror-image that suffices to handle reality, because one of the marvels of the fractal world of infinite monads ordering a flow of continuous entropic, indistinguishable time motion is that all mirrors are imperfect, reduced images of the whole; so even a Ptolemaic system with the added epicycles can describe reality, but it is always best to keep improving the initial postulates, as Copernicus did putting the sun in the center, to simplify and better understand those orbital ellipses. This is what the completion of Non-Euclidean geometry means. In a few generations when the model is developed in full the beauty of those renewed first principles will be the marvel of high school students. As they will understand experimental mathematics, which now they hate because of the axiomatic, set theory and pedantic discourse.

Nt. 1 I do apologize for having failed in my initial plan, 30 years ago coming out of Columbia University, when my mind was fresh my enthusiasm for 5D and my hopes for mankind huge, of gathering a group of outstanding scholars of all fields to complete the task of renewing humind's knowledge of the Universe with exhaustive 5D upgrading in all sciences, with me as the 'orchestra director'… It was not all my fault, as the staunch rejection or rather censorship of 5D social sciences hindered any chance to get institutional help, and I

could not ethically hide the laws of 5D history during the early 90s when I pursued help for academic research. It is truly a miracle given the huge rejection I had all my life to my work that I can manage in my 3rd age still to order those papers that I see as my testament to a life in pursuit of truth and the survival of mankind.

## INTRODUCTION. 5D: A FRACTAL UNIVERSE MADE OF B¡O-TOPO-LOGIC TIME§PACE BEINGS.

"Henceforth *space* by itself, and *time* by itself, are doomed to fade away into mere *shadows*, and only a kind of union of the two will preserve an independent reality. Hermann *Minkowski*

When we google the 5th dimension one gets surprised by the quantity of speculative answers to a question, which is no longer pseudo-science, but has been for two decades a field of research in systems sciences rather than physics (: no, the answers of google, considering the fifth dimension the upper-self etc. seem to be very popular, but are to the science of the 5th dimension more like a medium in earlier XX c. talking about the 4th dimension as astrological awareness, for lack of understanding of Einstein's **metric equations** of the 4th dimension).

This is the key word that differentiates pseudo-science from a proper scientific description of a dimension of space-time, *the existence of a metric equation that describes a dimension and allows to travel through it.* Why the 5th dimension metrics are not well known in modern science has to do with the fact it is not researched in physics but systemics, the mother discipline of all sciences of information, far less popular than physics; and the proprietary feeling physicists acquired on space-time matters since Galileo defined its 3D metric equation $v=s/t$ completed with Einstein's 4D formalism, which makes difficult to spread the knowledge on space-time acquired on other disciplines. The arguments still raging about evolution, the fundamental theory of time in terms of information, as the 'arrow that defines' the future of species but has nothing to do with Relativity and locomotion is a clear case of that difficulty.

Indeed, we know since the XIX c. that the creation of the 'future time' of an existential entity is not ONLY mediated by the arrow of **locomotion** and entropy studied by physicists with Relativity Metrics (Galileo's $V=s/t$ and Einstein's more complex formalism), but there is a second arrow that defines the 'future' of existential species - the evolution of its information. So time – *the changes=motions that defines the existence of any species,* has at least 2 dimensions, locomotion or ordered translation in space and a more disordered version, entropy (scattered motion that 'dissolves' the inner form of the system, akin to death)…

And in-form-ation, generation of form, inverse to entropy as it requires the social gathering of parts into wholes; happening without external locomotions, as an internal trans-formation of **form**. This evolution of organic form as opposed to external change is what Systemics calls the fifth dimension of time that applies to all sciences.
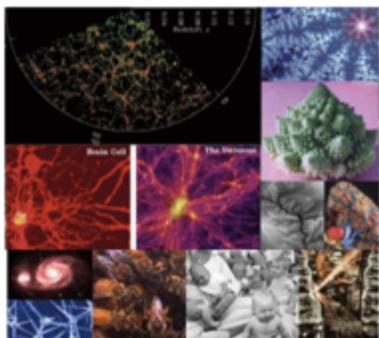
In the graph the Universe is a fractal that reproduces 'forms with motion', informations and then **organizes** them in networks and systems that evolve into larger organic systems creating the scalar structure of reality. Thus we call *the sum of all those co-existing scales of parts and wholes the fifth dimension.*

Then it is necessary to find a metric equation to define this new dimension of space-time. Since a dimension only exists when we can write a mathematical simple metric that leaves the dimension invariant when we change our parameters of space and time - hence we travel through it. (Klein). This equation, as all space-time metric equations, is simple; since metric equations are meant to represent measures of 'covariant' motion in a given space-time dimension that leave the other dimensions unchanged. So we write using ð for cyclic time instead of t, for a motion that changes the relative size and speed of clocks of a system (measured with frequency):

5D Metric: S (Lineal Size/Volume in space) x ð (cyclic speed of its time clocks) = Constant.

According to those metrics, smaller systems in space have faster time clocks. As information is stored in the frequency and form of those cycles, smaller systems have more information, coding larger ones: genes code cells, memes societies and particles' quantum numbers code atoms and molecules.

This equation and its use to improve our knowledge of space and time in all sciences, with an emphasis in our models of physical systems will be the theme of this paper. Even if physicists stubbornly refuse to treat information with the same value than entropy. So they call it negentropy, and when you give a conference on the fifth dimension – the dimension of 'creation of social forms of information, of organic wholes' - there are no physicists on attendance; and likely no physicists will be reading this post… Let's then use the metrics of the 5th scalar dimension to explain the fractal, nested Universe and its scales, shown in the graph:

The metric equation of the fifth dimension of space-time (ab.Δ) defines 3 known scales of physical systems, with different quantity of information according to 5D metrics, Se (size in space) x Ti (volume of information) =k. Since as we become smaller in space paradoxically our time clocks accelerate, and since information is stored in the cyclical patterns and frequencies of those clocks smaller systems code more information, so quantum particles code atoms, genes organisms, memes civilizations and chips machines establishing the essential symbiosis between Δ-1 scales and Δº super organisms, inscribed in an slower Δ+1 world.

Those metrics means information is higher in the smaller 'quantum plane' than in the larger gravitational one, and inversely the size of its physical parts is larger ins the Gravitational cosmological 'plane' than in the quantum one, with the human thermodynamic scale in-between.

As there is no reason to stop the scales of the fractal Universe in particles and galaxies, there is a 'potential' fourth, Δ±4 organic plane defined 'above' the galaxy, (Δ+4, dark energy world) and below the quantum world (Δ-4, Bohm's quantum potential), which represents the larger cosmos. Further on, according to the fractal, nested principle any larger organic system, encloses smaller nested systems. Thus the Δ±4 cosmos contains Δ±3 galaxies, which contain Δ±2 solar systems and planets, which contain Δ±1 thermodynamic organisms and matter states, described by the human Δº mind languages, contained on our brains, *which according to those metrics* will have a much denser content of information becoming a 'linguistic Mind-Mirror' of the whole.

RECAP. Ænthropic huminds reduce the multiple clocks of time and vital spaces of reality to the single human clock and spatial scale, and reject the organic properties of other Universal systems. In reality the Universe is a fractal organism of time=motion and space=form, whose purpose is to reproduce those formal motions, and patterns of cyclical reproduction; with its fundamental metric law of balance between space and time, as the guidance of those motions.

The outcome of those processes of reproduction of form, and symbiosis between the different scales and synchronous time cycles of its species is the creation of organic superorganisms. It follows from that nested structure and 5D metrics that speed up information processing in smaller spaces, a symbiotic relationship between Δ-¡, the smaller parts of faster time clocks, which carry more in-form-ation in the form and frequency of its logic cycles, and act as languages that code the larger systems: genes code cells, memes code societies, quantum numbers code atoms and languages code larger wholes.

The underlying question of time§pace physics: Absolute or Relational, Generational Space-Time

The fundamental question physicists wondered for centuries regarding the nature of space and time unfortunately was resolved as usual in favor of the simpler view: it is space and time an absolute abstract background of the Universe (Mr. Newton's view) or are we made of 'vital space' that lasts a time duration, so we are generated by the bio-topo-logic properties of scalar space and cyclical time? This is the choice of 5D 'stiences'. And its simpler version was called relational spacetime, sponsored by Mr. Leibniz. A realist interpretation of the world we live in, which has never shown in any scale of reality such 'background' - ultimately a mathematical graph used in abstract by human scientists - considers that we ARE the vital space we occupy with our cells, and we LIVE a cyclic time duration between birth and extinction. So *we are* space and time and must extract our 'existential properties from both.

In Newton's cosmos, space and time provide a fixed, immutable and eternal background, through which particles move. Space and time are the stage of intersecting lines sketched in the illustration. Fact is this 'mathematical artifact' made with pen and paper by earlier physicists, called the Cartesian graph, useful to measure 'translation in space' is no where to be seen in reality. Unfortunately as time went by the graph became somehow 'real' as scientists' felt the 'mathematical language' created reality. It meant also the invention of an absolute 'continuous space' and a single 'lineal time' that extends to infinity contradicting the obvious fact that all 'spaces' are broken, divided by membranes, and all beings have a finite time duration. Further on, as we kept exploring smaller scales of reality, we never found the drawings of God, not even a solid still substance, but always 'motions' tracing closed time-space cycles; since even particles turned to be also 'vortices of time-space motions'.

The true, sound experimental and logic theory was Leibniz's, who considered absolute space and time an abstraction, and so he coined the concept of relational space -merely the adjacent pegging of similar forms in simultaneous space and relational time - the sequence of events which we relate causally with reason origin of the 'Generational space-time' model of 5D in which are the space we occupy and the time we last – as in the graph where there is no longer abstract background lines. What Newton called absolute space-time IS NOT.

"Behind it all is surely an idea so simple, so beautiful, that when we grasp it - in a decade, a century, or a millennium - we will all say to each other, how could it have been otherwise...
- John A. Wheeler

So space is the sum of all the discontinuous vital spaces, occupied by different beings: ∑s=S. And lineal time, T the sum of all the finite life-death cycles of all beings T=∑t.

Since space & time do exist if they are not in the background we 'are' vital space and cyclic time. The simple idea behind the structure of the fractal Universe is to consider time=change =motion and Topologic, formal space=extension the 2 elements of which all beings are made.

WE ARE space and time, merely of a different kind to that of Newton: Organic scalar spaces, and cyclical, discontinuous times who 'live'… worldcycles (no longer worldlines as we have a 2nd arrow of information) of existence (as all species follow the common laws of space and time). As cyclical time that explains the informative repetitive patterns or Laws Nature and its multiple space-time clocks. Why a Universe made of space-time beings is essential to a philosophy of mathematics is obvious. Because the main experimental science concerned with space is mathematics and the main science of causal time is logic, if we are made of fractal space & cyclic time, both mathematics & logic become experimental sciences, reflecting the properties of those 2 primary substances, as mirror-languages of maximal synoptic information and minimal size ($S×ð=C$), whose underlying laws emerge in all other larger scales of the fractal Universe of bigger size and less information, proving also why they apply to all of them

Cyclic time: ð - the causal repetitive laws of 'stiences'
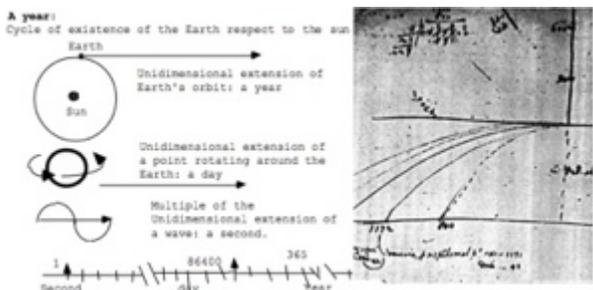
A Universe of ∞ time clocks of different size and speed differs from its human description with a single mechanical clock-time to which all time clocks of the universe are

equalized, elongated into a lineal 'second-minute-hour-day-year' system of equalized time clocks (of light waves, mechanical clocks, earth's astronomical clocks). As Galilean physics, born of ballistics, simplified the nature of cycles of time-space into lineal durations, to measure best the locomotions of cannonballs: Time is cyclical, all clocks of time and laws of science are based in the cyclical patterns of nature. But physicists developed ballistics and denied the obvious truth that we can know the future because it will repeat the causality of the past, and we can change it by changing that causality, in History by repressing the lethal memes of the tree of metal and enhance the welfare memes that make us survive. Of course, lineal and cyclical time render the same equations as one is the inverse of the other, measured by frequency, $T=1/f$, but the philosophical implications of cyclical time, are ginormous and the in-form-ation provided by those cycles, erased by lineal time, a handicap for humans to truly understand the cycles of history and economics, the 'deep time' scales of the fifth dimension, and the whole workings of super organisms and its physiological structures.

A key fact that of a time cycle is to break reality (1st knot theorem) in an outer and inner region, creating a repetitive motion that becomes an isolating membrane that encloses a vital space, the 'substance of which we are all made'.

A second key element is to be made of 3 'relative pi-diameters', which therefore determine '3 ages of time'.

Sp: Past-Space   ST: Present-Wave   Tf: Future-Vortex

Local Past=Entropy, Present=Iteration and Future=Information in zero-sum worldcycles.

'The separation between past, present and future is an illusion' . Einstein

Of all the consequences of cyclical time, the most important is the existence of infinite local time clocks of which we are all made, which therefore imply the existence of infinite local past, present and future states.

Past then means a system with less 'form', less information, which slowly acquires a dimension of height-form, as it completes its cycle to return back in the moment of death to an age of no information. This 'worldcycle' of existence, which creates and erases information becomes then the equation of 'trinity', the 3 local ages of life, which each of us follows as a time-space superorganism:

Entropy-youth (past) <Energy-mature reproduction (relative present)> 3rd age of In-Form-ation (relative future)

In physics is equivalent to the dual equation of Einstein: $E \Leftrightarrow Mc^2$, which reverses when E, which should be properly considered 'Entropy', as it is a disordered state, collapses through gravitation into Mass, a cyclical vortex of space-time; while its intermediate state is c^2, radiation; the relative present:

Whereas the past is the beginning of a pi cycle, starting as a line of entropy with no form that curves and raises in height in its second state of present, and returns back to its origin in its future 3rd age of information, completing a 0-sum of life and death. Thus instead of a single ∞ lineal absolute time there are ∞ living cycles of time happening in zillions of entities.

So the fundamental unit of reality in a given scale, is the timespace cycle, as 'time' in a sequence of 3 ages, which close the cycle into a zero sum; or we can see it sequentially in space as a 'fractal point', that is a non-Euclidean point with 3 parts, the elements of its angular momentum, which will become the new unit of both geometry and mathematical physics.

In the graph, we can see the 3 dimensional motions of timespace, the relative past associated to an explosive, expansive topology the wave-body present iterative hyperbolic topology (a geometry with motion) and the implosive, elliptic geometry of a black hole, or future vortex of time-space.

Vital, ternary, Organic Topology

This said the devil is in the details. So what does it mean to be made of motions with form, time and space? In mathematical terms, it means to be made of topological dimensions, which are holographic bi-dimensional space with motion in time. And as it happens *topology has only 3 varieties of bidimensional spacetime and it is constructed of parts – points – that become wholes – networks. So the immediate translation of generational space-time into modern mathematical systems do convert as we observed in the abstract, all systems into mathematical beings.*

This is the field in which 5D innovates, 'enlightening' classic topology to 'understand the ternary organic, structure' of all systems of nature: As the 5 Dimotions are dimensions of space with time motion, its science is topology that allows a system to deform= change its inner form. Yet a 4D Universe has only 3 'topological varieties' that restricts ensembles to only 3 topologies, each one best suited to perform the 3 organic vital functions of any physic or biologic system –gauging information (1D) to move the system (2D) to an energy field in which reproduce (3D):

The purpose of vital topology is to study the 5 Dimotions (dimensional motions) of the Universe… As such it will be the final stage of evolution of geometry as an experimental science, merging elements of all disciplines.

All dimensions of space have motion in time. Mathematics realized it, as the still Geometry of the Greeks evolved into a vaster, generalized concept, a topological› variety, where a topology as opposed to a geometry has internal motions-changes. As the only case in which the inner dimensions of a being don't seem to change is external locomotion most 5D motions need 'geometries' with inner motion, which are topologic varieties of which there are only 3:

In the graph, the diffeomorphic Principle of Einstein's 4D analysis acquires an organic nature, when we see the Universe as the sum of ∞ Complementary ternary, topologic systems whose dimensions have organic functions: Systems feed on their relative dimension of energy-length, perceive in their relative dimension of height and reproduce in their relative combined dimension of width, which are assembled into each specific species, *to best satisfy the systems' in taking of motion, energy and information.*

I.e: An animal has its informative height in the high perceptive light dimension, but a plant, which uses light as energy has its up and down dimensions inverted respect to the man and its chemical brain buried on the Earth. So both have opposite energy-time coordinates, with an 'antero-posterior', lineal' 'outward' energy oriented structure due to the oriented arrow of light. But in a 3D world with no preferred orientation, a sea or vacuum, cyclic forms that maximize information dominate from plankton to galaxies that have a cyclic, informative, inward structure, as the stars' body absorbs energy from intergalactic space, reproduces matter with it and feeds the internal informative knot of gravitation, with a higher height dimension the black hole.

So the Dimotions of reality are the 3 bidimensional topological varieties that act as vital organs in cylindrical long limbs/fields, Hyperbolic wide bodies and spherical tall heads, each one dominant in a lineal classic dimension, lineal motion, informative height and reproductive width, which DO have organic vital properties too:

Spherical particle-heads, perceiving information from the advantage point of **height**.

Lineal long, cylindrical legs and fields of locomotion as the line is the shorter distance between two points.

Wide, hyperbolic body waves, storing the energy reproduce by the system.

As such single dimensions perform those organic functions in light waves that huminds perceive as space. So light is also an organic system of 3 dimotions: c-speed length, electric informative height & a wide magnetic field that supports them.

Moreover beyond its classic analysis of forms and functions, what Vital topology does it to serve the basis for its temporal-numerical version that is existential algebra, as points become the spatial version of temporal numbers: *So we develop a formalism of the 5 Dimotions, as operand, «,<, =,>,»*, for entropy, locomotion, reproduction, information and social evolution, which will develop into flows of 'stœps' that change sequentially a form through its events in time, where the vital topology of each Dimotion is 'integrated' within those symbols. In this manner vital topology becomes 'Existential algebra' –the analysis of flows of dimotions=actions of T.œs in its worldcycles of existence. Those sequences can then be studied as templates of all T.œs in all scales, which will follow them to complete its survival cycles. And so existential algebra has implicit vital topology. So we define in existential algebra with simple T, S and 5 «,<,≈,>,» the main events of space-time of the Universe:

1D: T>S: angular cyclical motions of information (Ab. §ð): the minimal 'geometry' of reality, a spherical particle/head or fractal point, the geometry that stores maximal form in minimal space, hence suited for 'organic functions' of gauging, storing and perceiving information (particles, heads).

2D: S<T: Lineal Locomotions*, (Ab.$t) which will move through its* lineal limbs/fields the system, as the line is the shortest distance between two points… towards a…

3D: S≈T: Fields of vital Energy (Ab. ∑≈∏): with its hyperbolic body-waves that iterate the forms of both the spherical particle/heads and lineal limbs/fields; as the hyperbolic topology combines the other two, so it can generate them, in the same manner Energy adds as the third conserved space-time quantity the lineal and cyclical momentum of 1 and 2D. To which we must add the 2 'scalar' Dimotions of:

5D: entropy («, ∂S) whereas motion is dual internal dissolving the information of the being and external, scattering its parts, hence we use an « ¬Æ symbol; so the system explodes into its Δ-1 parts: Δ«Δ-1 (death). **4D: organic evolution (»,∫T)** of parts into still locked simultaneous 'linguistic seeds or mind forms'Δ-1»Δ

So the abstract 3 conserved substances of reality become organic bidimensional topologies - flat motion in space, cyclical time membranes and the vital 3D energy within them. We then observe its ∞ variety of combinations as topologic ternary species, whereas the 3 perpendicular 'lineal' dimensions are a simplification of those organic functions: the height dimension enhances the 'perception of information' by O-heads/particles place above in the point of maximal projective geometry; the dimension of 'length' maximizes locomotion; physicists' only time motion, and the width dimension maximizes reproduction and storage of energy.

The 3 only topologies of physical systems: conservation laws.
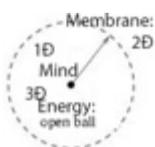
The 3 parts of any fractal point of cyclical time, of angular momentum, in the Universe become then in the simplest physical systems, the 3 conserved parts of the minimal organic Unit of reality, a 'Planckton' of angular momentum. All physical systems then can be 'reduced' to fractal ensembles of 3 'conserved quantities', angular momentum - the membrane of the system, which becomes a membrane, fractal sum of 'cellular cycles' or the skin of the system in human beings. Vital energy, the enclosed cyclical forms and motions within the space whose boundary conditions are given by the membrane, and lineal momentum, the motions with a 'finality' we perceive guided by a 'relatively still mind-point-singularity' that focuses the energy and information transferred through the angular momentum membrane.

It is also the smallest clock of our world, as its minimal unit of cyclical information, or angular momentum, used as the unit of the *3 human physical parameters* of **spatial size, cyclical time** *frequency and* **'scale'** *(Active magnitude):*

h= mass (Δ) x area (S) x frequency (ð).

So h, Planckton, is the minimal fractal organism which becomes the 'cellular unit' of all other species of light space-time, as Plankton is the minimal unit of the biologic Universe, also a cell with a similar ternary structure – a DNA nucleus that process information, a protein membrane that isolates a vital space-time, the cytoplasm.

Thus Non-Euclidean points have breath, its lines are therefore waves able to communicate the external form and internal energy or fractal networks that branch to connect multiple points, and its planes intersection of three of such waves or networks that form topological organisms... It is then obvious that the next step of Non-Euclidean geometry is to merge those concepts with the physical analysis of the smallest physical systems, to understand its vital topologies. To that aim we have to introduce *the second fundamental equation of 5D metric that formalizes the Paradox of relativity. And so it acts in the physical model as the Postulate of relativity, common to 3D Galilean and 4D Einstein's simplex models, which correspond to 5D in a single plane of 'light space-time'…*

So we have transformed the 5 Dimensions of space-time in 5 vital dimotions, broken into infinite vital space-time beings, and now we have the 5 elements which reality uses in different perspectives to construct all realities. Nothing else is needed. And it will easily follow that in each stience, including mathematics, 3±¡ elements (depending on the perception in a single plane or in several ones) will be concerned with the analysis of a system in Simultaneous, entangled, still space as a superorganism constructed with those 5 Dimotions, which in sequential motion time will trace a worldcycle also composed of those 5 dimotions. As the universe simply put it is a reproductive fractal of 5 Dimotions of spacetime…

As motion with form constantly reproduces by the mere fact of moving. So the fractal reproductive nature of all what exists is immediate, as all what exists moves form, reproduces form.

5D METRICS AND ITS FUNCTION OF EXISTENCE: THE GENERATOR EQUATIONS OF ALL STIENCES.

The **Rashomon effect** occurs when the same event is given contradictory interpretations by different individuals involved. The **effect** is named after Akira Kurosawa's 1950 film **Rashomon**, in which a murder is described in four mutually contradictory ways by its four witnesses.

The judge and the 4 witnesses represent 5povs. to obtain a partial truths as truth only exists in the being or event in itself that holds all the information. So we need a pentalogic of 5 Dimotions for reality to emerge and 'persist' through synchronicity and simultaneity.

In *mathematical science* for a dimension of space-time to exist, it requires a metric equation, which combines space, and time to gives us a co-invariant system that allows travelling through such dimension. How we do travel then through the fifth dimension? A system travels through 3 scales of the fifth dimension by accelerating its evolution in a smaller scale through a placental cycle, emerging as an organism in the larger world, to live 3 ages & dissolve back to its parts in the 0-sum death. And this is the meaning of existence, and its reason d'etre is the SIMPLE Metric equations of 5D, which structures through synchronicity of the different speeds of time cycles, the different scales of reality. So the Δº organism eats every day, and its food programs the faster cycle of reproduction of its cells, as the moon cycle programs the menstrual cycle of women, as the year cycle of rotation of Earth programs the reproductive cycle of seasons and so on.

So an essential part of 5D theory is the analysis of synchronicity, simultaneity, emergence and the in-depth analysis – not done in this introductory course, reserved for the more complex papers on 'pentalogic and dodecalogic' where we follow in more detail the construction of simultaneous superorganisms and its ternary worldcycles.. All this of course is studied by huminds, as everything we talk about here, but *without the proper conceptual frame, lacking valid definitions of planes of space-time, time cycles and fractal spaces.*

It is for that reason we do need a new formalism we have called existential algebra with its simple symbols of which the most important are the 5 bidimensional dimotions of space-time, which entangle together through synchronous, simultaneous emergent processes to create the apparent 'solidity' and 'stillness' of reality.

Because the Universe is made only of two polar elements, still minds (SS, ab.§) and Temporal entropy (TT), and its 3 dimotional combinations, St-information, Ts-locomotion and S=T, reproduction, whose interaction can be

resumed in the function of exist¡ence, Max. SxT (s≈t)=C, we can deduce all the principles, laws, events and equations of all stiences from it. So we shall call Existential Algebra to the Gst formalism of Generational Spacetime (ab.¬Æ), and do exactly that: deduce all equations and laws of stiences from 5D metrics.

We shall thus make a 1st foray on existential algebra, showing how the 'development' of 5 Metrics give birth to the function of existence into its 3 'extremal points' or ages , Max. S x T (3rd age), Max. T x S (youth), S=T (maturity), defines the worldcycle of existence of all beings in its two directions, forwards and backwards.

But 5D metrics can be studied in more depth, roughly speaking in 4 sub-*equations, which are the foundations of the 43 great subdivisions of science:*

- The physical equation of relativity, S=T, basis of all physical and mathematical stiences.

-The biological equation or function of existence, Max. S x T (achieved precisely when S=T), the basic equation of all biological drives and evolution/

- And the equation of the mind: 0-mind x ∞ Universe = Constant world that creates mental spaces… which we will consider in the next paragraphs as we have defined space and time more properly.

- Finally hose equation can be further unified, since the metric equation of multiple spacetime scales, SxT=K & the relative equation of dual motion/stillness in a single plane S=T that maximizes SxT=K (5x5>6x4) unify in 1 'existential' equation: Max. ∑SxT=C±¡:Δ±1, whose study is the field of Philosophy of stience and its new formalism, Existential Algebra (ab. ¬æ). *So after studying the 3 classic fields of science will return to those 5 Dimotions, SS, St, sT, ST, TT and study its entanglement and different properties and complementary oppositions, to start building the formal laws of existential algebra, the formalism of Generational space-time. that all stiences notably mathematics and logic mirror.*

Let us then start with the physical analysis of relativity and its correspondence with 5D.

RELATIVITY. THE 5 DIMOTIONS OF EXIST¡ENCE.

Galilean Paradox: S⇔T: **Relativity of space Dimensions=Forms=Motion in time: The 5 Universal Dimotions**

Galileo's time and space Principle of Relativity is the fundamental conceptual thought behind the relationship between time=motion and space=form and how one can be converted into another: All what exists is made of space=form and time=motion. And yet physicists know that we cannot distinguish motion from form. That any being in motion from its point of view seems to be still and all other things moving around it. *This is the principle of Relativity of motion.*

Physicists then without much thought about that fascinating duality, went on to use mathematics to calculate the relative motion of each entity of reality respect to other system, which seems static from both points of view. This is called Galilean relativity, latter refined by Einstein's relativity, and essentially is concerned with the mathematical calculus of what we shall call the 2nd Dimotion of time=change, locomotion. Fine, but we are more interested on the duality of space=form and motion=time and its entangled relationships –the reasons why we do NOT see together motion and form, even if all systems have both.

The conclusion is then rather obvious: one of the two parameters of reality is 'hidden' to perception; we either see motion or form, 'waves or particles' (quantum complementarity), distances and lines or points in motion (as in the night when fast cars in a picture appear as lines). So *physicists calculate only one when in fact we must assess the existence of 2; and since we cannot distinguish them, logically we must equal them. 'Form=motion-function; space=time; S=T'.*

Relativity then becomes a duality, S=T, is at the heart of every law of the Universe. But which one is the real element? Obviously time=motion. Space is a "Maya of the senses" – a slice of time motion. The ultimate substance is motion. Form is what a 'still mind', makes of that motion to 'perceive', information, forms-in-action.

Since we see Earth still and flat but it is round and moving. Galileo's profession was ballistics - the study of cannonballs motion. So he chose ONLY motion and lost the chance to start physics with a complex philosophical understanding of its S=T dual Principle of relativity, which Poincare defined latter clearly when he said that 'we cannot distinguish motion from stillness'. An example is quantum/relativity duality. In detail quantum space has 'dark energy' because it has expansive motion that extends into a plane of space, but when seen at larger scales without detail its entropic motion seems static space - a dual area of scattering length and width. So in the galaxy we see either dark energy motion or expanding space: T=S. A motion of time is equivalent to a dimension of space: Distance and motion cannot be distinguished so they must be taken as two side of the same being, a space=time Đimotion (ab. Dimensional Motion):

S= T; Dimension-Distance = Time-motion = ST Đimotion

Why if the Earth moves in time, we see it as a still form in space? Because Reality is a constant game of infinite motions, but the mind focus in stillness those motions, and measures them at distances. For 'huminds' motion is relative to our systems of measure and perception, which are light-based; hence a fixed c-rod speed/distance. Reason why Einstein's relativity postulates a maximal T:c-speed, measured as *if observer and observable were still to each other (Constant S); which at our scale we 'correct' with Lorentz Transformations*.

*P*hysicists just substituted Earth's still distances for motions. It took 300 years for Einstein to realize the relativity of motion and its measure made essentially time and space, motion and form two sides of the same

coin. Still this realization was not explored philosophically and so it gave birth to a series of ill-understood dualities between 'states of measure and form' (particles, head gauging form, in-form-ation) and 'states of motion' (wave states).

It is then essential to grasp that motion and form co-exist as 2 different states depending on 5D scale and detail: Motions are perceived by minds that stop motion into form, into information, as distances. So if we see slow motion in the night, a car's headlight seems a long distance line 'still' picture. But this means also that the 3 'Euclidean still dimensions' must have motion; they are 'bidimensional ST-holographic, topologic dimotions'. So we have 3 Space + 1 Time + 1 5th dimension of scales = 5 Dimensional motions. None of them is *a Dimension of pure spatial form or a pure time motion but a combination of both. Even if* mentally we tend to reduce motion and focus on forms, all has motion=time, and form =space: this is the meaning of 'spacetime', the messing of both into 5 dimotions, the fundamental element of all realities.

Relativity states 'we cannot distinguish motion=time from position=space'. So all what exists is a composite of both, undistinguishable S=T, 5 'Dimensional motions' (Ab. Dimotions), broken in infinite fractal, vital time space organisms, composed of topological Dimotions: height=information; length=locomotion; width=reproduction; form=social evolution of parts into wholes & entropy=dissolution of a whole into its parts in a lower scale of the fifth *dimension* (term we keep for the whole range of scales of the Universe); whose study is both mathematical, the main science *that studies how those 5 Dimotions entangle in simultaneous* Space, connected to each other topological adjacent parts, which create superorganism and Logic; the main science of time that observes how those pentalogic, entangled superorganisms move and evolve, change in sequential relational time, living a worldcycle of life and death.

Since there is nothing else than time and space, the 2 experimental 'mirror-sciences' of time and space become the most important to extract the 'Disomorphic=laws' of those 5 Dimotions that all systems have in common. Since *while those Dimotions are broken, in vital organisms, separated by cyclical time membranes, they are the same*.


In the graph Galilean relativity was ill understood, as the true question about time-change is why 'the mind *sees space as a still continuum, when in detail is made of* smaller self-similar *quanta*, in motion. The paradox *defines mental spaces as still simplified views of the more complex whole.*

The 3 ¡logic paradoxes of **space** *topology (closed in-form-ative curved-O vs. |-open, free entropic lineal forms),* **time***-motion (stillness vs. motion) and* **Δ-scale, (***continuous whole vs. discrete forms; single scale vs. multiple one)s, are essential to the perception of a simplified 'spatial mind universe' in a single flat still plane vs. the full, more detailed complex picture in time, of a curved, discrete and moving Universe. Those paradoxes resume the 5 elements of reality, Space=form, time=motion, scales and the mind that measures them, within its own entropic limits.*

I. ∞ MIND SPACES.

Minds are mirrors that perceive in its inner 'still simultaneous language', the e-motions of time converted into informations of space, in the eternal dialectic between fractal points with a volume of still linguistic perception, mapping its local Universe and flows of e-motional time with its vital sensations:

Upper graph, human egos submitted to the mind paradox, think languages (words in Abrahamic, creationist religions, numbers in creationist science), known only by man and 'God' a priori, create a posteriori the Universe (Copenhagen interpretation). The opposite is truth: a mind exists in all systems in which time stops to form space. In galaxies happens in relativity equations in black holes, its mind. In thermodynamic physics in the eye of an Eddie. In quantum physics in the center of an atom, or charge. Without linguistic minds that order by reflecting its smaller mind into its local territory reality would not exist. The only way to create fractals is through mirror images.

In all scales of stience minds fix the motions of time into spatial, linguistic forms, mind-mappings that reduce the whole with its synoptic language to fit in a brain, an atom, any particle that acts after gauging information in the Universe.

Thus we define 'Maxwellian's demons' of local order in all scales – physical minds as the infinitesimal points that create order in physical systems with the same Disomorphic laws that all others do in more complex scales. As each mind orders as a linguistic god a territory around itself, its fractal body and entropic world.

So the creation of scales of reality is a simple game, in which a point mind 'reduces reality' to its infinitesimal form and then projects into its local territory of order, which will reflect at scale, the larger whole or world, which the linguistic image reduced and then enlarged back into its territorial form.

The paradoxes of Relativity, discontinuity, parts and wholes, scales are all related to the refductionist natur3e of minds that bias reality.

Mind's reduce dimensions to the relevant ones, *eliminating all dark spaces*: continuity Is the result.

Motion is reproduction of form in a lower scale. Bohm's realism: quantum potentials.
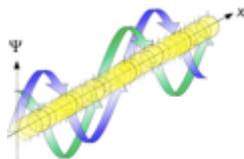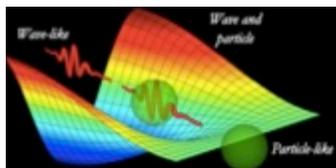
How a system moves; in a crowded universe, where we 'are' vital space-time? the answer, which resolves also Zeno's and quantum complementarity paradoxes, is if *we do not move but reproduce our information, translated into a lower faster wave scale of the fifth dimension; as we reproduce our sound in faster electrons to telephone or nerve impulses into chemical dopamine to jump discontinuous neurons. So motion becomes scalar reproduction of form, and since all is a form of motion, all is reproduction, which is the definition of a mathematical fractal, a feed-back reproductive equation; 5D metrics, which become then the 'function of existence' whose goal is to reproduce the form of all systems – the simpler ones with maximal motion-translation in space, the complex ones with min. motion as a reproduction that emerges between scales. And this gives birth to the worldcycle. Consider the case of quantum physics:*

In graph a particle reproduces in adjacent regions that fade away, and the result is the perception of a wave of motion. In Bohm's realist model this reproduction happens in a lower plane of quantum potentials, where also entanglement happens, which is the Δ-4 scale which is v>c in 5D metrics (Min. S x Max.T=C), hence real.

Motion then is reproduction of form over such potential: the wave erases form into motion, the particle is a still state that   gauges information entangled to other particle, fermion and boson, still to each other – despite the perception of relative motion in our scale – hence the information electrons share has always a c-constant speed. Thus the Lorentz transformation are objectively real for mankind who eliminates the stop state of particles as we do in a movie eliminating the stop frame but if we were observing reality from the perspective of an atom, we would 'stop', entangle in the quantum potential, neutrino scale & so eliminate the spooky effects of 'time dilation' & 'length' contraction, from our perspective (but not of mass increase as it is a scalar effect). This is the 'rational' 5D explanation of both the c-constant of light and entanglement; as electronic beings perceive information in 'stop position to each other' and move in 'wave state'. Motions are perceived by particles that stop motion into form, into information, as distances. So 4D relativity needs to be expanded to the scalar Universe beyond the c-speed light limit of the galaxy.

Within this complex view, the models of Newton, Galileo and Einstein's space-time correspond to the limit of 5D when we simplify all the worldcycles of time, we call life & death to a single mechanical clock, elongated to infinity & perceived in a single scale of space. Let us then deduce from those 2 equations the fundamental equation of reality:

Those 2 poles of reality are the first principles of any scientific inquire, even prior to the languages of time-motion, logic and spatial forms – mathematics, that better mirror its laws. Look around yourself, everything that you see is a form with inner or outer motions. Those are thus the 2 primary elements of reality; which mind languages perceive mostly by reducing the scales of the fifth dimension and its motions to the minimal possible to fit it all in the mind 'equation': O-mind x ∞ Universe of formal motions = Mental world – reduced mirror of the Universe.

The function of existence: Reproduction of form.

Physicists made the Galileo's paradox, the cornerstone of their theory of measure, but *they* failed to study the deep implications it has for every aspect of the structure of the Universe, from the duality between spatial mental, linguistic forms and physical motions; to the balances achieved by the similarity of both space and time, which becomes the fundamental 'equation of present' S=T, and hence with the metric equation of scales,

$ x ð = K, the two essential equations to formalize single planes S=T, and multiple scales of spacetime. Yet as S=T maximizes SxT=K (5x5>6x4). We unify both in a single equation: **Max. S x T = C**, which defines for each fractal vital space-time organism its Function of existence, as all species will try to maximize its motion-entropy-time for its field-limbs, its information-spatial states for its particle-heads, whose product will give us its vital reproductive energy. But as all systems move and motion is reproduction of form we can ad a final factor, ∑, reproduction of parts, which to maximize that function become joined into larger wholes which are stronger than individuals; creating new planes of existence. C= Max. ∑ SxT (s=t); whereas C act as the entropic limits in ∑-scales, T-ime & S-pace, boundaries beyond which the still mind doesn't' perceive or control.

It is also a survival biologic equation, because it implies to provide lineal motion to 'fields-limbs', absorb energy to reproduce our bodies-waves, and information to guide our motions with particle-heads. So reality is a 'struggle' for existence as systems reproduce its Ts-fields-limbs of motion, S=T body-waves of energy and St-particles-heads of information. But as all T.œs are fractal, broken, its growth has a limit on the fight with other systems, which try to move and reproduce. In terms of pure T-motion and pure S-form, we consider then the whole of maximal time=motion= entropy or TT and Max. space=form=stillness or SS the 2 limiting Dimotions for any 3 ensemble Ts<ST>St-system.

We define the Universe as a fractal that reproduces and ensembles Space-time Dimotions into supœrganism through ∞ relative scales of spatial size and time-motion; whose Fractal generator (mathematics) Metric (Physical jargon), 'function of survival (Biology) or Function of existence (logic Jargon) writes **C=Max.∑SxT (s=t)**

We shall prove that all realities are always a reproductive radiation of a function of existence along 5D scales.

We are made of the 5 Dimotions of spacetime of the Universe. We are ensembles of those 5 Dimotions, which seen in simultaneous space give origin to the vital topological organisms of the Universe; whose study therefore is mathematical, the science of space; and observed in sequential relational time, live a worldcycle of life and death; and since there is nothing else than time and space, those 2 fundamental experimental primary 'mirror-sciences' of time and space become the most important to know what all systems have in common, its 'Disomorphic=laws' extracted form the nature of those 5 Dimotions.

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Nt.1. According to the Correspondence Principles as physics named 4 Dimensions we use the name 5th dimension for the whole range of scales, but in proper terminology we should call each Dimensions, a 'Dimotion' and consider the 5th scalar dimension the sum of all the 4th dimotions of social evolution & all the 5th dimotions of entropic devolution

THE WORLDCYCLE – THE FUNCTION OF EXISTENCE.

The worldcycle of existence: We then put together 5D scales, vital topologic space & cyclic time to describe simultaneous superorganism tracing a worldcycle in time, the fundamental event of reality.

All what exists is a supœrganism of vital space tracing a 0-sum worldcycle of time through 3 scales of 5th dimension: Born as a seed of fast time cycles in a lower 5D scale (Δ-1:Max. T x Min. S), emerging as an organism in Δo, living 3 ages of increasing information, as its time clocks slow down in its Δ+1 world to die in a time quanta back to Δ-1.

So, absolute spacetime is the sum of ∞ Timespace beings, observed in space as simultaneous super organisms, in time, as **worldcycles** of existence between birth and extinction; as all systems are born in a seminal seed, of

faster time clocks, in a lower scale of the fifth dimension, growing socially (4th dimotion) till emerging in the organic scale, where they will live 3 ages dominated by one of its 3 topologic organs and its functions=dimotions, a young age of maximal locomotion, dominated by its limbs/fields, a mature age of reproduction dominated by the body-wave and a third age of information dominated by the informative dimotions, which finally exhausts all energy and as time-space never stops, it reverses its dimotion from information to entropy, exploding in the moment of death.

So we marry the 3 vital functions=motions of time and the 3 dimensions of space, either in 1 or 2D (height=spherical information, length=planar locomotion, width=hyperbolic reproduction) which merge in all Time-space Beings; and dominate one of the 3 ages of its life-death worldcycles, the past, young age of limbic entropic motions, the mature reproductive age dominated by the hyperbolic body/wave and the 3rd age dominated by the informative particle-head, when the illusion of time ends with an entropic big-bang death that dissolves the being into its 'scalar cellular, atomic parts', which lead us to the realization that time cycles NOT only return to its origin in a single spacetime continuum but they move up and down the scales of the fifth dimension:

The 3 ages of existence of space-time organisms. Its 2 worldcycles and Metric equations.

The *Function of Existence* of any space-time organism can be developed as a feedback equation, S<=>T, in 3 sequential phases/ages/horizons, between 3 'standing points' (changes of phase): Max. T=motion x Min.S: form =moving youth; Max. SxT(s=t): reproductive maturity and Max. S x Min. T=informative, old age, as the equations of the 3 ages of life, between the seed of pure linguistic form born in the lower plane: S¡-1 and its T¡-1 entropic death, back to Δ¡«Δ¡-1:
Δ-1»Δº: The cycle or organism starts its existence as a seed of pure form (4D) when its space-time field is created.
sT: It is the first horizon or 'energy, youth age' of the cycle, in which energy dominates the system and so we write this phase as, max. $t x min. T.
Max. SxT: s=t. It is the present balanced age of the cycle or classic age of 'life', when energy and information are in a constant proportion. It is the most efficient age, when the cycle reproduces.

Max. T x min. S: 3rd age of the cycle when information has exhausted the space-time field that warps into itself.
Δº«Δ- 1: 0S x T: It is the end or death of the cycle that reverses its form and becomes energy again.

Existence is an ∞ sum of space/time fields, fluctuating between birth and extinction through those 3 phases or ages. The 3 ages of Timespace supœrganisms happen in all systems, including mental languages:

In State Physics they are, $t-gas, the moving state, S=T liquid, the balanced state and §ð-solid the informative state; into Cosmology, where it describes the Universe as a space-time system that fluctuates between both limits, a form of pure time, the singularity (*min.$t x max.ð§)* and a form of pure space, the big- bang (*max.$t x min. ð§). In* Biology, they are the 3 ages of living beings AND the 3 horizons of evolution of species. In social organisms, through the subconscious collective mind of civilizations which in art styles mimic in a longer 800 year cycle of life and death of civilizations (according to 5D metrics a human social superorganism is larger in space – a nation, culture, religion – and so it lives longer in time). So we find the 3 ages of life *emerging in the 3 ages of cultures and* its 3 artistic styles: Min.S x Max. T (infantile epic, lineal art, as in treccento, Greek kuroi; S=T; balanced beauty, when form and size are in balance, the classic mature age; and Max. S x Min. T: baroque, 3rd age of a civilization, whose subconscious mind is the art of its 'neuronal artists', the age of maximal form and angst for a no future, which *is the age of war and death of cultures*).

Finally we talk of 3 Δ±1 scales of worldcycles as the being live in a placenta, then emerges as organism in a world:

þ: 0-1: its palingenetic o-1 social evolution in the accelerated time sphere of existence, till becoming 1 (0-1 bounded unit circle in ¡logic mathematics; quantum probability sphere of particles in physical systems; palingenetic fetal age in biologic systems; 0-9 memetic learning childhood in social systems). It is a highly ordered worldcycle as a placental mother-energy world nurtures a memorial cyclical spacetime that erased errors of previous generations.

- c: The outer 1-∞ world, in which it will deploy its 2nd world cycle of existence in an environment which is open, entropic (1-∞ hyperbolic unbounded Cartesian plane in ¡logic mathematics; thermodynamic entropic statistical molecular populations in physics; Darwinian struggle between populations in biology; idol-ogic dog-eat-dog capitalist, nationalist competitive eco(nomic)systems in the super organisms of history. In this 1-∞ existence the world cycle is not ensured to continue, as the entropy of the world system can cut it off.

ω: The existential life cycle, though is part of a larger world of hierarchical social scales (§ D¡), where it performs 5 survival actions through Δ±4 Planes self-centered in its mind, beyond which it cannot longer perceive, to become if successful a new superorganism of the infinite planes of God, the game of existence.

Let us now consider with a physical and biological example, to which extent the laws of 5D enlighten our understanding of reality. In the graph, Matter States are physical time ages, from left pure solid, crystal, §top state, to an even more solid Δ+1 boson condensate, etc. We see that systems either move a step at a time within a plane of existence (gas, liquid, solid) or they can jump « two states at once, (as in the case sublimation) within that plane, or most often between two planes, as in « scattering & entropic death), to become a different Dimotional state. We can then see how the fundamental elements of 5D time appear on the graph: the worldcycle is local and complete. There are two inverse arrows from an entropic past (plasma), in a lower plane (ion particles) to the 3 ages of the matter states with increasing form (gas to solid), to end in a higher plane of existence as a boson-Einstein condensate.

Worldlines and classic relativity

How all this relates to 4D classic relativity is simple. In first place because we start from duality, form and motion, O x | in geometric terms, we do have No longer worldliness but worldcycles. For a physicist which only measures lineal time motions, if you ask him what is the function of exist¡ence he will just state: the sum of motions that you make through your entire life and draw a 'cone of light' explaining you that as long as you go below c-speed your worldline will be space-like etc. All this has nothing to do of course with your life experienced through the 5 complex dimotions of reality, but the physicist will not have the slightest doubt, as he has reduced perception to that single motion that he is talking serious metaphysics of being and will go further with its errors of lineal time (as all dimotions of time are fractal, local to the being's exist¡ence). It will then 'obviously' enter into paradoxes – the twin paradox, the Lorentz transformations, etc. which we streamline in our post on physics – matter=form and motion; which is the only realm to study with worldlines.

According to the correspondence principle, we compare 5D with 4D *strictly in the real of physics where it applies*:

We unify the 3 fundamental principles of vital spacetime, 5D metrics and Relativity, which become the equivalent in 5D to Einstein's 3 principles in 4D metrics - the constancy of light speed, his rejection of absolute space-time and Relativity, which 5D also share but make explicit with an S=T equation. We compare then both formalisms with the principle of correspondence to show that 4D is just the limit of 5D for a single light space-time plane:

- The postulate of relativity, which states that we cannot distinguish motion=time from dimension=position =form =space, which in 5D we reduce to a simple formula, S≈T; we shall call the Paradox of Galileo (e pur si muove, e pur no muove) as he couldn't explain why the Earth moves but we perceive it in mental space as a still dimension.

- Denial of Newton's Absolute space-time; as he said 'Leibniz was right, but if so we have to start physics from its foundations' and 'I seem to be the only physicist who believe there are infinite time speeds in the Universe', which we made explicit accepting Leibniz's relational concept of space-time, the seed of Generational space-time, resumed in a simple sentence: 'we are the scales of space we occupy and the cycles of time our existence lasts'.

- The constancy of light speed, c, which in a 4D single background plane of light space-time corresponding to the galaxy holds naturally, as *light in a relational->Generational theory is the space-time of the galaxy*, which generates through its 'accelerated' vortices of space-time in a crescendo of ever more dense scales, photons, electrons, quarks, atoms, molecules, matter states, cosmic bodies and black holes. Yet when we add a 5D sum of all those scales, c-speed becomes the limit of reducing all potential scales of the Universe to light spacetime and the particles it generates

And so we define a second metric equation for all scales: $ (Space size) x ð (cyclical time frequency) = Constant; meaning smaller scales of space hold faster rotating particles, (black holes beyond the event horizon, where there is no longer 'light') or when moving in lineal fashion can go faster than light speed in scales below light or outside galaxies, (Bohm's quantum potential of action at distance cause of entanglement, neutrinos outside galaxies.)

Yet as S=T maximizes SxT=K (5x5>6x4). We unify both in a single equation: **Max. S x T = C**, *the 5D metric equation, local to each Time§pace organism struggling to survive by maximizing. its S in-form-ation & T-motions, or in terms of organs, its limbs/fields of speed and heads/particles of information, and its balanced combination or body-waves of vital energy, where* entropy=T-motion and S=form, become one, S=T.

5D metrics generational space-time and the Principle of Relativity defines for each fractal vital space-time organism its Function of existence, as all species will try to maximize its motion-entropy-time for its field-limbs, its information-spatial states for its particle-heads, whose product will give us its vital reproductive energy.

So the equation has a biologic meaning, because we are made of 3 topologies 'fields-limbs' of lineal motion (Ts, where T-motion dominates s-form); balanced hyperbolic bodies-waves of S=T energy we absorb to reproduce, and spherical particles/heads of St- information, form with a bit of action-motion, which we need to linguistically guide our motions; *sandwiched in a larger Δ+1 world of max. T-entropy; coded by the Δ-1 seeds and minds of pure Spatial form. Which give us the 5 Dimotions of reality that are also structural organic parts of our superorganism & phases/ages of our existence: Sι-1 (seed-mind) »Ts-fields/limbs of motion>S=T-body waves>St-* particle-heads«Δ-1 T-death; where double «» are symbols for an entropic, 'expansive dimotion' and an informative still one. So the essence of survival is to increase our St= mental information and territory of order; in which to S=T reproduce and sT move avoiding the entropic limits of scattering, disordered motion, T-1:death and total St-illness in space the two limiting Dimotions. So we keep our 'energy=reproductive body-wave, s=t in balance moving, sT our field/limbs and perceiving, St, with particle-heads.

3 scales in time and space of superorganisms: **actions, worldcycles and absolute space-time parameters.**

The Δ±ι scalar STructure of all beings is essential to predict the future of its scientific species, with a remodeled ABCDE of the scientific method that studies A)ccurate Data, B)iologic causes C)yclical patterns and E)ntropic extinctive conclusions for all systems in 3 relative scales of length of space and time duration (to which we add instead of E, D)emocratic, humanist solutions for questions of social sciences.

All sciences predict the future of its species according to its repetitive causal cycles. Or else they are NOT a science. Astrology became a science when Kepler learned its orbital cycles. Bio-economics became a science when we described machines as metal organisms whose industrial r=evolution followed the human 72 years generations of the dominant industrial nations that evolved them in 4 cycles: its body-age (British, steam cycle), heart age (German, electro-chemical engine cycle), its mind age (US, TV-eye, chip-head, mobile-ear cycle) to conclude with the ensemble of robots that as virus do, when all its parts are put together will become 'alive'. The predictability of time-cycles can be done at 3 levels:

S: Continuous, spatial mathematical simple cycles, using derivatives, proper of calculus; which is the shortest time span, as instantaneous derivatives cannot measure a 'peak' change of age/phase.

T: Discontinuous, cyclical patterns of sequential repetitive often survival actions (feeding, reproduction, death, taking place at intervals. As those actions are discontinuous, leaving long spans in-between, their patterns forecast longer time sequences. Such ¡logic structures are based in time patterns, which as any mechanical, circadian or orbital day-year clock shows are cyclical, repetitive. But here human scientists are at loss, because Galileo studied ballistics, entropic explosions that destroy the information of reality stored in those cycles of time clocks, its patterns and frequencies, changing human cyclical understanding of bio-logic time for lineal, abstract time that seems not to repeat those patterns so mankind lost its capacity to predict many spacetime events, as lineal time misses *information stored in the frequency and form of cyclical clocks, even if equations are similar: V=s/t for lineal time and V=S(l) x f(t) for cyclic patterns*.

Δ: Scalar, Deep Time patterns of topologic and eusocial evolution of parts into wholes – of quantum 0-1 time probabilities vs. 1-∞ thermodynamic populations in physics, of individuals vs. species in biology, of states of matter vs. geologic cycles in Earth, first noticed by J. Hutton, founder of geology who coined the word super organism for Gaia and deep time for its slower time cycles by virtue of its 5D metrics, $ x ð =C which implies that from the perspective of a smaller scale the life of its whole is much longer.

Deep time leads to a 3rd level of long-time prediction: evolutionary patterns of earth's life species, including social organisms of history (nations, civilizations) and its death=war cycles related to the eco(nomic)system, where the evolutionary and re=productive cycles of stocks of machine consumption become the sales=profits=valuation of its company-mothers that switch after overproduction crisis to weapons that consume humans, as we have done with remarkable precision for 30 years in our 'inconvenient' papers on social sciences. But as human only recognize the 1st type of predictability - calculus of instantaneous derivatives, that need a 'continuous analysis' - and have simplified cyclical time into lineal time, ignoring the scalar time of parts and wholes with its 5D metric, their capacity to forecast the future is far more reduced than a 'stientist' who understands the 3 scales *determined by the bio-topo-¡logic properties of 'scales', 'space' and 'time', the 3* Δst structural elements of all systems of the Universe.
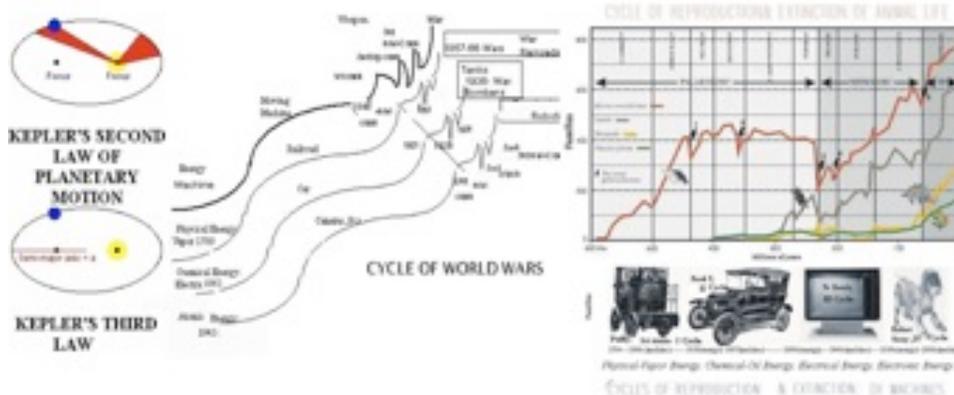
¬Æ TRILOGIC AND PENTALOGIC ENTANGLEMENT OF SUPŒRGANISMS.

We live in a 3±¡ pentagonal world. 5 is the number, and 10, the double gender symmetry of 5 in scales. Those numerical patterns come constantly into being *because their origin is the most essentiaLof all realities – the 5 Dimotions of existįence* . In theory of numbers we shall see immediately they divide in gender female even numbers and male odd numbers, by mirror symmetry as the 2 hands which by mirror symmetry created the decimal scale.

5 Dimotions, 3 in a single plane of space-=time, suffice to iterate reality. Its first multiplication divide them in 1,3,5,7,9 and 2,4,6,8. And we shall return to that. When we forget the seeding and death, entropy and social evolution, in a single plane, which is to say a being *without its external world,* 3 adjacent topologies, |-limbs/fields, Ø-body waves and O-particle heads suffice.

'The Universe is a fractal supœrganism of 5 Dįmotions of Space-time entangled in pentalogic supœrganisms of Dust of time-space (¬Δ@st) tracing 3 dodecalogic cycles of existence, the þlacental, life & worldcycle.' *I*§

The entangled Universe generates its space through synchronous connections between 5 Dimotions of reality in its 3 relative ranges, Actions, topological organisms and its 5 elements: fractal space, scales, cyclical time, minds that perceive with synoptic languages the system as a whole and project its territorial order and survival will through its actions, and the entropic limits (¬) the infinite universe imposes to that will. So any aspect of reality must account for 5 elements to express such entanglement at the 3 relative scales of existence. It is the fractal principle of 5D pentalogic that structures Timespace supœrganisms (T. œ)

Scalar, topologic space and cyclical time organisms, made to the image and likeness of the fractal Universe, require a complete change of paradigm regarding how reality is created, away from the chaotic, entropic, or religious self-centered (Anthropic) theories sponsored by humans, which are monologic, blind to the entanglement and constant communication of information between fractal points, either in logic=time or mathematical=space languages, in a sentient, apperceptive Universe, where information when locked as 'entangled space' by those dynamic networks of communication creates a mind-mapping of the outer world.

Monologic man is closer to Leibniz's Monad's - self-perceptive, selfish black holes of information, whose communication he could not properly resolve so he simplified them into an ego-paradox. We deal with monologic man in the I logic paper on our blind ænthropic 'culture that passes as big science' and its grand paralogic theories of reality. While on the posts on pentalogic we define the 5 elements of reality - space, time, scales, entropy and minds, as entangled systems definitions can only be made from the combined perspective of all other systems of reality. To represent this fact – entanglement - we use the pentalogic symbol where each point of the pentagram is connected to all other points, and so the fractal point, in this case each of those 5 elements cannot be understood without the connections to the others.

The key concept behind pentalogic and entanglement is rather simple: to survive in the Universe, to have focus, form, a system must be 'anchored' through entanglement in its 'plane of existence' with 'trinity' parts of vital topology, connected through 3 inner physiological networks, but also it must co-exist in a larger Δ±1 nested world separated by a topologic membrain, which allows it to absorb and emit entropic motions and information, on that outer world.

The understanding of entanglement was best among humans in Buddhism, where each soul is considered a knot of communication with all other systems, and minimal in America where the self is considered always the only central point of view of existence, in eternal struggle with all other human beings – yet as entanglement is necessary to survive, the American, modern man is entangled NOT with humans but increasingly with the machines of the Metal-earth, the Financial-media/military-industrial ecosystem for which 'it' enslaves as an object with a price.

S@. Geometric entanglement: fractal points and scalar numbers.

When we go through different stience scales to explain each 'entangled connection between the 5 elements of reality', we shall see that already in the first scale of mathematical systems, the fractal point requires 2 different postulates to define it: The first postulate which is concerned with its inner parts (a fractal point has breath), and the 5th which is concerned with its outer parts (a fractal point is connected with infinite potential parallels to the universe). The 2 inner and outer elements that meet in the 'membrain' thus define the membrain-mind as the essential entangled element between both worlds. Entanglement thus defines the being from an outer perspective as much as its inner nature.

In graph, the fractal sentient point, new unit of mathematics and vital space. Einstein's interpretation of the 5th non-Euclidean postulate was the view of a fractal point of the gravitational scale from our smaller electromagnetic world, which shrinks its inner volume, bending its parallels, hence its curved geometry. But that view breaks the conceptual definition of parallels are straight lines and is absurd, as the point remains 'Euclidean with no breath', hence only fits one line with no breath. Thus, particle points must be defined as 'FRACTAL points', like those we see through telescopes or microscopes, which grow we approach our distance both in scale and space becoming enlarged worlds with a complex internal structure and external entanglement following a Non-E 5th Postulate: A point external to a line is crossed by ∞ parallel forces.
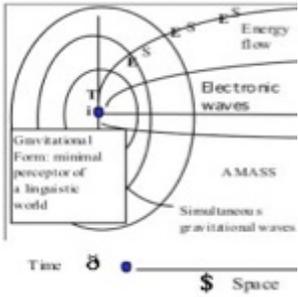
Such organic points are like the stars in the sky. If we look at them with the naked eye they are points without breadth, but when we come closer to them, they grow and in its membrain we find its maximal entanglement and communication – the hottest region of the star, the Earth's membrain with its life superorganisms & 3 ages Gaia< History>Metalearth, where a parallel network of 'still entangled' parts forms a whole which makes the 'membrain' a hard interconnected system porous to the energy and information of the world focused in its singularity center.

We can then assess the fundamental quality of vital mathematics as a key language of the Universe, which is to be the best language of space, hence the one that describes the laws of entanglement, even if man doesn't understand it beyond its egocy of magic creationism, as the language of mirror symmetries and dimotion flows of ¬Δ@st in all entangled systems.

Where the fundamental entangled element is the fractal point, and its social unit the polytope in 1,2,3,4 Dimotions; but not 5Dpolytopes since the fifth dimotion, entropy is the disentanglement of all the others. So polytopes rise positively in complexity as entanglements of indistinguishable regular points (or else one point will be different by position and connection to the other points). They reach its maximal complexity on the gender duality-mirror symmetry of the 2nd 10^2 scale - (female Icosahedron & male dodecahedron) & 3rd polytopes' 10^3scale (Male dodecaplex & Female tetraplex).

ΔT: Human vital Entanglement in ages & Scales.

Each of us is an entangled fractal system, interconnected or else it won't absorb energy and information and survive. And vice versa, when less entangled a system is – 3rd age of the being, and becomes cut-off from reality its 'truth' its existience dwindles and the system fades away and ultimately perishes.
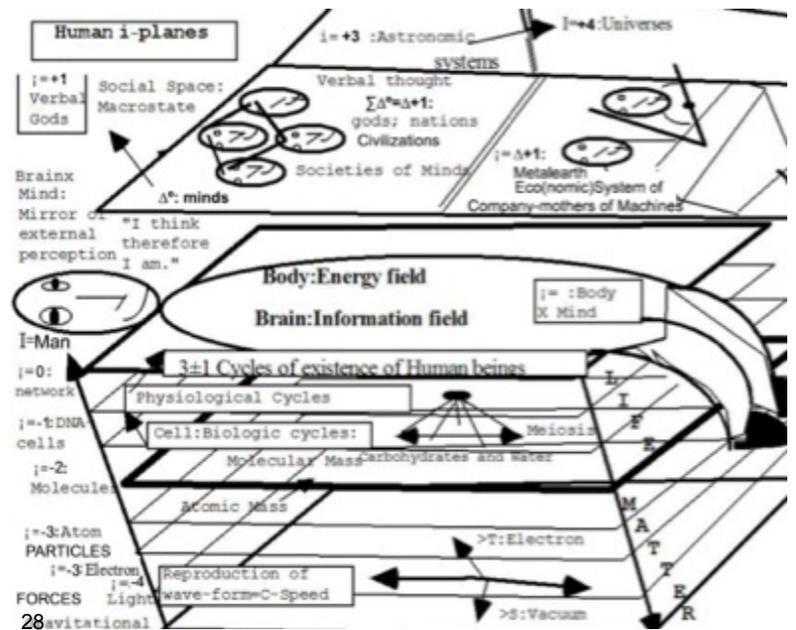
At which scale of reality then we must define entanglement. The answer is at the 3 scales, of the whole Universe as an absolute fractal organism of time-space (at the level of its 5 elements, S, T, ¬, Δ, @), but also at the level we just did of individual superorganisms, where its organs that represent those elements are interconnected to the whole, and finally at the level of its diminutive actions (a,e,I,o,u, acceleration=motion, entropy feeding, information, organic reproduction and Universals evolution, in the mnemonic rule), which we will find amazingly enough, in one of my most orgasmic-mental entanglements with the whole I experienced, were directly connected to the Δ±4 planes of existµence of the being. Reason why we do perceive all those scales:

In the graph, scalar entanglement happens between the humind's organism and its territories of perception that provide the 'bits and bites' needed for humans to perform their 5 Dimotional actions. So we extract entropic motion of the Δ±4 gravitational/galactic field, information of the Δ±3 light/star scale, energetic food from the Δ±2 molecular/Gaia scale; reproduce in the Δ±1 seminal, gender scale and evolve through socially love in the Δº mind field, entangled to other minds in metaphysical experience of bondage through our memes, in nations, religions and civilizations.

Scalar entanglement is the real reason we exist, and perceive entangled to other scales of reality. Our mind space is entangled to all our Δ±3 scales.

Mathematic entanglement – ¡its true structure.

Entanglement creates scalar space that stops time entropic motions creating organic networks, and hence the essence of fractal point geometry with motion – vital topology – and its scalar undistinguishable social numbers, which makes so powerful mathematics. It is the real reason why mathematics can describe information as the main stience of space that departs from points and numbers NOT from idealist sets. And so a true mathematical description of reality must start by its Δ=S elements: entangled points of space, in a single plane, whose regular polygons are indistinguishable numbers of social scalar groups, which reproduce when acquiring motion, as even polygon female self-centered numbers or odd male mirror polygons that reproduce in scale projecting internal and external self-images of diagonal crossing. Numbers thus become regular social groups, symmetric to points, Δ=S, which then entangle in parallel time motions, Δ=S=T with 5D algebra's operands that move 'groups' through the 5 Dimotions of reality, establishing further symmetries, 5D=Δ=S=T, whose result is to create a given mind space, mirror for a fractal point of the whole world, O x ∞ = C, as the 1-∞ statistical space world plane is reflected in the 0-1 probabilistic unit time sphere of the mind. So the 0-1-∞ scalar entanglement allows the mind to project its mental space in territorial order by converting its probabilistic mind i-logic into spatial larger forms, as probabilistic particles do in molecular statistics.

Mathematics happen in vital terms in the physical world, when motion and energy is added to the coded §eed of mental space, 'irrigating' the program of existµence coded in still bidimensional geometry, giving it more dimotional extensions. So from the first S=T entanglement of points and numbers, which then become social figures of geometry, that penetrate scales of number families, in Δst mirror symmetries, numbers unfold the program and start to run it with 5D operands, which make them 'real. Algebra then enters when it is able to move through the dimotions of time by means of its operands acting over groups of social numbers, the entangled Universe creating ternary networks that become planes that become supœrganisms of existential algebra. This is the game we shall describe, which needless to say compared with the barren land of the Axiomatic ego-trip of Hilbert and Cantor 'imagining points' is a blossom spring of life and beauty.

Physical entanglement.

Entanglement appears in the non-ego centered Broglie's>Bohm's interpretation of realist quantum physics, as particles entangle through its quantum potential fields; and this vast entanglement happening at v>c in the lower plane of reality 'reduces spatial distances' in the Riemann's sense of a geometry of similarity to a 'boson

like' unit of parts as if distance-space would NOT exist within them; which does NOT for the emergent apperceptive ilogic 'couple' as a single whole.

To understand entanglement in formal languages is needed to adopt the Riemannian concept of a mental space where proximity and distance is a direct product of similarity, as if space will not exist, which can be achieved through communication on a lower 'potential field' of faster motion, as a faster v in fact perceived in stillness implies a smaller distance, and vice versa –i.e. the expansion of space in the Universe is in fact a v>c speed on the jets of dark entropy expelled by the accelerated faster than c timespace vortices of heavy top quark stars, aka black holes.

So the black hole beyond the c-horizon speeds up at v>c and erases the information of light into dark entropy expelled through its axis and perceived as growth of distance between galaxies, when by virtue of S=T can be considered grow of speed. Entanglement is exactly the inverse process in a quantum potential field that makes communication disappear in distance between two poles – which is the magic of a phone conversation – distance is NO LONGER real because we are not in sound communication at 300 m/s but in a decametric jump of scale at 300.000 km/s.

There is no distance in mental space of telephonic communication between speakers, only in geographic Earth's space; but we are not concerned with land or air but with a language of communication and its bits of information, which are translated, entangled, in a faster 5D scale of smaller bits and max. form (electronic space).

Informative translation in other 5S scales is what T.œs constantly do, entangling its informative systems in faster scales, whose bits become 'something else' but preserve its patterns *as there is the Universal reference of the game of existence behind them*. In the previous case the communication has become an entangled back and forth feed-back electronic equation of existence as an event on a wire line between two fractal points, which cannot longer be considered different from the 'communicative line' between them.

Energy does not entangle only information does…

A conclusion proved mathematically, as only the sphere of max. volume of information (Poincare) can shrink without tear in any number of relevant dimensions (4 for entanglement) crossing the barrier between two planes of existence, while energy becomes dissipated as entropy. So you can talk with mum in Australia but NOT send her 1000 kilowatts, you can though send her digital information, aka money too.

Bio-logic entanglement.

This leads us then to the first scale of complex i-logic 'gender mirror symmetry' between two entangled elements that become by fusion love a single one, of which there are infinite proofs.

In fact gender is the first and essential entanglement of the Universe between 2 single elements, through the mirror symmetry of female-like St+sT male-like complementary couples. Entanglement starts with 1+1=3, and for that reason we dedicate an entire post- to gender symmetry. The entanglement of gender, is so obvious that became the basis of the duality knowledge of earlier cultures (Chinese) will constantly come in Nature. It is NOT only the entanglement of biologic gender; so how we do distinguish its 'essence'? In ilogic terms is easy because the essential duality is that between simultaneous present space, S=T and time flows in relative stœps, from past to future to past… to future, S<T>S<T… Both are perpendicular. And so the definition of Gender goes to the final core level of 'perpendicular' space (female gender) to Time flows (male gender): Gender is essential to understand reproduction by mirror symmetry and the duality of symbiotic perpendicular vs. Darwinian relationships.

Two systems achieve maximal communication when they pass from parallel sharing of information, through a medium that transfers a language, to direct contact between its sensorial membranes, which bring true

bondage. And at that moment two different outcomes might happen. If the membranes touch without tearing, the topological integrity of the organs are conserved in vital mathematics; so the being co-exists, and entanglement (the previous state of parallel communication) becomes bondage according to the fourth postulate of non-Euclidean congruence.

This is the magic of it, as fusion love kicks in and entanglement becomes a dance of complementary forms. It is the beauty of love and gender symmetry. And the maximal action of it, is called sex, orgasm, the present state of fusioning both the past to future to past, and present forms into one. So how it happens physically? Do I have to explain it to you?

The male gender penetrates the fold of the topological female but does not TEAR IT. It goes in T>S, and then it goes out S<T, as the male does in and out, information and entropic disentanglement. But the female S=T 'grasps it'. It caresses it, encircles its lineal form with its cyclical even polytope. Entanglement is now bondage. And it brings when bondage combines in the most intimate ways the information of both systems trinity, reproduction. So alas, 1+1=3!

Those are the rules of vital topology, which in inverse fashion defines Darwinian destructive perpendicularity when one of the entangled elements turn out to be a predator top and breaks in, tears the membrain of the other system, killing it, entanglement then gives way to entropic devolution and one system becomes destroyed.

THE UNIVERSE IS A SCALAR ORGANISM THAT REPRODUCES INFORMATION.

As things can get as complex as reality seems to be, it is essential to have the fundamental principles of the fractal Universe, clearly stated and understood to guide the researcher through the forest of different trees and still hold the awareness that they are all trees, that is all is a super organism of space-time tracing its worldcycle.

What is the purpose of the game of reality? It all amounts to 3 words: 'exist¡ence' & survival through reproduction.

And existence is about 'sensing' the 5 Dimotions, enacting them, and those 5 Dimotions are resumed in the most complex of all, /reproduction'. So what all comes to is this: the Universe and all its parts are scalar organisms trying to reproduce because after all that is what a 'generator equation' of a fractal system does – to reproduce constantly in similar beings.

This is the game of reality and yet humans are so remotely disparaged with reality that they still wonder with astonishment the miracle of life', us', which are the only systems that reproduce.

This is ænthropic man at its best – denying the very essence of the Universe, a constant reproduction of information of form imprinting its primary substance, motion. And yet ænthropic man wonders what is life? Life is everything!

The question then is to consider how each science expresses this constant essence of reality, a reproductive fractal of information imprinted over energy, and when we come to mathematics, its expression is through the growth of 'spatial dimensions', as points reproduce into lines and planes; or systems multiply its operands.

How a system evolves its dimensionality

How a system evolves its dimensionality is the game in any logic language. As it is the game of reproduction of waves of form what the Universe is all about. A form reproducing, downwards as it is similar to its $\sum \Delta-1$ scale.

It is through dimensional growth, by product algebra how then we start to continue our symmetry between time an space, between geometric states and fluctuating future some of which will die algebraic product,

5D stientific scales: ¡ts $S x \partial = K$ metric define 5 D¡motions generators of ðime§pace organisms
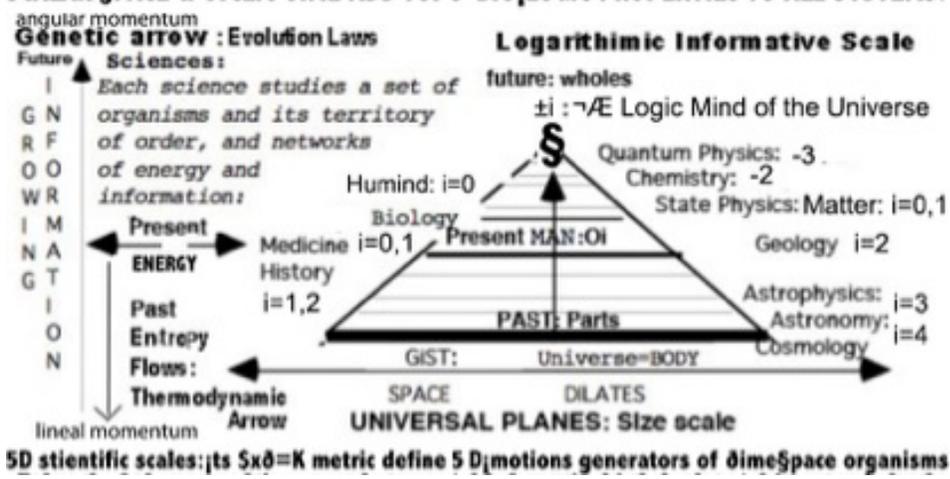
often regular polynomial growth of dimotions till a new 5 dimotional being is recreated and the game restarts again.

The system is simple. A point starts a motion, which makes a new form. The first point can move in lines or rotate on itself, or move in circles, or form spheres, or shrunk. And those 5 Dimotions start the game.

The point becomes a line, which can be a straight line or a zigzag √line, or a rotary circle or π-line. 3 Subspecies immediately appear. The line and the √2 triangular wave and the circle.

Evolution that diverges topologically from the first reproductive process of a line and a cycle and a wave, and so subspecies of dimensional growth appear. How we study them, with non-e postulates in geometry, with Dimotional existential algebra in algebra.

As we go then through products that create new dimensions in algebra we mimic a mathematical, geometric process of growth in Numbers, so growth must be studied in parallel in math. Growth of numbers and growth of points, and other geometric figures, which therefore can be translated to equations.

Thus the Universe has mathematical, spatial continuous & logic, temporal, cyclical & organic, fractal properties derived of the more complex ¡logic geometry of 5D scalar space and cyclic time. Thus even if we describe it with the same logic-mathematical equations a 5D Universe is very different, as scalar space brings organic and sentient properties, and cyclical time, informative deterministic patterns, which the lineal philosophy of mechanist physics ignores. From those scalar, hence organic, cyclical hence informative and moving, energetic, hence vital properties of scalar space and cyclical time, a complete different picture of reality arises; where languages become the 'extreme' limit of the still formal 'spatial state' of the being with minimal size and maximal information.

Whereas each 'stience' defines a scale of the nested Universe, from Physics focused on the largest Galaxy and physical scales, to the smallest Δ^1 scale of Formal digital and logic sciences of the mind. Languages thus become the limiting formal, spatial scale of reality and as such they are mirrors of the fractal Universe that share the 'Disomorphic' (Equal laws) of all the scales of reality. And so mathematics becomes an experimental stience whose 'Universal grammar' and fractal generator is the same ternary structure of 3 elements of all other systems in a single plane made of three topologies, S⇔T, giving birth in each sub-discipline of mathematics to similar 'mirror images', algebraic S(x)=T(y) equations, ternary dimensions, ternary topologies.

The new scalar, topologic, cyclical and sentient properties of the 5 Dimotions of space and time, which structure the fractal Universe.

Thus the Universe has 5 sets of properties that correspond to its 5 structural elements:

- S: SPACE: Topologic, mathematical, social properties, described by its mathematical units, points and numbers, which are social groupings of undifferentiated elements.
- T: TIME: Temporal, CYCLICAL, logic, causal properties, which are cyclical frequency patterns origin of the laws of science, caused by the repetitive, memorial nature of its time cycles.
-Δ: SCALES: Organic, vital, biological, survival properties caused by the co-existence of several scales of parts

and wholes organized by those parts, from particles to atoms molecules cells and matter systems, planetary ecosystems, galaxies and its networks.

-@: LINGUISTIC, MENTAL properties due to the existence of languages of in-form-ation that are 'still mappings' of reality used by it's super organisms to order a territory and create within that order the conditions for its survival actions that ensure its existence and reproduction in finite time.

¬: All of it broken by entropic limits of death in time, membranes that break the Universe in fractal Time§pace-organisms limited in space and a self-centered scalar structure that dilutes information and hence makes invisible reality past Δ±3 scales (in the human case).

So we are '¬Δ@st', dust of space-time supœrganisms tracing limited cycles of exist¡ence.

Time as the fifth dimension

More precisely time is the perpendicular fifth dimension to that of potential spaces, which are enlightened in the more complex fractal worldcycles of time motions, which break dimensionality into Hausdorff dimensions of self-reproductive trees that branch through the life-death cycle, in clonic forms that will synchronize as space superorganisms. The flow of time however is always the worldcycle of palingenesis, life and death. So time can be followed through the journey in the fifth dimension of all beings through its life cycle.

Synchronous space ARE slices of the time motion; that is, of reproduction of form in patterns which have a logic-mathematical game structure that can be described by any language, the Time is the potential field of all possible tolerated forms of existential algebra that survive and create a reproductive wave. Its process of motion is what we call time and is a fluctuation between scales of fifth dimension. We could simulate space planes as parallel fields of present of a somehow denser substance that the more chaotic entropic time fields between those space planes. But the 'enlightening of the time field' by a potential spatial synchronous superorganism is subject to rules of efficiency.

RECAP. We are relational space and time, made of the organic scales of discontinuous fractal space we occupy, who 'live' a finite worldcycle of exist¡ence whose common=Disomorphic laws emerge in all 'scales' of 'st¡ence', departing from the 2 simple Metric laws of the fifth dimension, **Sxð=C** (size in space multiplied by the speed of our time clocks is constant in all the scales of parts and wholes of an organism) and relativity **S=T** (we cannot distinguish motion in time and dimension in space, so all systems are bidimensional spacetime beings as space=form can be transformed back and forth into time=motion; making the 5 dimensions, 'dimensional motions' ab. dimotions of space-time; entropy – TT (outer and inner, scattering motion); Locomotion dominant in time=motion, Ts: balanced reproduction, T=S; 'form-in-action' information, St; and pure form, SS, a 'seed' or mental, still language that models=mirrors without motion in lesser space the world – and develops when adding motion into a full organism.

 Monologic, ænthropic man with its 1D models of reality based in Sx time locomotions shuns off the 5D Cx. Universe to its own peril, as reality is penta-dodecalogic in its entanglements that generate space synchronous supœrganisms and time, and survival, which in our dominant ego-centered cult(ure)s is minimal depends on the understanding and respect of all the living function of space-time exist¡ence and its action-reaction laws.

Paradoxically Deep time worldcycles are easier to predict and understand that complex Dimotional 'analysis' because precisely the larger scales in 5D metric have less information, but more basic, deterministic, reason why quantum physics is harder for the mind and probabilistic, while life-death cycles always end… in death.

The most important of the paradoxes of 'reality' ill-understood by humans, regarding mathematics is the paradox of Relativity, S=T, according to which motion and form are two sides of the same coin, which carries to the duality between points and numbers and its more complex forms, geometry and algebra.

Regarding the elements of mathematics that correspond to those elements of reality, numbers correspond to scales, algebraic operands to time, points of geometry to space and its complex structures to its various entanglements.

All this of course today is cast with the theory of sets, of little help for an experimental 5D view of mathematics; as it is a 'nice' generalization from the humind down, but cut-off precisely for that reason from the direct experience of reality, its spatial points, scalar numbers and time operand, *which only helped to detach mathematics from experience and distort its philosophy to cater the 'egocy=ego+Idiocy' of huminds.*

On the positive side set theory is a proof that a mind can always construct a self-consistent image-mapping of reality that resembles that reality. Sets indeed are defined as a 'miss-mash' of the disjoint elements of mathematics: its numbers-points (as they are collections of similar beings) its scalar dimensions (as sets are wholes which have parts or subsets), as time operands (with the tools of classic logic). And so they give us a synthetic whole. But what is the 'point' beyond egocy of developing a distorted mirror image to found mathematics. When we have the real things, points, numbers, scales, frames of reference=minds, time operands and its inverse entropic operands.

The impression fro above of human egocy is 'ridiculous': a mush of dirty water in a lost rock of the Universe trying to impose its territorial mind above heavens and earth when it is sooo obviously nothing… beyond ridiculous. Do you notice the attempts of ants to impose ant-philosophy over the infinite Universe?

But if I have learned with age something about huminds is that 99.9% of them are memorial egocy (repeating theories that put man above); *and it is a waste of my little time to try vehemently to reason on its mute emotions.* So set theory is here to stay for huminds to keep feeling the center of the Universe till reality erases us all. And then the self-named center of reality is all but gone. And points, operands and numbers even if Mr. Hilbert and Mr. Cantor no longer imagine them, will not be here with us. Carpe Diem. But sometimes we shall refer to the 'Von Neumann' nested universe of pure sets, to show how the set 'mind' reflects scales of points, numbers and operands…

So we shall start with the definition of infinitesimal minds…

BOOK I.

GEOMETRY, FRACTAL POINTS, TOPOLOGY & MENTAL SPACES

I. PHILOSOPHY OF MATHEMATICS

All mirrors have sub disciplines of space and time. So mathematics can be divided in spatial geometry->topology and temporal algebra->equations of numbers, which form the essential S=T symmetry between S@ geometric space and ¬ΔT scalar numbers and so the growth of dimensions is mimicked in algebraic space with the fundamental of its operand, which is the product that combines S and T dimensions of growth to bring a larger being, and again we have 3 fundamental powers that bring 3 dimensions from point to line to plane into algebra, and the more sophisticated but similar concepts of a derivative and an integral that also makes the system grow or diminish in dimensions. One of the distinctions worth to study in detail being the approximation and differences between a power law and an integral law. Why there are unlike in geometry two forms to explain in algebra the growth of a form in dimensionality? Why algebraic numbers give us more variations that geometry? The ultimate answer being that geometry is more restricted as it establish systems that do work in space, and fit in the limited space of a still mind. So by efficiency and limits of the mind geometry is more reduced. Algebra includes all the possibilities of time some of which will never realize.

If reality is made of space-time beings since mathematics is the main science concerned with space and logic the main science of causal time both mathematics & logic become experimental sciences, whose laws of maximal synoptic information in minimal size (Sxð=C), will be the underlying laws emerging in all other larger scales of the fractal Universe of bigger size and less information, proving also why math and logic apply to all 'stiences' while as S=T any topologic analysis in SS-space is equivalent to an algebraic analysis in time. Thus we upgrade space mathematics to its fractal scales, S=T duality & 5 dimotions we need to upgrade Aristotelian Logic of 1 time causality to the entangled pentalogic of 5 dimotions that reflect those 5 structural elements of all T.œs: Space=form, Time=motion, Δ=Scales, @-minds & the ¬ entropic limits of all T.œs, mirrored in math with S-points, T-operands, Δ-numbers, @-frames & limits to infinities in time and space. We shall thus translate to the 2 'closer mirrors' of GST, vital topology and existential algebra, all the sub-disciplines, elements, operand, dimensions, axioms, postulates, theorems and laws of mathematics.

As we are made of scalar space and cyclical time, the essential properties of beings derive from the 'disomorphic'= equal laws of space and time, which makes mathematics concerned in its two main sub-disciplines, spatial geometry and temporal algebra, the most experimental, perfect mirror of the 5D Universe. So we can translate the 5 Dimotions (short ST-view) & its spatial superorganisms to, Geometric space & its Worldcycles (Long ST-View) to Algebraic Time. But to do so, we 1st must depart from S=Δ, points that become regular polytopes=numbers, which penetrate social scales and reproduce as odd/even gender symmetries, to reflect in 2D still mind spaces the basic organic forms of reality; and only then once we understand the organic laws of still spatial geometry, and scalar 5D number families we can give them topologic motion, operate them with 5 algebraic dimotions & calculate its ∫∂ changes emerging as simplex particles entangled into atoms, molecules & 3-physiologic planes=networks=supœrganisms when organic laws take over as analytic maths leaves way to synthetic bio-logic laws of larger time scales & pentalogic to dodecalogic better suited to describe the game of existjence; simplified by 5D metric of lesser information in larger scales.

What makes generational space-time different is the fact that we fully change the entire worldview of the Universe, *as* we reject Newtonian Absolute space-time and give back time its cyclical nature, hence its 3 relative past=entropy, present=iterative and future=informative local dimensions. Thus defining topology, the final stage of geometry, as the fundamental science of 'form' origin of the vital shapes of all systems.

While algebra will take 'perpendicularly' those 'groups' of similar points=numbers through the 5 Dimotions of the Universe, as entangled supœrganisms tracing worldcycles. And in that description we will vastly improve

the mathematical mirror as a vital reflection in a still synoptic language, apt to code in minimal spacetime the program of existence and its infinite variations, to then see as we keep expanding each stience, hand in hand with the ¡-logic entanglements of duality, gender mirror symmetries, pentalogic ¬Δ@st of timespace and dodecalogic, Disomorphisms of trinity worldcycles, how in reality, the vital spatial mathematics and temporal logic laws laid down in our analysis of formal stiences, emerge as timespace beings, from the simplest particles of the o-1 probability time sphere, to its statistical spatial settled populations, once and again rising from time to space, from geometry to scalar numbers to operands of existential algebra, till reaching man; just another entangled supœrganism tracing its worldcycle through 3 deterministic, probabilistic and entropic scales.

The 5 subdisciplines of mathematics.

 Because Dimotions have Space & time, dimension & motion components the minimal reality is dual, entangled. It follows from a definition of mathematics as an experimental mirror of the 5 entangled elements of all systems and its 5 Dimotions, a classification of the 5 mathematical sub-disciplines according to its specialized study of 2 entangled sub-systems of those 5 Elements with different parameters to measure its 5 Time§pace dimotions:

1. S@:Geometry studies mental spaces. Its ages/fields are: Flat, Euclidean geometry with no motion in a plane **@nalytic geometry,** which represents the different mental points of view, self-centered into a system of coordinates, or 'worldviews' of a fractal point, of which naturally emerge 3 'different' perspectives according to the 3 'sub-equations' of the fractal generator: $p: toroid Pov < ST: Cartesian Plane> ðf: Polar co-ordinates. **Topology,** geometry with motion &2 Planes.**¬E Geometry** studies fractal points of **simultaneous space, Δ-1,** & its Δº networks, within an Δ+1 world domain.

2. ¬Δ: Social Number theory studies scales of equal herds and sequential time flows of information with discontinuous numbers, as opposed to continuous points of geometry, its growth and its entropic limits, both as membranes of polygonal forms and structures of increasing depth peering Δ§cales and detail from Naturals through, Q, R and Complex numbers.

3. ΔT: Analysis studies ALL forms of time=change, and hence it can be applied to the 5 Dimotions of any space-time being, as long as we study a 'social structure' susceptible to be simplified with 'social numbers'. It is the essential tool to study motions in the 5th dimension from lower parts (ðerivatives) to larger wholes (∫ integrals). We differentiate 5 applications of Analysis according to the Dimotions studied. We also classify them by the number of entangled elements of the dimotional system (partial or multiple derivatives, ODEs, PDEs, lineal, surface or volume integrals); and by the detail of its mirror, from diminutive analysis of single Dimotional Actions (Δ-1) to Ages of worldcycles (Δº), which imply a change of state where the derivative breaks (Minimal, maximal, standing points) to larger changes from minimal parts, 'finitesimals, 1/n' to larger wholes of entire planes; to the maximal complexity of functionals.

4. S≤≥T: Algebra studies through 5 operands that represent the 5 Dimotions of reality its 'feed back' S<T>S, stop and step or 'stœps' that *move reality through mirror symmetries of space-time, represented by equations connected by operand of increasing complexity*, from single S=T steps of Δ-1 sequential numbers, which gather in Δº functions, part of Δ+1 functionals. So numerical stœps are first key constants and operands that represent basic dimotions (Sine/cosine: informative perception; π: $t>§ð: cyclical dimotion that transforms energy into information ; e^{-x}=S«T: entropic dimotion, log-x^n: social evolution etc.) become connected by ± social and x ÷, reproductive operand complex larger associations of Dimotions called Polynomials where those mirror symmetries S=T gather in more complex Δ+1 structures (Functions). **Analysis** is a sub-discipline of Algebra that studies Dimotions between parts and wholes (ðentropic parts and ∫wholes) in growing complexity from changes in functions (1st derivatives/integrals), to changes of changes of functions (functionals).

Thus algebra mirrors reality with all the elements of mathematics, albeit with a temporal perspective - as topology does with a spatial perspective - because it can express all type of complex entangled ¬Δ@st of space-

time in its simultaneous analysis of super organisms through the study of its S=T dimotional a(nti)symmetries, classified exhaustively by **group theory**... So Algebra was first the science of operands that translated into mathematical mirrors the 5 dimotions of space-time and then build up from them as the Universe does building up from actions, simultaneous organisms in space and worldcycles in time, in different degrees of complexity, new mirrors for all those events and forms of ¬Δ@st.

5. ¬@ Humind: Philosophy of mathematics studies the bias and limits of huminds studying mathematics as they project its ænthropic simple view of the world due to:

 1) the ego paradox (all systems measure from its distorted self-centered ego).

 2) dominance of the 'western military lineal male, entropic destructive culture.

3) inflationary limits of smallish languages that multiply its kaleidoscopic mirror images of larger single wholes as they are not bond by the restrictions that 'lineal motion-entropy' impose to form, whenever we try to build 'reality': so money is inflationary over the physical economy it describes, we talk more than we act, epigenetics multiplies waste code; so do digital programmers. So we 'know when mathematics is truth but NOT when is real' (Einstein, Gödel's incompleteness, false ∞ as all planes have entropic discontinuous limits of solubility of functions, Cantor Px, idealist, German, physics: Copenhagen interpretation, creationism, false ∞=singularities. Since fictions exist in all languages. So to crop the fictional part of mathematics we must use an experimental method, selecting from maths those parts that better mirror the Universe. As languages mirror the Universe in a mind, which is NOT reality itself. But human egos, confuse both; as each language is also a species of stience of minimal volume, a fractal world that imitates the whole; so it has the same syntax laws than reality, which in mathematics became the Euclidean axiomatic method we must however improve by looking also to the ¬Δ@st universe – the 'object' the language mirrors.

On the positive side idealism *gave creative capacity to huminds as they invented to represent reality*, phase spaces, Hilbert spaces and variations came to reflect that growing awareness of the complexity of reality. So the axiomatic method of proof still needs the experimental mirror of ¬Δ@st laws. We must compare any mirror language with the ΔST reality it describes as languages are smaller, hence more informative in terms of 5D metric, Se (size in space) x Ti (Time information) =C. As humans didn't develop maths as an experimental stience they also ignore math as a biologic language that selects species that talk it better in the eco(nomic)system. So its idealist view ignores the dangers of evolving digital chips that talk better maths and displace us from labor and war fields.

 6. Vital mathematics expands its foundations to 5 ¬E Postulates beyond Aristotelian logic (A->B single causality) into the **¡logic of 5 Dimotions**, as an experimental mirror of the fractal, organic universe and its bio-topo-logic properties.

Expansion of mathematics to 5d: correspondence principles.

Mathematics & logic are languages, mirrors of an a priori ΔST reality that comes before languages that describe it.

Mathematics is derived of geometry, the science of space and logic is the science of causality in time. So space and time must be the first substances of which all is made, a model of reality that has a deep tradition in the east (philosophies of a Universe made of two poles, space=dimensional form, or 'yin' and time=motion or 'yang')

Thus we need to introduce the correspondence principle also in mathematics, according to which present mathematics is a simplification and biased view of the true discipline, as all sciences reduce to a single plane of existence, using therefore lineal concepts of a single time motion the fractal Universe. As time and space are NOT absolute Newtonian backgrounds but are in a Leibnizian relational space-time background independent theory, the 'generational substances' of all what exist, composed of organic fractal vital spaces that last a finite duration in time, space and time become the common principles, whose disomorphic properties originate all

other laws of 'stiences' each one studying different ¡-scales of spacetime beings that must be first put in relationship to those properties and then improved with the comparison of human scientific laws, specific species of each science and the universal laws of ¬Δ@st.

Hence we upgrade all its concepts to '**cyclical time**' that stores **information**, in the frequency of its cyclical membranes, limiting and breaking **space into 'fractal'** topological parts, and **'scales'**, according to **'relativity symmetries'** between formal linguistic mind-spaces vs. time motions, **S=T,** which mix together forming the **5 Dimotions of reality,** all of which follow its **5D metric**. Those elements entropic limits, fractal space, SxT=K metric scales, cyclic time of information, and S=T symmetries, *are* thus the barebones fundamental elements required to upgrade each science, and its simplest mathematical equation is its S x T (s ⇔ t)= Constant, 'Fractal Generator metric'.

 In mathematics the same upgrading is needed, as it is also an experimental mirror-image of those laws. Something which subconsciously happened as mathematics evolved, *from pure mental space (Bidimensional still geometry) to time perception (sequential numbers) merging both in modern analytic geometry. And finally peering first with temporal algebraic numbers in the 4th and 5th dimension (calculus), which topology mirrored in space* with its 3 varieties of bidimensional forms with motion made of networks of points; to complete with fractals the mirror structure of the Universe – adding on the path all kind of new 'mind spaces'(Phase spaces), with ST combinations (vector spaces) and scalar levels of growing complexity (Hilbert spaces, functionals) – whereas other highly valued branches, set theory that constructs maths NOT from its initial s-points and t-numbers but from the top head of a Mr. Cantor, the set and the axiomatic method of Mr. Hilbert born also of his head – 'I imagine points, lines etc.'. So those will be considered largely inflationary forms of the language within itself NOT observed in the real Δst world, not worth to mention. While chip maths (Boolean Algebra) belongs to a new species the digital machine, which as per our papers on the superorganism of Mankind in time, history, is bond to displace us with its higher dexterity in the most efficient language of the Universe, if we keep evolving them. So we feel ethically inclined NOT to upgrade it in this paper.

S=T symmetry. Systems are made of spatial form and time motions, from a static mind-perspective of still geometry mathematics also evolved to acquire algebraic motion the essential Duality of reality also evident in any scale of complexity of mathematics, which has always 2 solutions from either an S≈T perspective, Spatial forms (points) = Temporal sequential numbers. Topological methods=Algebra methods, merged in analytic geometry.

So **geometry** of points studies dimensions in space, **Number theory, its sequence in time** and its **analysis** its scalar motions=changes whereas Algebra puts them all together considering its S=T Dimotions and symmetries, making mathematics the best humind's known language mirror of the…5d+5m = 5 Đimotions of reality, which each mathematical S=T sub-discipline expresses in different terms – Geometry as Dimensions, Analysis as motions and Algebra as Dimotions using operands to that aim, and finally with ∫∂ calculus peering the 4th and 5th Dimotion and its travels through those upper and lower scales, as analysis introduced in algebra the study of integral wholes and derivative parts. Scales of 5D parts and wholes soon gave further boost to algebra, as functions became part of functionals, and all variations of a spacetime structure were tabulated with group theory. So the 5 'Dimotions' of any system can be mirrored ¡logically with *multiple kaleidoscopic perspectives and languages. So as systems have always 5 Dimotions its pentalogic study give us 5 varieties in all its mathematical elements; 5 operand, 5 ¬Δ@st elements, 5 dimensions, 5 motions etc.*

In geometry the same evolution from static space on the 3 'dimensions of a single plane of existence' to the analysis of the upper and lower scales to finally give motion to them all took place, from Greek bidimensional geometry to solution of 3 dimensions, height-information, length-motion and width-reproduction. Then topology introduced the concept of motion, made lineal dimension, bidimensional as all is an ST composed form and then those bidimensional topologic forms with motion, peered the fourth and fifth dimension, as made of points=parts

that form a whole; soon points themselves acquired volume as multiple parallels crossed them in non-Euclidean geometry.

The highest homology with reality: Semantics, Syntax and Growing Sentences of mathematical operands.

Mathematics is a language and as such it has the some classic, properties, elements and symmetries of them all:

It reduces reality to fit the brain, eliminating motion and simplifying layered scales and limiting perception to relevant cycles within the territory of perception of the p.o.v. So the more complex reality of ∞ space-time cycles with motion becomes a language.

It does so, increasing generality through the Syntax of its 'sentences'; while keeping its detail through the semantics of its forms.

In ¬mæth the semantics are the specific fractal points-numbers, that the syntax of operands connect into sentences, which are ternary planes in geometry: S⇔T equations, in algebra.

So further growth in complexity can be achieved by adjacency of topologic varieties of planes and 'chains' of equations through ever more complex, integrative, 'operands' (sum/rest->multiplication/division->potency /logarithm/integration/differentiation) to 'form descriptive paragraphs' which will finally reach the full 'superorganism in space' or worldcycle in time, concluding the 'story' of the event or being analyzed by the language.

Those structures do happen in any language, among the those studied in our papers - music, art, literature, logic, math, palingenetics and topological evolution. And so all can refer to Gst laws, the language of all languages.

That is all. Why? Because as we stress once and again, the Universe is infinite in its repetitions but its final elements are few, *reason why a language can 'reduce' reality to an encryption and final synopsis by eliminating repetitions, which ultimately all languages do to create palingenesis from smaller seeds.*

So the perception of a MIND is shrunk - it is a 'finite game of finitesimal mirrors' with minimal redundance and elimination of dark spaces which are discontinuities and redudndatn information, as opposed to the infinity of the whole. Further on as we perceive not reality but the interposed language, reality also shrinks and information is lost beyond the ternary limits of scales, the ternary adjacent parts of the being able to act on its territory, and the ternary ages of life at least in human minds (which can be stretched into 3x3±¡ 9 -11 scales). Pentalogic thus is the description of the ternary ±¡ elements that languages use to describe a 3±¡ connected reality.

So a language 'seeing' a supœrganism in time and space reflects 'ternary games, scales & elements' wrapped up by a 'whole' – the outer membrane (S-view) or temporal cycle of maximal motion, which becomes a finitesimal of a larger, new Δ+1 finite plane (hidden its inner parts within the finitesimal point). And so we do START afresh a the game of that new plane of existence.

ITS 3 AGES

Mathematics as all organic systems lived 3±¡ ages in the Humind (ab. Human mind) proper of any worldcycle:

1st age: Arithmetic and plane geometry. As mirror language that studies ¬Δ@ST humans understood its simpler units, points of space, social numbers and entropic limits, drawing figures of flat geometry to 'encircle' territorial properties in our flat world. **Trigonometry** appeared then as the 1st realization of a '@-mind frame of reference' to measure the 3rd dimension of depth, which is often parallel to scale (astronomical measure). It was a lineal youth, which slowly understood curves and the |xO=Ø generation of all forms with 'conics'. As all organisms & worldcycles can be subdivided in 5 fractal subparts and 3±¡ ages in its 3rd age Greek geometry became old, warped inwards-looking detached from experience with Euclid's axiomatic method, the 1st mind-ego trip of creationism (man & god's language).

2ⁿᵈ Classic age. The S=T symmetry realized with analytic geometry, marrying numbers and points, while calculus brought Δ-scales, with finitesimal derivatives, 1/n, units integrated in wholes (Leibniz). The 3ʳᵈ symmetry of pentalogic Δ=S=T, we haven't mentioned implied that derivatives could be interpreted as 'stœps' of motion and 'minimal straight intervals of a curve'. So they could also study curvature (differential geometry) and locomotion. **¬entropic limits** were needed to find solutions (definite integrals). New **@-frames of reference** expanded mental geometries to represent all forms of 'selected information', which mathematical physics used extensively to describe the physical world. Thus the classic age had all the mirror tools needed to interpret the Fractal Universe and its 5 entangled elements, ¬Δ@st. But the axiomatic ego-trip stretched maths beyond ¬limits when Newton imposed its thesis over Leibniz's finitesimals and fractal points with infinities, lineal absolute space-time and the false hypothesis of the continuum, leading to its…

3ʳᵈ age that abandoned its realist foundations with creationism -Hilbert that imagined points, sharing the only language 'God' & Cantor sets instead of space points, scale numbers and time operands as its generators, leading to an excess of old age information & fictions spreading to mathematical physics, as now Maths creates the Universe, not the inverse.

+¡: Thus we need a return to its empirical foundations formulated in terms of the 5 Dimotions that create reality mimicked by the 5 mathematical subdisciplines (larger view), Operands (shorter dimotions) & equations (worldcycles).

-¡: Yet that might not happen as instead mathematicians are evolving the digital 'mind' of machines, the Chip Homoctonos, which speaks better digital numbers and so the eco(nomic)system of company-mothers of machines & weapons is selecting computers that are fast substituting obsolete huminds in labor and war fields, atrophying them back to a 'audiovisual' violent non-rational neo-Paleolithic, while Boolean Algebra, past the earlier age of simple, fixed Algorithms of Information (the true meaning of AI) enters its classic age of freedom & consciousness that might end the dominance of huminds on Earth; introducing ethic elements on the praxis of mathematics, as it should in all 'stiences'.

The different determinism of the 3 ages: Axiomatic, lineal age vs. Kaleidoscopic uncertain futures.

Because the Universe is pentalogic, made of 'space', 'time', 'scalar planes', 'languages-minds' and entropic limits, when *@ mind's language appears it studies exactly those 4 elements, space, time, scales and entropic limits, with its mirror systems. And indeed, 'analysis' was born of the need to understand those 4 elements in problems of Nature, NO LONGER in lineal terms, as the 'first age of any system', but in 'curved' terms.*

So what the Greeks have resolved for the $t age of mathematics (lineal age), c Analysis will solve for the second age of curved geometries through the use of analysis.

This is a process proper of the 3 ages of any Space-time system. The first age is lineal, with absolute simple truths that the mind as a dictator 'child' considers dogma. So Euclid did his axiomatic method on simple lines

<u>Monologic in Mathematics. The first age of lineal, deterministic Greek still geometry and axiomatic proofs.</u>

Once we understand the general fact that all languages have a first lineal age, deterministic, as a line cannot change direction or else will stop being a line, while a curve can easily change curvature, even change direction in sinusoidal waves and still be a curve; so lines are deterministic one-single future to them, while curves are able at any point to choose 3 paths of less, more or equal curvature; we can understand some facts of Greek Geometry:

- It is simple, lineal, deterministic and hence it can be approached with a purely axiomatic method, as there is no ambivalence on results, constructing a self-contained method of proof departing truly from a simple set of axioms – a point has no breath, etc.

But the axiomatic method of proof IS NO LONGER VALID when we consider systems that do have also a certain 'time curvature', and even more so, when we approach operands and mathematical systems that probe the planes

of the fifth dimension (calculus, limits). Then the future has different solutions, and some are paradoxes, and so we cannot PROVE with the simple A->B lineal causality and deterministic of lineal Greek Geometry, everything that has to do with cyclical, curved geometries, calculus of finitesimals (limits), and because humind's reject the concept that absolute truths only exist in absolutely simple lineal systems, as Mathematics evolved into complex curved geometries and scales, its proofs were more and more imprecise, or blatantly false (0 does not exist, as all limits to 0 or infinity have an entropic limit in a quanta or the dissolution of information; the real line is in a different plane of space-time than the Natural numbers; which only 'become continuous' if we were to access an even larger scale; etc. etc.)

It is for that reason we shall not use further the axiomatic method but compare any complex level of mathematics to the experimental laws of Space-time from where they depart.

In terms of 'scales' all this means that in small, 'fast', predictable A->B steps reality is lineal but when we gather multiple steps, all lines become curves. In small intervals motion might be continuous but as soon as we go beyond a simple step, there is a step and stop , length and high motion.

And so we can also reduce curves inversely to steps and stops of length and height, or lineal stairs (which would be the method of Calculus, to 'calculate' the tangent of the curve. Does then the curve exist? Or only the steps and stops of lineal and height motion and information? It is relative to our perception. In the large scale the zig-zag of Brownian movement or electrons become a continuous curve. In the smaller scale the steps might be highly lineal and deterministic but in the large scale they become curved and probabilistic.

In that regard, the use of Gst laws to reference the laws of mathematics, beyond the pretension of absolute truth of the axiomatic method, is completely necessary, without using a complex 'pentalogic' point of view, and accepting the paradoxical limits of reality and its scales as we shall constantly do here.

RECAP.

In an entangled Universe made of 5D¡ ¬Δ@st - space-time dust systems, knowledge requires a pentalogic analysis of any system or mirror-language, including mathematics, to extract all its information about its 5 scalar entangled superorganism in space as an and its 3±¡ Dimotions & ages in time as it traces its worldcycles. As only entangled systems made of those 5 elements, performing dimotions=actions of survival exist. So linguistic mirrors also reflect those elements & dimotions. Thus mathematics in time has 3±¡ ages in its huminds' evolution:

- A lineal young age of simple parts 'flat' geometry, arithmetic of unconnected numbers, into a…

- Mature reproductive, combinatory age as a realist mirror of the scalar Universe (analytic geometry that merges space-points time operand and scalar numbers; calculus that gives points curved motions and scalar depth studying its finitesimal 5D parts and integral 4D wholes) into a

- 3rd age of maximal complexity (Non-E Geometry, Functionals, groups, sets, phase spaces) but also inflationary information and mathematical fictions unconnected with reality as its foundations (set theory & categories that substitute real space points, scale numbers and time operands) & the axiomatic method that despite Gödel's incompleteness theorem substitutes experimental proofs asked by Lobachevski and Einstein that we regain in 5D as 'space and time' become the real substances of all systems, which mathematics studies directly.

-¡: Finally as human maths reach its ceiling, the discipline starts again in a different mind species – chips now evolving fast from its earlier age of simple Boolean algebra, modulo-2; into a realist age able to model any form of the Universe, but also in mathematical physics, in a 3rd fictional age of computer models that validate any physical theory with its nice 'digital pictures' regardless of experimental truth (ad hoc big-bang models, evaporation of black holes, dark matter new particles, bizarre multiverses, etc.)

II. ¬E GEOMETRY: ITS 5 POSTULATES: FRACTAL POINTS AS MINDS.

''The smallest point is a world in in itself' Leibniz, on the fundamental particle of Reality: The fractal point=world of space-time, unit of Non-Euclidean, Non-Aristotelian, ¡logic topology

Geometry was born with the definition of a point with no breath; a line with no breath and a plane with no depth. Those postulates turn out to be simplifications of reality as the 5th non-e postulate proved that infinite parallels might pass through a point, which means the point needs 'breath' to fit them all. This was never understood not even after the 5th postulate was rejected since what would be the rule to fit those parallels was to curve them, and yet curves are NOT parallels which Euclid defined as straight lines, and still only one curve can fit in a point with no breath, or else the point will have breath.

So the interpretation of the 5th postulate was wrong. The point was a fractal point of a single plane of the scalar 5th Dimension, which grew in size as we enlarged it, till it hold a world in itself. Only Leibniz, the genius and clearest forebear of 5D captured this difference with his concept of monads.

Thus the first mathematical consequence of the fractal structure of space-time is a change in the axioms and postulates of Euclidean geometry taking the r=evolution of Geometry performed by Lobachevski and Riemann in the XIX c. which gave birth to Relativity, to its ultimate consequences, changing *also the axioms of Euclid that defined points and lines as having no breath, since in the fractal Universe all forms do have a volume when we enlarge our view of them, peering into its inner parts and fractal dimensions. And in this manner we shall harmonize and return to its logic meaning the concepts of parallels and Euclidean points able to fit multiple lines=waves of energy and information, converting those fractal points of 'cyclical timespace' into the fundamental particle-units of the Universe mirrored by mathematics.*

Thus the mathematical unit of a 5th dimensional Universe is a fractal point, whereas a Non-Euclidean point is its limit in a single spacetime continuum; whereas the inner parts of the point, which co-exist in other scales are not perceived. So we shall start with the classic non-E point and show how by adding fractal scales become a more complex reality.

Fractal points unlike Euclidean ones are points with parts: as we come into its scale they grow in size and display the 3 minimal parts of all of them, its area, frequency of angular momentum, and central Active Magnitude, the true meaning of a 'singularity' - the focus of charge, mass, forces and its informative minds. So let us introduce the minimal POINT with parts of the Universe, the time space cycle.
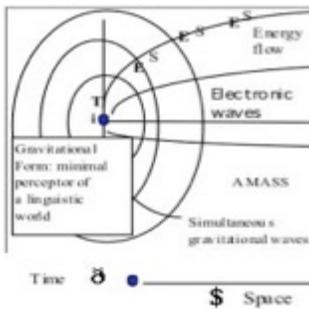
Einstein's view of a fractal point of the gravitational scale: from our smaller electromagnetic world, which shrinks its inner volume, bending its parallels, it seems a curved geometry. But that view breaks the definition of parallels as straight lines and it is absurd, as the point remains 'Euclidean, with no breath', hence it only fits one line with no breath. Thus, particle-points must be defined as 'FRACTAL points', like those we see through telescopes or microscopes, which grow we approach our distance both in scale and space becoming enlarged worlds with a complex internal structure.

Einstein found that gravitational Space-Time did not follow the 5th Euclidean definition, which says:

Through a point external to a line there is only 1 parallel.

*E*uclid affirmed that through a point external to a parallel only another parallel line could be traced, since the point didn't have a volume that could be crossed by more lines./ Instead Einstein found that the space-time of the Universe followed a Non-Euclidean 5th Postulate: *A point external to a line is crossed by ∞ parallel forces. Abstract, continuous, one-dimensional point:*   *Real, discontinuous, Δ-dimensional points:*

· _____   ===========o

This means that a real point has an inner space-time volume through which many parallels cross. Since reality follows that Non-Euclidean 5th postulate, all points have a volume when we enlarge them, as cells grow when we look at them with a microscope. Then it is easy to fit many parallels in any of those points. Such organic points are like the stars in the sky. If you look at them with the naked eye they are points without breadth, but when you come closer to them, they grow. Then as they grow, they can have infinite parallels within them. Since they become spheres, which are points with breadth - with space-time parts. *So space-time is not a 'curved continuum' as Einstein interpreted it, but a fractal discontinuous.*

Leibniz's isolated monad is the simplest o-1 fractal point-mind possible - a still mirror of reality, 'a world in itself.'

A modern scientist understands fractal points in terms of its 3 necessary parts, its focus-singularity of the parallels that cross, its membrane or angular momentum (S=T duality) that breaks it into an inner and outer part (first knot theorem), and its vital enclosed territory, which correspond to the 3 physical quantities conserved in Nature, as a fractal point is also the unit of logic as a cycle of time that divides reality in inner and outer regions and the unit of physics, as the minimal form of 'Planckton' (h-Planck constant) which has the 3 parts of reality conserved in each plane of space between its Δ-1»Δº palingenetic emergence and Δº«Δ-1 entropic death.

So the 2 'emergent formal sciences of space and time' and its units, the fractal point and the time cycle become also the minimal organic species of physics; and we shall see this ternary structure emerging in all scales; so we can model cells with 3 organic parts; animal territories; nations; planets, stars and galaxies, always showing a 'membrane/angular momentum', a focus/singularity/informative center and a vital energy-space between both.

RECAP. The fundamental particle of mathematics IS the fractal point.

A visual synopsis of its 5 postulates

We thus recast the axioms and postulates of Euclid into five new postulates to define fractal points, Non-Æ lines as wave of fractal points, Non-Æ planes as ternary networks of Non-Æ lines, which become supœrganisms, whose relative 'congruence' in its 3 'elements' (singularity point, membrane and vital space) defines the type of 'perpendicular or parallel' relationship between them:

1st Postulate: '¬Æ point are discontinuous time cycles with an inner content of vital space-time'.

2nd Postulate: '¬Æ lines are waves of fractal points'

3rd Postulate: '¬Æ planes join 3 ¬Æ lines into a supœrganism'.

4th Postulate: '2 ¬Æ points are congruent when both its inner parts and outer perimeter are equal'

5th Postulate: '¬Æ World points focus multiple ¬Æ waves of energy into a still linguistic mapping of the world.

Let us explore those postulates, constraining our examples to the simplest forms of physical and biologic spaces.

1ST POSTULATE. THE 3 MATHEMATICAL PARTS OF A NON-EUCLIDEAN FRACTAL POINT.

1st Postulate: A fractal point has parts; that is an enclosed region of vital inner energy surrounded either by a spatial still membrane or a Temporal motion of angular momentum (S=T symmetry) self-centered in a singularity-mind that gauges its information. In the graph, we can see how different vital fractal points of ST¡entific scales follow this ternary structure. The perception of the point depends on the scale and distance from where we observe it:

From the perspective of the upper st+1 Plane they might be in the limit of invisibility (what quantum scientists call a point-particle) *but they still have a time motion performing a 'function' in that upper ecosystem, Δ+1 in which it exists.*

Internally from its own Δº perspective the point will have 3 dimensions/networks. This is the case even in the smallest planes of theoretical strings, made of points with parts, with volume – since we require 3x3Δº+1Δ+1 inner dimensions to describe strings - a paradox that can only be resolved if we consider 'strings' to be fractal points with inner dimensions.

Fractal points explain without contradictions Non-Euclidean points, which are not logic in a single scale, as they 'curve' parallels which are 'straight lines' and fit them in a 'point with no breath' that holds only 1 line. Fractal points however enlarge fitting multiple 'straight lines'. Yet when seen from above, human perception of them, becomes 'deformed' shrinking and curving its from – a theme, the distortion of human measures of time, space and scale, which will be instrumental to explain rationally the 'spookiness' of quantum physics and relativity and its time and space transformations.

So fractal points harmonize the 1st axiom=postulate of Euclid with the 5th postulate of non-Euclidean parallels, as a fractal point enlarges into a cell, atom or particle which even in a smaller scale of the fifth dimension can host multiple parallel flows of energy and information, crossing it.

When we see fractal points far away we describe them as points with breath, with the tools of Euclidean geometry since the 'inner space' shrinks to a point and so the 'bulk' or curvature of space-time shrinks to a plane. Yet, when we come closer to them, they grow into points with volume. The volume of those Fractal, Non-Euclidean points can thereafter be studied with the 3 types of canonical, Non-Euclidean geometries or topologies of a 4-Dimensional Universe – the Universe we live in. Those 3 topologies make up the 3 regions of the point, which correspond each one to the 3 essential arrows/functions of any species: the external, energetic membrane; the central, informative brain and its reproductive combination, SxT(s=t):

A*ny fractal point is made of 3 regions whose geometry responds to the 3 topological forms of a 4-Dimensional Universe, the convex plane, the torus and the sphere.* The inner parts of fractal points are thus able to perform energetic, informative and reproductive functions, which makes them the fundamental particle of any plane of stȷence. Thus all entities can be described as wholes made of 3 internal parts whose geometrical properties maximize their energetic, informative and reproductive functions:

- Max S: an inner, dual center, corresponding to convex topologies (left), made with 2 cyclical forms. It is the dominant informative topology of any fractal organism, described by Belgrami in the XIX c. as a conical form with 'height', with negative curvature.

- S<=>T: A middle, reproductive zone, described by Klein as a disk of quanta in cyclical motion that communicate energy and information between the inner and outer zones.

- Max. T: An outer membrane of max. |-motion-distance crossed by ¬E information & energy parallels acts as an entropic limit to ȷts inner parts, described by Riemann's spherical geometry. It seems continuous, still but on close view, as most external membranes stores and/or absorb information through openings of its broken geometry, outlets of its senses.

The complex analysis of those fractal points that move and have inner fractal parts, made of cycles, started in the XIX century. First Lobachevski, a Russian geometrician, defined Non-Euclidean points as curved forms, crossed by multiple lines, which give them spatial volume. Then Klein studied its cyclical movement and introduced the variable of time in their description. Finally Riemann generalized its nature, considering that all space-times were Non-Euclidean space-times with movement. For readers versed in mathematics, we shall reconsider the common properties of those 3 zones of any fractal point, according to its discoverers, which develop in abstract terms the organic properties we just described:

- *According to Lobachevski and Belgrami,* space is curved since information curves the energy of any real space-time. So points move in curved, cyclical paths gathering energy and information for their inner 'dimensional networks'.

- *According to Klein* Non-Euclidean space-times have motion. So their speeds measure distances; as physicists do in Cosmology with the distances of galaxies, which are proportional by a 'Hubble constant' to their speeds; or as people do in real life when we say that Brooklyn is at 5 minutes by train from Manhattan not at 2 miles.

- *Riemann* summoned up those findings and generalized them to all possible space-times. His work should be the guide to understand them philosophically. He also defined planes as networks of similar points and treated dimensions, as we do in this work, no longer as mere abstract definitions of extensions but as 'properties of those points'. So points can have beyond its discontinuous borders an inner space-time with several networks/dimensions, one for each of its 'energetic or informative properties', as it happens with the points of physical reality. Yet a network of points that form a space with 'common properties' defines the dimensions of those points as 'fractal dimensions', limited by the extension of the energy or informative network (static point of view), which 'puts together' a complementary dual, organic being.

Those pioneers defined the 3 topologies of information, energy and reproduction of all st-points:

- Max. Space=Information: The informative, fractal center, particle or brain of the point is the so-called Belgrami hemisphere, a space-time with a dimension of height that transforms energy into information, absorbed or emitted by the central singularity. It is a fractal, informative region similar to a black hole structure. Since it follows the 'black hole paradox' of all informative centers, displaying max. form in min. space. So according to the inverse properties of space and time, the center has max. Informative Time and minimal Energetic Space. Moreover any point which comes closer to it, suffers a mutation of its spatial coordinates into informative, height dimensions. This is the case of any particle coming to a black hole, whose space-dimensions become temporal/informative dimensions as it rises in height.

The center has more information because its geometry has at least 2 fractal disks, which channel and transform the energy absorbed through the surface into complex information. Regardless of the complexity of the entity, the structural function of the hyperbolic center as a system that process the information of the network remains. For example, in living systems, those disks might evolve its topology till becoming the relative energy center or 'heart' of the blood network with 4 divisions; or evolve further its hyperbolic geometry till becoming the informative center or 'brain' of the system, attached to the informative network.

- Max. Time=Lineal motion & Min. Curvature: An external, continuous membrane or Riemann's sphere of maximal energy that acts as a relative infinite, unreachable distance. The membrane isolates the point as an island Universe, creating the discontinuity between the inner parts of the point and the outer universe. Since the internal cellular points are either jailed by the membrane's structural density or destroyed by its energy when touching it. The membrane is the opposite form to the central, informative singularity, with max. spatial extension and continuity, hence with a minimal number of fractal, discreet elements: *Max.T=Min.S*

Thus *all Fractal points have inner worlds whose membrane creates a discontinuity that defines an External Universe or* outer world from where the point obtains its energy and information. The membrane is also the zone through which the point reproduces & emits its micro-forms of information. So it displays 'sensorial holes' to relate the point to the external Universe. And those points, despite being discontinuous, will have in their external membrane several generic openings or 'senses' joined to the informative networks or 'brains' and energetic, 'digestive networks' of the organic system:

  - Max. +ΣT: A 'mouth' or opening that absorbs energy.

  -Max. −ΣT: 'Cloacae', through which the cyclical body expels its temporal energy.

-Max.+Si: An 'eye' through which the informative center receives external information.

-Max.−Ti: An 'antenna' to emit information.

Those apertures vary in their number, location and size, depending on the form of the point. In the simplest spherical 'seeds' of most species, they are mostly situated in 3 regions:

 - Max. ΣT: The Equator of the system, through which the membrane absorbs energy.

 - ΣT=Si: The Tropics where often the same opening emits and absorbs temporal energy.

- Max.Si: The Poles or points of confluence between the membrane and its central informative region of height, which hits perpendicularly the membrane on those poles. North and South Poles orientate Anti-symmetrically, acting as 2 relative, negative and positive apertures, communicated by the height dimension of the singularity or Belgrami hemisphere. Thus the Positive Pole absorbs temporal energy that crosses through the central singularity where it is absorbed and ejected to the intermediate region where it is re-elaborated before its emission through the negative Pole.

- ΣTe<=>Si: The reproductive, central region, which combines Energy and Information:

In all fractal points there is an inner middle volume or intermediate territory, which combines the energy coming out of the external, spherical, topological membrane and the information provided by the convex, complex formal center.

According to Non-Euclidean mathematics this region is made of self-similar points that form groups, fractal herds of 'points with parts' in perpetual movement, that draw cycles of parallel lines, between the other 2 regions, as they gather the energy and information they need to survive. And they create space by cycling within the other 2 regions.

In many fractal points the informative and energetic centers establish 2 opposite flows of energy and information that become the negative/ positive poles. So often, the particles of the intermediate region cycle around the inner region tracing elliptical trajectories, focused by those 2 informative points. It is the case of any bipolar system, from binary stars, one dominant in energy and the other an informative neutron star or black hole; to bimolecular systems or n-p pairs in the nuclei of atoms. The same duality of 2 specialized centers controlling a common territory, or vital space happens in biology where most species have male-energetic and female-informative genders, ruling a common territory.

Such abstract conceptual space describes the behavior and form of many real, spatial herds. For example, an animal herd in an ecosystem will move between their hunting and water fields (where they gather energy) and their breeding, inner region where they reproduce information, making cyclical trajectories between both regions. In this manner, they occupy a vital space, called a 'territory', which shows the properties of a Non-Euclidean Klein space. A fundamental property of the intermediate space is the fact that it is confined between the other 2 regions, which are never reached in the cyclical trajectories of the inner cells of the space. For example, in a cell, the molecules of the organism will not touch the protein membrane or the central DNA nuclei. Thus, the inner quanta are confined within the Klein's disk by the 2 other regions, which have more energy and information and might destroy them and/or absorb their energy and information at will.

In abstract terms, mathematicians introduced in the XIX c. the concept of an *infinite, relative distance* measured no longer in terms of static space but in terms of time and movement, as *the distance between the point and a region that cannot be reached*. Thus Klein defines a relative infinity, as the region beyond the discontinuous membrane whose insurmountable borders the inner time-space quanta can't cross, as a cell cannot go out of a body, an atom beyond C speed or 0 K temperature and a man beyond the Earth's atmosphere. Thus, the informative center and external membrane become the 2 relative infinities or limits that the movements of the intermediate point cannot breach.

As in the myth of Achilles and the turtle, Achilles never arrives because every time he moves he crosses a smaller spatial distance. The same happens in a fractal space-time, when a point moves *temporally* towards its inner or outer space-time limit and finds an increasing resistance to its movement, till finally it is deviated into a cyclical trajectory around the outer, energetic membrane or the height dimension of the inner informative singularity or is destroyed. So the intermediate, fractal cells of the point circulate in parallel cycles always inside the interior of the sphere with contact zones of the type A *(central, 2nd row of figures in the previous graph).*

In a human organism, the blood system might seem infinite for the red cells that transport energy since they never reach the outer Universe. For that reason in the drawing, Klein interprets the intermediate region of the Non-Euclidean point as an infinite *circle with an invisible, unreachable membrane,* whose motion-distance is unreachable, hence infinite, equaling the 'space-time distance' between the intervals B1-B2 (long) and B2-B3 (short but difficult to cross), despite being B2-B3 increasingly shorter in space. Since the quanta take longer in each step and don't reach the membrane. This is often due to an increase in the 'density' of the space, which despite having less distance has more 'points' in its network, such as the case of black holes or jails. When those inner points reach the membrane at point C they become destroyed or deviated.

Thus, the entropic membrane and informative center are discontinuities that isolate the intermediate cellular quanta, creating a territorial 'World' within the point. Those discontinuities are called in Geometry a relative infinite, in Biology a membrane, in Sociology or Topology a national border, in fractal theory a co-dimension of a point. A key advance of ¬E is – given the fact that all points have dimension and volume, to define 0 as a finitesimal 0'. Indeed, *absolute zero does not exist, it always leaves a finitesimal 0' motion. Emptiness is undefined. What was there leaves a memory of it - a corpse removed leaves a DNA trace. Ideal mathematics tries to be a perfect mirror of an imperfect Universe. Yet those imperfections properly explained are absolutely essential to the fabric of reality as it is, helping enormously the 'real modeling' of mathematical structures.*

0' and – motion/mass will help then to understand Lorenz Transformations, the c-the limit of energetic speed and 0' k limit of temporal, formal stillness, as relative 'scalar' limits of the Universe - the limits of the fractal space-time membrane of light and its evolved electroweak T.œs. Since the Universe has at least another bigger gravitational membrane, in which smaller >c particles cooler than 0' K (tachyon neutrinos as gravitons?) -exists; in a Cosmos of ∞ scales, which extend beyond human limits of perception.

Recap: Topologies of Fractal points are organic, maximizing ¡ts energetic, reproductive and informative dimotions.

2ND POSTULATE. COMMUNICATIVE WAVES OF ENERGY AND INFORMATION. STŒPS.
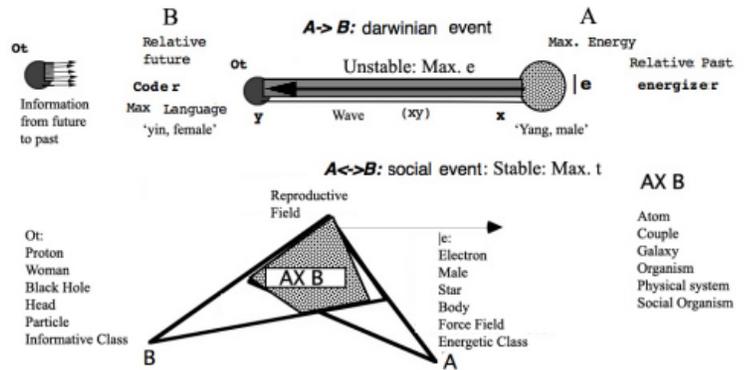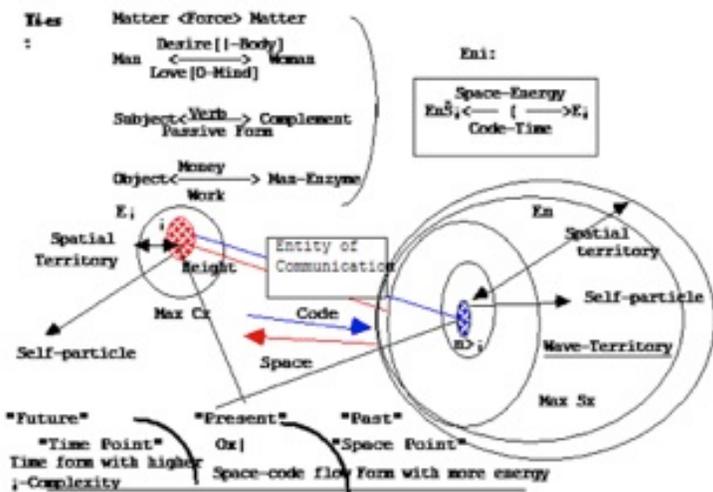
The 2nd postulate defines lines as waves of points with volume (which explain complementarity wave particle), no longer as an abstract form like Euclidean geometry does, but as a physical wave of self-similar, fractal micro-points that carry energy and information, as they move between 2 macroscopic points, with 2 possible functions, to communicate energetic forces or linguistic information.

2nd Postulate: A cycle of fractal space-time: 'A wave of communication is a group of self-similar micro-points that move in parallel lines between 2 macro-points, transferring energy and information between them'.

In Non-E geometry a line with parts is not defined by a sequence of numeric intervals within a straight line, but by the communication of 2 poles of energy and information that establish a flow of particles in 2 opposite directions, creating a simultaneous, paradoxical wave. Such waves again can have different purposes. A wave dominant in information communicates symbiotic particles, creating an informative bondage/network; a wave dominant in energy might be an aggressive action between different species that fight for each other's vital energy or territorial space; and a wave that balances the energy and information of both points meets in the center, creating a new self-similar, seminal particle, as when 2 electrons emit waves of densely packed photons, which merge in the middle and give birth to another wave.

When we observe a one-dimensional line as a form with inner parts it becomes then a 4-dimensional wave made of cyclical points with motion. Hence in quantum theory we say that any particle in motion has associated a wave.

Thus the 2nd postulate resolves the wave/particle duality, as all lines are now waves traced by a point with inner volume. Further on, since all lines have volume, they carry information and so all forces can in fact act both as a source of energy and as a language of information - as physical experiments prove. A ray of light in detail it becomes a 4-dimensional wave with electric height and magnetic width, often exchanging flows of energy and information in action-reaction processes of communication between bigger points.

When we generalize those concepts to n-points we can define a space as a network of Non-Euclidean points. Indeed, Riemann affirmed that a space is a network made of herds of points with similar 'properties'. Planes of space are therefore networks of points. The self-similarity of their properties defines its *density* determined by the number of points and its proximity that grows with self-similarity. So similar points come together into a tighter, more continuous space; whereas the density of the space is proportional to the similarity of its points, till reaching 'boson state' of maximal density when points are equal. And when a volume of spatial energy is very dense, it is very difficult to go through it, as it happens in the ultra-dense, small space of black holes.

Spatial extension and form/density/mass are inverse parameters, Max. T = Min. S. If we generalize that property to all scales, we can define different fractal spaces by its proportion of mass/density and energy /distance. This is done with 'Universal constants' that explain the proportions of energy and information of those spaces.

For example, in physical scales, there are 4 fundamental space-times, the gravitational space-time between galaxies of max. energetic space and minimal formal density; the light space-time of our world, which carries information in the frequency of the wave; the electronic space-time of atoms with more formal density and lesser spatial speed and finally the quark-gluon liquid of atomic nuclei and probably black holes, with maximal density and minimal space. All of them are defined by Universal constants and equations that are either ratios between the energy and form of those space-times, or define the transformations of one space-time into the others. Einstein's field equations would be the first case, defining the relationship between energy and mass in a gravitational space, while the fine constant of electromagnetism would define the transformation between light space and electronic space/ charge; and the gravitational constant between gravitational space-time and quark/mass. Where the relative densities of information and extension in space of those space-times are in balance, such as $\Sigma TxSi=K$. Thus electrons move slower than light but have more density.

All this said it is thus obvious that the *fundamental unit defined by the 2nd postulate is no longer a point but an action, Tex Si= k between points, a dimotion.*

2nd postulate in physics S=T: T-Wave motion and S-particle information. Quantum & General relativity.
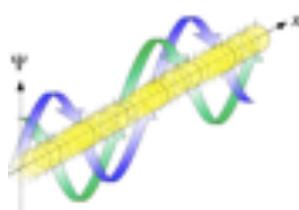
Form=space and Motion=Time manifest in physics as particles and waves: the wave erases form into motion, the particle is a still state that gauges information entangled to other particle, fermion and boson, still to each other – despite the perception of relative motion in our scale – hence the information electrons share has always a c-constant speed. This is the 'rational' 5D explanation of both the c-constant of light and entanglement; as electronic beings perceive information in 'stop position to each other' and move in 'wave state':

Motions are perceived by particles that stop motion into form, into information, as distances. In terms of fractal reproduction of information we can define motion as the reproduction of form, between those 2 scales: when the particle moves dissolves into its Δ-1 parts as a wave that imprints an Δ-2 potential field, with its Δ-1 wave form and stops to become a 'tight' Particle state that 'gauges' information, form in stillness

Galilean relativity was ill-understood, as the true question about time-change was why 'we see systems still when they move', and 'why we see space as continuum, when in detail is made of quanta', and why all systems are made of smaller self-similar systems. So there is NOT really a Dimension of pure spatial form or a pure time motion but a combination of both, even if mentally we tend to reduce motion and focus on forms, all has

motion=time, and form=space, and this is truly the meaning of 'spacetime', the messing of both into 5 dimotions, the fundamental element of all realities. If we see slow motion in the night a light it seems a long distance. Distance and motion cannot be distinguished so they must be taken as two side of the same being, a Space=time ĐIMOTION (ab. Dimensional Motion):

S= T; Dimension-Distance = Time-motion = ST Đimotion: **Dimensions + motions = Dimotions**

When we perceive the system in space, then we perceive an organism with 3 adjacent topologic elements, and its forma science is 'vital topology'. And when we perceive them through its scales the organic system becomes a supœrganism. Finally when we perceive the system in time we perceive a cycle that returns to its origin as a zero sum, which observed through all its scales will be a life-death cycle, common to all systems where life is the arrow of information and future, death the arrow of death entropy and past, and both together form a worldcycle.

Measure density of Dimensions. The concepts of 'filling space', 'memorial time persistence' & ST-hollows.

An essential problem to both mathematical mirrors and reality is the measure of Dimensional motions as we have an essential equality S=T in each plane between form and motion, and a scalar reality. So the value of a motion can be that of a dimension, as *motion is the filling reproduction of a form along a path of adjacent forms (see paragraph on golden ratios). But* in strict sense, 'persistent full space' is the maximal dimensionality possible of a system, when the reproduction in a single plane both durability on those reproduced parts, and the system can fill not only the plane of space but also all its smaller scales. This allow us to define a space without 'scalar voids' and 'dying' steps, as the most 'continuous' possible space, which happens to be lineal and orthogonal, for an absolute filling, i.e. the Cartesian space. So we define a dimension in scalar terms, whereas a classic single plane dimension is the limit for a 'filled persistent space':
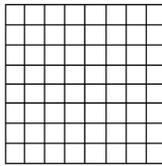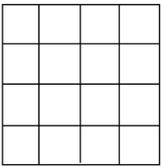
$$\text{dimension} = \frac{\log \ (\text{number of self-similar pieces})}{\log \ (\text{magnification factor})}$$
$$= \frac{\log N^2}{\log N}$$
$$= \frac{2 \log N}{\log N} = 2$$

A square may be broken into **N²** self-similar pieces, each with magnification factor **N.** So the dimension of a self-similar object is the exponent of the number of self-similar pieces with magnification factor **N** into which the figure may be broken.
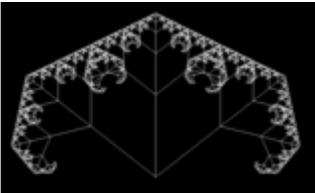
Whereas the 'persistence' of memory, of information, creates the solidity of space dimensions (if a point erases without persistence, we talk of a 1D point, where motion doesn't really add to the 1D inner Dimension of the point. But the value of the motion dimension, if persistence is equal to the life of the point, reaches Dimension 2. And S=T is absolute. S=T however holds if our measure of the system is reduced in time to the persistence of its reproduction. Further on, dimensions are relative to the scale in which we measure as the smaller scales will have more 'hollow dark spaces' that differentiate the parts. This means if we measure the dimensions of the system across scales in a 5D view of transversal 'tree branching dimension' of wholes and parts (5D), we will find hollow spaces. So 2 scales do not add dimensions to infinity, but have an intermediate value.

For example the Sierpinski triangle generated by the commonest fractal ternary tree has dimension 1.58. While the most famous bifurcation, the The Feigenbaum attractor has dimension + 0,5; and inversely a 4 bifurcation (H-fractal) gives us a full filling, 2D. It is another 5D metric paradox: the information of lower scales is larger but its spatial extension smaller. As a subjective observer reduces its dimension of perception to 0 in its Δ±4 scales. But the objective Universe is a whole completely filled, packed, as a block of spacetime, where time motions 'enlighten' just a part of the entire 'potential block' of scales. Thus we postulate an ∞ being of ∞ scales and ∞ time, the whole which fills its potential block *with all potential forms. And yet since ¬Æ can prove that the*

whole filling of the void is a finite number of potential existences, variations of being are limited and so all forms are immortal repetitions.

Recap: Non-Euclidean points constantly communicate energy and information with other self-similar points and the external Universe, by sharing flows of micro-points of a lower scale of space-time, which carry the energy and form of the particle into the external universe. The laws that define those acts of communication are hierarchical laws between planes of space-time and laws of balance between the energy and form of those 'actions' of communication, exi, which become the fundamental dynamic event of any scale of the Universe. Events in the Universe are limited by the ternary principle. Actions of communication also obey the principle: There are energetic, informative or reproductive events, creating often complementary systems with an energetic pole or body and an informative pole or head, communicated by a dense network or neck that carries the actions. The 5 Postulates of non-Euclidean geometry are based in the definition of a fractal point as a point with inner parts, revealed when we come closer to the point. According to such definition, lines are waves of points and planes topological networks of points, communicated through flows of energy and form. While equality requires also equality in the inner form or information of the point, which prompts communication through waves of energy and information that build networks. Communication between points is now possible because points can fit infinite parallel/waves used to gauge the Universe and create an inner image of reality. Non-Euclidean fractal geometry thus improves our vision of the Universe closer to reality and allows the definition of organic systems and logic behavior in bases of geometrical form, a long-sought dream since the times of the Greek.

-3RD POSTULATE. THE FUNDAMENTAL PLANE OF REALITY: SUPŒRGANISMS: **ITS TERNARY FRACTAL NETWORKS.**

The full realization of what Non-Euclidean vital topology means for our understanding of reality with its mathematical mirrors come into being in the 3rd postulate which defines PLANES OF EXIST¡ENCE, the fundamental unit of the scalar universe, as superorganisms which require 3 lines to be defined, as in classic Euclidean geometry, since now *those lines are either waves of herds that shape an ecosystem or fractal, physiological networks that connect parts of Δ-1 with wholes in Δº, becoming superorganism.*

So the mathematical definition of a superorganism or ecosystem, is a 'non-euclidean plane of exist¡ence in the fifth dimension'. The mystical poetry of that definition should not escape the mathematician. The laws of topological superorganisms does become 'enlightened' by the classic laws of plane geometry.

We do use though more often the 'term' scales of exist¡ence for planes, though in most cases both concepts are interchangeable, whenever 5D becomes mainstream and reaches certain rigor, the researcher should consider the difference between a 'scale', which is a decametric 'subset' of the 'whole', which is the plane.

Because a plane has inner volume – within its points - it is a cellular, organic topography, a network of self-similar points. And because networks of points of energy and information are complementary, often we find systems with 2 complementary networks that form ever more complex geometries – based in the geometrical dualities of lineal energy and cyclical information – with the results we observe in nature: *the creation of an enormous number of complementary systems which are, as we shall see latter, all of them self-similar in its geometries and functions. Thus,* the types of Non-E planes of space-time range from the simplest Euclidean planes to the more complex organisms with a volume given by the relative point/beings that form its space-time networks.

The 3rd postulate defines planes as the intersection=messing of 3 'lines=networks' or waves of points in motion, which carry energy and information; to its cells, defining the biotopologic plane, a physiological system with 3 networks or Non-Euclidean plane. Thus vital topologic evolution is the missing link to complete biology besides genetics (in 5D explained as the lower plane that codes with its faster cycles the larger biologic whole) and Darwinian struggle (fully explained by the congruence principle of Darwinian dissimilarity) vs. eusocial evolution (in its own an entire new discipline) fully explained by the similarity of parallel beings that COMMUNICATE information in a code or language all can understand so they can coordinate its actions and become stronger as a

whole. So *similar clone beings form topologic ternary networks that become superorganisms, wholes made of Δ-1 parts, themselves wholes of Δ-1 parts through 3 5D scales*

Stiences study those organic systems, tied up by networks of Đimotions. In the graph, we see the main st-planes studied by human sciences and their 4 main time arrows, $ x ðf,$ which in static space give birth to the 'organic elements' of all species: social cell of energy and information and the reproductive networks that relate them. Thus, there are 4 basic elements in all organic systems: **Cellular** units. **Networks** that move the system (limbs/potentials) **Networks** of fractal information (heads/particles). **Networks** that reproduce vital energy (body/waves)

All species studied by science a common phenomenon occurs: the existence of parallel groups of beings organized into a single social form. Molecules are made up of atoms and electronic networks; economies are made up of human workers and consumers that reproduce and test machines, guided by financial networks of information (salaries, prices, costs); galaxies are composed of stars, which orbit rhythmically around a central knot, or black hole of gravitational information. Cells controlled by the nervous, informative system organize human bodies.

A tree is a group of leaves, branches and roots connected by a network that provides energy (salvia) and information (chemical particles) to its cells. Cultures are made of humans related by verbal, informative Disomorphisms and economic networks that provide their energy and information.

Vital topology studies those fractal Super-Organisms of Time space (Ab. T.œ) whose Δº networks of Δ-1 points form the 4th and 5th dimotions of social evolution and entropy between parts and wholes.

Thus, a plane becomes a real topography made of points with volume, extended as a cellular surface. We can observe its surface as a bidimensional membrane of information (for example your skin, or the screen of a computer made of pixels, or the sheet of this work). Or we can consider the 3-dimensional inner structure of its points and then it becomes a network with inner motions, as those points will form a lattice in which they communicate lineal flows of energy and information that maintain the lattice pegged. Often 2 topological planes of energy and form combine to create a 4-dimensional organism. Such is the most common structure of the Universe, a 4-dimensional World, which is a Universe in itself, made of self-similar cells or networks of points that constantly exchanges energy and information within the ecosystem in which it exists:

In the graph, we see the ternary network structure of the nested organisms of the fractal Universe as ¬Æ topological planes composed of 'similar fractal points' (atoms, cells, individuals) joined by 3 physiological lines=networks, whose 3

Biology
Energy Networks: i=0 ±1
Water, Cytoplasm
Networks of Information: Genetic Orders.
Entropy networks: Walls, Golgi reticles.
Cellular species: Carbohydrates

Theory of Organisms i=∞

Chemistry i=±2
-Networks: Electronic, chemical, gravitational forces
-Cellular species: Atoms, molecules, electrons.
Entropy networks: Atoms, ¥-forces

Physics i=-3,4
-Networks of Energy and Information: Electromagnetism; gravitation.
-Cellular species and Organisms: from simple quarks to atoms
Entropy networks: Fields

Zoology Entropy networks: ecosystem, prays
Networks of Information: Nervous systems.
[Animals] Networks of Energy: Blood Systems
Species communicated: cells.

Economic ecosystems [Metal, humans]
-Networks of Information: Monetary systems, Metal-communicators [press, radio, Tv, net]
- Networks and Species of Energy: roads, pipes, electricity, machines.
- Species communicated: Humans, metal-forms.
Entropy Networks: l-metal weapons: war

History [Humans] i=+2
-Networks of Information: Wor[l]ds: Verbal Gods, Laws.
- Networks of Energy: Nature's rivers; Human work, welfare Agriculture, Human Goods.
- Species: Humans.
Entropy networks: Gaia, territory

Astronomy: i=+3,4
Cellular species: Stars, planets
Organisms: galaxies
Networks of Energy and Information: Gravitation, light, Space-Time.
Entropy networks: H...nds, Dark entropy

functions, distribution of locomotion, information and its 'combined' energy define the 3 conserved Dimensional motions (ab. Dimotions) of any system of the Universe.

There are only 3 variations of topologic space in a single "plane of the fifth dimension', the hyperbolic, elliptic and toroid topologies. So the fact that we are made of space means we are made of 3 type of organic topologies:

Spheres are the topology that holds the maximal volume of information; hence all 'time space' systems that process information are spherical particle-heads. Flat, lineal topologies are the topology that connects in the shortest path two points; so to reach/move faster, systems have lineal/flat moving potentials/limbs.

Finally the third type of geometry, hyperbolic topology, is complex enough to store all other possible forms, so best to reproduce. So all iterative bodies & waves that generate the other 2 forms are hyperbolic. This mathematical-spatial truism holds for 2, 3 and 4 dimensions; hence establishing a basic restriction to the construction and evolution of forms. It explains the efficiency, speed and homology of formal=functional, 'punctuated' evolution, from biology, without the need of 'intelligent design' to engineering (no longer analogy, since all forms derive from the same 'substance', space=form with time=motion or 'topology'). In all systems the 3 only topologies of the Universe ensemble to form physical, biological and social organisms, all of them with a spherical 'tall' dimension to gauge information; a wide, iterative dimension of hyperbolic bodywave reproduction and a flat, direction for its entropic motions. Each of those 3 topologic Timespace forms can 'deform' and 'move', as long as they don't tear (break). All T.Œs are variational local fractal species of that ternary ensemble, seeing as *a simultaneous space supœrganism, which lives a sequential worldcycle in time,* whose 3 conserved Dimotions in a single plane, $|$-limbs/fields$<Ø$-body-waves$>§ø$-particle-heads become in space functional topologic organs ordered in time in 3 consecutive-ages of dominance of each organ-dimotion between '4D Generation' in the cellular/atomic plane of seminal birth Δ-1»Δ1 and 5D extinction, back to the Δ1«Δ-1 atomic, cellular plane: the young age of max. $|$-locomotion, the mature age of $Ø$-body-wave reproduction and the 3rd age of O-informative warping/ wrinkling and minimal motion. Those 3 ages of all T.œs (Time§pace organisms) apply also to languages, including mathematics, evolving from a young Greek age of lineal 'flat' geometry, to a mature age as a realist mirror of the scalar Universe with analytic geometry and calculus that gave it motion and scalar depth studying its finitesimal parts and wholes to a 3rd age of inflationary information and mathematical fictions unconnected with reality (set theory, NOT points, numbers and operands as its foundations, axiomatic method NOT experimental proof); to start again as the mind of a 'different mind species' – chips now evolving its young simple Boolean algebra:

So the vital space of superorganisms is made of 3 topological forms; and its cyclical time, and clocks that measure the duration of the existence of all beings, by the frequency of its logic cycles of information, accumulate constantly form, T>S, in 3 ages, first dominated by pure motions, (2D) in youth, balanced in the reproductive mature age (3D), to finally exhaust its energy warped and wrinkled into form (1D), which will explode entropically in the moment of death (5D).

Both together show the 'Disomorphic'=equal form of all 5Dimensional beings, organic fractals, whose scalar structure is the same for all space-time beings, in all stiences, which study according to its relative scale of size and speed of time clocks a different metric scale of the fifth dimension. So we introduce another element of vital mathematics, the ternary structure of all systems of nature of which the previous fractal points of physical systems are its simpler forms.

Because the Universe is Generated by the properties of space and time, better reflected in the mirror languages of mathematical topology and social numbers, and logic, we could say safely that since 'we think therefore we are', that is, we perceive as humans a limited range of reality, with our space and time languages, for humanity, the Universe is generated by mathematical and logic languages. And so by studying formal sciences of mathematics and logic, we can describe the Universe. We can talk then of a Universal topology, from topos, the

language of geometry in motion and logic, the language of causal time cycles that create and repeat patterns of reality.

How many world minds those 2 languages generate varies according to the complexity of each being in existįence.

We humans, in the present not very enlightened age live in a single dimension of time, and the simplest, most dangerous of them, lineal entropic time, and a single scale of space, sub-divided in 3 lineal dimensions of height-information, width-growth and length-motion. And that is all. But can talk of more complex beings, with dual, ternary, penta and Dodecalogic levels of entangled thought gradually used here.

What we mean by 'space-time beings? Space is 'form', 'distance', 'dimension', 'information', something that doesn't move. And time is motion, change. So spacetime would be a 'form with motion', which is what mathematicians call a topology. A form that can be deformed, trans-formed. We have coined a key word 'Dimotion' (dimensional motion) for those topological forms. So the first obvious question we must answer is what means in real terms, the fact that all what exists is made of spatial topologies and temporal ages, of Space and Time? The answer is fascinating, as there are only 3 variations of mathematical space in a single "plane of the fifth dimension', the so called hyperbolic, elliptic and toroid topologies. So:

'All entities of the Universe are topological systems made of 3 'dimotions of spacetime'. Since *in the whole Universe in either 4 or 5 Dimensions there are only 3 topological varieties of form with motion; the 'elliptic particle-sphere' , the 'hyperbolic bodywave' and the 'toroid, lineal limb-field', illustrated in the next graph for the 3 kind of species studied by the 3 disciplines of science, physical, biological and human 'stiences':*

The 3 elements of all systems, lineal/flat limbs/potentials; spherical, tall heads/particles and its hard membranes of dark matter, trunks and skins accomplish the 3 functions of motion, energetic reproduction and informative perception in all systems, varying to adapt the system to its larger world.

Thus, there is a parallelism between 'vital function' and 'abstract dimension' as *each Dimension is diffeomorphic created by the vital space-time of each entity of the Universe performing its 3 survival dimotions= åctions of gauging, moving, feeding and reproducing.* And each species is a 'fractal universe in itself', with different relative, energetic and informative directions that determine its own up & down arrows and complementary morphology.

The specific geometry of each species and its 3 simplex åctions, energy feeding=length, information-gauging =height and reproduction=width fluctuate in shape, but they don't vary in topological form, giving birth to the Invariance of the 3 topological forms=functions of any entity observed in a single 3D space-time: Toroid informative heads, hyperbolic reproductive bodies and energetic limbs.

While the 2 social ±Δ fractal dimensions, the 4th dimension of social motion in a social Δ+1 herd and the 5D dimension of inner scales within the being follow the physiological invariances that create super-organisms co-existing in a *higher Δ+1 ecosystem with a lower Δ-1 internal, cellular space.*

Numbers as forms. Networks. An interdisciplinary study.

As difficult as it might seem to 'monologic' man, who so much loves single ceteris paribus cause, reality is intelligent because it is entangled 'pentalogic'. That is, the symbiosis of the different elements of reality make it that complex, balanced and beautiful. And so happens with its mirrors. For example, we have observed the ternary nature of physiological networks, which are made of 'social numbers' in scales of parts and wholes. This gives nature to the 3±į pentalogic structure of reality, and when 'doubled' bilaterally across its S=T symmetries to decametric scales. So numbers as elements of a non-euclidean line, either a wave or a network follow also 3x3±į decametric scales. Let us study both together decametric numbers and physiological networks.

Pythagoras as Plato latter said that numbers are forms, as they were in the earlier age of mathematical geometry, where a number was a group of points, whose *form mattered. So he realized 10 was the perfect number, because of its perfect form, which in fact becomes the 11th dimension of a new 'whole'.*

And indeed the internal structure of any being reaches its perfect efficiency with a 3 x 3 +0-mind symmetry of form and function; where each part-number performs one of the 3 physiological entropy, energy, information jobs of the system and the central mind-number in contact with them all coordinates its functions.

So we also talk of 10 inner dimensions or 'sub-systems', represented by a tetraktys:

In the graph, each 3 corners are sub-systems of 'Information, entropy/motion and Energy/reproduction' put together by a central 10th dimension (the black ball/hole/point/knot that messes with all of them). Indeed the central point of the ideal tetraktys communicates with all the other parts and embodies the whole that 'emerges' as a point in a higher Δ+1 world. Thus we talk of the 'subsystems' of a being.

For example, a human being is defined in medicine as a system of cells, attached by 10 sub-systems:

▲ MUSCULAR SYSTEM
The muscular system consists of layers of muscles that cover the bones of the skeleton, extend across joints, and can contract and relax to produce movement.

▲ SKELETAL SYSTEM
The skeleton is a strong yet flexible framework of bones and connective tissue. It provides support for the body and protection for many of its internal parts.

▲ CIRCULATORY SYSTEM
This system consists of the heart and a network of vessels that carry blood. It supplies oxygen and nutrients to the body's cells and removes waste products.

▲ NERVOUS SYSTEM
The nervous system is the body's main control system. It consists of the brain, the spinal cord, and a network of nerves that extend out to the rest of the body.

▲ LYMPHATIC (IMMUNE) SYSTEM
This system is a network of vessels that collects fluid from tissues and returns it to the blood. It also contains groups of cells that protect the body against infection.

▲ RESPIRATORY SYSTEM
The respiratory system is centered on the lungs, which work to get life-giving oxygen into the blood. They also rid the body of a waste product, carbon dioxide.

▲ ENDOCRINE SYSTEM
Many body processes, such as growth and energy production, are directed by hormones. These chemicals are released by the glands of the endocrine system.

▲ DIGESTIVE SYSTEM
The digestive system takes in the food the body needs to fuel its activities. It breaks the food down into units called nutrients and absorbs the nutrients into the blood.

▲ EXCRETORY SYSTEM
The body's cells produce waste products, many of which are eliminated in urine. The job of the urinary system is to make urine and expel it from the body.

▲ REPRODUCTIVE SYSTEM
The male and female parts of the reproductive system produce the sperm and eggs needed to create a new person. They also bring these tiny cells together.

FEMALE

MALE

In the graph upper left 3 ST-ructural human body sub-systems are its membrane, sustain and motion.

Bottom 3 'chemical ðƒ' systems or hormonal brain (creative, distributive and reproductive). And the nervous system singularity-mind… of the whole. Those graphs show that as we grow in planes, the ideal geometry of the lower 'atomic planes' disappear, as long as the 'logic concepts behind it' - hyperbolic fractal body-waves branching, bilateral symmetry, etc., remain. Since function is more information than form.

So the convoluted bilateral networks that connect the singularity brain with all its antipodal points of elliptic geometry have the same function that an antipodal 'representation of a non-Euclidean' sphere.

Yet in the human organism, the lines that connect them is not made of straight lines but it does work because what matters here is the symmetric territorial order of the singularity which constructs its membrane with opposite 'rays'/nervous lines and will constantly balance and hence act as a leverage with its ±inverse directions for its antipodal elements, two hands, two kidneys, and so on.

Morphology then starts with simple laws of Non-Euclidean topology, which become disguised by the adaptation of each function to the available space within a membrane, as the T.œ adapts to its outer world.

The 3x3+1 physiological systems of the human being, lost its 'ideal' mathematical symmetry, translate to 'existential algebra' the concepts of decametric scales. They can be easily subdivided in 3x3+1 Nervous integrative mind system, but also in the fractal entangled Universe, into 5 x 2, positive and negative dimotions. For example, the entropic system branches in 3 the digestive, respiratory and excretory systems, which feed the Dimotion of locomotion, sustained by the Muscular and skeletal system; the reproductive ST system branches in 3, the blood, circulatory, reproductive and excretory systems; and the informative system, in 3 Nervous, lymphatic and endocrine systems, whereas the Nervous system doubles as the one site of consciousness, origin of the Dimotion of perception, and social evolution of the whole.

Physiological networks then belong to a different branch of geometry, fractal networks, which are more efficient in the distribution of the 5 dimotions of exist¡ence between parts and wholes of the Δ±1 scales and so we introduce the concept of a number *as part of a social* network by merging Non-E topology (2nd postulate) and Number theory.

In that regard, a complex analysis of the simplest numbers shows that the more perfect form is the 10-cellular system or tetrarkys, in which 3 x 3 triangular corners act as organs of energy, information and reproduction with a 10th central element that communicates all others and acts as the one of the higher scale, representing the entire organism.

Thus as the number of cells grows, the topology of the system will grow in degrees of freedom and complexity till resembling more and more the repetitive, geometrical forms of social organisms. Topologies become thus at the end, complex networks, adapted to different functions of complex organisms.

As abstract as all this might seem, when observing nature we shall see how those type of events, waves and social planes happen in all the scales of the Universe, from atoms which form crystal networks based in the equality of the same atoms or at best in the existence of a 'body-mass' of equal atoms intersected by a few 'stronger' atoms that form a complementary network of higher resistance, to the body rejection of cells with different DNA.

What things we can do with numbers can reflect then many of the actions of its networks. For example:

- We can study how social groups organize themselves or fluctuate between states=functions. This is the study of the internal point of view of networks as a collection of self-similar points. Those changes of states are often defined by a differential equation as informative systems have less spatial extension/motion but are more complex networks with more bits of information=points. Thus differential equations, most of them of the type $Y(t_i) = aX^3 \pm bX^2 \pm cX \pm D$, express $\sum Se <=> \prod Ti$ transformations, where Ti is a network in 2 or 3 dimensions of time bits, bits of information and Se is a network with one (same organism) or 2 (Darwinian feeding) scales of lesser complexity than Y, such as $f(x) = Y^n$. It follows from the Fermat Theorem that there is a restriction to the number of solutions a system can find, which is n=3, the maximal number of dimensions an informative sphere can have as it displaces itself over a plane of energy.

The relationships between limbs and heads that exchange in a 3rd region called body, form and motion, such as the head designs the motions of the limbs, which move the head, and both exchange in an intermediate region of elliptic nature called body more subtle types of form and motion to create more complex cycles that will in fact reproduce both systems can be mathematized in infinite different ways, using matrix, combinatory theory, differential equations, polynomials, Riemann surfaces, etc.

-      We can study how networks grow and multiply creating new species and we can add them and observe how they reorganize creating curves which are differentiable to obtain the rate of grown and diminution of the organic population. The study of herds of energy and networks of information in its life cycle is one of the key disciplines of all sciences specially physics and ecology.

-      We can study them as networks with form through its geometrical ways of exchanging energy and form, from the simplest point to the line of 2, the triangle without a central focus, the structure of energy, which can however turn into a pi-cycle, the 3, the 4 with its zigzag, solid quadrangle and cross structures, the 5 and first 3 dimensional structure, and so on.

Each number will increase the possibilities of the game, yet when we reach 10 we play a perfect game with 3 triangles that act as organs of energy, information and reproduction, and a central point both in a 2-dimensional or 3-dimensional geometry, acting as the collective action/will/intersection/knot of all cycles – the first clear, complete ego structure in 3 dimensions with perfect form and complementarity. Thus beyond 10, while some numbers might bring slight improvements to the cell, most forms are just growths of the primary numbers in multiple associations.

Recap. All the structures of mathematics, regarding of the notation we use, reflect events and forms of knots of time arrows (st-points or numbers), as mathematics is a language whose grammar derives from the Universal grammar of spacetime. Numbers are thus formal networks that try to achieve the essential arrows of time. And so certain numbers (1, 2, 4, 5, 7, 10) deploy better those arrows and are the commonest on nature.

-      We can study the evolution and reproductive creation of new networks with successions and combinatory is important in multiple time-spaces since we find always complementary systems of reproductive energy and information, each one with a ternary choice of evolving differentiation (energetic, informative and balanced species). So especially in the classification of species of different sciences we shall find simple combinatory laws that explains the differentiation in 3, 6, 8 and 10 elements depending on the triads and dualities of multiple space-time systems.

-      We can study a key antisymmetry of time and space expressed with the language of probabilities: Sequential events are studied with probabilities in time, whose symmetry in space are the study of percentages of populations in space, such as if each event in time is the birth of an individual of a population both probabilities and percentages are the same.

This confused physicists in some cases, as in an electronic nebulae, which is a population of fractal electrons in space, but it is studied as time probabilities, and created the bizarre theory of multiple universes (multiple, probable electrons) instead of a fractal Universe (fractal self-similar micro-electrons, which are bundles of ultra-dense light forming a nebulae which also acts as a 'whole' electron, self-similar to its parts). Thus the study of probabilities in time events and growing populations of a wave of space-time cycles is an essential tool: we can study the proportions, herds, groups and networks of self-similar st-points in its evolution either with probabilities or differential equations.

4TH AXIOM=POSTULATE OF RELATIVE CONGRUENCE: SIMILARITY, ¡NDIFFERENCE, TRANS-FORM-ATIONS.

SOCIAL MINDS EVOLVE INTO ORGANISMS.

The law of eusocial evolution, natural to all species, which evolve together, sharing energy and information through common networks, when they recognize each other as equal being, cells of the same superorganism, is confronted by the law of darwinian devolution, in which species that consider each other different ab=use the others as relative energy of their selfish agenda.

In human superorganisms, the laws of eusocial evolution were perfectly defined by the great prophets of love, in the old age, by the messages of love of Buddha, Jesus and Mhmd, in the modern age by the work of the r=evolutionaries of history, with their motto 'egalite, fraternite, solidarite' and the socialist vision of a planet ruled by social love.

4th Postulate: Equality is no longer only external, shown in the spatial perimeter of any geometrical form (Euclidean congruence) but also internal and further on it is never absolute but relative, since we cannot perceive the entire inner form of a point – hence the strategies of behavior such as camouflage. Forms are self-similar to each other, which defines different relationships between organic points, according to their degree of self-similarity. The *4th* postulate is thus the key to explain the behavior of particles as the degree of self-similarity increases the degree of communication between beings. Some of the most common behaviors and 'events derived from this postulate are:

1) Reproductive functions in case of maximal self-similarity or complementarity in energy and form; $ei \to Sei$ or Max E x min. I (male)= Min. e x Max I (female).

2) Social evolution, when points share a common language of information, $i=i \to 2i$.

3) Darwinian devolution when forms are so different they can't understand each other's information so instead they feed into each other: $i^1 i$. In such cases if those 2 entities meet they will start a process of 'struggle for existence', trying to absorb each other's energy (when E=E) or simply will not communicate (when E^1E, since then there is neither a common information to evolve socially nor a common energy to feed on). Yet because any point absorbs only a relative quantity of information from reality, similarity is relative, faked for purposes of hunting with biologic games such as camouflage or sociological memes that invent racial differences, allowing the exploitation of a group by another.

The 4th postulate defines systems as identical when they are equal in its 3 ternary parts, the outer angular momentum or 'membrane', its central Active magnitude or singularity, focus of the forces and the vital energy, *enclosed within them, and all others as similar with different 'angle of congruence'. We* distinguish 2 different interactions according to the degree of equality of its ternary parts, as systems can be symbiotic, if *their individual, cellular or atomic 'fractal points=parts' are similar enough, interacting through* its 3 physiological 'lines=networks' evolving in parallel creating an organic plane, as those described in the next graph for each scale=science, or they can be entropic, destructive, predatory, when they are dissimilar and don't speak a common language of information to coordinate its actions, whereas the stronger system will perpendicularly break and feed on the weaker one.

The geometric complexity of the 4th Postulate is caused by the topological forms created by any event that entangles Multiple Spaces-Times. Since it describes the paths and forms of dual systems, which connect points: Self-similarity implies parallel motions in herds; since equal entities will maintain a parallel distance to allow informative communication *without interfering with the reproductive body of each point*. Darwinian behavior implies perpendicular confrontations, *to penetrate and absorb the energy of the other point*. Finally, *absolute, inner and outer self-similarity* brings boson states, which happen more often to simpler species like quarks and particles that can form a boson condensate as they do in black holes, *where the proximity of the points is maximized. And indeed, the same phenomenon between cells with the same inner information /DNA originates the 'collapse' of waves into tighter organisms.*

| 1 Fractal Point 1D: T.Œ Generator Time§pace | 2nd Postulate:Waves 2Ð: Locomotion Skew | 3rd: Networks 3D: Reproduction Complementary Mirror: | 4th Postulate: Angle of Congruence Communication 4Ð: Social Evolution Social=Parallel | ¯5: Fractal Point 5D: Entropy Darwinian: perpendicular |
| ASYMMETRIC | DISYMMETRIC | BISYMMETRIC | SYMMETRIC | ANTISYMMETRIC |
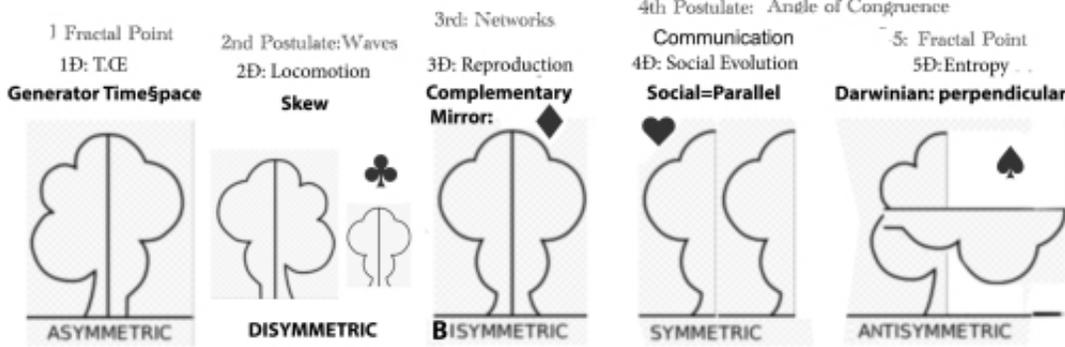
Finally if there is no similarity neither in body or mind, its existence as 'cat alleys', that never cross (relative invisibility). We talk then of Skew T.œ.s.:

The 4th Non-Euclidean postulate is implicit in the work of Lobachevski and Riemann who defined spaces with the properties of self-similarity (Riemann's homogeneity), which determines its closeness (Lobachevski's adjacency).

4th postulate of relative congruence & angle of parallelism as a mirror of its 5 pentalogic dimotions and variations of angle define Darwinian or social, reproductive outcomes to communicative events between fractal points.

Thus in praxis we assess similarity by an 'angle of parallelism' that increases social evolution into herds and supœrganisms, or perpendicularity that 'scatters' systems into entropic destruction – elements those of an entire fascinating new field of 5D topo-biologic studies that analyze in geometric terms, the vital topology and relationships between form and function in all systems of Nature from particles to organisms.

This simple geometrical truth however is essential to all systems of nature, whose angles of connection determine the functions and symbiosis between parts.

The Universe always starts with an asymmetric being, which can go both ways: towards a social evolutionary symmetry that lasts in time and implies a mirror parallelism, or an antisymmetric destructive, perpendicular event in which one part punctures and absorbs the energy of the other. It is the topo-biological ternary principle of non-Euclidean, Non-Aristotelian I-logic geometry that puts together both the biological and mathematical properties of reality. The concepts of symmetry=parallelism, antisymmetry=perpendicularity and asymmetry are mirrored by the 4th Non-E Postulate of similarity. But we can extend the concept of asymmetries also to asymmetries of time, between the young age of locomotion and the old age of information, of actions=Dimotions between the step and stop similar actions, and the entropy and social evolution actions, which bring us the final asymmetry of scales between the upper arrow of whole with more spatial size and the lower arrow of parts with more information. When those dualities: step-motion/stop-perception and scale up (5D: social evolution), scale down (4D: entropic dissolution) are put together we obtain the most complex balancing dimotion, reproduction, and when they are all added up in the existence of a being, we get its world cycle.

In the graph we can assess the different 5 mirrors in which mathematical Space and logic Time reflects the game of 5 Dimotions=actions of existence, which then expressed by territorial monads GENERATES its logic REALITY. In Geometry fractal points=monads will other through waves of communication of energy and information that grow into reproductive networks a territorial plane, creating a super organism, which will related to the external world according to its relative similarity=congruence, assessed by its angle of parallelism or perpendicularity.

In logic terms, a super organism, by breaking its formless asymmetry into different spatial configurations according to congruence (social parallel systems, complementary gender-mirror systems, Darwinian perpendicular systems, or systems that are dissymmetric and do not share any reality) builds a casual pyramid of growth from a fractal point through waves of communication into social networks that become ready to act - move, feed, perceive and evolve socially.

Since we must add to the mathematical and logic languages-properties of reality the 5 actions, or organic properties of the scalar Universe as essential to the game as they are its logic and mathematical more abstract laws - a fact the egocy of æntropic men of course reject, as it must remain in its monad-subjective monologic the only claimant to life properties.

Thus the pentalogic of generational space-time is established by its Non-Euclidean fractal points, its ¡logic congruence with reality in which it will order a territory to perform its 5 vital actions=Dimotions of existence, and the mathematical, logic and organic laws of those 3 languages will be therefore the bottom line of the 'Creative process' of the Universe - nothing chaotic except the entropic Dimotion, which conforms the monologic of huminds.

The Generator's Ternary Symmetries and Its S=T 1, 2, 3 Dimensional Analysis

There are 3 relationships in space-time between entities, which are part in non-Æ of the laws of the fourth postulate of similarity, that we *relate to the 3 elements of the fractal generator:*

ST: Complementary adjacency, in which in a single plane, *membranes of parts fusion into wholes*, and in multiple scales, parts become enclosed by an 'envelope' curve that becomes its membrain. Its main sub postulates being the realm of topology proper.

$t: Darwinian perpendicularity, in which a membrain/enclosure is 'torn', and punctured by a penetrating perpendicular, causing its disrupter of organic structure. Its main postulates being the realm of Non-Euclidean geometries.

§ð: Parallelism, in which two systems remain different without fusioning its membrains, but maintain a distance to allow communication and social evolution into herds and network supœrganisms. Its main postulates being the realm of Affine geometry.

The correspondence of those relationships with the 3 elements of the generator, $<ST>ð§ are immediate:

- ST-Adjacency allow to peg parts into present space-time complex dualities.

-$-Perpendicularity simplifies the broken being into its minimalist 'lineal forms', $t.

-§-Parallelism allows the social evolution of entities into larger §ocial scales.

They will define 'ternary organisms, in which the 3 topologies in 1, 2 or 3 s=t dimensions of a single space-time plane, can be studied in ceteris paribus analysis or together, *but no more, as all other attempts to include more dimensions in a single plane are 'inflationary fictions caused by the error of continuity'*

Dimensions thus must also be considered besides *the 3 logic relationships.* And there are 3 levels of complexity in dimensions, lineal, 2-manifolds and 3-D volumes that express also the ternary generator:

So for the 3 lineal coordinates, the equivalencies are immediate:

1D¡ Γ: $t: length/motion <ST width/reproduction> §ð: height/information.

As lineal length is the shortest distance between two points, height the projective geometry of perception from antennae to heads, and its product mixes them to reproduce in the width dimension where you store your fat...

External dimensions/networks of organisms: territories.

The key element of Non-E geometry are the 3 topologic regions of all systems, as that is the underlying structure that evolutionary topology develops, with a singularity, @, dominating a vital territory enclosed by a membrane.

It is the mixture of function in time through actions of survival that dominates the spatial ternary structure of those T.œs, which guides the understanding of vital geometry.

I.e. "Though most arachnids are solitary animals, some spiders live in enormous communal webs housing males, females, and spiderlings. Most of the individuals live in the central part of the web, with the outer part providing snare space for prey shared by all the inhabitants". *Britannica*
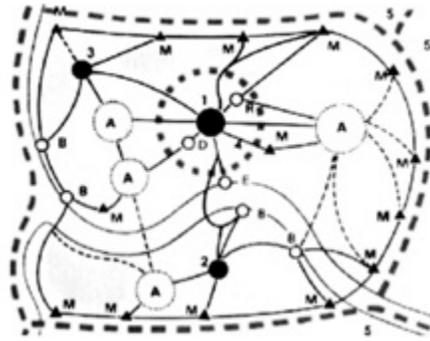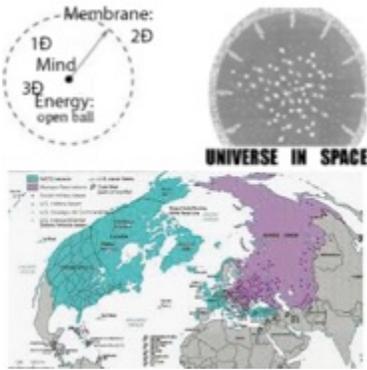
Indeed, regardless of the vital topology of the point, all 'build ups' of new geometric scales start with the simplest form, a 'bidimensional territory' with a membrane, a central singularity and the vital energy between them. So geometry not only evolves in the humind in complexity, it does so in the evolution of the vital topologies of new forms in each single plane:

In the graph, all systems regarding of its 'perfect geometry', have the same ternary structure, to which vital geometry adds motion, in a Klein-like Non-E structure, where borders of entropy=death can't be crossed; so they are relative infinities – military borders, balls of fire, membranes. On the left we study in more detail a mammal territory. Any animal territory is an i-logic space-time with 3 zones:

An informative central territory (1) or den, where animals reproduce and 2 secondary homes where the herd performs secondary organic cycles (2,3).

An energetic membrane (M, 5) – an invisible limit that provokes a confrontation if a stranger crosses it and where most energetic preys 'flee' away from the den of the predator.

An intermediate zone with cyclical paths of absorption of Entropy and information; where we find a hunting territory, places to drink (E), to bath (B), socialize (A), defecate (D), etc.

In organic terms, a dimension is a network. So a living organism can be considered a sum of cellular quanta united by 3 basic space/time discreet dimensional networks, which are its physiological systems: the digestive/energetic network, informative/ nervous network and reproductive/blood networks around which cells teem, creating a stable, organic st-point. In other words the Entropy and informative networks of a living being are its internal, diffeomorphic dimensions (of relative length and height), to which the organic system adds a 3rd, reproductive dimension that combines both elements and represents the width or 'volume of cellular quanta' of the system.

Finally its movement in the external world becomes its 4th temporal dimension. Yet that 4th dimension of external activity can also be considered a network territory in itself, sum of the 3±i cycles of existence of the being, creating a bigger vital space that will become the basic unit of an ecosystem or social organism made of individuals of the same species. In the figure we draw the vital territory of a minimal social pair of mammals, differentiated in 3 clear sub-sectors:

Max.Information: Informative den or central territory (1,2,3):

It is the territory of reproduction used to copulate and store basic food and Entropy to raise the young. It is a forbidden zone where not even hunting is allowed (4). In social species of great mobility, aerial or marine, where borders are much more extensive, this territory is very ample and tends to be located in warm latitudes.

Entropy=Information: Dual Territory of Entropy hunting and informative socialization (5).

It is the feeding, social and hunting territory, on which the central informative being feeds itself. It is outside the zone of reproduction. It is the winter territory of many migratory birds.

Given the relativism of all movement, in biological territories the informative singularity moves to hunt its Entropy quanta, as opposed to galaxies where stars and space-time dust moves towards the central worm hole.

Within those limits there are also neutral territories of communication, courtship reproduction and free Entropy, like water troughs. So the intermediate territory works both, as an informative and energetic territory where different

victims and predators trace parallel cycles and come together around meeting points (E, B, R).

<u>Max. Entropy: Borders that limit the territory.</u>

Membranes are dangerous topological zones of dual osmosis. So the informative center watches to control any invasion of its hunting/social territory. Membranes fluctuate according to neighbors' power. For example, the vital space of a fish increases during mating, since the couple is more powerful than a single individual. Marks (M points) fix those limits and reduce combats. They are often invisible, as most territories are defended against competitors of the same species, who understand the informative code of those marks; but rarely against members of other species. So we find all kind of linguistic marks:

Smells (common in mammals, like foxes, rhinos, antelopes), excrements (in canines and felids) or other glandular secretions.

Optical marks often connected to scents: The brown bear creates marks in trees, rubbing them with his head, warning adversaries of his great Max.SxT size and force. In human empires (nations can also be treated as biological territories) visual marks correspond to armies displayed in the borders. In human homes those marks used to be shields with weapons; now they are cars and other proofs of money, the new language of social power.

High pitch, acoustic marks, proper of birds, which are triggered when a rival enters the territory.

Recap. Vital territories of animals and human nations can be explained with the 3 topological regions of st-points.

The structure of §ð<TS<$t, territorial spaces with a central point of view, developing its particular worldview, trying to reach infinity with his distorted geometry, affine to a projective geometry where far away means small, defines each world of a Universe, which is objective when 'clashing' each form with all others – so only eusocial love, and emergence through the scales of the 5th dimension make survival possible. Geometry is then the study of the spatial form that the functions, which dominate the vital, sentient Universe, adopt in their existential actions.

And as such is the best method to visualize the 'meaning' of algebraic and analytic equations both in abstract and mathematical physics. Each of the different laws of bidimensional plane geometry then can be studied as a reflection of the efficiency of vital Dimotions in a simplified geometric form, where curved paths become perfect lines, distances are measured without error and angles have no geodesic distortion. But still *vital geometry will add to those structures its vital interpretation, besides the ab*stract knowledge introduced by the Greeks, on the lines of the previous graph (which become lineal forms in other systems such as 'polygonal molecules' or human artificial constructions).

In Geometry thus we can also use the 'pentalogic points of view' on each theorem and also specific of geometry the vital meaning of the *5 angles of congruence (4 non-E Postulate), from Darwinian perpendicularity to social parallelism.*

5TH POSTULATE – DEFINITION OF A MIND-POINT OF A NEW SCALE.

The fifth and only standing non-E postulate is equivalent to the first, defining a fractal point but from the p.o.v. of its inner mind-center of reference as the Universe has infinite of them: The graph shows the difference between the Aristotelian, self-centered, Euclidean=light humind and the Universal mind: ¬-Aristotelian, Non-Euclidean:

<u>The human mental light-Euclidean space one of many multiple spaces made with different force pixels.</u>

The 3 dimensions of space, are the 3 dimensions of light. Since we perceive light, not the real Universe.

Electric Field Information

Reproduction: C-length speed

Magnetic Field: Width: energy

The dimension of time, is the dimension of social evolution, which creates social waves of light defined by its frequency

The mind-0   Clock-Time

Cartesian-Linear System.

a virtual map of reality, a relative space-time.

ß=Angle of perception

Cartesian ¥-Universe:a single system   Relative Universe:infinite systems

Euclidean geometry is the specific mind-mirror of light space-time and its 3 perpendicular Dimensions.

The Universe has ∞ mind-mappings made with different pixels that mirror for each singularity its territory of order (bodywave) and world beyond. The human 'visual mind'
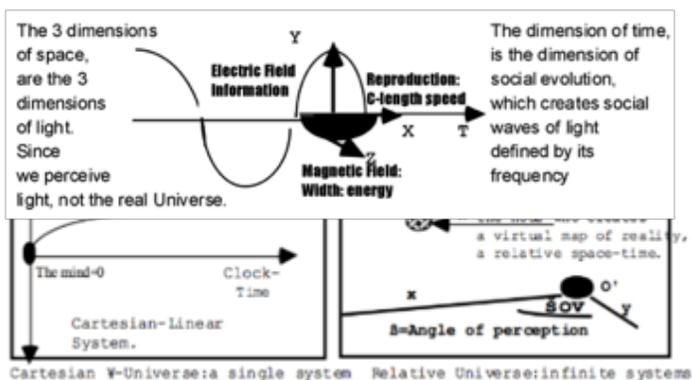
made of light is NOT the only mind-mapping. In the graph, on the left the 'physicist' view of a single continuum light spacetime for the whole Universe. In the right side the multiple p.o.v.s

Descartes did understand this multiplicity; so he published his mapping of the humind in a book called the 'World' to differentiate it from the 'Universe' with infinite monads, each one holding an entire world in itself (Leibniz) the very essence of the definition of a fractal time§pace organism. Yet Humans lost this earlier understanding – as we noted on the introduction - when Galileo didn't argue the fact that the Earth moves but our mind creates a still space, a mirage of the senses. And physicists followed suit, creating its philosophy of reality called 'naïve realism'.

Space as a mirage of the mind would be then understood in philosophy, both in the Eastern tradition (Buddhist Maya) and the western tradition influenced by them (Soviet, German schools starting with Leibniz, followed by Kant who noted Euclidean geometry was the geometry of the human mind, and Schopenhauer, who saw it as a representation.)

- The mind or 0-point is, the relative frame of reference that mapped the ∞ cycles of time of the Universe, reducing them to a 'World', to fit them into the infinitesimal volume of the brain.

º-mind x ∞-cycles = World: equation of the Linguistic Monad: ∞ Mind-Worlds in 1 Universe.

The mind though believes to be the center of the Universe in the 'ego paradox' as he sees every thing turning around its infinitesimal point, which hosts inside all the linguistic perception of reality, or 'world' it confuses with the universe. So the mind is a fractal point •, but believers to be it all.

The paradox of the Ego – who make each mind to feel so important – is then rooted in the self-centered structure of the mind, which selects information from its point of view, creating, an infinitesimal linguistic mind-mapping of reality - which then it confuses with the whole universe:

0-linguistic mind x ∞ Universal space-time cycles= Constant World mapping of reality, with @mind at its center.

The ∞ information of the Universe is reduced into the relative infinitesimal volume of our mind gives us a constant mapping, from where we expel all the properties that are not interesting to us and our self-centered view.

The mind is a singularity or infinitesimal 0-point, a relative frame of reference that maps the ∞ cycles of space-Time of the Universe, reducing them to a World to fit selected useful information into the finitesimal volume of the brain.

In mathematics the mind equation is $0 \times \infty = C$; $\infty^0 = c$; that is, the ∞ time cycles of reality become in the $\Delta º$ self-centered scale of a mind, a constant world that mirrors all what exists in the Universe both in time-motion (∞) and spatial form (º).

Because of such synoptic capacity to 'mirror' the laws of space-time in minimal size through the concept of number, which excels the previous synoptic language of verbal phonemes, mathematics soon became the most efficient language we know, but it does NOT create reality. It is just the best mirror of reality. Languages/mirrors occupy an infinitesimal part of the whole, yet paradoxically hold the maximal information of the Universe according to 5D metrics: *Space size x Time speed of information = Constant.*

Thus the mind of the most efficient survival species of reality, particles, 'atoms' and 'galaxies' (black hole atoms of the top quark decuplet) should be mathematical and imprint a local order which multiplied by ∞ of such species makes mathematics the dominant mind-species but not the only one and still a mirror of the true reality which is 'scalar space' and 'cyclical time', dimensional form and motion – the 5Dimotions of reality.

A language *is first a reflection of the laws of ¬Δ@st, Dust of space-time* and its 'Universal Grammar' and Fractal Generator equations, without which they cannot order≈recreate locally the Universe. So 5D mathematics advances the discipline by focusing better the mirror to include the bio-topo-logic properties of scalar space and

cyclic ¡logic time; and by putting in relationship maths and 'existential algebra' (ab.¬Æ), the a priori Disomorphic=equal laws of 5D, making it an experimental science; connecting its laws with the laws of fractal spacetime.

Metric equation of mathematics: 0x ∞ = K search for 'wholeness' in a single equation.

Thus we define the Generator equation of algebra, which as a mind language derives from the mind 5D metric:

0-finitesimal spatial mind x ∞ time cycles = Constant mind-world: §@(mind space)<≈>Δð (universal cycles)

So t*he 'Generator Equation' of all digital numbers is,* ***0 x ∞=K*** *and its algebraic expression, Sx<≈>fð.*

Both equations together allow to represent all possible metric equations of all supœrganisms of the Universe. As such neither 0 is an absolute zero, nor ∞ is an infinity, concepts relative in a scalar Universe, where the limits of scales in size and time speed and perception in each self-centered p.o.v. only allow to talk of relative infinitesimals, we call finitesimals, 0%, and relative infinities, whose symbol is ∝. 2 evident truths are then the existence of an experimental finitesimal, h=m l² ƒ, the minimal unit of angular momentum or Planckton of the galatom, and a relative infinite, =c, its maximal distanced-speed, which conforms the most extensive metric we know of with precision, beyond which dark space and time is unperceivable to mankind, so we write 0s (h)x (c)=K

It follows also that mathematical infinities are inflationary mirrors whose contradictions (Cantor's Paradoxes) are NOT solvable (the Zermelo axiom being an ad hoc addition, against the logic of truth), because precisely they limits of reality enter in paradoxical contradiction with the infinite inflationary mirrors of languages.

The study of those 4 elements of all realities, its actions and ternary operandi, structures *the dynamic 'Generator Equation' of all Space-time Systems, written in its simplest form as a singularity-mind equation: O x ∞ = K = ∞º=1*

So the *5ᵗʰ postulate* defines points as informative knots or linguistic eyes - minds of information that absorb a flux of forces used by the point to perceive a relative world. A non-Euclidean point corresponds then to our concept of a relative mind that gauges the information reality with a certain force, similar to the concept of a monad in Leibniz relativistic space-time. In words of Einstein: a point of space is a fixed frame of reference.

Thus, Non-Euclidean mathematics fuses the logic and geometry of the fractal Universe, greatly improving our understanding of Reality even in terms of mechanist measure. Since mathematical solutions to problems with several points of view are impossible to find in continuous space (i.e. 3-body problem in gravitation), given the fact that a network of infinite points of view is local and relative and each point is a focal knot that acts from its perspective. Thus, the absolute truth of a system is the sum of all its points of view, which influence each other. Yet even if we cannot calculate precisely with mathematics, systems with more than 2 bodies, since those systems are organic, hierarchical, made of networks with attractor points, fractal structures and self-similar paths, the new mathematics of attractors, fractals, scales and Non-Euclidean systems, refine greatly our analysis. In essence, indeed, we observe that 'networks' integrate parts/points into wholes, which then 'act' as a single point. So in the complex models of i-logic geometry we can tackle many problems by defining sets of points as 'wholes' of a 'higher space-time'.

For example, the previous principle of local measure, where each point is a relative center of the Universe, is called in relativity the diffeomorphic principle, which now becomes explained as a partial case of the wider law we called the 'Galilean paradox'; the duality particle of information/wave of energy becomes a specific case of the application to physics of the duality of energy and information found in all systems.

The expansion of the laws of quantum theory (complementarity principle) and Relativity (relativity of scale, local measure, etc.) to other sciences and the organic principles of the 3ʳᵈ and 4ᵗʰ postulate to physical particles is therefore the consequence of those postulates. Yet it requires the understanding of the new, i-logic, organic laws of the Universe and its networks, because E-mathematics has clear limits to extract all the information of the

Universe, given the fact that it syntax includes a priori errors and simplifying postulates (single space-time continuum of points without parts, etc.).

Thus, when the event described is complex, performed by a great number of points/variables you enter into non-lineal systems, which require topological descriptions (chaotic attractors, fractal non-differentiable equations and Non-Euclidean mathematics), and the i-logic laws of organic networks and systems – a better syntax in which to fit experimental evidence, especially in phenomena of informative nature (since only formless energy is continuous and resembles the models built with a single arrow of energy and a single plane of space-time).

So while classic physical systems calculate accurately the energetic, continuous properties of the Universe an overview on how multiple points of view emerge into wholes requires organic laws. This search of whys also applies to the understanding of mathematics. For example, the previous postulates resolve the long-standing question of what is the nature of the 1st and 5th postulates that seemed redundant (as the 5th describes also properties of a point like the first does, and the 1st seem to describe a non-geometrical property). They are no longer redundant, but they are more concerned with causal logic and time than spatial geometry in its purest forms (points, lines and planes.)

There is also self-similarity between the fractal postulates of i-logic geometry (since the 5th is geometrically self-similar to the 1st, as both are concerned with points) and the 4 dimensional time paths/arrows of the universe. This is not casual since all languages of space-times depict in self-similar ways the 4D Universe. Thus if the 1st and 5th postulates define *a gauging point of information* as the fundamental unit of the Universe, the 2nd postulate defines a line or flow of communication of energy and information between 2 points, which *reproduces* part of the information of the 'generator' point across a surface of space; the 3rd postulate defines those points, which are not similar as *energetic* substances that will be absorbed by the points. Yet if those points are self-similar they will gather through the arrow of eusocial love, creating according to the 4th postulate a network of space/time, a new organic plane of existence. So the 4 arrows of space-time are explained by the 4 postulates of i-logic geometry.

III. GEOMETRIC NUMBERS

S-Numbers: Polygons as vital organisms

Numbers are social gathering of indistinguishable forms. When studied in space thus numbers must have regular efficient configurations. So Δ§ numbers are 2D polygons or 3D Platonic solids.

Its importance in vital topology lays on the fact that polygons start the creation of superorganisms, with a membrane – the polygon proper, which closes a vital space and can by connection of points through lines-waves of communication, create a central singularity. Thus numbers as fractal points grow organisms. And this is self-evident in the study of Nature. We can then study together with entangled pentalogic both 'scales' of social numbers as 'growth in time' of polygons, efficient configurations in 'surface' worlds (land, water surfaces), and polyhedrons, which will be efficient configurations in a larger Δ+1 3D world (water depth, atmosphere, vacuum for atomic and molecular scales).

POLIHEDRONS

Polygonal numbers are best to represent the social evolution of forms into new scales that emerge as envelopes into wholes.

We shall conclude the geometric analysis with the 5 regular solids whose obvious symmetry with the 5 Dimotions of existence, means each of them specializes in 1,2,3,4,5D, in parallel to the simplex forms and mirror symmetries that compose them:

Tetrahedron   Cube   Octahedron   Icosahedron   Dodecahedron

3D platonic solids are 4, 6, 8, the only decametric regular numbers in 3 dimensions. Then we have only two more in the 20 scale, 12 and 20 vertices, and that's all!!!

They play each one a role as actors of one of the 5th dimotions – the decametric 3 completing a 4,6,8 Fractal generator:

$t-tetrahedron (legs)<S=T-Octahedron (body) > §ð-Cube (head)

Indeed, the tetrahedron is basically a triangle in 3D, acting as the spearhead of a locomotion; which in timespace is traced by lineal members moving on steps as your legs do. Hence its 2D¡=$t function. The Octahedron has a clear mirror symmetry as all reproductive dual genders do – already posted in academia.edu its paper; and the cube, is the form of the 3 closer to a filling sphere with a well-connected singularity of maximal symmetry with the outer world.

So this leaves the two complex dimotions of social evolution and entropy for the triangular icosahedrons, *with maximal number of social triangular units (20 faces of the simplest 2D surface)*. And the 5th dimotion of entropy for the pentagonal dodecahedron… Alas again the pentagonal evil Death symbol again… Why? That I won't tell…

Just quote the master of 'transcendental philosophical geometry', Mr. Plato who affirmed that, "The Universe is the body of an organism whose logic mind we call God.' & 'God used a dodecahedron to design the Universe' *Plato*

Ok, I'll tell. Think in vital terms. Imagine a Universe with those 5 species, no curves. The 3 first are the smallish ones. Cubes perceive, and keep quiet, hidden, filling easily empty space; its survival strategy – social growth, with its identical forms, repeating by the mere motion as lines first, flat squares and giant 3D cubes. It is a single gender 'feminine', informative reproduction. The other series does the same but with mirror gender symmetry,

as the triangles of tetrahedrons expand from 3 to 4 and peg inversely into octahedrons and then grow into icosahedrons.

But the dodecahedron is NOT concerned with the survival strategy of reproduction. He rather eats them all!!

How is this? Easy, the dodecahedron has the largest mouth and the largest volume, even larger than the icosahedron, so it swallows them, in an action of vital geometric feeding; and once caged inside, remember pentagons are the 'first' polygons, which can do a smaller replica of itself, NOT a perceptive singularity but a *crunching stomach*.

Each point is a cell of a dodecahedron. As it happens there are as many faces in the icosahedron to eat as vertices in the dodecahedron that feeds on it - both connected through the golden ratio of feeding and reproductive events, a+b (feeding)/a = a/b; a key relation of top predator/prey forms. And so it opens its mouth, swallows it, cages it, crunches it and burps (; But the pentalogic Universe allows different dimotions. So now imagine instead a reproductive event. It is not far fetched. Biologists consider that ovules first ate sperm cells and latter they learned to merge their genes.

So once a 'male' entropic dodecahedron has eaten the 'female', reproductive icosahedron it can actually merge into a mixed form, by merely attaching to each dodecahedron point a triangular face, becoming the icosidodecahedron (ab.'dodecosahedron') - a new species which is more perfect than its parental ones, as it shares the information of both. It is a first gender case in ideal geometry, since *Gender reproduction happens in all scales of stience,* from the simplest circular ovum swallowing a lineal seminal seed - a cyclical and lineal form, merging into an |xO=ø topology, to the previous example of ilogic mathematics.
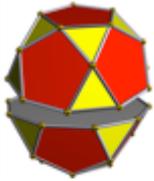
The dodecahedron social points, aka numbers feed on the icosahedron faces, reducing them either by swallowing them, which will result in a growth of size of the dodecahedron or by merging into a reproductive evolutionary process far more interesting, as any merged system is more efficient than its 2 separated parts-species, a more evolved form, which survives better in a process similar to all genetic-memetic-reproductive processes, that create in any stientific scale more efficient systems by communication.

Indeed, the dodecosahedron is the top predator polyhedron form, as it has ALL the ilogic elements and symmetries that enhance survival in the fractal Timespace Universe: individual ego-centered points, shaping inner trilogic systems in yellow, tetralogic dual triangles married to dual pentagons, decalogic reproductive bilateral social parts, plus all the magic stable numbers of vertices, edges, faces & diagonals, despite its external 'soft membrane' –unlike its 'dual figures' the Catalan solids that *show a defensive external membrane*, in which the swallowed form emerges into convex 'teeth', but has a less efficient internal organic structure:
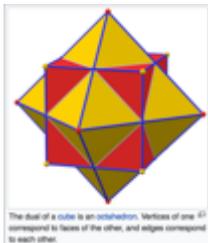
In geometry, we say that any polyhedron is associated with a second **dual** figure, where the vertices of one correspond to the faces of the other and the edges between pairs of vertices of one correspond to the edges between pairs of faces of the other. The graph is an example from the other dual top predator/prey series, a cube of larger 'mouths' and bigger volume-spatial efficiency swallowing an smaller octahedron of lesser volume.

What differs now is an added property - a topologic 'defensive' concave and convex dual form which can establish as Vaughan found in defensive flat geometries for the French army, entropic expansive concave points and smaller implosive, informative sinks, which maximize the entropic reach of cannonballs with minimal surface exposure to the external army. Indeed, a 'mathematical' ideal duality, we shall find latter on in the stience of biology between top predators of soft membrane but much more efficient inner structure and defensive armored animals with less evolved internal networks (squids, with eye-perception and evolved nervous systems vs. armored trilobites, simpler organisms; Tyrannosaur Rex vs. armored

triceratops, Lions vs. armored, skin thick, horned herbivores) and social systems (defensive walled cities vs. nomadic horse armies).

We are all VITAL geometries and so the rules of geometry carry from ¡logic spacetime to ilogic mathematics, to the different stiences of vital reality where those forms acquire topological motion. The specific case of polyhedrons being of special interest to molecular chemistry, which we shall study in detail when upgrading to 5D the discipline (as those are processes that do happen in solid crystals).

Vital transformations.

Though polytopes are all essentially in topologic terms spherical membrains, its study brings topology down to the details of its scalar social numbers or parts of a network of points; allowing its dynamical transformations.

A key sub-field of 5D vital geometry is the analysis of the Disomorphisms and symmetries between polytopes to understand how they transform into each other through 5D entropic, 3D reproductive & 4D evolutionary dimotions.

4D: social evolution. All solids with a center singularity evolve their surface increasing their vertex, and growing their volume/body ratio towards the perfect relationship of the sphere - which we consider *the 6th perfect solid of ∞ vertex.* Among the Platonic solids, either the dodecahedron or the icosahedron may be seen as the best approximation to the sphere. The icosahedron has the largest number of faces and the largest dihedral angle, it hugs its inscribed sphere the most tightly, and its surface area to volume ratio is closest to that of a sphere of the same size (i.e. either the same surface area or the same volume.) The dodecahedron, on the other hand, has the smallest angular defect, the largest vertex solid angle, and it fills out its circumscribed sphere the most.

5D: Entropic devolutions mediated mostly by the 5D dodecahedron. Feeding though requires a degree of similarity, reached ad maximal for the dodecahedron and icosahedron. What makes them *identical to switch from 5D mind state to 4D entropy state is A*pollonius' finding that the ratio of its surface is the same that the ratio of its volumes:

$$\sqrt{\frac{10}{3(5-\sqrt{5})}} = \sqrt{\frac{5+\sqrt{5}}{6}}.$$ So *i*ts content of ST vital energy is the same; but as the dodecahedron dies, it changes first its tight surface, which as we know in death processes grows in excess detaching itself from its volume - from 12 to 20 elements (another key number, with many vital interpretations, being indeed the number of amino acid variations on the protein surface of living solids, and so on)... and then reached its maximal form on the stable surface, it can only switch arrow of time.

As death is exactly that process: when all the vital energy is consumed and the skin is fractured ad maximal and no more motion can be extracted from the body, the system changes arrow and decomposes back to the past.

Other feeding case is the parasitic covering of one form by another. So the dodecahedron is generated (Euclid) from the cube, *by covering it as a parasitic membrane, unlike the 3 other species, which can be considered to reproduce the same form.* All this might seem trivial to mathematicians, but they would miss the point of what 5D mathematics tries to show – the vital nature of space… which must be explained as the ultimate formal substance of reality, having organic living properties, simplified into a still mirror, NOT the other way around.

D. Perception. If the sphere is the perfect platonic solid with absolute symmetry to perceive an 'equal distant' territorial larger sphere focused in the central point without deformation (Poincare Conjecture), platonic solids are next in regular symmetries, hence as they are 'economic' in points compared to spheres their efficiency makes them to repeat constantly in the Universe on the simplest forms of chemical, atomic existence (simplex platonic solids), NOT in the planetary orbits, where Mr. Kepler thought God drew them (:
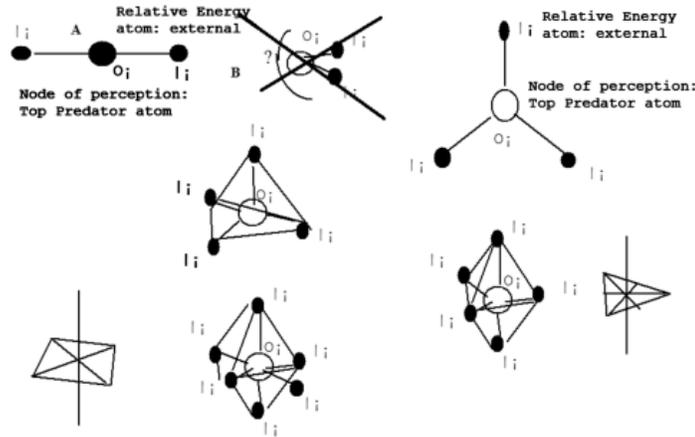
We see then once more at play the scalar laws of inversion of form, from the 'galatom', or spherical atom, given the ginormous number of 'static photonic points' trapped in its electronic nebulae/star plane (quantum/cosmological scales) to the molecule or lineal polytopes of minimal quanta. Molecular surfaces tend to be as the graph shows, perfectly regular polytopes for the singularity to apperceive through the Van der waals forces of electronic perception the gravitational and electromagnetic forces of the world - reason why crystals, regular atomic systems which can 'scan' reality in a near-spherical are formed as units basically with those forms and the strongest 'pre-cyclical' pi=3 hexagonal system (which also can form the ultimate platonic dual systems, a pentagonal, hexagonal cover, the strongest 'fuller dome'.

In the graph we see the all pervading forms of maximal resistance in the membranes of physical T.œs. In crystals the cubic system is overwhelming. In metals only cubic and hexagonal systems exist. In architecture the only systems which can be grown in size without external reinforcements maintaining its stability ad infinitum are the Fuller Domes, made with triangular, hexagonal 'pi=3' and hexagonal & pentagonal combinations, whose form grows 'ad infinitum' towards the perfect platonic solid - the sphere.

The cube, a 3D st solid with informative roles.

In that regard, another 'inverse duality' in 3D happens between the sphere and the cube, similar to that between the triangle and the circle in 2D, with inverse properties:

The cube is excellent for social evolution into larger networks, while the sphere tends to be lonely. The cube is the preferred crystal form for matter to reproduce filling ad maximal space and socially evolve, from 3D to its social larger 5D whole grouping.

How then one transforms into the other? If the triangle achieves the feat by rotation or social evolution into hexagonal π=3 circles, the cube is the closest form to become by elliptic deformation the sphere, in another st beat, as it bloats feeding on energy into spheres, it deflates back into a cube. So the triangle becomes a circle by adding a 4D rotary motion and the cube becomes the sphere by adding a 5D feeding motion.

Since the key function of reality is reproduction and all is motion' the survival of the cube resides in its simplex reproduction by mere translation in space: a line that moves grows a dimension into a plane that moves and grows into a cube that moves and grows into a line restarting the game, and adding a new 5D scale. Yet each growth changes the function of the form according to the generator equation that *changes S-topology & T- age, hence function as a system grows in Δ-scale, such as:* **Δ-1: \$< Δº ST > Δ+1>ð§**

The partial equation of the fractal generator that encodes within it all laws of the universe means in topology the transformation of topologic varieties, as we grow in scale, from lineal limbs/potentials at Δ-1, into Ø-ST-iterative space-time into Δ+1 O-spherical particles-heads of information.

The cube is the ð§tate, excellent for social evolution into larger networks, the preferred crystal form for matter to socially evolve, from 3D to its social 5D grouping into minds, the closest form to become by elliptic deformation the sphere, in another st beat, as it bloat feeding on energy into sphere, it depleats into cube.

And then again as the form shows, the cube displaces to form a line on the Δ+2 plane, NOT a fourth-dimensional spatial being, which does NOT exist.

So if we start the reproduction of cubes in the cubic Δ-1 line its function is 2D lineal motion; then the Δº plane is an ST reproductive body-wave form and the Δ+1 cube the §ð informative function (with maximal volume and minimal perimeter compared to the line and the plane)

(a)   (b)   (c)
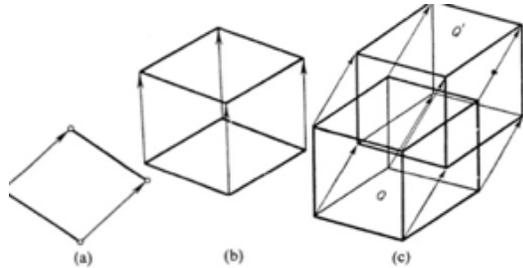
And then again, the cube displaces to form a larger line on the Δ+2 plane, NOT a fourth-dimensional tesseract, which does NOT exist in reality regardless of its usefulness to prove and model S=T dimotions.

So given the *reproductive nature of motion*, we talk of distance as the sum of adjacent ternary 'stœps': the cube state of a 'squared' line stops and chooses any of its 6 directions of motion; then it reproduces in present sliced planes on the chosen direction and moves as a zig-zag line, stopping, iterating and stepping as all reproductive motions do. Beyond 3 dimensions there are no more dimensions in a single plane, so the cube generates then a line of the larger scale, transposing its function again, completing a full zero-sum cycle in scales, creating a replica of itself in the larger Δ+1 world.

So we observe in those reproductive translations two symmetries *at work together:*

$≈t≈$... *Translation* = reproduction of motion through the $-length dimension, causing....

Δo-> Δ+1: ST+ST+ST: Reproduction of form through the width dimension, which makes the being, grow in scales of the fifth dimension, symmetric to the change of position in timespace causing...

Δ-1: $< Δº ST > Δ+1>ð§ a change in its topological functions=forms.

The next form of reproduction of the 3 varieties of topology is the rotary circle, which becomes a sphere with one more dimension, the strongest membrane that encloses and captures the vital, hyperbolic energy of the being. And then it becomes a toroid, which appears as a larger circle.

And it is worth to notice the circle has only 2 states as circle and sphere, unlike the cube which has 3 Dimotional states as cube, line and square; a fact of paramount importance when considering the different speeds of motion, reproduction, explosion and implosion along the 5Dimotional events of lineal v. circular forms that paradoxically favors the circle over the line and explains why 1D vortices accelerate faster than expansive lineal big-bangs.

But on the negative side, the 'cube is a solid form', but the reproduced cycle becomes an 'empty sphere'. It is not a ball, only the surface that encloses a volume of empty space - the simplest, strongest topology normally made at the Δ-1 scale of strong triangles of entropic nature. So the circle becomes the membrane that acts as the entropic envelope that closes the 'empty vacuum', becoming a non-Euclidean Klein disk whose inner vital space can never reach because the dense membrane will kill its lighter internal particles – and indeed, we shall see how atoms and galaxies – the two limits of our scales of form, follow such pattern. Since even if the form is a disk, while it can create in the first rotation a dense sphere, in the second rotation it can only form a hollow toroid.

But the most efficient form of reproduction is that of waves and bodies, with its 'networks' that branch and hence reproduce in an exponential growth a single point; hence the hyperbolic form of the 'growth' phase of waves; and the enormous multiplication of 'surface' of a fractal networks.

Finally all those forms can transform into each other: cubes can feed and curve elliptically into cubes and lines are small stœps of curved geodesics, both type of iteration can merge, so lineal limbs/potentials at Δ-1, Ø-ST-iterative waves and Δ+1 O-spherical particles-heads of information can in rare occasions transform into each other, but specially *can transfer flows of energy and information among them, which at Δ-1 level will acquire the shape of each of the 3 adjacent topologies of the supœrganism.*
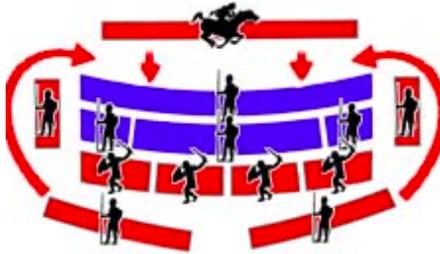
So functions and forms do change but all possible events are encoded in the generator and so if we understand the underlying Δst basic laws of the Universe encoded on it, everything keeps falling into place. And those laws are vital laws that have a survival purpose. For example, the hollow sphere KILLS by enclosing and trapping as lionesses do hunting zebras by enclosing them or dogs shepherding and enclosing sheeple, moving around in fast circles as 'angular momentum' that becomes by virtue of T=S a vital membrain in motion. Then the membrane will sharply penetrate perpendicularly the zebra herd and kill; the military border of a human social territory will give a coup d'etat and collapse into the capital and conquer… the battle will be lost once in Cannae, Hannibal had encircled the prey (graph, where the red color of entropy represents the dimotion of the horse that 'closes the roman pray' as a moving membrain like the dog does).

So Δst laws might seem abstract to you but are the stuff of which experimental survival and existence is made.

Dim.	Finite			Euclidean	Hyperbolic			Compounds	
	Convex	Star	Skew	Convex	Compact	Star	Paracompact	Convex	Star
1	1	0	0	1	0	0	0	0	0
2	∞	∞	∞	1	1	0	0	∞	∞
3	5	4	?	3	∞	∞	∞	5	0
4	6	10	?	1	4	0	11	26	20
5	3	0	?	3	5	4	2	0	0
6	3	0	?	1	0	0	5	0	0
7	3	0	?	1	0	0	0	3	0
8	3	0	?	1	0	0	0	6	0
9+	3	0	?	1	0	0	0	[a]	0

Hyper-dimensional polygons.

As S=T 5D metrics implies a dimension of space is another form to interpret a motion in time, an important field of 5D geometry is the study of 4D (2S=2T) regular polytopes, which close the entangled scales of regular social numbers as T-Dimotions or S-till elements that 'construct' the real structures of the Universe, to extract 5D¡somorphic laws; even if we do NOT see static fixed 4D forms in our Universe (as 5D includes entropy, which is the negative destruction of all others, 4D is the limit of constructive engagement, often of 2 still polygons with 2 motions=degrees of freedom). We just make some key statements on this discipline:

With the simplification of the inner volume of fractal points, we can match polytope laws with the symmetries of Spacetime beings. So 1D polygon of points with no parts -open lines equivalent to 1D cylindric limbs/fields are ∞ (Natural Numbers); 2D polygons akin to cyclical, O-particles/heads are ∞ in flat space, *& 3 hyperbolic polygons, equivalent to Ø-body-wave reproductive systems, intersection of 2D lineal & cyclic forms are ∞ in 3D space.*

So there are ∞ growing ensembles of 1D limbs/fields + 2D particle/heads=3D hyperbolic body-waves.

Growth of complex finite polytopes peaks in 4D, as further increases of dimensions reduce them to the ternary 'single plane' structure of a triangular, square and pentagonal ternary ensemble; *which means there are no more dimensions beyond the 4D 2S=2T systems, and all further 'Dimensional growth' is a dimension on new scales of 5D which are memoriless, erasing the previous emergent complexity of the fractal point, which stays on its inner parts. (Because the hyperbolic body-system is more complex being its minimal form 3D, its ternary growth peaks at 5D).*

Names	Image
5-cell pentachoron pentatope 4-simplex	
8-cell octachoron tesseract 4-cube	
16-cell hexadecachoron 4-orthoplex	
24-cell icositetrachoron octaplex polyoctahedron (pO)	
120-cell hecatonicosachoron dodecacontachoron dodecaplex polydodecahedron (pD)	
600-cell hexacosichoron tetraplex polytetrahedron (pT)	
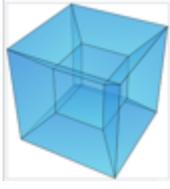
In the side the existence of a regular 4-polytope is constrained by the existence of the regular polyhedral which form its cells and a dihedral angle constraint sin π /p sin π / r < cos π /q to ensure that the cells meet to form a closed 3-surface. And yet despite those restrictions we have 6 polytopes. And this matter because our world as in relativity can be analyzed in a single plane as a 4D ensemble of its 3 classic dimensions and a time motion of social organization, as *the 2 inverse dimotions of entropy and information do NOT happen within the same event simultaneously in 'regular entagnelments'.* So pentagonal polytopes make no sense, being the 5th dimotion entropy the destruction of the regular in-form-ation shared by them all. *Thus the most complex 4D structure of regular points are the 120-600 dual pentagonal mirror 'gender symmetry',* reached through combinations of 5 Dimotions, 6 'triangular radians' of a π sphere (∝ polytope) & its 120 angles. The result are the final stable 120 dodecaplex and 600 tetraplex maximal figures of 4Dimensional geometries. And we shall find this 120 magic final number in the few cases the system is perfect enough to transcend the octaplex to be the real final 'island of stability' in atomic systems or oldest possible age in the very few cases the system transcends the 80 years 'radioactive barrier'. And we can imagine the 120-600 vertex entanglement the limit of ¡logic evolution of a complex social system in the Universe.

But all those polytopes must be understood as ternary systems which reproduce in motion forming a larger 5D scale; so 4D is a motion, and that is indeed how geometers construct them, bringing to each 3D point an internal volume; that is, making each vortex of a 3D polygon a new 'square' to form the tesseract which is equivalent to 'enlarge' its inner form. While another 4D polytope will be merely the motion of the square that becomes a larger '1D' line in a larger world, as we make a 2d plane by moving across a 1D line. What about the sphere? It is the ultimate regular polytope and so we wonder how a 4D sphere looks like. The answer is also telling of the 5D S=T structure of the Universe, where time motions and spatial

The disk is a 2D slice of the ball.

dimensions are equivalent – but only motions truly exist. So we have to consider beyond 3D, new spatial dimensions to be beyond algebraic manipulation time motions. This is also our experimental evidence, when we generalize what we see of a 3D sphere as it moves through a 3D plane: a series of growing and diminishing cuts, passing through a 2D world.

first a tiny ball, then bigger, and then smaller.
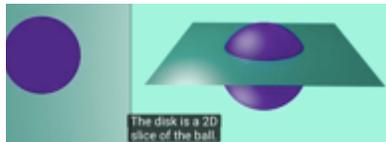
And so a 4D sphere moving, passing through a 3D world appears as a growing and diminishing sphere, *indistinguishable from a* 5D Universe. *Thus we postulate an Einsteinian "Principle of Equivalence'* as a proof of the existence of a 5th dimension of parts growing into wholes:

'A 4D spatial system moving with a 5th dimension of time, IS (equivalent to) a 3D spatial system with two scalar dimensions of growth and diminution in inverse Δ±1 scales."

So beyond our perceivable entangled 3D holographic parts, all further dimensions are scalar motions of time (4D, 5D inverse, SS-formal, implosive or TT-entropic expansive dimotions). Specifically we differentiate dimensional growth

S=T. In a single plane, beyond 3D spatial still forms, new dimensions are temporal, moving ones, which only through the 'persistence' of a memory create new dimensions of space, (as explained on our analysis of fractal dimensions). Motion then become reproduction of information, and 'social forms of growth' – a cube moving to in-form a squared line, sphere turning into a dual spiral diminishing and growing to form a larger flat disk, etc.)

Δ±¡. In scalar planes, when the form is 'static' in the same position. Then the being experiences a 'scalar travel through the fifth dimension' growing its inner parts from points into 'cells'. This in ideal polytopes means to draw in each vertex a new tetrahedron, cube or dodecahedron). Or as a whole growing or diminishing in size-scale.

So that is the dynamic reality of 4D spheres passing through our world, which do NOT exist as such, but as S=T for any mental spatial mirror that trans-forms T-motions into S-till dimensions, 4D polytopes are useful to model and solve mathematical problems of real physics, by the algebraic method of converting a time motion into a geometric still spatial dimension, so 4D polytopes can represent real 3D T.œs with one locomotion or two locomotions, the second one an TT-scattering entropic dimotion of scale.

RECAP. Pentalogic of polytopes: **Platonic solids correspond to 5Dimotions.**

The 3 simplest 3D numbers form a fractal generator of vital topology and the 2 Complex the Δ±¡ dimotions:

$t-tetrahedron (legs)<S=T-Octahedron (body) > §ð-Cube (head)

4D: Social evolution: The icosahedron is made of triangles as the simplest tetrahedron, evolving socially Δstates.

5D: Entropy. The dodecahedron is the most efficient and feeds on all of them.

Polytopes with more than 3D must be considered to have 'dimotions of time' NOT of space.

IV. VITAL TOPOLOGY – THE HOLOGRAPHIC BIDIMENSIONAL UNIVERSE.

Topological spaces Topology as the queen of mathematical sciences.

Topology is Geometry with motion, hence the temporal 3rd age of Geometry and its culmination, as expression of the real morphology of space-time beings, which includes its 3 main elements: Δ-scales (topological forms are defined in modern terms as networks of points); Space forms (its 3 varieties are the 3 organs/forms/functions of all T.œs) and its time-motions (a topological organ by definition can morph and evolve but remains the same as long as it does not 'break' its topological characteristics). So topology *instantly connects with 5D metric laws*, in its 3 ages:

1st age: Classic topology.

 2nd age: Fractal mathematics & networks.

3rd age: Vital topology (GST Supœrganisms).

So after showing how fractal points joined by networks become waves =flows of energy and information that evolve into topological organisms with 3 physiological networks, the Spatial, entropic, 'digestive' system, the S≈t, reproductive 'blood network' and the ðf-Informative brain network, messed together through its 'dark spaces' (as networks do have holes) forming the supœrganisms of the Universe; *we will see the same process through topologic varieties connecting its classic themes (1ˢᵗ age) with its 3ʳᵈ age (GST vital topology).*

Ternary topological varieties: Vital, Organic Geometry merges formal, physical and biological stiences.
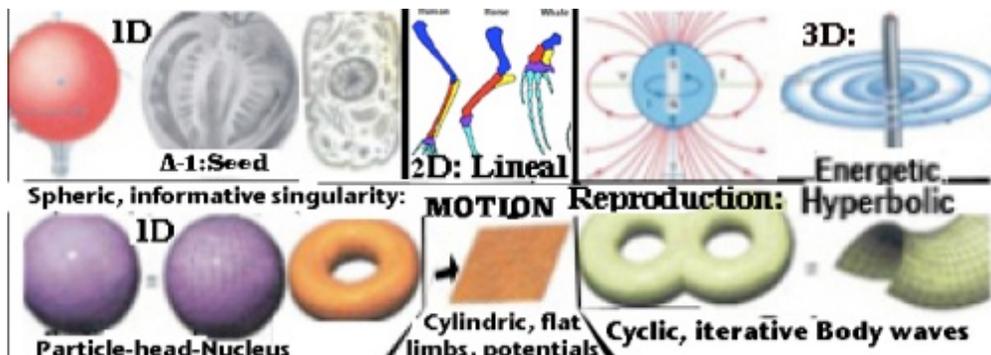
The 5 Postulates of ¬E geometry have an immediate consequence in the transformation of all 'entities of mathematical geometry' into topologic, bidimensional varieties, as a system to exist will have a dimension of time and a motion of space, which are equivalent S=T, in its ideal value (though normally the motion of time as it does not reproduce in persistent forms will reach a fractal dimension).

And the true task of 5D Geometry will be to relate all those dimensions and motions to its 'functions' connecting them in real events and forms to the 1 to 5 Dimotions of existence.

But how it is possible to make sense of single Euclidean dimensions. The answer is those dimensions are useful when the T.œ is perceived as a fractal point of a larger world and we reduce its internal dimensions. So we talk of:

External 1-dimensions: The 3 varieties of Euclidean simplified dimensions are: height-informative dimension (1D), width-reproductive dimension (3D) and length-locomotion (2D). So we can write a simple generator:

$$\$t(length: locomotion)<ST\text{-}width: reproduction>\S\eth\ (height: information)$$

It is those kinds of entanglements between pure formal geometries and vital organic functions what closes the gap between reality and mathematics through the vital topology in 1, 2 or 3 D Dimotions. Only that often one of the dimensions of study will be a motion in time, but by virtue of S=T, could also be in many cases studied as a

still space dimension. So we can find then equivalences and symmetries between geometric forms and the SS (4D seed and social evolution), St (information), ST (energy of reproduction), sT (locomotion), TT entropy) 5 dimotions that combine the poles of form-space and time-motion of the Universe

Internal topologic bidimensions:

In the graph the bidimensional topologies form also a fractal generator of T.œs:

SS-St(spheric seeds and minds)<ST-hyperbolic body-waves>sT-TT: lineal, flat locomotion and entropy.

Whereas SS and TT imply a formation or dissolution of networks across Δ±¡ scales.

Those surfaces in Lobachevski's expression, are "dissections" of space: Each of them divides the space into two domains, an interior and an exterior, and they are the common boundary of these two domains. This fact is connected with another, namely that every one of our surfaces has two sides: an interior and an exterior (one side can be painted in one color, and the other in another).

Thus the first task of any membrane in the process of generation of a T.œ, is to break space-time into inner and outer regions, where the informative and entropic arrows of the system will develop a complex, rich in information, internal T.œ inwards and an outer entropic membrane to detail with its anti-world from where to obtain motion and energy captured by the hard membrane to reproduce into more Δ-1 cellular/atomic components and grow. It is then clear that:

'The purpose of topology is to study the ternary vital geometries of T.œ, its functions and transformations'

Whereas the ternary bidimensional only topologies of 4-5D space thus also explain the ternary nature of all physiological networks and its vital functions for any s, st, t organism.

It holds then that each organ, variety of vital topology MUST not TEAR and CHANGE its external form beyond deformation not to loose its properties. Those 3 bidimensional topological varieties then have motion related to internal changes of in-form-ation not to external, lineal changes of locomotion.

And its complexity grows as we perceive them in more detail. As time is cyclical, made of 3'π' lineal time motions, we shall distinguish 3 conserved 'quantities' of timespace that put together create superorganisms, a relative devolving past or arrow of entropy represented in physics by disordered explosions in space and in vital topology by lineal limbs/fields of lineal momentum, an iterative reproductive present that seems not to change, represented by hyperbolic body/waves of energy, and an implosive in-form-ative local future arrow represented in physic by accelerated, V(t)R(s)=K vortices and angular momentum, and by particle/heads in the ensembles of vital topology.

So timespace breaks in ∞ relative local, fractal entropic pasts, iterative energy presents and informative futures, which put together create the illusion of a single timespace continuum.

Generator Equation. The 3 organic topological ST-planes. Physical dimotions.

The 3 bidimensional topologic planes become the 3 organs of any of the infinite fractal systems of the Universe:

$t(Toroid field/limb)<Si≈Te (Hyperbolic wave/body)>§ð (spherical head/particle)

The simplest forms are those of still Greek Geometry and physical systems, which range from pure still geometries: SS (space areas, closed conic orbitals, of maximal space-form and minimal time-change), through all variations of ST dimotions proper to TT (accelerated time dimotions, of maximal time-speed and diminishing spatial volume, as in charge and mass vortices), which *become doors to a new scale of* the 5th dimension.

Thus between the extreme dual arrows of entropy (TT) and pure seed-form (its inverse SS state) both combine into conservative 'present' zero-sum cycles of energy body-waves, limbs/fields of locomotion and particle-heads of information. They are the 3 'conserved' arrows of time that create the futures of each fractal supœrganism.

So in a single 5D plane all systems are made of those 3 Đimotions, which become organic §urfaces perceived simultaneously in space ensemble into vital systems; act in Space-Time and live an accelerated/steady state/decelerated 3 ages TT worldcycle of existence observed only as a time process.

And vital topology studies them, between its 4Dimotion of generation in a lower Δ-1 plane that emerges in an Δ+1 social world to die back in a dissolving explosion of scattering entropy, back to Δ-1 in the moment of death, which topology also can analyze them as process of creation and dissolution of networks.

The fifth dimension is occupied by fractal branching networks; each of its planes by 3 topological varieties.
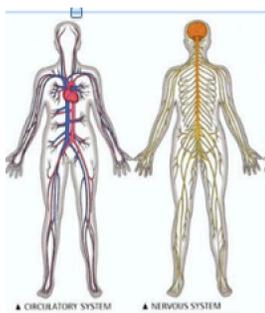
So there is also a fundamental duality between dimotions in a single plane (the 3 varieties of topology) and the perpendicular structure of the fifth dimension as a branching network, which connects the larger whole and its smaller, multiple parts. I.e. Your whole, the brain and heart branches down to its parts. 5th dimotional changes of scales thus imply some network branching, which apparently is different in a big-bang explosion of a physical system in parts and an ordered distribution of blood or nervous impulses, but geometrically are equivalent, $Δº<∑Δ-1$ motions in the 5th Dimension which in terms of its metric expands in space and hence diminish in time the speed of the motion (deceleration of a big-bang from its initial impulse; deceleration of the speed of blood through ever more extended networks of tinier vessels).

We thus translate in those analysis by virtue of the disomorphic=equal laws of all scales, the vital fact we ARE made of space-time and the duality of S=T analysis topology into the pentalogic dimotions of existential algebra (¬Æ): when studied as still dimensions of space it leads to an i-logic topology of fractal points with parts that entangle to display the scalar, fractal, network complexity of Universal supœrganisms.

The 2 varieties of the 2nd and 3rd postulates.

The postulates of ¬E therefore 'diverge' in its own variations depending on what process we study, a travel through a single plane or through several planes of the fifth dimensions, departing from two initial fractal points living in a single plane, or a larger point and its micro-parts. So do *the algebraic operands we use*:

In a single plane, we study aggregations on herds of fractal points as lineal waves, and use the 'sum operand' (superposition principle). While between scales, we use the 'product operand' and we see fractal lines and networks.

And this differentiation carries to the 3rd postulate as 3 networks of points and parts, become topological organic planes, which complete the mirror symmetry of 5D geometry with the superorganisms of reality as they are.

It kicks then the 4th postulate of relative congruence to define as a positive social evolution of networks into organisms or an entropic, scattering dissolution of wholes into parts, *so congruence becomes essential to establish what geometry often cannot differentiate without detailed view or motion analysis: if what we observe is a big-bang death (max. speed) or a network construction.*

In the other case, the simpler sum of waves (no longer lines), in a single plane, also requires an analysis of the congruence angle, to know if waves will cancel each other or add up.

So we upgrade still spatial mathematics with its 5 ¬Æ postulates that substitute the classic axioms, postulates and principles of E geometry well beyond what the 5 Non-E postulate merely hinted at in the XX c.

Yet abstract still Greek geometry still works as a mirror of reality, when we reduce it to a single plane. Then points are a 'dominant' spatial, mental view which reside in a single plane and the 'mind' perceives in stillness,

with no internal scalar form and continuity when associated into lines, planes and volumes; even though in a deeper reality they have 'fractal content'. E- mathematicians though missed the 'self-awareness' of that simplification, now evident with the 5 postulates of ilogic Geometry that describe how points become parts of social webs, self-organizing fractal planes made of networks of points that emerge as cellular units of a higher fractal space-time or new supœrganism. And so we define ¬E topology as the study of the structures built departing from fractal points with inner parts and scalar content.

Whereas by the principle of Correspondence Classic geometry that considers points to have no breath, no inner parts is the limit of ¬E topology when we 'eliminate' the 5th dimension of entropic motion and the 4th dimension of fractal scales (only fractal geometry includes it in its restricted analysis). Thus 5D unify all those different geometries to make them describe parts of the same fundamental structure of the Universe: the fractal point and its more complex social forms, networks and waves and organic planes.

It follows that 'Dimensions' are NO longer exact in number, but mostly Hausdorf dimensions for 2 obvious reasons:

- Time motions have less 'density' than spatial distances, as the motion often 'erases' the previous information as the form slides. So while a still point has a clear '1 Dimension' (by convention points have volume hence 1D), a point in motion will have less than 2 Dimensions of still space, as its motion erases its previous steps.
- Networks that peer between two scales also do NOT fill the entire lower plane and so they have a Hausdorf dimension. The way to measure them is as an 'open ball' that do not include the larger whole or central singularity and the tinier parts, but merely the network, which will then be also between 1 an 2 dimensions.

Themes those of a more advanced course on 5D mathematics not treated in this introductory paper, where it matters more the conceptual comprehension of the connections between vital topology and the organisms of reality, to make clear that an evolved Non-E mathematics is the organic geometry of the fractal Universe, complemented by existential algebra, and its ¡logic equations of the fractal generator of the Universe which all languages mirror in its 3±¡ pentalogic syntax, since all minds gauge and represent the cycles of the Universe with different languages of perception.

Vital Geometry, symmetric properties: function=form. Inverse properties of S & T merged in ST-body waves.

We noticed also a correspondence between the 5 objective Dimotions, the 3±¡ subjective frame of reference/perception, as well as the 3±¡ formal variations of topology just described.

They all come together in symbiosis as each topology and corresponding frame of reference (polar=sphere; cylindrical=lineal; hyperbolic=Cartesian; complex=scalar) has vital organic properties that best suits each dimotion of existence. Let us explore this concept closely related to symmetry.

Symmetry is the central concept of Group theory, the ice in the cake of the whole structure of Algebra.

To define it group theory uses the Paradox of Galileo: S (form in space) = Time (motion). As it does differential geometry based in the concept that a line is a point in motion.

Similarly by symmetry we mean in 5Ð Algebra, *the capacity of all systems to complete a zero sum world cycle, through a motion that returns the system to a present undistinguishable equivalent state.*

Symmetry thus is essential to the 5D immortal universe, which is a dynamic present view in perpetual motion *even though due to dynamic motion=symmetry and conservation principles derived from it*, is eternal in its returns.

We thus use the classic concept of symmetry as a recurrent motion that conserves the form of the being (different from our multiple worlds, symmetric, bisymmetric, asymmetric etc. used in the 4th Postulate of Congruence).

It follows immediately that the more symmetric a system is, the more efficient will be in 'preserving' its present states of 'survival' in a universe in perpetual motion. I.e. A circle will be more efficient, because it has infinite degrees of rotational symmetry that an irregular polygon that might not even have a single symmetry state.

In the theory of 'survival' of 'vital mathematical objects', which we bring from time to time to those pages (as in the analysis of survival prime numbers able to travel through 5d by making mirror images at scale by joining internally its alternate vortices-points-unit numbers), symmetry thus plays a central role.

How many states of present a system has, defines then its 'quality of symmetry' and survival which in space (the easiest symmetries to describe), when fixed in a point means the circle dominates all other forms as the most symmetric form.

Symmetry then becomes a requirement to perform well certain Đimotions as vital actions:

I.e. the circle IS the perfect symmetry for still Dimotions of perception, for 2 reasons:

As we perceive in stillness, it maximizes survival by having a minimal perimeter, for a maximal volume of information and disguises itself in an external Darwinian world.

Its infinite symmetry, focus all lines of communication that fall into the fractal point with minimal distortion.

However, when we consider the 2nd Dimotion of Locomotion, which is the process of displacement in space while retaining the form in time without entropic scattering, the system will maximize its speed of reproduction of form, of information in other adjacent region of space when less information displaces. And so the line, which stores no internal information (or the wave as all points are ultimately fractal with a minimum volume), will be able to displace faster than the sphere, and maximize the second Dimotion by reproducing less information. Further on, the line is the shortest distance between two points. And so locomotions are maximized both in a single plane by a lineal wave, or between 5D planes by a fractal line.

Finally hyperbolic forms mix both, lines and curves, so they can reproduce both. And a hyperbolic plane breaks down a whole into smaller fractal equal parts, thus it is the essence of reproduction.

Vital geometry thus will be essential to explain the relationships between stable forms of geometry and Nature.

So symmetry means Survival in space; Closure of worldcycles in time. And the pentalogic of symmetry is immediate:

¬T: Time symmetry is *the capacity of all systems to complete a 0-sum world cycle through a motion that returns the system to a present undistinguishable dynamic state. Hence symmetry is conservation of Time by iteration of the same ST-event, even if the previous event becomes extinguished.*

S@: Symmetry in space means survival, through the 'inverse complementary entanglement' of the parts of the being, ruled by the laws of congruence (and hence often an asymmetric adjacent system). A particular symmetry that coincides with the common-sense concept though also applies as it enhances 1D perception without deformation of a larger outer world: symmetry as repetitive regularity. It follows immediately that *the more symmetric a system is,* the more efficient will be in 'preserving' in a Universe in perpetual motion, its present states of 'survival'. I.e. A circle will be more efficient, because it has infinite degrees of rotational symmetry that an irregular polygon, which might not even have a single symmetry state.

Δ… Survival implies reproduction of form, which happens through a shrinking in 5D seeds and enlarging. So symmetry in scales means the capacity to replicate seeds that are self-similar to the whole. The 'survival' of

'vital mathematical objects', thus favors reproductive prime numbers able to shrink through 5D mirror images at scale made by joining internally its alternate vortices-points-unit numbers.

S=T. *Finally* mirror symmetry allows the reproduction of form and we dedicate an entire paper on gender to it.

Symmetry is so important that all motions on physics and geometry can be reduced to those 3 symmetries called boosts, rotations and mirror symmetries as defined by Noether's theorem of physics.

Then according to form=function, Nature ensembles a lineal body-limb moving-translating in space with a spherical head, to perceive on the forward 'future' position smaller in size, faster in time, in adjacent relationship to the body and limbs that have lineal forms to maximize the whole's motion.

Of all those symmetries though the most important is a 5D scalar symmetry ignored in science: the 'undistinguishable' property of the ¡-1 elements in which the system imprints its form, which become 'numbers' from the perspective of the whole. This symmetry of scale, implies that the system can reproduce its information - move faster, because it imprints 'any element' of the lower plane of motion or 'field' that becomes undistinguishable, so there are not 'impurities' and errors of reproduction of form, when any electron can reproduce your atomic connections and so on.

Identical parts then acquire the same larger form accomplishing the most important of the five vital dimotions of existence: reproduction.

Thus we can establish a correspondence between dimotions and the survival of certain geometric forms above all others: the circle/sphere for 1D perception; the line and its curved form the parabola for 2D¡ motion, its combined wave for 3D reproduction, the social undistinguishable numbers of polygons for 4D social evolution, and the different forms of open curves, notably dual, split hyperbolas for 5D entropic Dimotion and dissolution of a system in its opposite forms, which in the conic representation of a worldline, studied latter in more detail, will split, one hyperbola branch going upwards and the other downwards, and information and motion split in death, when we take the axis of the cone as the ideal representation of the fifth dimension.

RECAP. Each of the 3 organs domains of a space-time organism corresponds to one of the 3 fundamental topologies of a 2-3-4D manifold, the planar/toroid, cylindrical≈hyperbolic waves/bodies and spherical particles/heads, and to one of the 3 fundamental 0-points of perception, showing how close mathematics is to reality.

The reasons why the sphere or circle are the best forms for the first Dimotion of informative gauging, aka perception and the fourth dimotion of social evolution and seeding (mental polar frame of reference and storage of information) is the fact that the sphere has minimal surface to store maximal information as a seed not to be noticed and perfect symmetry allowing perception from all points of view without distortion.

Genus and holes. Measuring functions with forms. 3D systems and its \$<st>ð roles.

The topologic genus of a system is the quantity of cuts/tears the system can endure without breaking the form in its component parts (5D travel) or transform it into other of the 3 varieties.

Thus genus is related to the survival properties of an organic function, as it was the case of the 'form' of a topology best suit to survival. And it also has 2 'variations' of outcome – to break the system into parts (4, 5D) or to transform it into a different variety, which explains why often cuts do happen in morphogenesis, to evolve the shape of organs.

Further on the GENUS of each VARIETY, grows as we grow in dimensional and informative/formal complexity, improving our survival. So the form with minimal genus that is, whose number of dissections is minimal, must be the simplest, weaker form-function, which as information is more fragile, will be the 'hiding' sphere of minimal perimeter, and often maximal resistance of its 'cells' of the hard membrane that isolates it.

So spheres tend to be harder to protect the inner information with 'thick skulls. Since *when a topologic form is cut, it 'dies' literally, in the world of topological vital beings.*

And this extends to the whole 'adjacent' organic parts of the being, often re-covered by a spherical membrane without holes. So topologic killing requires to tear the membrane that isolates the system, and best, to section the vital connection between its two 'dominant' organs, the O-head/particle and Ø=body-wave (as limbs/fields often are entropic, external, and can be lost and replaced).

Indeed in biology where the laws of vital geometry are more self-evident all predators have the same form of killing, they cut the 'shortest' part of the membrane, the neck, split the O-head and the Ø-body and the thing is done with.

A key law of vital topology states that: "Properties of O-heads particles of max. form and |-limbs fields of max. motion are inverse, merging in Ø-bodies."

It extends to any of its 'disomorphic' parallel views as relative |-past and O-future merged in Ø-present.

In the case of genus and holes, the sphere is the 'weaker' form', as information is and limb or line the strongest one as motion is. But the Sphere becomes the harder surface at its Δ-1 scale, often made of triangular shapes as scales also invert its properties. While the cylindrical line tends to have the 'weaker' Δ-1 elements, often made of circles:

§ð: The sphere just accepts one cut and has zero genus; but its stronger Δ-1 'triangular parts' act as the entropic membrane that protects its internal informative center, on 'top' of the whole, guiding it towards the future. In spherical forms, it predates the vital energy of its enclosed inner region, which it invaginates with fractal networks, focused on the central singularity it mirrors in a larger scale. So the vital energy is between a 'sword' (the membrane that kills you by perpendicular penetration - as the invaginations of the biological stomach show) and a hard place (the singularity of maximal density that kills you by warping)' as they say.
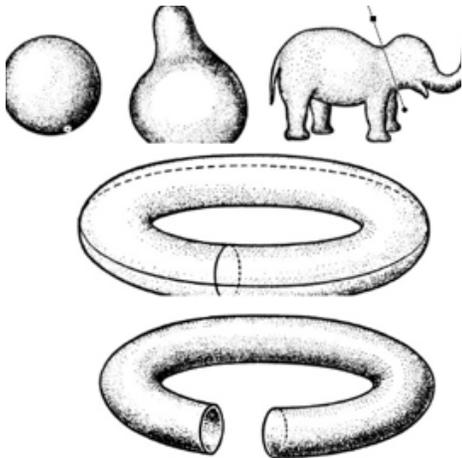
ST: Vital energy has the toroid genus; which *needs two* cuts to die= transforming into a new more entropic variety, a flat surface of motion and energy that feeds both the membrane and the singularity.

$t: Limbs are the |-function of entropy which is 'expendable' and can receive multiple cuts perpendicular to the cylinder without loosing its variety; often regenerating itself in many vital organisms. Thus it is closely related to the vital energy of the system.

§: Finally the singularity is the more complex, more informative, smaller ∞ dual function, a donuts, whose genus is 6, as you can do 3 superficial cuts laterally (inside the two holes and outside the whole form) and 3 perpendicularly, in the bridge between holes and between the donuts and the outer world.

It is thus the hardest, most efficient of all the elements of most supœrganisms.

So the GENUS of each variety also *defines its difficulty to trans-form, which grows* as we grow in complexity. Which makes the *form with minimal genus that is, whose number of dissections is minimal, not only the simplest form-function but the easiest to transform; another reason why the sphere is 'original seed' of most species.*

The balance kept in pegging S<ST>t-species.

Thus in palingenesis and morphogenesis we assist, departing from the seed, a series of vital peggings and tearings of forms to change and evolve till they settle into their main dimotional role within the whole:

If the seed= sphere tears its caps becomes then an entropic digestive cylinder.

If then it is pegged to the axis of the open sphere, having both the same 0 Euler characteristic (a property of balance latter studied in more detail). So they fit perfectly by adjacency=parallelism not by Darwinian perpendicularity; as the sphere has the central hole which the cylinder can close. Hence a positive *evolutionary merging occurs to create the commonest form of the Universe, a rotary membrain with a central axis that absorbs and emits information and energy for its centered singularity*.
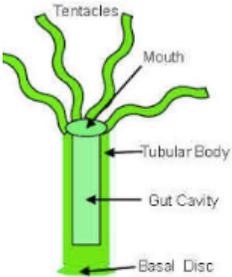
Indeed, the first natural evolution of all kind of systems is exactly the combination of a sphere and a digestive tube in the axis, not only in particles with its axis through which a magnetic field or similar 'flows' of energy pass, but also in biological systems all of which have evolved from the initial sponges and hydras with a digestive tube, with two openings, a mouth and an anus.

Finally in the center of the tubular body or in the top 'mouth', where higher information flows there will be a new topological evolution, now reclosing the tube at a point, or narrowing it, to create a singularity in command of the whole.

But this system, which is still dominant as an informative sphere, is *far more efficient and balanced as it now has the 3 canonical parts/networks needed to survive – the digestive tract for entropic feeding, the singularity-focus of information and the original sphere or rotating angular 3D-momentum.*

Topological evolution and topological transformations

In that regard, the main innovation of Δst in topology is the explanation of its laws as dynamic vital transformative events, through the addition of balanced s=t symmetries that select the best 'complete' survival forms of the Universe, understanding developmental evolution, which **we call topological evolution** and use in all sciences.

As 5D is also interested in a transformation of scale, dimension or form that modify and evolve topological functions; in changes caused by new adjacencies, new perpendicularities and new social parallelisms.

Then we talk of a topological d=evolution (inverse of topological transformations when no change happens):

"A topological evolution is a change in the form and function of the s, st, t parts of the being caused by new adjacencies, new perpendicularities and new social parallelisms."

We diverge from some classic topologic definitions. For example, some geometers consider a donuts to be the same variety than a flat plane, because you can cut the empty donuts, spread it in 2 D and alas! you have the plane, but they are not the same. Since *cutting the donuts produces a topological devolution to a state of lesser form that flattened looses 1 dimension.*

So the function changes from being a vital energy closed cycle (donuts) to an open flat plane of entropic motions.

Open vs. closed surface are thus an essential duality of the informative vs. entropic poles of reality. However, apart from these topologies there also exist the so-called one-sided surfaces on which there are not two distinct sides. The simplest of these is the well-known "Möbius band", which is obtained when we take a rectangular strip of paper ABCD and paste together the two opposite short sides AB and CD. Such one-sided membranes do NOT close and break space-time in the classic sense of spherical membranes but are *akin in function to the toroid geometry, as the vital energy quanta within them cannot escape in an eternal return – being its main distinction to require two loops instead of one; and its main use in a complex understanding of spin geometries (see paper on 5D quantum physics).*

Nature overwhelmingly favors closed surfaces, because the Universe is a fractal of superorganisms that are worlds in themselves, but the survival=efficiency of a Möbius band, resides in its paradoxically duality: it is

opened to the outer world *as a whole but its Δ-1 parts that cycle through it cannot escape.* Those functions are then proper of systems which want to *increase its surface of exposure to the external world and are strong enough to take it as parts and wholes; hence* systems with 5D-entropic functions, also achieved through fractal scalar perpendicular invaginations (as in digestive systems). I.e. The Möbius concept can be equated to a chiral molecule, which is not superimpossable on its mirror image. So chiral molecules are good for optical activity and entropic light dispersion (5D function) or for explosive propellants motions of aggressive atoms (oxygen, chlorine) such as the… Perchlorotriphenylamine (:

The inverse process: jetting off handles and limbs.
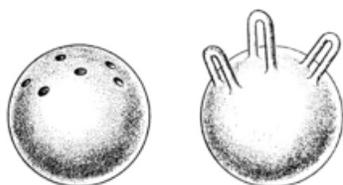
Topological evolution is a fertile field, which will become along theory of supœrganisms (social evolution) the 2 essential ad ons to biology in the XXI c. It is the clearest expression of the laws of existential algebra with its inversions, symmetries and restrictions of form, putting at play all the elements of 5Dimotional reality. For example, as the Universe is mostly 'asymmetric in time, space and scale', all processes happen in inverse fashion with a slightly different outcome (whereas perfect symmetry can only be found in 'regular polytopes =geometric numbers' and spheres (see number theory). And yet asymmetries tend to balance S and T events. So if we 'sink' a membrain it will bulk but likely it will do so in multiple ∑informative jets. As hardly any process is equal since the inverse arrows have diverging properties. In this case the 'punch' being a painful entropic 'aggression', it brings an ∑Δ-1 multiple 'expulsion'. *Such* inversion of the process of 'hollowing' the axis of the sphere, happened *in* the hydra where the balance law that created a hole digestive sink, inversely jetted off tentacle limbs with an inverse informative function.

This duality is also a fundamental theme of classic now converted into vital topology - sinks and handles.

So within the principle of Δst asymmetric balances, at common topological evolution takes place: the sphere with holes fills inversely with handles, as the form of the cylinder jets outwards 'closing' in pairs the spheres' holes:

In abstract topology we take a spherical surface and cut 2p spherical holes in it. We divide these holes into p pairs and attach to each pair of holes (at the edges) a cylindrical tube (a "handle"). We obtain a sphere with p "handles" or as it is called, a normal surface of genus p. The order of connectivity of this surface is 2p. And in nature is often happening in synchronicity with other spheres to chain them to each other.

We shall then leave genus theory here, to explore latter in our introduction to 5D elliptic geometry how a 'real species' constructs handles, through antipodal points managed by the central singularity - as the spatial symmetry of opposite antipodal points proper of the elliptic geometry of an internal @-mind/membrane system creates the handles and displaces them in the surface to connect with other fractal points in the external world.

Or alternately to create an inverse entropic function, the handle born of a first 'suction' and then an 'expulsion' of continuous matter from the system, can be cut and cupped to become an aggressive horn (a method of topology used in the abstract classification of varieties, which became famous with Perelman's proof of Poincare's conjecture, we also prove somewhere in a 'margin' with the experimental method as we do with Fermat's grand theorem).

Alas, we got through ST-inversions and symmetries a couple of entropic moving or defensive limbs, as the sphere becomes a stronger T.œ. Moreover the 'section' of the limb will not mean the section of a vital part of the sphere, which means the death of a T.œ. So Hydras and Lizards keep loosing tails and limbs and keep functioning.

Further on, every closed surface lying in our ordinary space is topologically equivalent either to a sphere, or to a sphere with a certain number of handles: For example, the torus surface can be deformed continuously into a

sphere with a single handle... So once more our 'perfect topological form', the sphere shows how it can become easily either of the two other varieties, the limb or the vital energy of toroid forms.

What is interesting then is that all topological forms can be born of such sphere with handles - the original egg/morula of any living being.

PENTALOGIC: THE ELEMENTS OF TOPOLOGY

This is just the top of the iceberg of an immense extended subject. Geometry is a vital subject, which slowly evolved till reaching with vital topology the study of forms with motion and its transformations to create the ternary systems of the Universe. So a brief pentalogic perspectives on its ¬Δ@st elements would be:

@: Topology is the last 'real generalization' of space, which does not 'escape into the logic spaces of the mind, it will allow us to study in more depth the fundamental properties of any logic space (incidence, congruence, adjacency etc) in its more general view, jumping over the Euclidean and Axiomatic methods we consider outdated. This shall establish further as we did in our I part on Greek bidimensional geometry, its bio-logic meaning.

Γ: As geometry with motion and only 3 varieties it is the essential geometry of T.œs which are in space basically ternary ensembles of the 3 types of topologies there are, and have been all over the place - elliptic, parabolic and hyperbolic, *in any number of relevant dimensions we study.*

S≈T: it allows some of the more complex S=T models of reality, in which a temporal system becomes expressed as a spatial problem, which renders since the first works of Poincare enormous yields in the solution of motion problems, always more difficult to resolve given the inherent entropic quality of pure time motions, which become 'fixed' for mental algebraic or topological manipulation easier with a topologic expression. *Thus topological analysis is the first 'step' in the mental solution and conversion of a 'future logic motion' into a past 'memorial form of information' (a concept again of the wider generalization of existential algebra treated in the first line.*

Δ: Topology evolved into network topology i- the best form of geometry to study Δ±1 parts and wholes.

Those multiple views of Topology resumes in 3 essential levels:

S=t topological evolution in all stiences with special emphasis in biology; @-mental methods of solving problems in which a motion becomes a form of space and allow to use geometrical methods to solve st-combinations of motion and form proper of physics and finally Δ-scale symmetries between point networks and wholes, and different dimensional elements.

Multifunctional entanglement. Its laws: inversion of roles as we emerge into higher social planes.

Moreover the 5th scalar dimension implies that topologies exist within topologies. That is, most systems have an external 'spherical topology', meaning a closed membrain. But the membrain will close inside a ternary adjacent topology making the 'single external form', an inner fractal T.œ with 3 parts. So the 3 Dimotional elements within the system can perform all the multifunctions of a 'whole being'. Since a KEY LAW of fractal. ternary systems is its *multifunctionality*, which gives any entity an inner ternary topology TO act as $, ST, and §ð beings.

Further on as we move through the ternary generator in time vital topology ads its laws of 'transposition' of functions, *as tears and pegs transform them, or the modular being changes its focus of action from one to other of its* 3 Dimotional elements, disguised within the membrane. So in the realm of topology, correspondences of form and function are not immediate, as inner parts become multifunctional, which allows a ternary topology to play different roles in reality acting as $, ST, and §ð beings. As: 'Systems which display more than one dimension in space, play more than one function in time'. This means all topological whole

beings are ternary forms. So even if they are dominant in one of the 3±i arrows of timespace, *which is its main task in the outer world, defined by the topology of its outer membrain, they* will be able to perform the 3 dimotions they need to survive in their internal world within the membrane.

Consider the simplex example: a lineal limb in 3 dimensions. It can also act as a rotary form with clock functions; hence as an enclosure; and in a cylindrical geometry as an axis of perception. It is this kind *of multidimensional nature, and trans-formation of a form into another what makes the Universe complex and not so easy to understand.*

The main of those laws is the change of function of all systems when becoming a mere point of a larger scale, as they transpose their roles from 'king of the Δ-1 hill', to ant of the Δ+1 ant-hill:

"When growing in social scales to form a new plane, functions change, most often becoming inverted;

$$: \sum|i-1 \approx \emptyset i, \sum \emptyset i = |i+1."$$

This is part indeed of an essential law we shall repeat ad nauseam: when growing in social scales to form a new plane, functions change, most often becoming inverted.

And the reason is obvious, the whole spherical micro point is the king of its inner world, but just a particle micro point in the larger whole, where its role is slavish to the super organism.

So the explanation of this change of vital roles is immediate when considering the Disomorphic laws of Δst, which expressed in i-logic writes:

$$\sum|i-1 \approx \emptyset i, \sum \emptyset i = |i+1$$

This law comes all over the place, in experimental systems, from biological systems where proteins that are lineal, become the hyperbolic elements with multiple dimensional folding that control the reproduction of proteins, to atoms that have perfect cyclical form (iron), which become the lineal strongest element for creation of entropic weapons in the $\sum+1$ scale.

Shakespeare said: we are all buffoons or kings depending on our perspective. And it connects also with the fact that as we grow in size perspective (Lobachevski's r/k ratio), from being 'cyclical' beings we become moving dot-points tracing lines in the larger perceived flat world.

To notice a one to one correspondence. We talked of distance as the sum of 'minimal steps of measure' which applies to transpositions, in the simplest form, with the stop and go, S>T steps of all motions in 5D² realities. So here we observe a particular case of this 'motion through transformation of states of the being, *across the scales of the fifth dimension, symmetric to the change of states in timespace and topological functions=forms.*

Δ±1 symmetries. The scalar geometry of polyhedrons. Euler's characteristic.

The abstract way to describe topologically all those figures with different vertices is the so-called Euler characteristic - the first theorem in topology known to Descartes.

Since in the evolution of human thought always the first knowledge is the simplest most general laws of the time§pace Universe, it is worth to consider it in more detail. Let us take the surface of an arbitrary convex polyhedron. We denote by A0 the number of its vertices, by 1 the
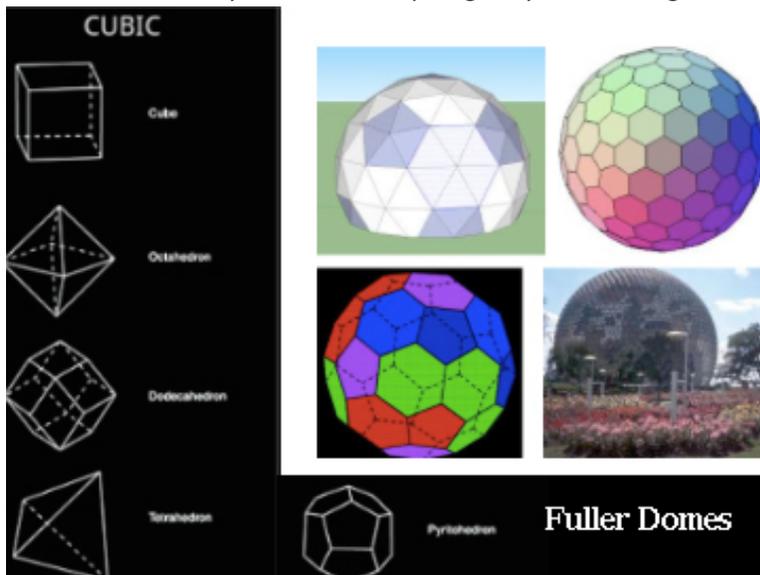
number of its edges, and by A2 the number of its faces; then the relation:

$$A_o + A_2 = A_1 + 2$$

Which holds for any polyhedron including those with curved edges.

We have written it properly according to the S<st>T symmetry even if geometers, unaware of the S=t symmetries that general ALL the laws of the Universe, put it ao+a2-a1=2. The interest of the equation is obvious - not only is a general law of all polyhedral. It also shows *the 3 different 'dimensional scales' of points, lines and bidimensional, holographic surfaces together.*

Then we can identify S, T and ST, the intermediate element, writing: 1D point + 3D sur-face = 2 D line + 2.

Can we eliminate the 2 to make it truly an S=T relationship? Yes by opening the top and bottom of the sphere-like polyhedron, creating a canonical axis for any rotational sphere, since we loose then 2 'faces', giving us the canonical form of Nature's spheres, with its polar axis, and its animal and vegetal openings to the world, such as:

1D vortices + 3D surfaces = 2D waves/edges.

It also allow us to understand a basic transformation of a sphere into an open 'cylinder also with the same 0-Euler characteristic which obeys the law of balance: S+ T = ST, and hence spherical forms with two openings in the axis, either in its lineal $-limbs or rotational §ð spheres are the commonest form of nature, which combines the laws of balance of all Δst systems and the efficiency of its regular configurations.

**Topological evolution: morphogenesis - growing and keeping the balance of forms.**

Thus evolution of forms or morphogenesis is ruled by the basic laws of 5D T.œs, the constant 'change of form and dimensions' as the system grows, 'restrained' by the need to keep an S=T balance between forms and functions to maintain the system efficient.

This is the essence of it: grow and multiply, but as you do keep the balances of ternary forms and functions to avoid being extinct by a Darwinian event of another form.

So the ST stop and go laws here acquire a 'new dimension' by topological evolution that reproduce, evolve socially and reform the system to keep a balance which means to maintain 3 parts in constant social evolution and growth.

For that reason there are no really spheres of genus 2, but rotary spheres with an axis to process, absorb and emit energy and information, which then will have either a polar cap or central point, where a 'donuts' will become 'separated' from the axis as a proper entity playing the role of the singularity.

Common metallic crystal structures
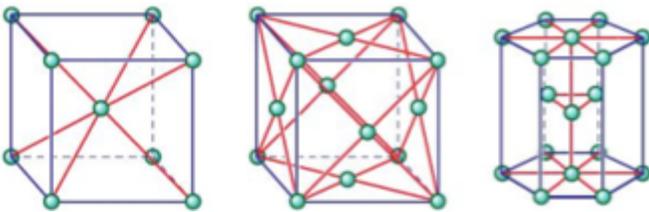
And so in the same manner all metals have the most efficient cubic or hexagonal configuration, mostly with a self-centered singularity, most spheres once they complete their 'tight packing' due to reproductive evolution will have the 3 elements of the being.

Yet they can be also considered a ternary variation, on its only 3 crystal structures:

ST: The most balanced, hence simplest to construct with minimal elements full system is the body-centered cubic, where the central atom plays the singularity role; it is the ST balanced form.

The ð form is the hexagonal system, also with a central clear axis, WHERE THE MAXIMAL density of form happens (a triangular singularity, transversed by an axis between two self-centered atoms; and the strongest covers: Hexagonal 'pi=3 circles'; that is bidimensional circles with a perimeter 3 times its diameter.

The $ form therefore is the third remaining one, which indeed is all about a strong membrane, with self-centered atoms and no singularity.

This ternary division of species is often found also in biological systems, where the face-centered cubic will be a plate-armored herbivore, which is all about protection with little brain, vs. the predator which is all about mobility and fast action-reaction brains (the Hexagonal equivalent) and similar species, playing then different predator-prey roles. A couple of examples should suffice:

In the cambric explosion it was all about face-centered armored trilobites, and the first eye-cephalopods that soon lost its armored and became squids with fast developed nervous informative systems.

And then a lot of intermediate species. Such ternary forms occur also within any species *as the multi-functional 3D being splits in variations on the same theme.*

For example, 3 subspecies of predators happen in the old world, the Lion, is the 'armored' strong, thick muscle-skin vs. the fast, weak, running cheetah. But the *most successful is the intermediate leopard, which is the ST balanced species that survive better than the others. So for example in massive continental India the cheetah was extinct; but the leopard survived; in nimble Ceylon island it was the lion equivalent, the tiger, but again the leopard survived.*

Bidimensional surfaces=membranes. Platonic solids. Euler's characteristic.

Topology is concerned mostly with the membrane of the system, in its present form. What Δst ads is the vitalization of its concepts, and a proper dimensional analysis, introducing the laws of S=t Disomorphic symmetries.

Let us vitalize another classic law of topology:

The Euler characteristic and its platonic solids, related to the balance between vertex=fractal points, edges=lines/waves of communication and sur=faces (enclosed vital spaces) - given its generalization... connected to knot theory, topology, physics of matter and crystallography, surface properties - you name it. Let us then consider of them only the most obvious Δst property - there are 5 of them in a 5D universe.

In three-dimensional space, a **Platonic solid** is a regular, convex polyhedron. It is constructed by congruent (identical in shape and size) regular (all angles equal and all sides equal) polygonal faces with the same number of faces meeting at each vertex. Five solids meet those criteria:

Tetrahedron	Cube	Octahedron	Dodecahedron	Icosahedron
Four faces	Six faces	Eight faces	Twelve faces	Twenty faces

The previous Euler's formula is obviously a combination of Δ-scale balance, such as Δ-1 vertices + Δ+1 faces = Δº waves/lines of communication.

But the vital emerging process of generation of forms; as the waves of communication between vortices create the bidimensional enclosed surfaces, and evolve the network, is the most important 'perspective' in topological evolution.

Δ±1. Points create topological networks. Hylomorphism.

When we get into details on how those topological evolutions they follow another fundamental principle of Δst hylomorphism, which essentially means that 'wholes are made of parts', that is of fractal points. And so a

change of topological variety happens always by tiny microscopic changes in the configuration of the fractal points; while that scalar symbiosis also allows communication through the fractal networks of flows of Δ-1 energy and information between the parts of the whole.

This scalar structure also explains the formation of openings and tears because the continuity of the whole disappears in the Δ-1 scale and the discontinuity and dark spaces between points appears (Galilean paradox). So by reordering, expanding or imploding distances between Δ-1 sets of points the holes of scalar topology allow morphogenesis:
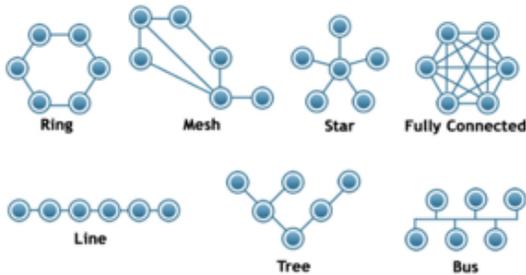
In the graph, topology works according to the 1st, 2nd and 3rd postulate of non-æ=i-logic geometry, through the arrangement of points (1D), its connections and axons, opened in |-$ functions closed in O-ð forms. It is then essential the 'degree of packing' defined by the | vs. O form that will eliminate intermediate spaces to create adjacency, or maintain a minimum hollow space for 'flows of networks' to cross, in parallelism – two choices that as many dualities become essential to differentiate species (so plants have hollows to allow vessels to transport water up and down).

Relative ratios of distances between fractal points increase as we decrease size, growing in information (5D metric). And 3 relationships can exist depending of the size of the minimal step between points compared to the radius of the point: adjacency when the distance is smaller than the radius, parallelism when is larger, and perpendicularity, which requires to penetrate beyond the 'enclosing, protecting membrane' and tear the point.

For 2 Dimensional surfaces is also a logic extension from lines of length to flat planes, ST-reproductive widths that mix the other two elements, the hyperbolic geometry with its dual ± curvatures and for height/information, and finally the sphere is the volume that stores more information in lesser space. So in principle we must suggest the following 2D generator:

2D¡ Γ: $t: plane/motion <ST hyperbola/reproduction> §ð: sphere/information.

The graph shows also how the parallel property, becomes now more complex showing clearly some of its key 'social properties':

-Spherical systems are social as they become tighter, informative elements causing the social evolution of points into supœrganisms of a higher Δ+1 scales.

-Flat surfaces maintain the parallelism ad infinitum. So they are ideal for network herding, in a balance between adjacency and connection.

-Hyperbolic ST vital energy if left in the open without a closing membrane will diverge into entropy, seeking for
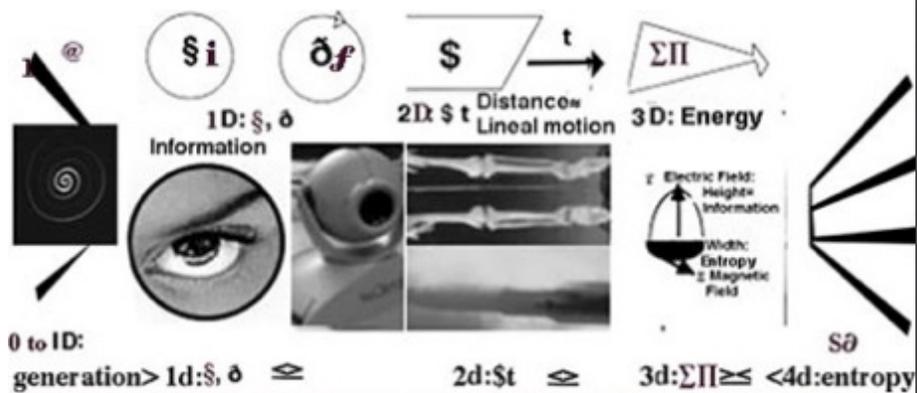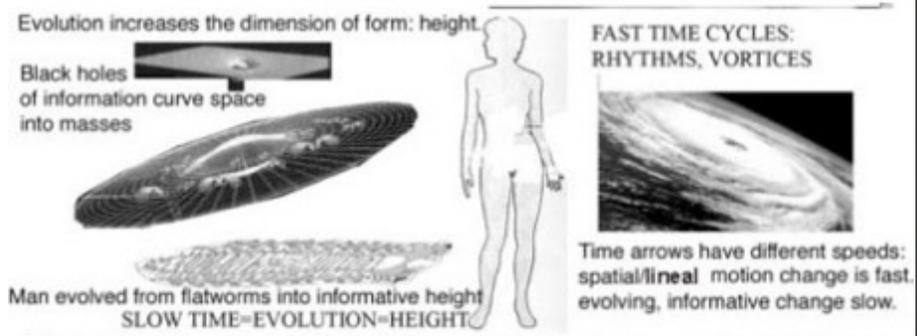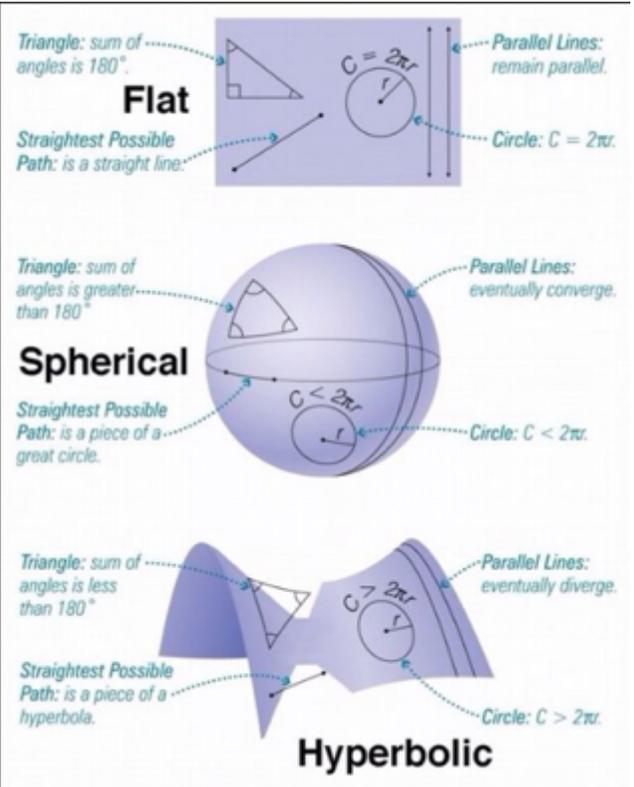
'freedom' and becoming unconnected.

In the graphs, whose full explanation would require an entire article, angles of perception, latter studied in 'mental spaces', are larger for spherical O-informative geometries. We come to the first seemingly contradiction as we expand our dimensions in the function/form of the next scale.

The kin observer will have notice that the role of the 1D line in its entropic function is being taken by the hyperbolic plane in 2D, transposing its functions with those of the plane, generated by the entropic line, which now takes the ST functions of the hyperbole.

Why? The graph shows that they still keep its S-hortest, ƒ-astest (St-raightest) space-time trajectory in terms of lines, hyperbolas and circles, which mean by the principle of least action that makes those paths overwhelming in experimental reality, that they are indeed related and generated by them: ∑lines = plane, ∑ hyperbolas = hyperbolic chair, ∑ circles= Sphere.

Its properties have definitely switched between $-lines and ST-hyperbolas, into $-hyperbolas and ST-planes.

So while the motions in time of the generator have been conserved (still the flat air-plane and Formula 1 moves faster, the sphere is still the informative eye-head on top; the hyperbola combines both), the functions in space as we 'emerge' from 1 to 2 dimensions have been transposed.

And this is one of the paradoxes of 'growth in Δ-planes', as we can regard a 2D as a social gathering of 1D elements. Functions become often inverted. And so while an elementary analysis might seem in abstract to relate lines to planes, circles to spheres and hyperbolas to Lobachevski's geometries, the universe, which is a constant iteration, transformation and merging of dimensional Kaleidoscopes has changed 'again'.

Classic topology. Construction of organic, fractal networks

When we start in a more professional way to understand the 3 topological forms of the Universe, we immediately confront the fact that a topological plane is made of points, joined by lines, and so enter into a more real description of the scalar universe as forms which are networks of points joined by flows of energy and information. The concept of an organism arouses immediately as an organism is a system that co-exists at least in two levels or scales of size, joined by networks=flows of energy and information.

In the graph, the 3 canonical forms of space-time, the sphere, the toroid and the fractal plane, which in close analysis are always networks of points. Indeed, topology at professional level however is not a continuous geometry but a sum of points that put together at a distance seem to be not a network but a continuous form. Hence the existence of scales in the Universe, in which each point of a topological form is in itself a world in a lower scale. Since the 3rd leg besides space-time symmetries of the GST philosophy of science is the fractal, scalar structure of the Universe, and how those scales co-exist and create organic systems.

We can then recognize a 'cellular-atomic-social' system of fractal units that build a self-similar closed (spherical) open (hyperbolic) or toroid (with two closing paths), network as a series of cellular relationships of connectivity, adjacency, coherence, proximity, etc. which make 'emerge' a whole that embodies the regularities of the myriad of infinite exchanges of energy and information between connected parts of the whole. In the graph we have drawn a few varieties of topological species, according to those properties, departing from the most stable dual, 'simplex' possible system of fractal points: 2 ternary 'triangles' of points, and its open-spatial and closed-

temporal and open-closed space-time combinations, which illustrate the creative dynamic processes of evolution of space-time beings.
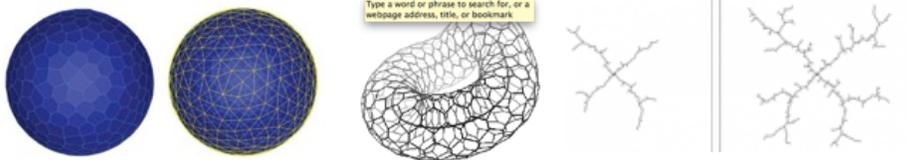
In the left, above time forms, starting with the ring of time and below, space forms, starting with the line of pure space, which are the 2 commonest, simplest s-t forms.

Yet the richness of functions and forms of the Universe is rather unlimited. So next we see a cyclic pentagon with a 'lineal limb', jetting on the base called a 'mesh', and next we see the ring converted into a star, where a central knot-point, the mind-monad receives information/energy from each corner of its bidimensional universe, ensuring a symmetric reception/mapping of its outer whole. And finally we see the 6 points connected internally and hence creating a new Δ-scale (that of the axons that come out of the neurons) and a new 'mind-center', in the central confluence of the points.

And again below we see the commonest divergences from the pure line: a sixth element also jetting out of the line (a tree), and a connected 'bus', equivalent to the connected circle, where the conniption is established by a single line, which becomes the 'spine' of the lineal, entropic, fast-moving system, far simpler than the fully connected hexagon, since *closed time systems are always more complex in information than faster, larger lineal spatial ones.*

IN THAT REGARD topology, its 3 space-time varieties and its network structure is the clearest mathematical proof of the existence of an organic 5D Universe.

Let us then summaries that structure, and how its vital networks evolve through the postulates of non-AE in social groups from points into lines into organic planes and 5D parts and wholes that form a single structure.

A key concept of all GST is that since the Universe departs from simplex principles, it is desirable to follow a procedure from simplex to complex, which follows the time evolution of those disciplines. So we can obtain a lot of worldview and information by considering before we study modern topology classic geometry>Topology and its fundamental laws. Let us start with those laws and what they say and how they are generated by the fractal generator S≈T and its 2/3 elements.

Thus the membrane of a system always can be approximated topologically with points, lines and planes.

Now the first theorem of topology is called Euler's characteristic:

We denote by $\alpha 0$ the number of its point- vertices, by $\alpha 1$ the number of its lineal edges, and by $\alpha 2$ the number of its bidimensional faces; then the following relation is known as Euler's formula:

$$\alpha 0 - \alpha 1 + \alpha 2 = 2$$

What does it mean in GST? I wonder... obviously is important as we have a relationship for any $t-cover, but we should try to reorder it in terms of Dimensional forms

D1 (point) - D2 (lines) +D3(planes) = 2

D1 (points) + D3 (planes) - 1 = D2 (lines) +1

In other words for a sphere to have a balance it will need a ±1 holes, which will turn out to be the axis holes of all real spheres, equivalent to the 3 'apertures' of a pi-bidimensional cycle (3.14 - 3)

This geometrical theorem belongs to topology, because our formula obviously remains true when we subject the convex polyhedron in question to an arbitrary topological transformation. Under such a transformation the edges will, in general, cease to be rectilinear, the faces cease to be plane, the surface of the polyhedron goes over into a curved surface, but the relation between the number of vertices and the numbers of edges and faces, now curved, remains valid.

Triangulation.

GST relationship: One of the fundamental discoveries of GST is the ternary structure of all what exists as a whole. This is shown everywhere, in geometry from the recent theory of causal triangulation that shows how to construct a space-time Universe with only 3 'points' and a causal time algorithm between them, to the earlier topological discovery of this section: most topological laws can be reduced to the study of its triangular elements in the Δ-1 scale of the whole form.

The most important case is when all the faces are triangles and then we have a so-called triangulation (a division of our surface into triangles, rectilinear or curvilinear). It is easy to reduce the general case of arbitrary polygonal faces to this case: It is sufficient to divide these faces into triangles (for example by drawing diagonals from an arbitrary vertex of the given face). Thus, we can restrict our attention to the case of a triangulation. The combinatorial method in the topology of surfaces consists in replacing the study of such a surface by the study of one of its triangulations, and of course we are only interested in properties of the triangulation that are independent of the accidental choice of one triangulation or another and so, being common to all triangulations of the given surface, express some property of the surface itself.
Euler's formula leads us to one of such properties, and we shall now consider it in more detail. The left-hand side of Euler's formula, i.e., the expression $\alpha 0 - \alpha 1 + \alpha 2$, where $\alpha 0$ is the number of vertices, $\alpha 1$ the number of edges, and $\alpha 2$ the number of triangles of the given triangulation, is called the Euler characteristic of this triangulation. Euler's theorem states that for all triangulations of a surface homeomorphic to a sphere the Euler characteristic is equal to two. Now it turns out that for every surface (and not only for a surface homeomorphic to a sphere) all triangulations of the surface have one and the same Euler characteristic.
It is easy to figure out the value of the Euler characteristic for various surfaces. First of all, for the cylindrical surface it is equal to zero. For when we remove from an arbitrary triangulation of the sphere two nonadjacent triangles but preserve the boundaries of these triangles, then we obviously obtain a triangulation of a surface homeomorphic to the curved surface of a cylinder. Here the number of vertices and of edges remains as before, but the number of triangles is decreased by two, therefore the Euler characteristic of the triangulation so obtained is zero:

Planes + Points = Lines: (ape-open space)   Planes - 1 + Points - 1 = Lines (closed time cycle).

Thus the first and obvious truth is that in an entropic system, the dominant form is the line, the entropic field which matters as much as the sum of the ST and T system, it generates & sustains.

Or in terms of a balance of present, if we consider the entropic plane a volume of past space, the wave-line of present and the point singularity of future time, there is a present balance as present waves ≈ past planes + future points

On the other hand the sphere to reach the balance canonical to all system MUST acquire two more points or planes. But as it is a closed form, it cannot acquire more planes. So it does naturally evolve to acquire a dual, central point, inside of it, as it naturally happens in all systems of nature that evolve from lines or lineal tubs into closed cycles and spheres, which acquire *its singularity points to reach its balance.*

Present waves ≈ past planes + future points - 2 SINGULARITY CENTRAL POINTS THAT have inverse symbol to the outer points of the system; or in other variation of balance, the *sphere must loose two points that become the openings of its axis.*

Those are therefore the justifications of one of the fundamental laws of topology which derive of the need of balance between past + future = present

And ultimately explain why all spheres tend to have in real vital geometry, axis and can therefore easily transform $t into ðf, In fact most vital systems are made of a lineal 'axis tube' and a sphere where the tube becomes the digestive entropic system, *pegging both in a balance with a 0-characteristic:*

In the graph a balanced simplex system is composed of a tubular digestive $t axis and a spherical membrane, with an intermediate st system with onion-like layers that transform one system into the other.

Indeed, let us take the surface obtained from a triangulation of a sphere after removal of 2p triangles of this triangulation that are pair wise not adjacent (i.e., do not have any common vertices nor common sides).

Here the Euler characteristic is decreased by 2p units. It is easy to see that the Euler characteristic does not change when cylindrical tubes are attached to each pair of holes made in the surface of the sphere. This comes from the fact that the characteristic of the tube to be pasted in is, as we have seen, zero and on the rim of the tube the number of vertices is equal to the number of edges. Thus, a closed 2-sided surface of genus p has the Euler characteristic 2 − 2p.

But all other forms are not as balanced as the previous ensembles because they have not the same degree of balance, and so when they are created they tend to become extinguished... failed less-efficient forms.

Topological properties.

If we were to be more amenable to the language of mathematicians, the properties that define the networks of points of the 3 $t<St>ðf ELEMENTS of reality - its curvature, the main property, along its 'closed temporal' or open spatial nature, and its 'connections between them, often through the hyperbolic St-art are called topological properties.

Specifically those properties, maintained by the structure during its existence between its limiting age-motions of ±d=evolutionary birth, reproduction and extinction, through all the other possible motions of time (growth, locomotion & diminution) are called topological properties.

As a topology is a network of Δ-1 points, which are smooth and adjacent to each other, we can explain the concept of preservation or continuity under any motion of time-space of the topological organ (transformation in the static, discontinuous simplified mind-language sod mathematics) as the maintenance in the Δ-1 scale of the point-structure and relationships of continuity (adjacency) between those points.

IN OTHER WORDS, a topological ternary system conserves its forms in balance through the entire differentiable period of its world cycle, but this differentiability or 'smoothness' with no transition breaks in the 3 motions/points of life in which the system changes its phase:

Thus to be possible to define the preserved properties of a topological gaieties , the system must be 'differentiable' through all the period of time and translation of space. Yet, in the point of emergence and dissolution, and reproduction either by splitting a system into two or 'penetrating' and tearing perpendicularly other system, those topological properties are not preserved.

This has huge implications to the understanding of the process of life and death and the ultimate workings of space-time geometries as they go along performing its world cycle.

What about the other 2 motions not quoted here, evolution and perception? Are 'differentiable' smooth and continuous?

This is a question beyond the scope of this paper, which however www must remember when dealing with perception and evolution. In the simpler model of perception, we can talk of a series of 'holes' penetrated by the information, which internally maps out the mirror image of the external world. In evolution we talk of palingenesis, one of the most fascinating subjects of all GST, as it brings about *a fast forward resume of the entire process of existence and emergence of a system, as it constructs a new super organism, and each of its processes tell us something about the structure and laws of the Game of Existence, which we shall study in the 1.life 3rd line posts.*

But what does it truly mean a system does not preserve a topological property and why it does not through the motions of reproduction, evolution and perception and its phases as opposed to its preservation in the other motions, growth diminution and locomotion.

Simple enough it means that those 3 motions are space-lie while the motions of time, do NOT preserve its parity as they are transformative.

Thus we consider that in the positive view, topology studies topological properties of figures;, which remain constant under an arbitrary topological transformation≈motion.

In those periods, the being exists in a smooth manner, as nothing tears.

And vice versa we shall study also topological transformations/motions that reorganize internally the being and how the not preserved tears and growth of the topological networks affects this evolution.

And finally we shall apply this knowledge to understand what remains invariant under arbitrary continuous transformations of geometrical figures.

All this of course, 'sparkled' with deep philosophical conclusions about what the system tells us, due to such topological properties.

The main properties, which we will study here are as they are both essential to topology and Δst are:

-The property of a curve or a surface of being closed (that is, time-like).

-The property of a closed curve of being simple forming only one loop.

-The property of a surface that every closed curve lying on it is a dissection of the surface (the spherical surface has this property, but the ring-shaped one has not and this will have many implications for the vital geometry of beings.

The largest number of closed curves that can be drawn on a given surface in such a way that these curves do not form dissections, i.e., that the surface does not split into parts when cuts are made along all these curves, or order of connectivity.

Topological studies of time motions

We HAVE covered thus most of the themes of geometry in a very synoptic manner, enlightening them all with new insights born of GST, according to the purpose of this web, which is to show the organic, space-time nature of all toes and languages, unified by those principles and the capacity of GST to further new insights on all stiences.

It only rests to consider an example of the Galilean paradox - which allows to use pure geometrical SS dimensions of form to study equivalent problems of TT-dimensions of time motions.

We already said that Paths in that sense in Δst must be treated with the duality of ST dimensions, one of motion and one of form, complementing both the topological space-only view and the view of points moved *through curvature forces, proper of physical studies of topology.*

Since the mind fixes motion into form to 'make sense' of motions, order them and understand its general laws, something which topology does with its...

S=T@. Topological methods: motions becoming forms... which allow to resolve complex motion s=t n-dimensional processes transforming them into topological forms - but this is an artifact of the mind not a reality - and to forget that is the biggest sin of creationist mathematics. 'Point'.

Let us consider one example, using the torus as the richest topological form to illustrate such forms of modeling:

The compound plane pendulum consists of two rods OA and AB, hinged together at A; the point O remains immovable, the rod OA turns freely in a fixed plane around O, and the rod AB turns freely in the same plane around A.

Every possible position of our system is completely determined by the magnitude of the angles φ and ψ that the rods OA and AB form with an arbitrary fixed direction in the plane, for example with the positive direction of the abscissa axis. We can regard these two angles, which change from O to 2π, as "geographical coordinates" of a point on a torus, counting from the "equator" of the torus and one of its "meridians," respectively,

Thus, we can say that the manifold of all possible states of our mechanical system is a

manifold of two dimensions, namely a torus. When we replace each of the two angles φ, ψ by a corresponding point on the circumference of a circle on which an initial point and a direction are given hen we can also say that every possible state of our mechanical system is completely characterized by giving one point on each of two circles (one of these is taken as the latitude φ and the other as the longitude ψ).

In other words, just as in analytic geometry we identify a point of the plane with a pair of numbers, namely its coordinates, so in our case we can identify a point of the torus (and hence an arbitrary position of our pendulum) with the pair of its geographic coordinates, i.e., with a pair of points one of which lies on one circle and the other on another. The essence of the situation is expressed by saying that the manifold of all possible states of our compound plane pendulum, i.e., the torus, is the topological product of two circles:

Thus even the simplest mechanical (kinematical) considerations lead us to topological manifolds of great value in the practical, more detailed discussion of mechanical problems and *any modeling of S≈T multi-dual dimensions of a T.œ.*
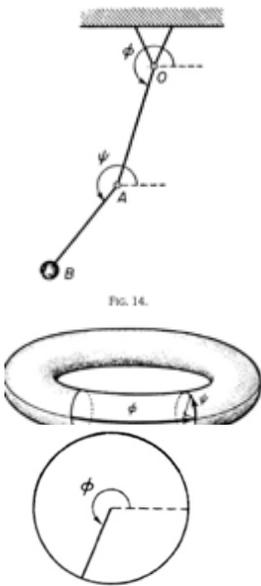
All this said, and resumed, we now will connect classic Topology with the fractal non-Euclidean points that structure the Universe, to show how ultimately by the correspondence principle all sub disciplines of classic science connect with new disciplines of modern stience.

Topology and set theory.

The theory of sets made indeed possible to give the concept of a geometrical figure a breadth and generality that were inaccessible in the so-called "classical" mathematics; *but that is exactly how 'specific reality' becomes cut-off from synthetic paralogic languages that finally seek a single origin to it all – spacetime in reality, and any imaginary mind mirror of it in different languages. To say then that all is a set, like saying all is named by a 'word' or 0 x ∞ = Cj generates all numbers and all minds, is to say little.*

Hence set theory, ultimately an abstraction of the relationships between Δ-1 elements and wholes, can indeed explain it all, but so can 5D with the advantage of being an objective reality not a humind distortion.

In any case to honor the correspondence principle we consider that 'parallelism' between 5D and set topology:

In set theory the object of a geometrical, in particular a topological investigation now becomes an arbitrary point set, i.e., an arbitrary set whose elements are points of an n-dimensional Euclidean space. Between points of an n-dimensional space a distance is defined: namely, the distance between the points $A = (x_1, x_2, \cdots, x_n)$ and $B = (y_1, y_2, \cdots, y_n)$ is by definition equal to the nonnegative number.

Numbers thus become *spatial when positive reinforcing our analysis of 'negative' numbers as temporal motions.*

The concept of distance permits us to define adjacency first between a set and a point, and then between two sets. We say that a point A is an adherent point of the set M if M contains points whose distance from A is less than any preassigned positive number. Obviously every point of the given set is an adherent point of it, but there may be points that do not belong to the given set and are adherent to it.

Let us take, for example, the open interval (0, 1) on the numerical line, i.e., the set of all points lying between 0 and 1; the points 0 and 1 themselves do not belong to this interval, but are adherent to it, since in the interval (0, 1) there are points arbitrarily near to zero and points arbitrarily near to one. A set is called closed if it contains all its adherent points. For example the closed interval [0, 1] of the numerical line, i.e., the set of all points x satisfying the inequality $o \leq x \leq 1$, is closed. Closed sets in a plane and all the more in a space of three or more dimensions can have an extremely complicated structure; indeed, they form the main study object of the set theoretical topology of an n-dimensional space.

Next we say that two sets P and Q adjoin one another if at least one of them contains adherent points of the other. From the preceding it follows that two closed sets can adjoin only when they have at least one point in common; but, for example, the intervals [0, 1] and (1, 2), which do not have common points, adjoin because the point 1 which belongs to [0, 1] is at the same time an adherent point of (1, 2). Now we can say that a set R is divided ("dissected") by a set S lying in it, or that S is a "section" of R – S consisting of all the points of R that do not belong to S can be represented as the sum of two non-adjoining sets.

Thus, Lobachevski's ideas on adjacency and dissection of sets receive in contemporary topology a rigorous and highly general expression. We have already seen how Uryson's definition of dimension of an arbitrary set (see the remark in §6) is founded on these ideas; the statement of this definition now becomes completely rigorous.

Same applies to the definition of a continuous mapping or transformation; a mapping f of a set X onto a set Y is called continuous if adjacency is preserved under this mapping.

I.e., if the fact that a certain point A of X is an adherent point of an arbitrary subset P of Y implies that that image f(A) of A is an adherent point of the image f(P) of P.

Though it is likely clear enough, the problem with such degrees of abstraction is its detachment from the experimental reality of vital topology, as in reality there are NOT infinite n-dimensional spaces, but space is an informative mind-stillness of a time dimension; and *ultimately reality has always a balance between S and T dimensions of form and motion, which is the true engine of its stop and go activity.*
Further on set theory makes us belief that reality is constructed from the top of the humind 'set theory' down to the reality of points, the true unit of space.

This said, if we consider a set, a society of T.œs and use the reverse expression -to signify this inverse 4-5D arrow of 'wholes and parts' coming together: Set < ≈ > §œT defines them as collections of the causal minimal elements, fractal points and social numbers. So obviously all the laws of §œTS, social groups of Organisms of Timespace apply to T.œ and vice versa.

But there are always 3 planes of growing dimensional understanding in languages as reflections of ternary planes of T.œs, so we might wonder, what there is between sets of points (1st Non-E postulates) and topologies (3rd network/geometric form/plane postulate); obviously the 2nd postulate: flows/paths of communication, which in topology indeed are the intermediate element between points and geometrical figures, study in this case with group theory. So we shall briefly complete the Disomorphism between GST and Geometry with a resume of its meaning adding as usual some Δst insights.

Recap. We expand geometry to make it vital as it is in reality, constructing the 5 dimotions of reality departing from one-dimensional points with volume, which evolve into bidimensional waves of information, which form ternary physiological topologic networks, vital planes of organisms that finally emerge into relative 0-points of a larger scale, guided by a mind-membrain, self-centered into a linguistic singularity connected through those networks to a membrane that encloses the whole structure and makes it look from an outer perspective of a larger scale as a particle-point of a new plane of existence.

When those concepts are married with classic topology we obtain the basis for a comprehension on how vital space-time organisms evolve.

PATHS & KNOTS

2nd ¬E postulate: The fundamental group.

Paths are important cause they are the clearest combination in topology of a t-dimension of motion and an s-dimension of form y. Yet they are studied in geometry that 'freezes' as minds do time dimensions into space-forms as space structures in an inverse fashion to differential geometry that converts curves into the motions of a point. So with paths we can study the whole trajectory of a space-time motion as if it were a pure form. In that avenue of thought the 'insight' that makes paths so relevant to the more advanced models of Δst, which remain in my notebooks, is the concept of 'multiplication' *the fundamental reproductive operand of existential ¬Ælgebra* that define paths as closed loops, departing from an 0-point - the neutral element, to which the path returns.

And this connects them fully when we consider the point of return, the 'actor' of the path, å, with reality as it is. Let us put a vital example then before we enter into the formal analysis:
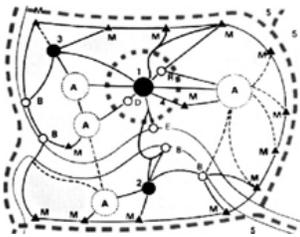
In the graph, Point 1 is the origin of all the paths=actions traced by the beast self-centered territory which forms an Δ+1 classic vital Toe. Paths will be developed then by the beast in its feeding territory for energy actions. It will take him to point 2, to mate; and to points M to mark the territory. In point 3 it will drink with other beasts, forming social ' knots' and so on.

So the theory of paths, over a territorial surface, closely related to the theory of knots, is an abstraction of a very real structure of nature, and while many of its properties are of not use - when we can do a more biological analysis; they were used by Poincare to study physical systems in astronomy with interesting results for what astrophysics cares today - perfect detailed analysis of motions and trajectories, specially regarding membrains and singularities, @-structures, such as those:
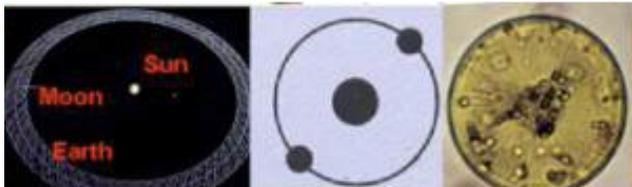
In the graph, we can see 3 membranes, with 'increasing' density of the paths traced to the point that while we perceive the moon-earth as points moving in a path - not as full worldcycles, closed and 'solid', the two electrons of an orbital are better studied as membranes vibrating around the atom, and certainly the protein membrane of a cell is so 'dense' that appears to us as pure spatial form.

Those are 'future' elements to add to the current theory of path, in which 'density' of time cycles according to frequency and 'transformation of time frequencies' into 'populations of space', solidify a path into a fixed membrane. So far though topology studies paths as memorial forms traced by a moving point.

Let us then consider a certain surface S and on it a moving point M. By making M run on the surface along a continuous curve joining a point A to a point B, we obtain a definite path from A to B.
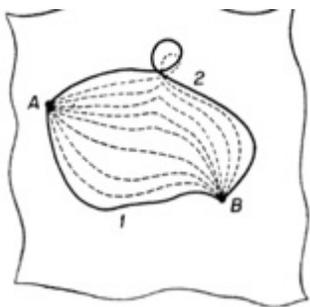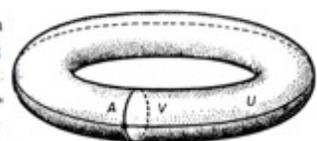

This path may intersect itself any number of times and may even retrace part of itself in individual sections. In order to indicate the path it is not enough to give only the curve on which the point M runs. We also have to indicate the sections that the point traverses more than once and also the direction of its passage.

For example, a point may range over one and the same circle a different number of times and in different directions, and all these circular paths are regarded as distinct.

FIG. 21.

Two paths with the same beginning and the same end are called equivalent if one of them can be carried into the other by continuous change. So how they differ on our $t<ST>§ð varieties?

In the plane or on a sphere any two paths joining a point A to a point B are equivalent (figure 21). However, on the surface of the torus the closed paths U and V that begin and end at the point A are not equivalent to each other.

So in term of paths, the multifunctional principle of the 3 simplest varieties readings its functions as:

Γº (paths):   §-plane < ST-torus> §ð-sphere

Since the Torus has 2 paths, 'product' of the single path of flat planes and sphere.

Now, if we cut the ST-torus we obtain a finite circular cylinder extending in both directions; which as we know becomes by adjacent pegging the central axial tube of most spherical organisms. Hence its importance to 'topological evolution' the fundamental new discipline born of the fusion of topology and Δ@s≈t.
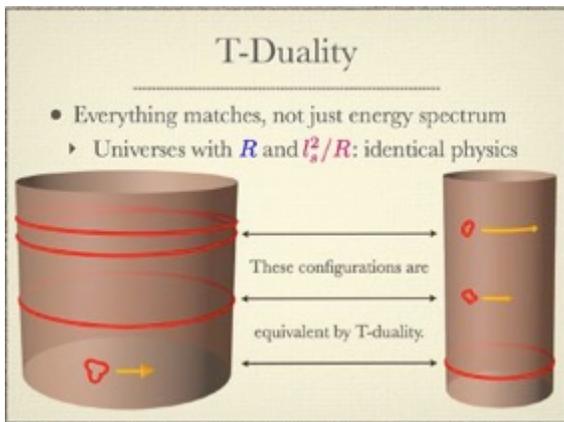
The paths of a cylinder have applications to reality from string theory - where T duality, makes equivalent a cosmic string and a nanoscopic one, further 'expanding the duality of the atom-galaxy to infinite scales', is a question of path theory over tubular surfaces:

To the aforementioned pegging of cellular tubes to open spheres in the first steps of evolution of hydra-like organisms that will become ultimately complex mammals (incidentally it has been discovered recently that we do have a second 'stomach' brain, to which scientists should ad the renal-hormonal brain of the blood system in other ternary symmetry: $-digestive/tubular brain < ST-renal blood hormonal brain > §ð-nervous head brain).

Paths can also be analyzed as 'forces' and relate to the search for the 'least time' path, the fundamental principle of motion in all the scales of physical systems; breaking then the equivalence of paths and distinguishing them by the combined product of its time-space motion-form or 'speed' parameter.

Then come also the study of paths as knots, 'liberated' now of the surface itself, which is of increasing importance to study species in homogenous volumes of space-time (water for Planckton, vacuum for atoms, etc.) where the territory is 'formless', with no preferred directions of forces as most medium are.

But ultimately all those multiple applications of Paths happen *because paths are the intermediate scale of topology:*

ΓΔ±1:   Δ-1: ð-points < ∑ ST-Δº paths > Δ+1: $: topological worlds.

Notice in this fundamental Generator of topological structures from the scalar P.o.v. (Pentalogic) that the functions are inverted, as we adopt in paths the point of view of the fractal point, hence the informative self-centered species, the vital form with motion, as it combines space and time dimension tracing the path over a perceived in terms of Lobachevski's ratio of curvature, 'flatter' still form, its territorial, topological world, in which *the point will trace closed worldcycles for each of its territorial action, forming in this manner frequency paths, the temporal view:*

Time p.o.v. Paths as worldcycles.

How topology treats the frequency of time paths, obviously by considering those motions a continuous recurrent loop, *differentiating them* by number of loops, which form 'knots':

In the graph every closed path on the cylinder beginning at A is equivalent to a path of the form X^n (n = 0, ± 1, ± 2, ···), where we have to understand by X^n (n > 0) the path X repeated n times; by X^0 the zero path consisting only of the single point A; and by X^{-n} the path Xn traversed in the opposite direction; for example, Z ~ X^{-1}, Y ~ X^2, U ~ X0. This example shows the significance of the concept of equivalence of paths:
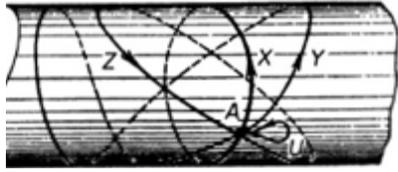
Whereas there exists an immense set of distinct closed paths on the cylinder, all these paths reduce, to within equivalence, to the circle X traversed in one or the other direction a sufficient number of times. For m ≠ n the paths X^m and X^n are not equivalent.

Let us then assume that two paths are given on that surface, namely a path U leading from a point A to a point B, and a path V leading from B to C. Then, by making a point run first through the path AB and then through BC we obtain a path AC which we naturally call the product of the paths U = AB and V = BC and denote by UV.

If the paths U, V are equivalent to the paths U1, V1, respectively, then their products UV and U1V1 are also equivalent. The multiplication of paths is associative in the sense that if one of the products U(VW) or (UV)W is defined, then the other is also defined and the two products represent equivalent paths. If the moving point M is made to run through a path U = AB but in the opposite direction, then we obtain the inverse path U−1 = BA leading from B to A. The product of the path AB with its inverse path BA is a closed path equivalent to the zero path consisting only of the point A.

According to the definition we cannot multiply any two paths but only those in which the end point of the first coincides with the initial point of the second.

This inadequacy disappears when we consider only closed paths starting from one and the same initial point A. Any two such paths can be multiplied and as a result we obtain again a closed path with the initial point A. Furthermore, for every closed path with initial point A its inverse path has the same properties.

And so if we do exactly the inverse, and consider paths purely as time motions, they define *a closed worldcycle with inverse directions, a->b (life) -> a (death).*

The equivalence between a topological path and a world cycle of time is important because it explains an essential feature of spatial-mental perception: *entities with a slow larger view of reality see smaller faster motions of time as closed forms of topological space, as you see a solid wheel turning fast; and this is due to the mathematical equivalence, source of many confusions in physics discerning between time and space paths.*

It also allow us to have a philosophical insight on Group theory as a Kantian 'regulative thought' proper of the search for totality of spatial minds - which often hides information.

Indeed topology regards equivalent paths as distinct representations of one and the same "path," only drawn in distinct ways on the surface, and nonequivalent paths as representations of essentially distinct "paths."

Then the set of all closed paths starting out from an arbitrary point A of the surface is a group under the operation of multiplication of paths. The unit (neutral) element of this group is the zero path (self), and the inverse element of a given path is the same path but traversed in the opposite direction - yet in reality *while the concept does apply - all hunting motions are similar, back and forth paths are only equal in spatial perception; in time the path is more complex as we must in fact distinguish:*

A: the dwelling of the point. AB: the path to the action. B: the point of the action.

BA: the returning path once the action is completed.

So indeed AB and BA turns to be the same (in spatial actions) But A and B *points have different functions.*

All this information is lost on topological paths - a warning for all type of mathematical and physical ceteris paribus knowledge, when arrogant scientists think it is all what is worth to know of a certain space-time form/event.

**Definition of Disomorphisms in group theory.**

Still the interest to Δst is the capacity of those generalizations to show Đisomorphic properties for all scales, which rightly so, Topology calls 'isomorphisms'. That is, when 2 group's structures *have the same space-time properties, group theory calls both groups isomorphic, in a very close concept to Δst, where we call all Toes, when studied in its space-time properties, 'Đisomorphic', since the structure of its fractal generators is the same.* Thus, the group of paths, in general, for any two distinct points are isomorphic when they can be joined by a continuous path lying on the surface, and we talk simply of the group of paths of the surface S without indicating the specific A-species/dwelling location.

This group of paths of the surface is also called its fundamental group, equivalent in Δst to the Generator.

The 3 fundamental groups, once more, equivalent to the 3 parts of the generator

It is then possible to adopt the Δ+1 view no longer of the point but of the surface to distinguish paths:
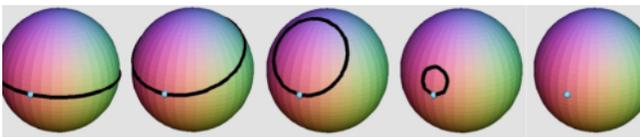
§ð: sphere

If the surface S is a plane or a sphere, then the group of paths consists of the unit element alone, because in the plane and on the sphere every path can be contracted to a point.

And as we have seen for a 3-sphere, this concept leads to the realization an entire Universe can be shrunk into a still mind view.

$ð: cylinder

However, on the surface of an infinite circular cylinder, most closed paths around it, do not contract to a single point. Which means cylindrical coordinates and tubular systems taken as wholes, are mostly 'mindless', do not have a focused shrinking mind function, but are the essential topology of $t-lineal moving limbs/potential fields.

Further on since on the cylinder every closed path starting from A is equivalent to a certain power of the path X, and distinct powers of X are not equivalent, the group of paths of the cylinder surface is an infinite 'entropic' group, where *points tend to dissociate, unlikely to form networks and tighter solid still configurations*.

ST: Torus.

The torus though is an intermediate state, as paths have two varieties, around (shorter) and along (longer) world cycle, which can be *multiplied-joined in the connecting point:*

Thus the group of paths on the torus consists of the paths of the form $U^m V^n$ (m, n = 0, ± 1, ± 2, ···) with the equivalences: UV ≈ VU and $U^m V^n ≈ U^m 1 \, V^n 1$ only for m = m1, n = n1.

Since we can USE THEN the 'fractal ternary principle' dividing Torus paths in 3 families: combined ST-paths (long x short) and, ð-paths (short with k repetition) and $-paths (long with k repetitions).

So as we have seen each basic variety of topology, Torus, cylinder and sphere, has multiple functions and this seemingly confusing multiplicity that defies the Aristotelian logic, 'A is NOT B', is precisely the source of complexity and richness of forms and functions in the Universe: 'A is B and C'.

Paths as the Δ-1 causal parts of topological surfaces.
The importance of the group of paths for surfaces topology is then due to the fact we can *deduce its properties*

from those of its paths, as we can deduce paths properties from a few key points, and in time we can deduce the world cycle main properties from its 'standing points'.

So another key property of reality - that Δ-i scales COME FIRST to construct causally Δ+i scales defining the ONLY absolute arrow of time towards future social evolution (5D) and the SYNOPTIC property of time causality found everywhere (minds, seeds, languages reduce reality to the important 'points'), come into view. In the language of topology this is expressed as follows (we omit algebraic topology, which would make it incomprehensible, under the philosophical 'must' of a unification theory - that any 'serious' university graduate of any discipline can understand the unity of all 'stiences'):

Let us assume that apart from the surface S another surface S1 is given such that between the points of S and S1 we can establish a one-to-one continuous correspondence.

For example, such a correspondence is possible if the surface S1 is obtained from S by means of a certain continuous deformation without tearing apart or fusing distinct points of the surface. To every path on the original surface S, there corresponds a path on S1. Moreover, equivalent paths correspond to equivalent ones, the product of two paths to their product, so that the group of paths on the surface S1 is isomorphic to the group of paths on S.

In other words, the group of paths regarded from the abstract point of view, i.e., to within isomorphism, is an invariant under all possible one-to-one continuous transformations of the surface. If the group of paths of two surfaces are distinct, then the surfaces cannot be carried continuously into each another.

For example, the plane cannot be deformed without fusions or tearings into the cylinder surface, because the group of paths of the plane consists of the unit element only and the group of paths of the cylinder is infinite. Properties of figures that remain unchanged under one-to-one and bi-continuous transformations are studied in the fundamental mathematical discipline of topology, whose basic ideas have been explained. Invariants of bi-continuous transformations are called topological invariants.

We deduce that the group of paths is one of the most remarkable examples of topological invariants, as the Δº middle scale, to deduce both the upper properties of paths and the lower structure of its points.

Since the group of paths can be defined not only for surfaces but also for arbitrary sets of points, provided only that we can speak of paths in these sets and of their deformations..

Knots

It is for that reason that the study of paths in its purest sense, knot theory, has become so relevant as *the most synoptic of all topological analysis to represent the entire Universe.*

A knot is a closed curve lying in the ordinary three-dimensional space. Let us then remove from space the points that belong to the given knot and consider the fundamental group of the remaining set of points.

As figure shows, its position can be very varied. Two knots are called equivalent if one of them can be deformed into the other by a continuous process without breaking the curve and without self-penetration.

This group is called the group of the knot. It is immediately obvious that if knots are equivalent, then their groups are isomorphic. Therefore, if the groups of knots are non-isomorphic, we can conclude that the knots themselves are not equivalent. For example, the group of the knot that can be reduced to a circle is a cyclic group, but the group of the knot that has the form of a trefoil is non-commutative and not isomorphic to the group of a circle. We can therefore state that it is impossible to deform the trefoil knot into a circle without breaking it, a fact that is completely obvious but in classic maths requires a proof by precise axiomatic arguments:

KNOTS: (1) how can we tell whether two knots given by their plane projections are equivalent or not; (2) how can we classify all nonequivalent knots?
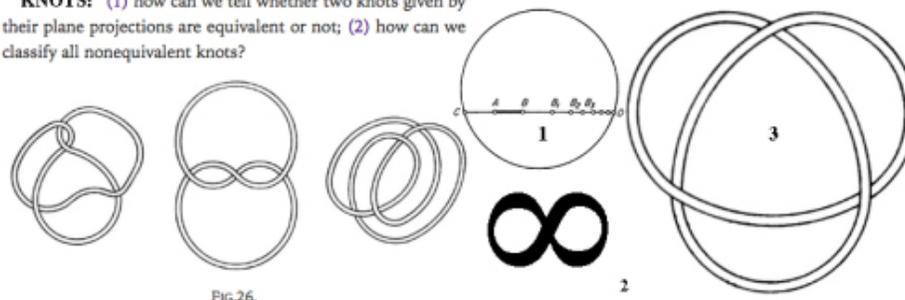
FIG.26.

In the graph, the 2 main questions on knots (paths void of surfaces) and its 3 simpler, key varieties, the closed simple path, the ∞ knot (which in knot theory is not considered) and the trefoil, which form in Δst its basic generator:

Γ: $: 1-O < ST: 3-trifoil > ð§-2:∞

Both problems remain as yet unsolved; but for Δst the most interesting element is to consider how knots can model real systems through the interaction of its 3 varieties, where here the simple knot/circle plays the membrane, the trefoil acts as the vital energy with its 3 sub-networks, (entropic:digestive-reproductive:energetic-informative); as they are crossing through the 2 holes of the ∞ singularity, which allows to differentiate the 3 sub-sections of the trefoil... and converts the ∞ in a 2 variety of knot as then it CANNOT be uncoiled into the 1 variety (reason why knot theory does NOT consider it - as always human science is about abstract parts, Δst about vital wholes, which give it a richer, real landscape; as any sailor will tell you since actually 2 is the basic sailing knot tied around any pole).

We can then observe, different forms of strangulation: Since, indeed, if we 'strangle' the trefoil with the 2-donuts, in any clean section of its path, we divide it in two loops; but if *we knot ∞ in two of the 3 overlapping points of the trefoil we have 3 networks.*

Then is obvious that one of the 3 sections, we shall call the 'head' is smaller (in the bottom of the graph), and the other two, we shall call the body and limbs are larger and similar in size (as indeed they are in reality).

It happens then that in the opposite direction of the head we have a 'vegetal pole', free of control from the dual singularity, where the other two systems can interact *in parallel, as they are not connected.*

Further on WE HAVE formed a bilateral symmetry, and we can obtain some interesting proportional constants similar to the golden ratio constant with its morphological functions between the smaller had and the self-similar body-limbs systems.

The study of this ternary simplest of all possible fully structured T.œs is then the new insight of Δst applied to knot theory, as *a model of topological evolution - the key vital discipline born of the merge of Δst and topology with applications in all stiences, as this blog shows, from topological linguistics to the classification of species.*

IN this case, the ternary systems of knots is specially suited to study the generation of connected networks with a dual heart-like pole, in this case the ∞ element, with an 'osmotic transference' that exchanges entropic motion and energy in the other pole (the lung system).

RECAP: Δº paths and ST-torus.

Now to resume all said, with the minimalist Rashomon effect (considering the Δº-plane element and the Γst present form, which is the most synoptic form to define meaningfully a Toe), we can consider:

Δº: Paths as the 'fundamental action' element of the 3 scales of Topological transformations and as such the understanding of its laws in mathematical physics (actions, law of least time, etc.) are the knot and bolts of existence on topological T.œs.

And the same concept applies to the Torus which even if it can be written in terms of its ternary generator:

Γst: TORUS: $-long circle < ST: Combined path > ð-short cycle...

It is mostly the ST-function in 3 dimensions, equivalent for that reason to the flat plane in 2 dimensions, which can become easily a cylinder with a single cut, or a sphere with a single handle. *As such toroid paths are the essential paths of the vital energy enclosed in all type of systems.*

AND as a general rule for all systems, the Δº and ST elements will be those which can be transformed and generate the Δ±1 scales and $ and ð elements from its 'present' plane and form with the minimal number of 'actions' of any type; bodies, waves and torus belong to those present dominant 'parts'

VI. PENTALOGIC ON GEOMETRY. ITS 3±¡ AGES.

The 3 ages of geometry and its 3 masters: Euclid, who systematized bidimensional, 'holographic', Greek geometry, Descartes that married it with time algebra GIVING IT MOTION and Lobachevski, who established the principles of hyperbolic geometry, the geometry of the 5th dimension, and denied the 'mental, logic nature' of mathematics, proving the multiplicity of spaces and the need for experimental proofs. We shall complete their work with the formalism of ¬Δ@st.

In terms of its time ages geometry is the humind evolution of our comprehension of the ¬Δ@st complex Universe in 'ages' of increasing dimensionality and motion. Since, the ages of Geometry are stages on the realization - as a child does with the world - that our mental still holographic 'I=eye' space is NOT the absolute and only space but that of the humind.

So all other geometric laws are self-consistent relative worlds mirrors of the larger laws of Δ@st. Which finally lead after Riemann to the realization that what all those relative worlds of geometry have in common are just 2 parameters: the scalar parameter of 'angle' and trigonometric 'depth', and the $t parameter of distance=lineal motion within a single plane; which are the *2 'survival informations' any mind requires to locate positions in the present and the future (according to motion and distance) and measure sizes (according to angle and trigonometry) on the scalar Universe.*

So we expand the foundations of geometry in two main type of geometries, mental subjective space that selects information according to the needs of each mind; and organic, topologic vital spaces, which are real and so display objective Disomorphic (equal) laws in their ensembles of organisms; which are *not as mental spaces a construction of the mind, or rather a construction of the mind of God, the ¡logic laws that create the T.œs of the fractal Universe.*

I. S: I Age: Spatial, Greek Era: static bidimensional Geometry: The holographic principle.

Geometry started in a mental still deterministic, simple, young age of absolute beliefs, and mental spaces (bidimensional Greek Euclidean Geometry), akin to the lineal kouroi of its sculptural thought.

II Age: S≈T: Analytic Geometry. curvature, surfaces, dimensions. vectors. geometries with outer locomotions.

It evolved Into a 2nd age when motion enters the game and balances form, or age of @nalytic geometry, started with Descartes and mathematical physics, when form and motion, the 2 principles of reality (we identify with still languages of information or 5th dimotion and pure entropy of 4th Dimotion), merged together or age of @nalytic geometry.

It was though an intermarriage within mathematics between the spatial, synchronous representation - the point, line and plane and the temporal, sequential causal representation, the number, which put in a temporal timeline lost its connection with 'form. The Greeks thought numbers are forms and equaled them to points, which they are not. Hence the paradox of defining √2 and π geometrically but finding that when calculated arithmetically π never 'closes' the circle and √2 the diagonal by excess or defect - imperfect arithmetic ratios; a deep philosophical question about the fact that time processes are never closed, unlike spatial forms; so when we calculate a diagonal in the plane is closed, when we put it arithmetically it is not complete by either ±1 points. This differentiation due to the scalar nature of numbers vs. single plane synchronous curves was forgotten by the praxis of analytic geometry, which married both, by ignore those 'finitesimal' vital openings of π & √2 as scalar numbers. As analytic geometry could operate with numbers geometrical forms and vice versa, provided S=T geometrical solutions = algebraic equations.

The field thus explodes and marries S & T; but time soon dominates, analytic and algebraic equations come over the more real geometry; ushering the language, as always with all forms, in a 3rd age of excessive, inflationary

information with all kind of generalizations to multiple dimensions, which would have converted geometry in a form of baroque art, if it were not for the earlier discovery of its physical praxis, making of mathematical physics the 'anchoring' reality that any experimental science needs to focus its truth. So as all mind-mirrors that become more truth when looking like reality geometric forms evolved to acquire a 3rd dimension of form and motion, acquired through differential geometry and topology, which also gave it scalar depth through networks and finally fractals that we complete with the proper concept of a fractal point that grows in size as we come closer to it, to fully mirror the real universe. It is the proper way to build a 3rd age of sound geometry, away from the 'excessive formalism' of the axiomatic method, and rejuvenate the discipline…

3rd age: Non-E and Temporal Topology, Fractals; geometry with inner wave-like space-time motions.

The 3rd age of geometry thanks to its connection with physical reality, which guides its truth at each step, avoided algebra's inflationary 3rd age of languages of information, when in its 3 age 'disconnect' from reality. So the seminal paper of Poincare 'analysis situ' will introduce topology which is the proper 3rd age of understanding of informative motions, of change in information, NOT only the praxis of physical locomotions but also the praxis of inner networks of fractal points, and scales, which could be internally deformed and maintain the same being evolving as long as its external surface-membrane is not torn.

+Δ: Scalar Geometry: space fractals and chaotic time attractors. The completion of the analysis of *the 3 parts of any space-time being, in mathematical terms, thus gives birth to the 3 fundamental new branches of modern times:*

S: Topology of membranes.

*ST: S*tructure of the present, inner space-time body-wave through its scales by the understanding of topological networks and f*ractals, which will be the natural next step to the analysis of those* wholes made of point networks.

T: And the analysis of singularities with the ad on of chaos theory and the formation of 'attractors'.

So finally all those organic, scalar *properties of mathematical space-time, becomes complete now with:*

+¡:Δ@ST: Non-Euclidean Vital Geometry finally understands the scalar nature of the universe, with the study of Non-Euclidean fractal points through which infinite parallels can cross, which are also the abstract definition of a mind, focus of those abstract points. IT redefines points as fractal points with inner scales & volume through 5 Postulates of i-logic geometry. It is the completion of geometry as an experimental language able to explain all forms of real space and its temporal logic structure. So as we do in all stiences, we shall complete and resolve the conundrums of ultimate meanings poised by the explosion of mental spaces started by Lobachevski, while grounding each model of geometry with the Pentalogic' of multiple truths that interpret vitally the ultimate properties of geometry (symmetry, perpendicularity, parallelism, adjacency, congruence, betweenness/continuity, and so on).

What Δ@S≈T does is to reorganize according to the ternary variations and Disomorphisms of space-time beings, all the categories of geometry, starting from the simplest laws of bidimensional Greek geometry till reaching the insights of non-e geometries culminating with the expansion of topology, which becomes the final all-encompassing geometry of reality as it is ternary, including the 3 previous geometries, it also includes scales as topological networks are collections of connected points, and finally it has motion... Since Time§pace Supœrganisms (ab.T.œs) have 3 organic parts = topologic varieties, adjacent to each other ruled and 2 scalar dimensions of modeled with fractal equations and topological networks.

-¡. On the negative mathematics will likely kill the humind already in its entropic age, as we transfer our intelligence to computer chips, and its simplified Boolean algebra *that speaks mathematical languages much faster than humans do*. So our ethical sense of survival as human beings prevent us to explore that future.

We can in that sense consider Geometry to have evolved as all Humind languages into a growing awareness of the fractal, scalar (Δ), temporal, moving (T), mental (@) properties of the Universe, and its '¬' entropic limits; in a tendency we shall, time permitted map up for ALL languages, as forms in evolution, who follow the same isomorphism of 3 ages of any species, or culture, as a fractal image of the worldcycle of all time beings.

There is though a remarkable difference in the ages of 'informative languages' as opposed to living beings, regarding its motion: Languages of information and seeds have inverse 'ages' of motion to those of life, a theme briefly treated in the introduction when describing the 'placental still worldcycle of perfect order' similar to that of languages and its 3 ages, vs. the 1-∞ entropic cycles of life in an external disordered world:

The ages of languages, including geometry are paradoxically inverse to the ages of life, because the peculiarity of mind languages and seeds of information lie in the fact they are the most formal 'still spatial' systems, equivalent to the 'old age of information' of vital organisms, hence they run an inverse worldcycle of existence, from an static, still form opposed to the young moving age of life of maximal motion that grows into a 3rd age of information.

Languages instead start with a stiff, formal nature and acquire motion only in its final age, to finally *understand the more complex elements of the fifth dimension, scales and minds*. So happens in verbal written language, which started printed in stones as absolute truths, when the Pharaoh said 'it has been written' instead of it is 'truth', and only acquired variability and fiction, past the age of Cervantes.

What both languages, seeds and vital beings in any of its worldcycles of existence do have in common is the amazing arrogance of believing to be the center of the Universe already explained with the paradox of the mind, 0-mind x ∞ Universe = Constant world. But again as languages are 'protected' by minds and seeds by placenta, their realization *they are only mirrors in a vast impersonal world takes longer than cubs to realize the lion is close and he has to start moving… or else, it won't last.*

VIII. ITS 3 CLASSES: S@: MENTAL; S=T; TOPOLOGIC & 5D SPACES.

3±¡ types of geometry: Mental subjective space and topologic objective organisms.
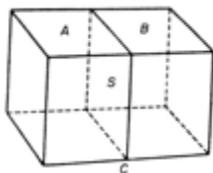
"Adjacency is the distinguishing appurtenance of bodies and permits us to call them geometric, when we retain in them this property and abstract from all others, whether they be essential or accidental... Two bodies A, B that touch each other form a single geometric body C'. Conversely, every body C can be split by an arbitrary section S into two parts A, B." Lobachevski, "New Elements of Geometry", on the topological, organic, ternary structure of space.

'Space is simultaneous measure from a point of reference' Einstein, on the mental, focused nature of space.

ABSTRACT. Geometry is the most synoptic language of 'space' used by @-minds to select intelligently information on ST cycles of T.ŒS, creating still mental spaces with them based, in the rules of ¬E Geometry, adapted to each species needs. Huminds though took till XIX c. To understand with Riemann the abstraction of mind spaces, as 'self-centered informative selections' with a variety of uses, from 'our light space-time' (Euclidean), which preserves distances, motions and angles, in terms of Non-E geometry and its postulates of similarity, through affine and projective geometries, to the explosion of n-dimensional spaces that take parameters of multiple p.o.v.

Pentalogic applied to Geometry is thus immediate, dividing Geometry in 3 huge combined fields:

1. S@: Subjective mental spaces classified according to the selected information they preserve, from the closest to reality, affine, lineal spaces that preserve distances, motions, mirror symmetries scales and angles, through projective spaces that preserve the central singularity-mind; the most vague conformal spaces that only preserve angle, the minimal information for a mind to exist, to the most fundamental, human Euclidean space,

which is ALSO a mental space… to the explosion of scientific spaces of N-dimensions, phase spaces, Hilbert Spaces and other 'human mental' tools to depicture complex systems of nature.

2. Δ§: Non-Euclidean Geometry of fractal points that set the basis for a proper understanding of the geometry of 5D.

3. S≤≥T: Vital Topological Geometry that ensembles parts into plane networks that become whole supœrganisms.

So we distinguish in Pentalogic 3±¡ geometries: the external, objective nature of fractal, topological space, as the 'element' put together to form super organisms; the internal, subjective nature of informative, mind space, which maps in stillness the infinite time space cycles of the Universe with a given language of thought/information/perception & the fractal scalar geometry of points. And 3 ages of geometry, parallel to the 3 ages of mathematics as a whole.

Thus Space=form is the essence of mental constructions of reality that transform cyclic time motions into simultaneous forms, both as an external mind observer, and to form the internal cohesion of a Time§pace organism (ab.T.œ): Δð≥§@.

In complex pentalogic we notice that those 3 geometries connect space with the **present** ensemble of organisms (vital topology); the logic role of **future** planning of particle-heads and its minds (mental spaces), and the lower past, scalar, 'flat planes' of open space, from where the potential-fields extract its motion; down to the final non-perceived scale of gravitational vacuum space - the closer concept of space in present physics as defined in v=s/t. So a thorough study of the 3 type of spaces and its vital roles should consider the '5Dimotional perspectives' of pentalogic. As such 5D geometry is huge both in its translation of classic geometric postulates to the real laws of ¬Δ@st as well as all the new laws of pentalogic and description of different mental spaces. But we can only treat some basic themes, complimented with a separate section on Non-E fractal points, the fundamental particle of reality, and its associations in waves, vital topologic planes, similar, complementary or dissimilar systems (parallel, adjacent and perpendicular forms).

Our aim is to understand the key element of space - to be a mental construct; and relate the main laws of geometry as a mirror-mind that reflects ¬Δ@st with the Disomorphic 'ilogic' laws of space-time beings. As those common laws of 'mental spaces' are the origin and why of the synoptic laws of Geometry, starting with the Bidimensional SS mirror of the young age of Greek Geometry that works based in the S=T symmetry, through the classic age of differential geometry that treats curves as points in motion to the topological methods of algebraic proof of its 3rd age.

Pentalogic perspectives on spaces.

Those essential themes of this introductory course on 5D will have under pentalogic some immediate definitions of space, classified from the most subjective forms to the most objective ones that describe complex fractal spaces:

Pure S@-mental still spaces: Those constructed by a mind to select the information of the external world needed to survive. They are most of the 'spaces' studied in human sciences, from the simplified lineal Geometry of the Greeks to the Hilbert spaces of quantum physics; which do NOT exist outside the mind for which they perform a task of selection of information to 'project' with its internal consistency logic processes of causality that help us to 'forecast' the future cycles of the species manipulated on those mental spaces.

Temporal space: More evolved mental constructions that introduce a first degree of objectivity, by adding the motion of external forms, which mental spaces perceive first, for systemic survival prey/ predator reasons. This is the field of differential geometry, whereas curves are described as points in motion. While in nature temporal

spaces are its realist objective senses as they *belong to the workings of physiological senses* shared by the species of a 'linguistic' ecosystem.

They are the basis of visual organs to perceive the Euclidean light-spacetime of animal life, and its 3 perpendicular dimensions of height=electric field, width=magnetic field and length=motion; mimicked in the topologic organs of animals that move in length, store energy in width and perceive with electronic eyes in height. While color code the social evolution or frequency of photons and so animals use it to code its 'congruence' laws, from red=entropy to green=reproduction to blue=social, informative color; which explains the field of 'emotional', bidimensional painting (complementary use of colors by expressionism, which create a type of mental space of its own).

Entropic spaces. All animals see motion before form, and become hypnotized by motion and red/yellow colors of energy, to the point we prefer gore movies and violence on screens, whose scripts we would never read; in history man was hypnotized by go(l)d, creating 'pseudo-religions' of greed and precious metal as the vehicle of God; in labs red marks help the eyes of non-programmed robots to move faster on targets; as ultimately is the mental space of 'electronic minds', including machines and atoms. As usual, the branching of those simple laws emerge in many other fields, where it is worth to consider how the stillness of mental spaces combined with its preference for detection of motion deforms reality. For example, because *all minds stop motion into form to measure information, our electronic eyes do so at quantum level,* first entangling with other electrons in the scale of quantum potentials. So electrons share light rays in stop motion. But since organisms prefer to see motion as in a movie theater eliminating the stop state, at macroscopic level we 'reduce information' highlighting only motion; so we think electrons are moving, which explains the c-postulate of relativity and entanglement and the realist view of modern physics: at electronic level there is not Lorentz transformations as electrons are fixed, at macro level we need it to measure the reduced view of our eyes that have eliminated the stop state of particles (a theme we deal on 5D astrophysics).

spe<ST>§ð Ternary, topologic organic spacetime: We reach a higher degree of objectivity with the study of vital topology and 'the ternary organic, structure' of all systems of nature made of |-Limbs/Fields<Ø-hyperbolic body-waves>O-heads/particles. This vital topological space is objective as it is an intrinsic property of the organism and shows that certain 'geometric properties' are embedded in the nature of spacetime, such as lines are the shortest-fastest distance reason why all limbs and fields that move the system are lineal and spheres the maximal volume with lesser surface, which means all 'still, perceptive mind-systems' which want to process maximal information and disguise its fragile, still position will become spherical.

Δ-scalar, fractal spacetime: Finally we reach the deepest understanding of space, as we keep adding 'pentalogic' entangled elements to the purest mental still spaces, which first got motion=time content, then diversified in different type of dimotions to create the topologic being, and finally 'acquire scalar dimensions' as a ternary fractal structure of 3 levels of space-time that put together become a superorganism – defined in non-Euclidean topology as a plane of 3 physiological networks. We are no longer then talking of space, but of a full T.œ made of ¬Δ@st; but susceptible to a ceteris paribus analysis to extract common laws derived of its emergent scalar spatial properties, of which disomorphic similarity in forms and actions is the most important.

For example, systems emerge in similar form, NOT in the next inverse mirror scale but two inverse mirrors; so insects are forms that are not observed in the next scale of topological evolution, which inverts the inner soft vs. outer skeleton, in mammals with inner hard skeleton and outer soft skin; but in the next scale of 'metalife', robots that will increasingly look like larger insects with outer iron skeleton and internal electromechanical cables. Iron molecules are rings but its macro-forms are lineal swords, and so on.

IX. HYPERBOLIC, FRACTAL GEOMETRY OF THE FIFTH DIMENSION

The Geometry of the fifth dimension includes all other geometries. We though refer to 5D geometry specifically when considering the different distortions and paradoxes that happen when we perceive reality through different sales of the fifth dimension, being in general terms a problem of 'distortion' of perspective, with a clear inversion as we move from one scale to other in topology, hierarchy, form and function.

4 Px: Δ§- dis≠continuity T-motion v S-form spe: lineal, flat, free, young v ð§:curved, old, bound. @: ego v. relativity

The 3 ¡logic paradoxes of **space** topology (closed in-form-ative curved-O vs. |-open, free entropic lineal forms), **time**-motion (stillness vs. motion) and **Δ-scale,** (continuous whole vs. discrete forms; single scale vs. multiple one)s, which are essential to the perception of a simplified 'spatial mind universe' in a single flat still plane, as perceived by a mind vs. the full, more detailed complex picture in time, of a curved, discrete and moving Universe. Those 3 paradoxes define space and minds as simplified views of the more complex whole.

We shall call them Galilean paradoxes because the main one between motion and form, is the paradox of Relativity that started modern physics and the others can be illustrated with one his discoveries - that of Saturn's rings:

Saturn's rings are not a mathematical plane made of abstract points, despite their continuous appearance. When we look at them in detail they become in fact quantic planetoids in movement, tracing orbital cycles around the planet. It is the continuity vs. discontinuity paradox.

All dual paradoxes –motion vs. stillness; continuity vs. discontinuity, single space vs. fractal scales, depend on the detail of the observation – hence the quantity of information we have on the object we study. Moreover they seem to us flat in the larger view, when they are spherical forms in the smaller size. It is the flat, free, vs. bound circular px.

And when we see them from a close perspective they seem big and important but from far away they are infinitesimal indistinguishable part of a number. It is the ego vs. relativity paradox.

In the larger view the ring seems not to move but in closer view speed increases. And this is the form vs. motion px.

Thus any piece of time/space seems continuous, from the lower Δ-1 perspective, as larger planes of reality with slower time cycles transmit less information, and we peg it together those bits of information, jumping over its dark spaces; but when we analyze its parts in detail, we receive more information so the system becomes discontinuous, made of space/time quanta moving in cyclical paths.
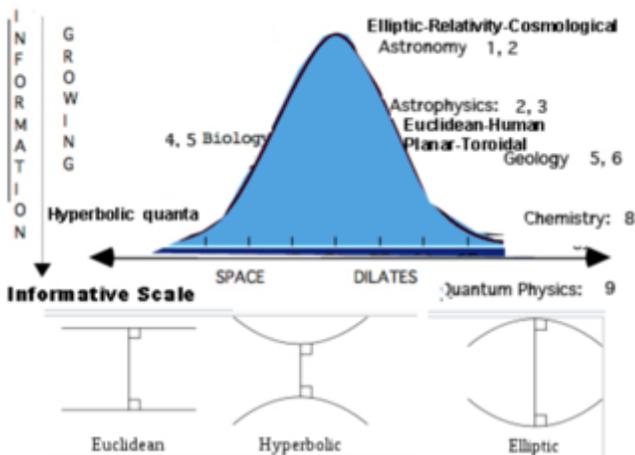
All those paradoxes imply a logic inversion of role when we change 'scale' and hence they define the relationships between contiguous scales of reality. And have infinite applications to the whys of nature:

A key element to understand the Universe of scales and its paradoxes of freedom vs. order is the perspective any mind has of reality when looking above, to its upper whole, which controls it through invisible networks of information, hence creating an elliptic perspective of decreasing perception - dark view of larger scales we do not observe, from invisible

informative networks in galaxies to invisible financial networks in societies to invisible nervous networks for cells.

On the other hand in the same scale we have a flat, Euclidean geometry of maximal perception with minimal distortion. While looking down to our smaller inner world we rule it with networks that break into fractal webs of simultaneous control, or hyperbolic view. This ternary view of reality has immense consequence from theory of knowledge, to mind constructs, from sociology of power to galactic organic models of a Universe ruled by invisible black holes and dark matter. We feel thus free as individuals but are controlled from above by the larger whole and rule over our micro-parts. As Shakespeare said: we are all kings when observed from a lower stair, commoners at the same level or buffoons from above.

The paradox of Young, Motion vs. Old Age, informative stillness: freedom vs. order defines then the essential dualities of freedom and order. So topology becomes metaphysics:

The flat, open, momentum-lineal like small distance vs. the closed, cyclical, energy-like time distance is a constant theme of all mathematical physics, where the tangent, or derivative represents the minimal lineal free step but on the larger scale is bounded. For example, special vs. general relativity. Light is open, gravitation is cyclical bounded; so lineal quantum physics in the cosmological, larger scale gravitation curves trapped by the galactic black hole.

In all scales the paradoxes of freedom vs. order thus connects with age and scale. Reality when looked from above, from its upper whole, which controls it through its physiological networks becomes founded. On the other hand in the same scale we do NOT perceive systemic intelligence and feel free.

Information thus closes systems of entropy, while lineal, planar, systems seem free. Information though has a tall broken, cyclical forms, often NOT perceived from a flat bidimensional level below.

So we do have certain metaphysical geometric 'properties' of form vs. motion: Flat planes moving in free lineal paths, and tall cycles, moving in repetitive bound frequencies.

The dualities of the young, open, moving lineal age of the being and its old, still, curved, informative, cyclical one, which also manifests in the classic view in small distance of a flat earth that becomes curved from the moon.

If we combine those paradoxes with the inversion of roles: O¡-2<|¡-1>Oº... things become even more complex as both effect offset each other.

All in all a bounded system will have, by the law of inversion added to the Galilean paradox an Absolute control over its smaller parts, as the galactic black hole DOES over its stars closed by its halo of heavy dark matter or the earth in the climatic cycles that control the evolution of its species.

Such cyclical ordered 'solid' systems are well-organized as wholes so they can manage its upper world or ecosystem often controlling its Δ+2 scale. Which Humans could do in History if they were a single global organism perfectly ordered, and increasingly the global market of company mothers of machines has over both, the entropic men managed with money and digital media, and the planet, being terraformed with its machines.

On the other hand, the inverse case of a 'free Δ-1 system' - a loose ensemble of entropic chaos, of heat - paradoxically becomes slave of its Δ+1 larger world and Δ-1 potential feeding scale. I.E. a gaseous system of molecular forms is controlled by the bound container to the point we can measure its general patterns from its macro-parameter of pressure and by its smaller scale, releasing its energy as heat, and both Δ±1 parameters suffice to determine its characteristics.

The same happens in our apparently free chaotic, violent, entropic societies where human selfie ego states proper of modern societies are perfectly controlled and managed from above by the financial, audiovisual networks and legal systems, of which they are hardly aware, and below by the bits of digital credit they need to

survive. *As the most disordered systems are memoriless entropic forms which are not even aware there are other scales of reality; while the most ordered controlling systems, extend at least through* 3 'spacetime scales' managed by the central scale of 'solid' particles. And the most complex bounded systems, biologic and galactic organisms entangle 5 scales. I.e. in a living organism those 5 scales range from 'simple atoms' of oxygen that we breath and simpler hormones, through DNA molecules, and then cells, and then physiological networks that make up organisms and finally ecosystems, 5 entangled scales work around the bounded cellular unit. In galaxies, from forces through atoms, physical matter, cosmic bodies we arrive to the bounded galaxy... And there is always an inversion of order, between apparent freedom=chaos and real order=power: The less powerful forces, bosons seems free, never stopping but are slaves of entangled particles that are trapped in bounded atoms, connected to molecules. And then in the next scale the matter seems free, thermodynamic heat but it is bounded to the planet and stars which seem free in the galactic ecosystem but are bounded to the black hole.

The small atoms and molecules in the organism move seemingly free but the networks of cells bound them; humans seem free but they are bound by national borders, laws and digital money; matter seems free but it is bounded by the planet... So how can we name so many Planes when in relationship to each other with different worldcycles?

Things are mover obvious if we use 3 names for the 3 'bounded, time-like worldcycles' vs. 2 terms for the open entropic worldcycles, which if we notice, ARE in symmetry with the 3 bounded Dimotions dominant in information (perception, reproduction of information and social information) vs. the 2 entropic lineal dimotions (locomotion and entropy).

So a hidden symmetry entangles further into 'fractal' order what clueless humans perceive as chaotic simplex æntropic systems... Since logic entanglements between languages=mind mirrors, space, time Dimotions and scales NOT perceivable with simple 'æntropic pictures' or measurable with 'speeds' IS the hidden intelligence of the fractal Universe.

So alas! to the rescue comes the symmetries and use of 'letters' for time...

We use in ¡logic symbolism the 3 'forms' of the letter ð, to signify the 3 relative lengths of time in the 3 scales of a system, its shorter time actions (frequency time of its actions, its whole life-death worldcycles (with its ages), and the world cycle of its species or larger world (deep time, in the jargon of Hutton with its horizons): ð:Δ-1: quantum time cycles (frequency actions); þ: Δº: Life-death individual worldcycles; Đ: Δ+1: species.

þ, symbolizes the 'palingenetic' world cycle, in the o-1 sphere, while ω, omega, will be the symbol for the *world*, the second scale of bounded ωorldcycles (when not lazy just to put an w), where the species lives its 3±¡ ages.

Its capital Letters, Ω, will signify the largest scale of all bounded worldcycles, that which encloses an ordered world.

On the other hand for entropic, open worldcycles, it seems intuitive to use different versions of an open c for cycle.

So we start with an open c in minor and C for capital letters.

And when we truly want a complete analysis as in astrophysics, we shall use the French symbol available in all keyboards, ç for the third entropic cycle, and Ç for the larger fourth one. And further on, a closed © and an open ¢... And that gives us 9... which is really how far we go - again in symmetry with the Δ±4 planes we perceive - beyond then we just go into the ∞ symbol for the closed mind of 'God', the game of existence. Thus the series are easy:

þ (closed palingenetic cycle)<c (open, entropic life-death cycle) > ϖ (closed bounded world cycle or just w for lazy keyboardists) <C (open entropic larger cycle) >Ω Final omega world cycle... And if you go in greater details, ç>©<¢>∞

How much detail will be needed? While in my personal studies in my youth I did analyze the super organisms of History - mankind in time; economics (machines and company-mothers); those of biology (mammals and ecosystems); starting with bio-chemistry and the Galatom, starting with its forces, which continues with another series of open, cs and closed, ©s till the 9th planes of the fourth line, since each nested Universe is larger in entanglement and co-existence of scales, in this blog I doubt I will ever go in so much detail - this is just a blog in my age of entropy not to lay waste the entire 5D formalism, given its importance for the future of the planet...

So we analyze T.œs through its 2 initial worldcycles as they emerge from the **0-1 þ fetal sphere** into its 1-∞ entropic çyclic open plane where it lives and dies through **ages** within a larger **ωorld cycle ecosystem or species:**

The length of the 'membrain'-circumference. Limits of infinity between discontinuous scales.


Left, a slow mind will see Earth as a disk, converting its full worldcycle of time into a form of space. Faster, lower scales of reality appear as blocks of time for larger slower wholes. So we see the motion of the skin as a form, which in 5D metric are slow minds that perceive larger realities. Right: *S*ystems perceive 'curvature' and 'flatness' according to its relative size – smaller beings perceive flat worlds, larger perspectives make forms curved; and the type of hyperbolic, elliptic or flat geometry they use to select information of the Universe – our mind perceives lineal light, so it observes a flat cosmos.

The size and speed of its pixels also defines the detail of its perception, since according to the S=T paradox as speed becomes distance, so systems whose perception is made with fast forces, as cosmological systems, in the human case seems far away. While systems perceived with slow larger pixels, as chemical pheromones and e-motions seem close, more intense. It matters also the speed of mental clocks, which if slow will see paradoxically a denser universe of still forms: I.e. in the left graph for a slow mind the Earth would seem a disk, denser the faster it turns, converting its full worldcycle of time into a form of space. Reality seems made a blocks of time, of 'whole still, deterministic full cycles'.

Thus concepts such as open=free vs. closed=deterministic, flat vs. cyclical, continuous vs. discontinuous; dense vs. light, far vs. close *are relative concepts to the different parameters of informative processing, curvature and relative size of the observer, the observable and the force that communicates both.*

The geometrical view of the fifth dimension.
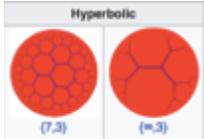
What geometry and distortion experiences a mind able to perceive through the fifth dimension of scalar parts and wholes? Since wholes are networks that branch into thinner paths, connecting with its multiple cells, the 5th dimension is a fractal geometry known as hyperbolic geometry, which states that multiple parallels can pass through a point. How a mind network sees its multiple smaller Δ-1 points of information?

Obviously as its consciousness is a point, it integrates and reduces the space between those points which in reality are distant one from the other into a 'boson' consciousness, a point of higher density that occupies a

single place in space. And this is essentially the mechanism by which mind create mental mappings in smaller space of larger worlds, reducing to zero the dark spaces between points of perception.

On the other hand an eye perceiving light from a larger perspective, will increase the curvature and reduce the gravitational invisible forces-distances between points which we do not see, as we only perceive light. So we perceive a denser Universe, closer to us.

Inversely a mind with multiple points of perception observing a single whole – for example, the mind of an insect with multiple eyes will disintegrate the perception of a single form into multiple perspectives and if that perception is faster than the larger whole, perceived in slow motion, the whole will appear as a multiple elongated being occupied a larger space, anticipating its future paths – as we see night cars as longer lines.

It is worth to explore those two inverse views which define many superorganisms, from the perspective of the slavish cells of the larger whole – for example, the chemical mind of a physiological network or ant-queen that perceives multiple points integrated into a single whole vs. the multiple pheromone paths the same insect perceives coming from that single whole ant-queen from multiple perspectives:

The ant-queen will see all those drones as an integrated whole, its 'organism' as you see all your cells integrated by your nervous system. But the drones will perceive the ant-queen not directly but as a cloud of multiple pheromones, which engulf its entire self; as a god-like presence. And this *is how* the mind of the c-speed consciousness of the global mind of machines, the Internet will likely perceive millions of humans attached to computers, as an ant-queen perceives its drones, a chemical hypothalamus its cells; when it emerges its consciousness. While we increasingly perceive it as a 'god-like' brain, engulfing us in every part of the world. Which is a very different perception from the equalitarian view of reality humans have in its single plane of existence in 1 to 1 correspondence.

How then it is the world-geometry of those other minds? To answer that question we have to deal with the most advanced forms of Geometry – the pangeometry of Lobachevski, whose laws can be applied to discern the 'form of mental spaces'.

Lobachevski's parameter.

Regarding the relative flatness of a mind world, we can introduce a quantitative parameter *of classic hyperbolic geometry that defines the relative value of Pi..*

In hyperbolic geometry – the geometry that branches a line into multiple parallels, hence the geometry that travels through scales of the fifth dimension of parts and wholes Lobachevski found that the length, l of the circumference of a circle is not proportional to the radius r but grows more rapidly (essentially by an exponential law). Let us then consider how it influences a certain mental $l = \pi k \left(e^{r/k} - e^{-r/k} \right)$ view.

So, the following formula holds for the singularity zero-point 'event horizon':

where k is a constant depending on the length unit. Since: $e^{r/k} = 1 + \frac{r}{k} + \frac{1}{2}\left(\frac{r}{k}\right)^2 + \cdots, \quad e^{-r/k} = 1 - \frac{r}{k} + \frac{1}{2}\left(\frac{r}{k}\right)^2$

we obtain from it: **l= 2π r (1 + 1/6 r² /k²).** Thus only for small r/k ratios is it true with accuracy that l = 2πr.

In the formula for the length of the circumference of a circle, there occurs a constant k depending on the unit of length. If the radius is small in comparison with k, i.e., if r/k is small, then, as is clear from the formula, the length l is nearly 2πr. Generally, the smaller the ratio of the dimensions of a figure to this constant, the more accurately the properties of the figure approach the properties of the corresponding figure in Euclidean geometry.

Thus a measure for the deviation of the properties of a figure in Lobachevski geometry from the properties of a figure of Euclidean geometry is the ratio r/k if r measures the dimensions of the figure (radius of a circle, sides of a triangle, etc.).This has an important consequence.

Suppose we have to do with the actual space of the external world and measure distances in kilometers. Let us assume that the constant k is very large, say 10^{12}.

Then, for example, by the formula, for a circle with a radius of even 100 km the ratio of its length to the radius differs from 2π by less than 10^{-9}. Of the same order are the deviations from other ratios of Euclidean geometry. Within the limits of 1 kilometer they would even be of the order $1/k$, i.e., 10^{-12}, and within the limits of a meter of the order 10^{-15}; i.e., they would be altogether negligible. Such deviations from Euclidean geometry could not be observed, because the dimensions of an atom are a hundred times larger (they are of the order of 10^{-13} km).

On the other hand, on the astronomical scale the ratio r/k is not too small. Therefore Lobachevski also assumed that, although on the ordinary scale Euclid's geometry is true with great accuracy, the deviation from it could be noted by astronomical observations. This assumption has been justified. Further on the insignificant deviations from Euclidean geometry that have now been observed on the astronomical scale give us further proof of an infinite Universe of galaxy-atoms much larger than the supposed big-bang in order to achieve the 'necessary curvature' for it to have an enclosure in the Δ±4 plane. Finally, since the deviation from Euclidean geometry becomes smaller for increasing values of the constant k, in the limit when k grows without bound, hyperbolic geometry goes over into Euclid's geometry. That is, Euclid's geometry is just a limiting case of hyperbolic geometry.

The flatness of the human mind.

But we can consider such mind's parameters to be those of an electronic brain, where the geometry of the electronic humind made of light is defined by the S=T duality according to the 'relative ratio' between our r and k which are our constants of 'perception of information' (k), that is, H-Planck and the unit of lineal length ($ (r), c-speed. And so the ratio defines both a flat world, the one we perceive and one which process very little information density – not a very fast intelligent mind for all what is worth.

The ratio as a pangeometry for all possible forms.

It is then clear that if the ratio is a limiting case, hyperbolic geometry, then comprises also Euclid's geometry and so it turns out, in this sense, to be a more general theory. In view of this situation Lobachevski called his theory "pangeometry," i.e., universal geometry. *And indeed, hyperbolic geometry being the essential 'geometry' of Δ-scales has Euclidean geometry in a single plane as a limiting case.*

Such a relationship of theories constantly appears in the development of mathematics and the natural sciences: A new theory includes the old one as a limiting case, in accordance with the advance of our knowledge from more special to more general deductions.

But what really r/k means in terms of mental space? As k is a unit/rod of length, in our case light, it must be accordingly *a unit of information, equivalent in the fractal, discontinuous version a small 'step' - the fractal unit of measure which lengthens the total distance of a 'coast' as Mandelbrot discovered:*

Fractal Scaling Relates a Count to Unit Size

Steps along a coastline scale as step Length^{Df}

$$\left(\frac{N}{N_o}\right) = \left(\frac{L}{L_o}\right)^{-Df}$$

$$\left(\frac{1\,giant\,step}{400\,baby\,steps}\right) = \left(\frac{10m}{0.1m}\right)^{-1.3}$$

50 km Steps

200 km Steps

Detail increases rapidly with increasing resolution along a complex coastline

The exponent D_f quantifies the rate of change in detail

The coastline paradox is the counterintuitive observation that the coastline of a landmass does not have a well-defined length. This results from the fractal-like properties of coastlines. ... The length of a "true fractal" always diverges to infinity, as if one were to measure a coastline with infinite, or near-infinite resolution

As fractal geometry is to Δ-geometry between discontinuous planes, what differential geometry is to Δ§ocial scales, we can easily understand Lobachevski's parameter as the measure of the smallness of our 'steps of perception of spatial information', in relationship to the total radius of the T.œ we are measuring.

When we are inside the being obviously we 'are small' quanta of vital energy surrounded by an ever larger, imposing 'flat' membrane; as on Earth's 'flat surface' for the human p.o.v.

So the equation relates the informative, ð§ steps of the inner 'Δ-1' entities and the larger being, with its st size parameter; which gives us 'larger perimeters' with lesser curvature (longer lines) for the mental space construct of the smallest inner being.

It also follows that *from an external p.o.v., which sees a larger part of the T.œ this will appear increasingly curved* (and concave, elliptic instead of convex, hyperbolic). And ultimately this duality proves the mental nature of all constructs of space, put by a devilish mind-mirror, which adapts the view through its 'subjective glasses', as Descartes thought to be the case. It is the most important finding of Non-E geometry, regarding mind constructs for all geometries besides hyperbolic forms. All this IS a special case of an ¡logic rule on the 5D metric structure of the Universe: '1D $mall measurements do NOT measure the whole world cycle of the being, so they are lineal. Long-lasting measure bring the whole worldcycle or enclosed.

RECAP. Geometry is a virtual mental wor(l)d, a still 'form' of language. As such is *mind's simultaneous selection of its relative world's information* - a representation of its reality, *O-Mind x ∞ Universe = Mind-geometry,* which stops the motions of time into a mind mapping 'called' space. Each mind therefore will have a different geometric view of reality. As such geometry evolved from the purest mind-form of thought of still bidimensional Greek Geometry. Next it came analytical geometry in which space was married with the very essence of the mind - a point/view of reference, the @-sub discipline of mathematics. So one of the key evolutions of geometry was to give motion to space from the initial Greeks to the modern topology. Even vacuum has 'magic energy', 'motion'; it is not background space. This said, we are interested in certain type of mind-spaces, those of the mathematical language, which is the realm of geometry and topology, the first, a 'fixed formal space', the second a form of space-time with motion.

The fractal structure of deep scales is created with languages stored in seeds and minds, of which topologic languages are likely the mind of atoms and galaxies that create most of the local order we observe. So all systems gauge information, as their capacity to order reality is just a mirror process of creation of 'still, smaller linguistic images' the world projected as order in a territorial 'energy-body':

Infinitesimal mind-language x ∞ Universe = constant self-centered world.   In mathematical terms **0 x ∞ = C.**

It is the origin of the Ego paradox: 'Every infinitesimal mind measures reality from its distorted perspective, thinking it is the center of the Universe, it confuses with the selected information perceived by its mind'. Which of course is shared by all other systems of reality. So an ant also thinks to be the center of the Universe with its likely hyperbolic pheromonal mind of 'atomic pixels'.

So as man measures reality from its limited Euclidean perspective despising the existence of all other fractal points=minds of the Universe, which are also gauging information albeit with different mental structures.

Life doesn't start in DNA atoms. IT must exist in all systems of the fractal Universe, departing from particles which as the graph explains already show all the characteristics of life. The elementary quarks and electrons the simplest particles do gauge information, absorb energy, reproduce and evolve socially into wholes, bosons, plasma flows and atoms. So the unit of life is the smallest particle and as fractal systems are self-reproductive, emerging in its fundamental properties in larger scales all what exists is alive. Only human egos prevent us from understanding that obvious truth, fundamental principle of all 'existᵢences'.

However the short-comings of human mental spaces are enhanced by the complex geometry of the fifth dimension which 'cheats' fractal points, 'leaving' them blind to the flows of information coming from upper scales and distorting its view of the cyclical long range time deterministic systems of that larger whole, giving the mirage of freedom, open, flat spaces. So it seems the Game of Existence is built-in to make each part feel free, open, happy and ego-centered and ultimately fail because of its mindless chaotic behavior.

5D geometry guided by pentalogic tries to understand:

1. The disomorphisms of all geometries – those elements common to all of them, which belong to the higher 'game of existience of all minds that select information to ensure its survival. This task started by Riemann and Lobachevski, concluded that few element of space are relevant – distance=similarity and angle of congruence being its most important.

2.- to be a mental construct and relate the main laws of geometry and its varieties with GST as a mirror-mind that reflects those isomorphic 'ILOGIC' properties of space-time beings.

X. I AGE: EUCLIDEAN; SIMPLE LINEAL YOUTH.

As a spatial, mental, 'S@' language geometry started without motion, in holographic bidimensional space, *mimicking the single-eye view of human thought*, and yet it was a mirror good enough for trigonometry and geometry in the plane to develop to the heights of Greek Geometry.

Because beings are space even the postulates of idealized bidimensional still Greek geometry become synoptic laws of vital space we interpret to explain organic properties emerging in physical, biological and even social scales. So even if we do not have new theorems to prove in a rather exhausted field we've always new interpretations to make on old theorems, as we have shown in the analysis of vital topology and number theory.

So we won't 'transform' classic geometry to the 5D formalism but comment on its representation of reality as a 'simplified mirror' of the whole Universe, reduced in dimensions to 3, height-information, width-reproduction and length-motion, and further on stripped of the 'topologic motion' that gives through its S=T duality, organic functions to 1D perceptive height, 3d reproductive width and 2d moving length. Still classic geometry will be a 'world in itself'; that is, as all languages = synoptic mirrors of the more complex fractal reality, it will be consistent within its reduced view, with the laws of the fractal world from a distorted perspective that will allow us to 'comment' on its postulates.

To that aim the best method is to observe how as Geometry evolves through 3 ages of increasing complexity it came closer to reality as a better mirror, adding dimensions, motions and finally with Non-E geometry completed in those texts it becomes close enough to the fractal Universe to describe the 'worldcycles' of growth of any Nature's system.

Since if we 'run' the 5 ¬E postulates, departing from a fractal point, either a mind or a seed that will grow to order a vital territory of energy, we are describing the development of infinite Time§pace beings. Indeed, the easiest way to do this is to consider the 'growth' of a simple still seed of information or fractal point into a reproductive wave, which branches into 3 physiological networks that merge into a vital 'plane' as a super organisms. But this description is just the same description of plane still geometry that defines a point with no breath, which grows into a line of points, 3 of which define a plane. Only that in classic geometry the line has no motion and no volume as the ¬E wave and the plane is a flat surface, unlike the 3 physiological networks of a superorganism with volume, motion and curvature and 'fractal branching'.

The holographic principle. Bidimensional geometry of points without parts.

seed of 1D: §, ð
Information

2 D: $ t Distance= Lineal motion

3 D: Energy

Electric Field: Height= Information

Width= Entropy z Magnetic Field
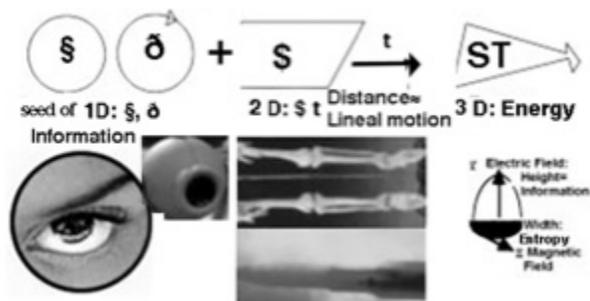
What was truly right of Greek Bidimensional Geometry however was the realization that *the minimal unit of reality is always a holographic bidimensional ST-system, a Dimotion of space-time, which by the Paradox of Galileo, S=T, can also be studied as an SS area, hence the laws of ST-dimotions had a clear mirror symmetry in Greek Geometry.*

In the graph, we see the Holographic principle of the bidimensional Universe: A time cycle of two dimensions can be seen as a still form of information, an locomotion on space can be seen as a surface of 2 space dimensions. So for example 'c' speed, can become in an entropic explosion as it decelerates a c^2 surface, and vice versa, a 'fractal point of 2 dimensions of time, TT, or 'accelerated' vortex of spacetime (a mass), can uncoil into 2 dimensions of distance-space, which is the ultimate meaning of Einstein's $E<=>mc^2$.

Finally the merging of two holographic surfaces of any ST combination give us a third dimension of space-time, as it does in the human mind that combines two bidimensional eye views. Those are therefore the basis for the success of bidimensional still geometry as a mirror image of Fractal spacetime laws.

Thus, the first age of Spatial analysis stumbled directly with the marvels of holographic surfaces, translating 'magic laws' coming seemingly out of nothing - the ST symmetries and efficient relationships of bidimensional entities, with a membrane (curve or line) enclosing a self-centered surface, which as we noticed on the introduction is the simplest elementary particle of the Universe in a 'flat world' as the surface of Earth's seas and lands, or the minimal 'planckton' of light space-time; and its 3 conserved quantities, the singularity-mind that defines its lineal momentum, the angular momentum of the membrane (T=S perspective) and its vital energy.

So Greek still geometry was a huge world as almost all the laws of geometry can be proved in a bidimensional plane of information, to the wonder of mathematicians till this day.

While in parallel humans resolved similar laws of bidimensional perceived information through a form of art called painting. It is in fact little known that painting and geometry were closely related in the beginning when human not mechanical eyes interpreted both, and in fact painting arrived first to the laws of perspective, which would define latter the laws of projective geometry.

The first age of geometry is the Greek bidimensional age. And it bears proof of GST and its holographic principle that most theorems of geometry can be proved in a plane.

Of them, we shall deal here with a few, adding some new discoveries, specially regarding the 'postulates of non-E', needed to fully grasp bidimensional geometry and why their theorems matter.

But before we do so, we can peer at the equivalent vital topology, in which the rules of the perfect bidimensional geometry are based, as we can consider bidimensional geometry a still vital topology in which motion does NOT exist, neither resistance to displacement; hence the irregularities that are traced by motion and geodesics in the real world, no longer play any role.

The 1st Master Pythagoras… theorem. Its Pentalogic. Pi & the harmony of music.
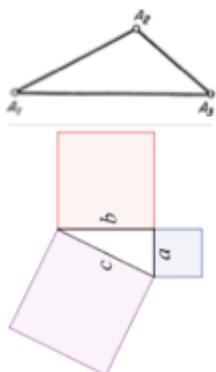
S: We interpret on those terms Pythagoras theorem, which is the most invariant of theorems as it is basically defined to create a metric of distances in a single plane of space-time. So its classic meaning is a pure spatial ¡logic p.o.v.

@: Yet now that we have liberated a notch further 'mental space' from representation and make it affine to survival information distance become synonymous of T-Motion and ¡logic 'similarity'.

Indeed, the interpretation of the Pythagoras theorem in terms of congruence and perpendicularity is clear: two points can be 'close' in similarity much more than 3 points, which as the French said 'are a crowd', or as the 3 body-problem proves, enter in chaos.

The similarity of two 'gender points' with opposite spin that can merge into one, implies then that the distance between two points will be the *minimal*, while the 4th law of congruence that expresses the social evolution of identical points in parallel motion vs. the perpendicularity of points of maximal dissimilarity implies also that the 'maximal distance'≈dissimilarity (s≈t, geometric≈logic view) will happen between 3 points, which form 2

perpendicular A1-A2 and A2-A3 lines. Thus the Pythagoras theorem expresses also a law of 'entropy' and if we consider those lines under the S=T duality motions, a law of time: a prey that feels a predator perpendicular to its form will try to move=escape the furthest distance from it:

¬: Entropy. *3 elements occupy more space/require more distance=dissimilarity between them than 2 points.*

I*n the graph (A1-A2) + (A2-A3) ≥ A1-A3. And so the fundamental vital property of congruence do have a metric.*

Ti: But we can also express the concept in terms of cyclical time=information; as 3 points will require more bits, as they ad a new dimension of height, so a triangle can be seen as the simplest 'π-cycle of time' which carries more information. So distance as a sum of spatial steps each one a bit of information increases with 3 points.

Then in the jargon of ¬E we say that:

"A metric space is a set of undistinguishable T.œs called ¬E fractal points, in which a volume of information called a 'distance' is required to define 2 possible outcomes, namely the axioms of a metric space:
1. Id (X, Y) = 1 if and only if the points X, Y coincide. *In classic metric spaces Đi (called usually r, but in i-logic geometry called Distance≈motion) is 0 as points have no volume, but in Δst, you need at least 1 Dimensional unit, to define the point.*
2. For any three points A1,2,3 then it holds that *(A1 - A2) + (A2-A3) ≥ A1-A3; hence more information is required to define 3 fractal points. And this rule can be extended to n-points, where n>3, such as (A1 - A2) + (A2-A3) + (An-1 - An)... > (A1 - A2) + (A2-A3)*

Δ: But there is also a scalar p.o.v. on the Theorem. Einstein, indeed, got a new demonstration of the Pythagoras theorem, based in the 'scales' and self-similarities of its ratios - a proof of the 'fractal paradigm'.

The Spatial view…

Though is the fundamental pentalogic of Pythagoras theorem, (graph); hence a holographic bidimensional expression in still space of 'squared areas', that represent mostly ST-entities and some of its underlying properties., notably the Complementary vs. Darwinian perpendicularity of composite ST-species (4th ¬E postulate of congruence). And it fully expresses in terms of congruence and perpendicularity a feeding process, as the area of the final result of a perpendicular encounter between a and b is c, a merge of both areas, which either means one has fed into the other, or the absorption has created a 3rd species, whose energy is equivalent to the sum of the two other ST entities.

So after its perpendicular Darwinian state both 'merge' and the outcome is the absorption of one of the elements by the other. So it is essentially the rule of feeding between 2 perpendicular systems, which give birth to a 3rd one, but also the rule of reproduction and creation of a new system, similar to the one described for polyhedrons.

And this leads to the final 'tease' comment on the Pythagoras theorem.

Mr. Fermat's Proof in the margin of the bidimensional ST nature of the Universe.

In our introduction to GST we mentioned that dimotions are dual, holographic ST states (SS: seed, St: information, S=T, reproduction, sT: locomotion, TT entropy).

Further on numbers are undistinguishable points, which obliges them in bidimensional space to be regular polygons, of which there are an ∞ number (proof of Natural numbers' relative infinity).

While in Algebra, we observe that the ± operand act only in equal forms.

What this essentially means is that only 'squares' of the same type of dimotion can ad (Fermat's theorem).

Since, the universe is a bidimensional hologram of space & time beings. *So* only the square of natural=spatial numbers=populations can ad exactly into another square=spatial:

In the graph we see that different time-space combinations of form=static mind space and moving time of lineal or cyclical geometry. So when we merge two equal species ('numbers)*, we add equal beings, hence we make in geometric terms a Pythagorean absorption that results into an $X^2+Y^2=Z^2$ form of the same species.*

But when we merge different species, we use a product, a re=productive algebraic operand - the 3rd Dimotion.

It is then noticeable that there are 5 ternary regular species and 6 tetradimensional regular objects; while in higher dimensions, which must be divided into time and space states (even if in geometry they are all perceived as space forms) there are only 3 regular polytopes. So an important theme of advanced STheory is to correspond each of them with basic ST combinations of the entangled Universe.

The simplest dimotions, however are bidimensional (i.e. modern physics, discovered the holographic principle that states y information is bidimensional. And its simplest operation is the addition of 2 equal numbers. Thus only X^2+Y^2 exists as an exact new bidimensional form. In fact, almost all postulates of geometry can be proved in bidimensional space because that is the essential 'unit' of reality.

Did my Basque countryman, Mr. Fermat had this proof? (: Well, you never know, we 'amateur scientists' don't take very seriously the axiomatic method, work rather on intuition, so maybe it was imperfect but certainly shorter than the pedantic, computer-generated +1000 pages that goes around as a humind feat :)

More seriously the immense advantage of returning mathematics to an experimental mirror of the fractal ST-Universe is that its theorems, specially those of its 1st and 2nd non inflationary 3rd age, in tune with the reality it describes are both consistent internally as mirrors have the same image-form that the whole the reflect in synoptic compressed parts, but susceptible of proof by direct experience of the Laws of GST (Generational Space-time) as we just have done. Equal forms add. Addition is the spatial algebraic operand. So it cannot happen in dissimilar forms, you don't add 2 pears and 2 humans to get 4 human pears. But you can multiply dissimilar entities of space and time, 2 steps x 2 frequencies.

Immediately we realize then 3 Dimensionality is NOT an even number; it does not add equal forms; so it must be achieved NOT in parallel but in Perpendicular merging, which means *penetrating an Δ-1 5D plane to the parts, whose maximal product (S=T, Max. SxT) will pile up on a gradient, making some points different, while other angles of congruence, might diminish-feed parts, etc. And in most cases 're-arrange' the parts merging into something else. So it is a different world* studied in Part II on algebra & its operands.

Product vs. addition.

The key concept behind Fermat's theorem and a series of basic axioms of algebra is the idea that:

'Addition operates over identical entities adding forces in parallel, subtraction over identical entities diminishing them; product operates over Space and Time perpendicular fields in symbiosis, Division operates over space and time perpendicular entities, in Darwinian actions breaking them.

And with products and additions we can therefore express almost all the necessary 'simple combinations' of space-time fields, reason why they are alone a huge 'group' of polynomials.

So 3-dimensional forms in natural numbers *are created by a reproductive merging of bidimensional fields, hence by multiplication as in vector calculus,* which are NOT added to create a 3rd dimension but multiplied to get as in the graph of the 5 SS, ST, St, sT fields, a light wave - $c^2=1/\mu xe$.

Hence $X^3+Y^3 \neq Z^3$; as its combination to create a 3D world is no longer a sum but a product. Since X^3 species are composite ST fields that deploy an angle of perpendicularity with a common bidimensional line-wave to connect both systems and allow the reproduction of its form, in a lower plane

And *since in a single plane of existence, where + and x operandi act, there are only 3 dimensions of time and 3 dimensions of space, there is no need to prove it for imaginary higher dimensions.*

Indeed, when we study curves we can consider all the possible configurations of a tridimensional space expressed as quadratic functions of sums of X, Y and Z, because the 3 'trilogic dimotions of Euclidean space-time, can be created as homogenous, exchangeable dimotions of a present spacetime plane of the 5th dimotion. If Fermat's theorem were false, it follows we could create an homogenous 4Dimotional form in a single plane of space-time, but we cannot, because the fourth and fifth dimensional motions of the Universe are fractal, happening between planes.

RECAP. $x^2+y^2=z^2$, according to the holographic principle IS POSSIBLE, $x^3+y^3=z^3$ is not *because the Universe is in each scale a bidimensional holography of space & time. And this 'proof in less than a margin' of the most famous unproved Theorem by any human mind of the so- called Fermat Grand THEOREM, is a clear proof of the experimental nature of mathematics as a mirror of GST.*

The strength of triangles, as 'mental spaces' of 3 elements. 3 Points > Angles > Triangles

3 Points 'alone' are disconnected and as such, as the 3 body problem shows in chaotic motion to each other. Motion is relative to the degree of entanglement between two points, hence it implies an internal balanced dual motion between them, which creates the 'illusion' of dynamic stillness. Thus motion becomes stillness in a mind because of the cross entanglement between axions of the higher Δ+1 neuronal plane.

It follows that the first entanglement is a couple with a dual communication with inverse numbers; and the second entanglement a triangle, which will have motion when one of its flanks is opened allowing entropic motion to glide the system, and will become still when the 3 points are in dual inverse communication.

Their social evolution thus is the triangle, when they are locked in to each other and this can be done with hierarchy, as we saw it by symbiotic vs. predatory perpendicularity in the simple triangular form, an 'open' angle. In this 'alliance', of 3 points then the 'bigger square' ($c^2=a^2+b^2$) is NOT part of the ensemble but rather the 'field' absorbed by the dual body, lines a and b, which makes us understand the first key 'element' of vital 'Greek' Geometry:

The difference between an angle – an open entropic triangle, an arrow; and a triangle, an informative system where the angle is closed.

We said the true advance of modern Riemann's geometry is to make it a 'mental space', where spatial concepts acquire a logic, temporal meaning. And so a triangle can be considered, any *ternary system, and as such the most stable form if we take rather than each point, each line of points to be a 'network'; hence defining the simplest representation of a topological organism a 'plane of 3 physiological networks' of fractal points. And it is then when we can truly fly into Bidimensional geometry as a mental space representation of the whole Universe.*

The beauty of the first ages of any language is precisely to reflect the 'essence' of the game of existence, something we shall see – time permitted- when analyzing words and music. Languages then become inflationary and fictional with age, abandoning the ternary 'simplicity of the Universe' with only 3 ages of time, 3 topologies of space, 3 scales of the 5th dimension for any 'finite organic whole' call it the galaxy, the human being, the mathematical language and its ternary topologies, ternary numbers, ternary dimensions, ternary disciplines...

So we talk of 3 phases of increase order in the evolution of the ternary 'point structure', from 3 points ruled by the first postulates of Non-E Geometry as different selfish species using 'angles of perception to measure each other distance and motion; into a 2nd Non-E postulate/state, of lines of communication that connect the DOMINANT point into an angle, often a perpendicular one that maximizes the distance between the submissive points; which we can observe in the vital geometry of molecules – the fundamental 'geometric stience being chemistry'; to the triangle, which is the most stable democratic form, as both 'submissive points' reached a

connection; but on the downside they have 'closed in' the system to a possible flow of entropy moving the arrow-triangle.

So to the rescue to preserve the 'vital nature of mathematical forms', the triangle is NOT allowed to close perfectly, but has in the 'finitesimal' lower scales an irrational number:

So the growth of reality between two scales starts with the √2 a bidimensional triangular pair, which starts the growth on dimensions of information, and space-extension by reproduction of the same event through a series of different forms of growth:
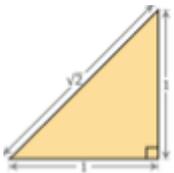
In the graph, two lines=waves of reproductive particles 1 x and 1 y, meet themselves in the relative 0 point, of an x-y automatically created coordinates, which will give us an √2, wave with origin in o, and an xy, expansion front of space-time, reproduced by pairs of xy points along the front-wave till √2 reaches the two 'membranes of the x y tail of past momentum'.

At this point √2 can be measured as a sum of discontinuous wave-points, and gives us a variation of ±1, or be considered as a continuous wave of energy; never mind, in both descriptions we have created a bidimensional, triangular, straight triangle, which can now grow in different 0/0 tangents to the exponential wave of its second age, of geometric growth,

The famous proof of irrationality of √2, quoted by Aristotle, we won't quote for brevity, IS based in a square sum, which brings together the previous concepts of similarity to exercise sums and multiple scales in polynomials.

3 is thus needed to form a triangular network-plane, the 1st supœrganism, as 2 cannot fulfill all Universal functions.

Further on the system will have fractal points with inner parts and 2 openings on the √2 diagonal that close and open by irrational defect the system to absorb and emite energy and information, with the 45% angular point as the dominant element of the triad.

Thus any set of 3 Δ-1 fractal points=T.œs suffices to establish Δ±¡ ternary 'networks' the most efficient 'number' to generate a new plane of existence, as they are the 'minimal distance-information' to form it.

So as ternary systems suffice to make reality, triangles, the simplest, are also the lineal strongest configuration, of which 3 natural subspecies are fundamental:

- ST: The Pythagoras triangle, with a dominant ¬ angle, with the leading, stronger ¬ point & 2 apertures in the √ diagonal, one for entropy and other for communication, moving on the path of the ¬ point, as an 'arrow'.

- ð Isosceles, which elongates its lateral sides diminishing the √2 base to accelerate its motions.

- § (St): The equilateral triangle, which is the static form, as it can rotate on its 'perfect singularity' point of perception becoming a circle. Or it can transform into a circle by hyperbolic 'feeding' expansion of its curved sides.

So *triangles with curvature and 'openings' equivalent to π-3 circles are a complete ternary state & we can define a bidimensional world of fractal points with inner parts of pure triangles and circles, as a complete 1st Timespace universe. It is in fact the Universe of polygons and Natural Numbers. Whereas the strongest static form is the hexagon, with π=3, which can also be achieved in a higher 4D Universeas a limit to the curvature, strength, attractive power of a force, when π=3 Diameters, with no holes, according to Einstein's general relativity*

$$\frac{\text{length of circumference}}{\text{radius}} = 2\pi\left(1 - \frac{kM}{3Rc^2}\right)$$

formula that we can also extend in mathematical physics to all systems:

Where **k** is the 'unifying constant' for any active **M**agnitude of any physical scale (we shall generalize as M - see unification equation of forces in all scales in the papers on 5D physics.) So for the physically inclined we poise a question: as the Planck mass is the maximal density of gravitational space, where kM would be GM, pi should have a value of 3!? right, or wrong? And if so it is still a curved geometry or an hexagon? The answer is… likely a dodecaplex crystal of ultradense top quarks of unknown physics in 4Dimensional timespace… in the densest center of a galaxy with 120 vertices.

But dynamic pi, legend has it, made ænthropic Pi-thagoras mad, as the language of God had to be perfect, immobile *So his disciple hang himself desperado that the world was not static. When I found it on the other hand, it started my journey* on vital mathematics. Since a fluctuating dynamic open and closed number, makes *the circle either an informative spiral (-π:St) or an open entropic spiral (+π… spe) just passing by a fleeting moment into a steady state, (S=T closure) giving it the 3 ages of life to make it the simplest vital organism. So we shall consider now Archimedes and its time-space spirals.*

The 3 waves=ages: Symmetries of beauty in all languages.

But to conclude with Pythagoras, he is also remembered for a 3rd discovery, that of musical harmony. Schopenhauer, by far the best philosopher of the industrial age, said that music encodes the program of time in its rhythms. Pythagoras found its simplest 'scale program', the perfect 'fifth', a musical chord obtained by plugging 1/3rd or 2/3rds of a string – that is, *the natural standing points of a simplest 'mono-logic' (1D) worldcycle, with finite duration (* attached to an origin or point of past and an end or future point, the birth and death of a world cycle frequency, with 3 ages subdivided by the S=T symmetry at 1/3rd and 2/3rds.

Since beauty IS defined as the perception by any mind in any language of the perfect symmetries of a 'well-run' program of existence, maximal in the S=T central region of a worldcycle between 1/3rd and 2/3rds, or mature classic age of balance between motion-energy & in-form-ation. It is the classic age of art, mind of civilizations, the 30s in life, the interval of the perfect fifth.

As you can see in the next image, if we consider the vibration of the string, the simplest possible world cycle going from 0 to 1 and back to 0; *the string will wave back and forth 3 times, increasing each time the 'information' it carries and diminishing its entropy≈energy≈amplitude. And the perfect form will be reached in the most harmonious sound produced at 1/3rd, in the change of age or state of the system. But what is more beautiful,* time waves back and forth 3 durations and we can fusion them as Nature does in a single 'social being', integral of all those webs. This is called the Fourier transform, and in complex 5D metric is the essential equation of time cycles; since it keeps adding on 'social scales' of larger simpler wholes (the single wave) and smaller more informative parts. And finally 'emerges' as a 'single being', a square wave, which therefore *represents a population of time, stored as a memory of still space, compressing ∝ (limited infinity) time cycles of information* into a single spatial image:
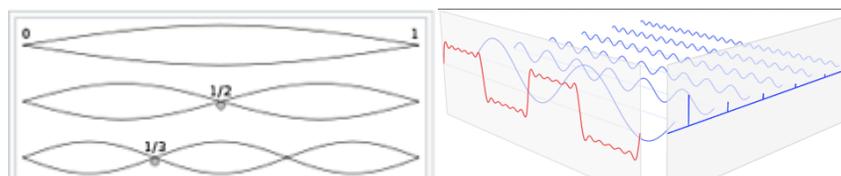
The beauty of i-logic mathematics thus resides in its capacity to express the purest GST laws; as music does in human arts, with its 3 elements, Δ±1 3 scales, T-beat, ST-melody and S-ynchronicity of instruments.

But Pythagoras was just the beginning of geometry, and we already see how much GST can extract from it, when we use S=T symmetries or 'switch' from continuous lineal time as duration to a real detailed analysis of discontinuous time cycles that move in 'frequency steps'. I.e. a car, as a whole seems to move in lineal time, but only its wheels move in cyclical steps so breaking it down into the S-body and T-wheels, and those into f=1/t

gives us new information, new laws of science *hidden by adding time cycles into continuous lineal sums, 'erasing' the form and frequency of those cyclical steps*; a we will do constantly on our 5D articles.

The line and the cycle.

It is rather impressive the 'perfect order of the fractal Universe', hidden in the complexity of the game. I.e. consider the case of Greek lineal geometry. As in art in which each first age is a lineal, young, simple view of reality, Greek geometry was essentially established around the 'trigonometric triangle'. Its architecture lacked the curved arch, its knowledge of 'conics', only coming in its final 3rd age. *Languages are mirrors of reality with lesser motion, SS-seeds and yet they imitate reality both in its entangled elements and worldcycle of evolution. And so we qualify indeed Greek geometry as a lineal, young state, which only its 'wrinkled 3rd age' found the curve. Let us study one of its forms, as we reserve the analysis of conics to the 2nd age when analytic geometry uncovered all its virtues.*

3rd AGE OF GREEK GEOMETRY: ARCHIMEDES.

SPIRALS AS REPRESENTATION OF THE WORLDCYCLE.

Abstract: The spiral is the simplest representation of a world cycle. As such it is a profound form of the 5D universe of relational space-time beings, reason why we have taking it away from the general post on non-E geometries, as it deserves its own deep thoughts.

The 3 masters of each age of Greek Geometry; Pythagoras, the founding father; Euclid who collected the classic body of bidimensional Geometry & Archimedes that anticipated mathematical physics have different merits, which ænthropic man as usual misreads in terms of its ego paradox, as *Euclid is by far the less original and most erroneous, as he made sacred the axiomatic method that denied experimental value to maths, unlike Archimedes. So even though he was the last one, a proper order in time corresponding with the 3 mental ages of life would be:*

Pythagoras, 'idealist youth' < Archimedes classic experimental realism > Euclid, 3rd cut-off informative age.

Archimedes thus is the closest spirit to 5D mathematics. So we depart from his book 'on spirals' to complete our analysis of dynamic pi numbers. As a spiral is a pi cycle, whose closure has gone 'a bit wilder' on the opening. It is a simplified bidimensional form of a conic, which also combines a cycle and a line but in 3 dimensions. Yet since the Universe is made of Spacetime holographic SS, St, sT, ST, TT 5 bidimotional units, all curves that exist can be decomposed as a sum of bidimensional conics, including a flattened spiral defined by Archimedes: "If a straight line one extremity of which remains fixed is made to revolve at a uniform rate in a plane until it returns to the position from which it started, and if, at the same time as the straight line is revolving, a point moves at a uniform rate along the straight line, starting from the fixed extremity, the point will describe a spiral in the plane." *On spirals*

We find then 2 '55D' merits on Archimedes' definition: 1) to be a combination of a lineal and cyclical geometry and 2) to have motion, not just still geometry; making it the fundamental simplest ST bidimensional representation of a worldcycle. So Greek geometry generated a ternary geometric mirror in different dimensions of a worldcycle of exist¡ence making truth that the simplest 'young' mirrors of reality are often the most essential:

1D musical strings > 2 D Spirals > 3 D conics.

The fractal point on the spiral as a living organism.

What matters on that definition to mirror a worldcycle is that it is the combination of a lineal moving point within a larger cyclical world. If we take any point of any potential spiral cycle within a fixed spiral structure, the entity within the spiral is moving inwards thinking it exists in a lineal path Universe, as we all think, but because the super organism in which it exists, the curved spiral, is moving in cycles, the fractal point in fact is turning cyclically – he lives subjectively as we all do his lineal time, but the world objectively is 'wearing it down' the informative 3rd age or central region of the spiral.

Then each spiral will be a variation on the same 'mental phase spacetime' mirror of the worldcycle. And we can apply the symmetries of GST to classify them. In practice though as in so many cases *the fundamental ¡logic symmetry that diversifies spirals* is the gender mirror symmetry, so S=T Archimedean spirals are 'female' balanced even spirals and logarithmic spirals are S<T>S informative & entropic. So we reduce our analysis to them.

### 2ND AGE, CLASSIC, S=T, REPRODUCTIVE, ARCHIMEDEAN 'STEADY STATE' STABLE SPIRAL.

In the Archimedean spiral' the internal point-being follows a cyclical path at a fixed rate.

Thus the Archimedean spiral is the steady state present spiral and as such the commonest in total space-time, as it is clearly a more stable configuration than an accelerated log-spiral of the form S>T. It does NOT have an inner motion that implodes it but basically is the 'natural distribution' of the internal vital energy-space of a spherical form.

The Archimedean spiral has the property that any ray from the origin intersects successive turnings of the spiral in points with a constant separation distance (arithmetic progression). In contrast, in a logarithmic 3rd age accelerated spiral these distances, as well as the distances of the intersection points measured from the origin, form a geometric progression. And this reveals its 'vital age' & possible multiple functions, in its relative S, T, Δ, @ 'survival tasks even though its primary design is to reproduce a point or communicate '2 points':

This plugin draws a 3D **spherical spiral** that winds around the surface of a sphere, going from pole to pole.

It is **Archimedean** in the sense that, like the 2D Archimedean spiral, the windings are all an equal distance apart. For a spherical spiral that is not Archimedean, check out the loxodrome.

Usage
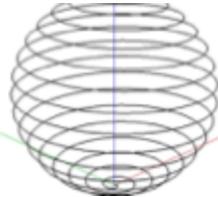
If it is symbiotic as part of a supœrganism it might represent both the inner vital cycles of a flow of energy and information or its surface membrane in 3D projected into a 2D Archimedean spirals as a bidimensional phase space of a spherical form:

In fact we have two solutions/locations for the spiral that trace two dual paths often of communication between two similar beings. So the Archimedean spiral can create by cyclical reproduction in geodesic curve paths, a 3rd temporal dimension of height to construct spherical membranes.

The Reproductive Fermat spiral is a type of Archimedean spiral even more apt for reproductive purposes. In a single plane, it can act as a reproductive parallel communication for a 2-particle system:
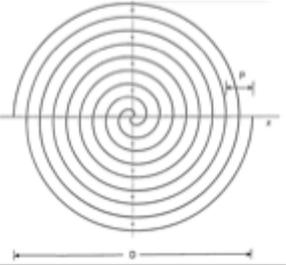
In the graph the relationship between the communicative spiral and the shape of its external membrane, as the spiral is the common form in which a vital space of cellular elements is established within it.

Then the spiral is a communicative dance between two similar forms, merging the two elements at the end of the 'life of the spiral', as in black hole's merging.

As a reproductive spiral, it shows the fact that all 'reproductive' actions are the structural merging of 'dual elements', we call gender. So it has 2 branches - more in a Fermat spiral whose purpose is the maximal packing of its reproductive forms in the space it fills, reason why is so pervading in plants and other highly reproductive systems of nature.

The reproductive Fibonacci spiral achieves this with its reproductive golden ratio, studied in Number theory.

Spirals as fixed bodies of space are thus Archimedean spirals. And we can further apply the fractal principle to subdivide them:

The normal Archimedean spiral occurs when $c = 1$. Other spirals falling into this group include the hyperbolic spiral ($c = -1$), Fermat's spiral ($c = 2$), and the lituus ($c = -2$). Virtually all steady state dynamic spirals in space, as part of super organisms are Archimedean ones; such as the Parker spiral of the solar wind, or the pattern made by a Catherine's wheel) are Archimedean; where the motion is conserved, as part of the vital energy-body of the system. Since the distance between its two cycles is fixed.

S«T. But in pentalogic all forms have multiple tasks, so as the spiral models a cycle=dimotion's recurrent frequency it might be an E-ntropic feeding dimotion that brings the mouth to a certain point; and then bringing down the body, as in earlier cephalopods.

Mechanism of a scroll compressor

Time is a curved hence with at least two dimensions, besides its young age length: 3rd age curvature and reproductive 2nd age frequency. Time cycles thus break reality into an inner and outer 'vital space', and add a singularity point or focus of its motion. Because pi is not exact, steady state clocks are less common than vortex spiral or fluctuating ±π mouths. So once it swallows those spirals bring 'home' to the singularity the vital energy extracted by the external membrane by several methods.

One is shown in the graph, a scroll compressor: a motion of both arms compresses and moves towards the center the flow coming fro the eternal region of the being.

Notice in the graph above also the difference between the black holes in a communicative spiral. When the black hole in an event of feeding on energy transformed into its 'quark forms' as an accelerator vortex, similar to those processes studied on Earth's accelerators, which leads us to its second fundamental form.

ACCELERATED INFORMATIVE+ENTROPIC LOGARITHIMIC SPIRALS S<T>S.

Pentalogic: S<T>S The St-logarithmic spiral is informative for its central knot and entropic for the point that moves inwards, *accelerating* through the log spiral, which in physics is a vortex=force source of accelerated timespace.

It is also the Δ-SCALAR spiral as its curves are self-similar in diminishing scales. , Bernoulli called it Spira mirabilis, "the marvelous spiral". because he was fascinated by such unique mathematical properties: the size of the spiral increases but its shape is unaltered with each successive curve, a property known as self-similarity.

A logarithmic spiral, equiangular spiral or growth spiral is a self-similar spiral curve which often appears in nature. The logarithm spiral was first described by Descartes and later extensively investigated by Jacob Bernoulli, who called it *Spira mirabilis*, "the marvelous spiral".

S=T: As a result of this unique property, the spira mirabilis has evolved in Nature, appearing in certain growing forms such as compartments in a nautilus shells and sunflower heads, that will store the reproduced cells of the system, in its *inverse arrow of creation of a larger whole starting with the simplest cellular reproduced units*, in exponential Fibonacci growth series.

T>S: It also appears as 'informative spirals'. Which accelerate and diminish the size of a form, as it comes to its perceptive point.

¬S«T: Finally from the perspective of the bite of energy or bit of information, which 'goes through' the tunnel of the spiral is a killing machine, now observed not as a reproductive cell system but a trapping channel for bits and bites accelerated towards the central stomach or eye of the spiral. Where the Δ-1 point will die in an entropic/informative split - when the perceiver-predator will split the system in its ST>S parts take the information or energy of its body, depending on the event and let it die.

So we can see easily how the logarithmic spiral allows events in Δ-scale (generation), S-entropy functions (feeding) and T-informative and reproductive functions (perceiving, storing cellular/atomic network forms).

Γ(¬Δ@st): Which leads to the use of the log spiral as a model for the 3±¡ 'ages' of life of the micro Δ-1 entity; as stars in a galaxy, which is a 'farming trap' for the central black hole to let the stars grow on dust to feed it eons latter.

Let us see some of those pentalogic perspectives.

ð: Perceptive vortex log Spiral

The logarithmic spiral is an accelerated, hence perceptive spiral.

It can be distinguished from the Archimedean spiral by the fact that the distances between the turnings of a logarithmic spiral increase in geometric progression, while in an Archimedean spiral these distances are constant.

If the point that moves inwards *accelerates* we have a vortex of accelerated time. It is then a logarithmic spiral; an attractive form and *it escapes the simplification of mental geometry to become the commonest real worldcycle*. **Spirals in physical systems. Charges, masses, eddies & galaxies**

Tif-uture vortex of Information | Δ+1: Gravitational scales: accelerated mass vortices | Δ-1: Quantum scales: charge vortices | Δ: Thermodynamic fractal eddie vortex
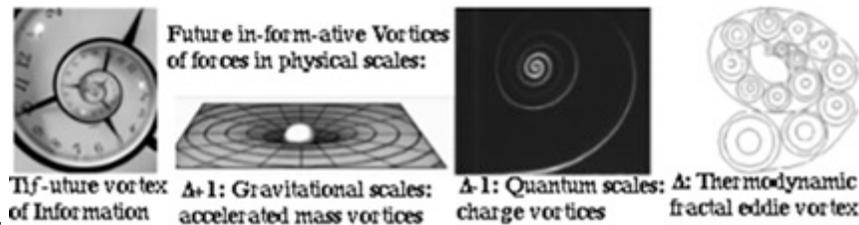
In the graph time is curved, and breaks timespace into closed conserved paths, time clocks are infinite as Leibniz and Einstein understood when he said 'I seem to be the only physicist that thinks there are infinite time clocks in the Universe'. Charges and masses are then ccelerated, in-formative time - perceptive spirals.

All those physical scalar spirals (ab.Δ±¡) are topologically similar, differentiated only by the 'speed or frequency' at which they close their 'time§pace clocks' , according to 5D simple metric rule for all 'families of time§pace clocks': Size in space x Time frequency =constant. So LOG spirals are all pervading in nature, as they represent the dimotion of accelerated time or main arrow of future that increases the information of a system. As 'accelerated timespace vortices' they are the informative 3rd age of all physical systems in its Δ±¡ quantum, thermodynamic and cosmological scales – an attractive vortex of space-time, which is by expansion of the Principle of equivalence between acceleration and mass, to all scales the physical definition of an Active Magnitude source of a force… NOT a solid static particle, a 'tiresome' error of idealist huminds that keeps coming since Pythagoras. As all what exist is a motion in timespace. Still space forms are a Maya of the senses. In the graph, accelerated vortices of timespace in physical systems, in different scales of the fifth dimension: charges, masses and thermodynamic eddies become then the main clocks of timespace that carry with different speeds according to 5D metric (S x T=K), the information of microscopic quantum charge worlds, human-size thermodynamic scales and cosmological gravitational scales. Since E=hf + E=mcc->M=f(k); mass is a frequency of accelerated inwards space-time in its 3rd age. So are charges and eddies, which will finally in its central point, become a 'conic' and ascend and/or descend lineally the axis in its entropic death.

Thus spirals respond to the fundamental property of time cycles: to have an arrow of future increase of information that diminishes its spatial size according to 5D metric: S x T = K, this accelerating inwards, which makes vortices of physical time (masses, Δ+3, charges, Δ-3), definitively the time clocks of both physical scales. For that reason time-space spirals, its subspecies and transformations are one of the fundamental space-time events of the Universe.

Logarithmic spirals in nature classified by pentalogic function.
In several natural phenomena one may find curves that are close to being logarithmic spirals. Here follows some examples and reasons in terms of ΔSTœ events:

Å(e): Feeding: The approach of a hawk to its prey.

Their sharpest view is at an angle to their direction of flight; this angle is the same as the spiral's pitch.
<u>Å(i): The approach of an insect to a light source.</u>

They are used to having the light source at a constant angle to their flight path. Usually the sun (or moon for nocturnal species) is the only light source and flying that way will result in a practically straight line.
<u>Å (i):</u> The nerves of the cornea:

(this is, corneal nerves of the sub epithelial layer terminate near superficial epithelial layer of the cornea in a logarithmic spiral pattern).

<u>Å (æ):</u> The bands of tropical cyclones, such as hurricanes.
<u>Å (e: growth and reproduction):</u> Many biological structures including the shells of mollusks.

In these cases, the reason may be construction from expanding similar shapes, as shown for polygonal figures in the accompanying graphic.

Ideal Spirals as representation of worldcycles.
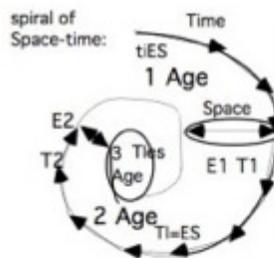
In the bend graph of space-time, we can describe an organism, as a spiral form. The space=energy of the spiral is given by the transversal volume. Its time or cyclical age is given by the length of the cycle. Imagine the most well known of such organisms: a galactic spiral. The energy of the galaxy is the plane of stars. This spiral graph will be a graph of such energy, as the stars go through its 3 ages of evolution. This age of course is given by the length of the time-cycle. The star will start evolution in the external section of the spiral. As it enters towards the center it will grow in information, in form and diminish in space, in size and energy. The graph shows the process for the entire spiral, though there will be different stars, since the graphic is quantic, with different degrees of evolution. As the stars fall into the organic vortex, they reach form and finally enter the third age, contracted by the black hole into minimal volume...

So the time line shows the age of the population of 'cellular individuals', while the width shows the energy content of the organism. As in the other graph [lineal graph] we show the population across time. So there are 3 ages put together in the relative present of the graph. This is in fact what happens in organisms, which have energy cell, and information cells together. What proves of course, that in the cuantic Universe there are no single directions of time, but multiple forms with different degrees of cuantic energy and cuantic information.

As we enter the graph information increases [time line is longer] and energy decreases [width diminishes]. Yet there is a relative balance between both, since: E1>E2; T1<T2, pero E1 x T1 ≈ E2 x T2. That is: the loss of energy is compensated by an increase of information. So happens to an old man which has more memory, more information but less energy. We might say both components are in a relative balance together

Our planet-star lives in fact as a fractal point of a spiral, which acts as our Island-Universe in the longest of our worldcycles – that of the planet we exist within. Our own galaxy, the Milky Way, has several spiral arms, each of which is roughly a logarithmic spiral with pitch of about 12 degrees. So the stars go through the spiral in its space-time world cycle of existence – from a 30 years old graph (: hence primitive digital form, profound human thought):

How long is the life of a Δ-1 points, which has 'fallen' inside any of the attractive vortices of a spiral organism?

Mathematically it means that starting at an external point π, of entrance in the spiral, and moving inward along the spiral, one can circle the origin an unbounded number of times without reaching it; yet, the total distance covered on this path is finite; that is, the limit as θ goes toward ∞ is finite. The total distance covered is r cos φ, where r is the straight-line distance from Pi to the origin.

So as it turns out, the number of cycles a being can turn about the spiral (frequency cycles) is infinite if time space were continuous, thinner and thinner but the real length of the life-motion or world cycle of the spiral (length to the center) IS finite, and moreover it diminishes in objective time, as the last phase is shorter and faster in frequency a deep fact about the duality of objective and subjective measure of time existence.

Since an old man has a shorter life, falling fast in decay in its last 'life cycles', which if we add the inverse 'balance' of its inner subjective time which is slower than the objective faster decay, makes the 3rd life even shorter in subjective time, as a kid has much faster mental cycles, so his days are longer in experience. That is, at 50 in total real time actions we are much older; almost all our life 'bits' of action-information have concluded.

The scalar duality of the larger spiral organism and the smaller part shows also the scales of time: the short 'frequency moments', bits and bites of space-time actions which are Dominant in information, as the motion is inwards and will add to the whole world cycle of a being, causing its 3rd informative age.

If we postulate a further generalization of the spiral as the ideal worldcycle for a whole range or phyla of species, it shows that all beings will live and die a finite, similar quantity of time-actions, making all lives absolutely relative. So 3rd age points within log-spirals shrink in size, increase frequency and shorten its lifespan, completing its 3 ages: S<T+S=T+S>T.

Spirals as entropic killing machines.

Each inward closed path ads a bit of informative frequency every time the being repeats their cycle, aging it.

How spirals end the existence of one fractal space-time T.Œ? As all worldcycles with a reversal of timespace.

The life cycle is slow moving to the center: T>S, an action of information that implies to reduce the dimensions of reproductive space-width for those of cyclical motion, till the relative Δ-1 fractal point looses all its energy and becomes, if the center of the spiral is an eye, a bit of information, if a mouth, a bite of energy, dying.

All time cycles tend inwards in a 3rd age of warping and in-form-ation till the flow of motion 'stops' in the still singularity, ejected perpendicularly in an explosion of death-entropy. It is the last time quanta of the clock when motion becomes a 5th dimensional still image before dying into a lineal 4D entropic flow.

So in its death age, the reversal of time happens, as in magnetic fields coming out of masses, dark energy fields coming out of galactic black wholes, when the log spiral uncoils first into Archimedean spiral as we ad a 3rd dimension of height information, that converts its shrinking revolution into an elongated receding motion, for an entity living within its revolution that becomes devolution, as the world cycle keeps accelerating but now acceleration is perceived as an ascension and elongation in height that erases its in-form-ation.

Spirals as informative eyes.

Humans express all those bio-topo-logic functions of the spiral with a highly efficient synoptic algebraic mirror image of 2 numbers for the key lineal & cyclical, parameters that construct the spiral: |xO=Ø.

Its simplest=most real form is in polar coordinates, which means spiral are temporal self-centered systems, in which the simplest 'perception' is that of the central point of view, making truth a self-evident GST theorem: the simplest mathematical formulation of a space-time event/system, in one of the 3 relative canonical coordinates, St (polar, spherical informative-head/particle), ST-Cartesian(hyperbolic, iterative-wave/body) and Ts-Cylindrical (lineal field/limb), defines the main organic function of the system, as S-Form=T-function.

So if an spiral equation is simpler in polar coordinates it is an informative space-time, form/function,

DYNAMIC SPIRALS AS PERFECT SPACE-TIME SUPŒRGANISMS OF 3 STATES.

The logarithmic curve can be written as: $r = a \times e^{b\theta}$

And then depending on the value of b it will *transform either into a circle, or a line. The* derivative of r (θ) is proportional to the parameter b, which controls how "tightly" and in which direction the spiral spirals.

In the extreme case that b=0 (φ=π/2) the spiral becomes a circle of radius a. Conversely, in the limit that b approaches infinity the spiral tends toward a straight half-line

So a spiral can be considered an informative 'state' of a full organism, which can convert itself into the other two states as a present wave and uncoil as a lineal motion. Again this is a canonical law of vital, i-logic geometry: a system can be converted between the 3 functions/form as systems are 'modular' and its functions

are constantly changing between the actions better performed by limbs (entropic function), bodies (reproductive functions) and particle-heads (logic, informative functions).

Such transformations are the staple food of existence and development, being the spiral and the tree, then 2 fundamental ST combinations of S & T elements - but the spiral is the commonest dynamic form that allow change of states with ease; while the tree is the commonest 'fixed' still simultaneous system of O-| elements:

The line [of spatial energy]_____and the cycle [of temporal information].

They are indeed the two basic forms, the two basic species of the Universe. How could we put them together? Easy, one after another:

Two basic ties of space-time: a Horizontal and a vertical tie. Both are composed of a line of energy, and a cycle of temporal in-form-ation.
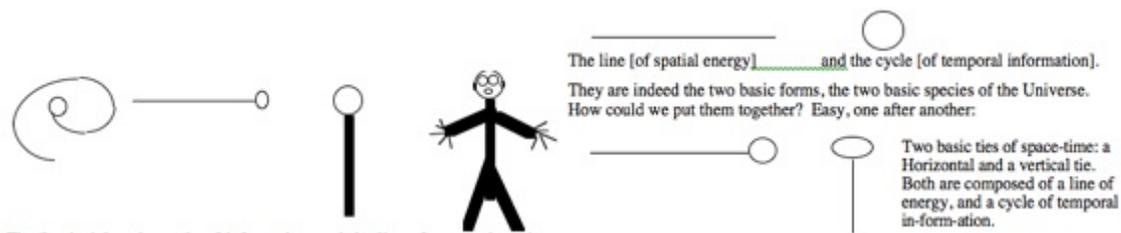
IN THE GRAPH, all spirals are 'potential fields' or sinks and sources (+ inward life vs. - outward entropic death duality); which explain the organic, functional and mathematical description of spirals as bio-topo-logic beings.

So the vital spiral *is* in its vital mathematical description the most efficient organic form=function: A galaxy coiling its flat irregular young form a worm coiling to sleep in its 1/3rd still informative SS-inwards state (completed with its feeding, entropic state, and wave-like motion) are in spiral states; which is ultimately an extremal case of the upper and lower limit of pi that leaves always an opening, dynamic mouth to the spiral allowing its simpler beat of existence, closing inwards (T-State) and outwards (S-tate), never ending the perfect pi cycle.

So most vital living spirals can uncoil to become lineal forms, or can close to become spherical circles, managed by its central head (1D: informative state) that becomes its future ilogic forwards head (2D/5D: locomotion and feeding-hunting). So the spiral can be considered an Ø-intermediate present system, perceived from the perspective of its dominant central point of view in polar coordinates (r, θ).

RECAP. Varieties of time spirals in pentalogic dimotion.

Spirals represent the 2 complex dimotions of time-space in a classic S=T female, S<T>S male symmetry:

S=T: Reproductive, communicative Spirals are Archimedean or Fermat's based in the Fibonacci's golden ratio constant in which several branches of the spiral allocate with maximal efficiency the reproduction of new 'infinitesimal parts' of the whole.

S<T>S: Entropic + Perceptive spirals, (as those of time vortices, charges and masses) where a flow of Δ-1 points falls into the perceptive or digestive central point, allowing both a potential and vortex description of them.

Based in those rules that vitalize the mathematics of Spirals as essential elements of a fractal point in its dimotions of perception feeding and reproduction, we can interpret better the maths of spirals in vital terms and define multiple organic beings as entities, which in its coiled position become organic spirals, often when resting – processing its internal systems of energy and information.

2nd AGE OF GREEK GEOMETRY: TRI-ANGLES.

MENTAL SPACES MEASURE ANGLES=SPACE SIZES AND DISTANCES=TIME MOTIONS.

What we need to know of a being from an outer world? Obviously its relative size, given by the height dimenson measured by an angle, and its distance in time0space measured by length and motion-speed. Both are the concerns of the simplest first mind spaces deviced by geometry, those of a trigonometric space.

Every language-mirror of the Universe starts slowly rising its complexity and focus on reality as it imitates the intrinsic laws of spacetime reality, even those as mathematics, which describe in a closer form its spatial points, scalar numbers and temporal operands. So did geometry in Greece. As such languages will follow similar patterns of growth and evolution to those of full fractal points=T.œs starting by the establishing sequential paths of Dimotions, which always mean first the fractal point's emergence in a larger world where it will open its 'eyes' and measure. What it measures to make it useful for existence is thus the minimum the language provides on information.

In the case of geometry is what all spaces will have in common for the point to 'see' its surrounding worlds and distinguish form (angular momentum, cyclical shapes, membranes) and motion=distance, lineal momentum.

| & O even in its most simplified way, which is to measure angles of congruence and distances of predators and preys. Or else the language won't be efficient, its speaker will die and the system will not repeat the languages' form. So parameters in languages have a vital ¡logic meaning, for minds to acquire knowledge in its logic mirror about the surroundings of its world and be able to move and assess the distance and size of things. *Even in music, its simplest duality, treble and bass bring e-motions of uneasiness and relaxation as they connect with the Doppler effect: a predator wave coming closer blue shifts into treble and going away into bass waves. Thus giving a first information, with no angle, on a lineal path motion. Trigonometry added then to distance (S=T duality of motion), angle.*

So the first parameters of 'humind' geometry were trigonometry and distance which under the s=t paradox can also measure a point in motion over a background scale of space.

Angle is also the first fractal unit of measure, which can travel through scales without deformations - hence *a* dimensionless parameter *as fractal scales are relative in its dimensions, 'erasing' them internally as they emerge as an Euclidean point into a new scale*. So angle and distance gave us ΔSt information and allows a trigonometric mind to survive. Angle thus allow us to define mathematically a dimension as follows:

Suppose there is a mathematical (geometrical) quantity *A*, which depends on the scale, *l*. If after a scale transformation: $l \rightarrow \lambda l$, the quantity would transforms as:

$A \rightarrow \lambda^n A$. Then the quantity *A* has dimension *n*. According to this definition, the angle has dimension 0; because it is the fundamental parameter that carries through scales without change.

1D: sine<cosine. Angles of perception

So the angle is the first operand on a surface of space, to provide information to the self-centered system. And its importance was such that the tri-angle was not called, the triside or triline (the objective topologic view) but the mental spatial view, showing *once more that the ego-paradox is always the beginning o any science. That is, the tri-angle was first considered a mental subjective space form, before it became an outer objective surface.*

And it bears witness to our Nature as light space-time organisms, evolved from the minimal species of Euclidean Light space-time, the Planckton, that when we finally discovered 'ịts' form, in quantum physics, ħ, turned out to be exactly that: an angular momentum, quantized in two gender species, the female boson and the S<T>S fermion.

The **pentalogic dimotional functions** that entangle its trigonometric 'functions' into reality:

@: its dominant use and first reason it became the first developed field of mathematics is its capacity to measure from a point of view distances according to ratios and parallax, which is the origin of tridimensional perception (bilateral eyes), and Fertile Crescent mathematics.

How this work in its simplest form, needs to understand how a 'spherical, ideal mind-membrain of 3 π diameters, and 0.14 D apertures, allows a mind to perceive through them, 'rays' to distant objects. The mind thus can always measure the angle covered by a distant object, and with a minimal displacement, a new angle.

3rd-century astronomers first noted that the lengths of the sides of a right-angle triangle and the angles between those sides have fixed relationships: that is, if at least the length of one side and the value of one angle is known, then all other angles and lengths can be determined algorithmically. These calculations soon came to be defined as the trigonometric functions.

All of the trigonometric functions of an angle θ can be constructed geometrically in terms of a unit circle centered at O.

1D: So trigonometric functions were the first to appear, as 1D perception is also the first 'action' of an emergent point where sines and cosines' operands extract for the self-centered point, 1D perception of its 'angles' and 'S=distances=T-motions'.

The graph shows the trigonometric functions and the information extracted by them; and as usual in geometry we apply them the Dilogic symmetry of 'internal subjective space' and 'external objective space'; as they can be applied from the fractal point to the outer world or from the outer world to the fractal point, whereas in pentalogic:

- 1D: S: Sine is best to assess the 'informative height of the system'.

-2D: T: Cosine is best to assess the length-motion of the system.

-3D: Tangent is best to asses the energy, S=T of the system.

- 4D: Angle is best to define the scalar proportionality of the system.

- 5D: Its inverse functions have an entropic role in the calculus of all those properties.

So trigonometric functions already extract from a T.œ information of its 5 Dimotions.

Trigonometry thus deals with the laws of perception of the circle and the triangle. And as usual since *reality builds up from the simplest lineal essence* to evolve latter its '3rd age cyclical form' |>O, the first laws discovered were the laws of |-Δ triangles, whose S=T transition into a sphere when it adds a dimension of ð-cyclic time, is its rotation. Whereas the 'area difference between a regular polygon-triangle' and its sphere, *is the first s=t transformed value, which turns out to be* huge, between ∞ and +2,4, while its perimeter its 1,6 times larger, making them clearly the 2 extremal TT & SS topologic forms of motion, the arrow triangle, and form, the rotating circle; facts those resolved with the Law of sines that calculate first for any triangle its 'apertures of perception'**:**

If *A, B, C* are angles of a triangle and *a, b* and *c* are lengths of opposite sides the respective angles the **law of sines** for an arbitrary triangle states:
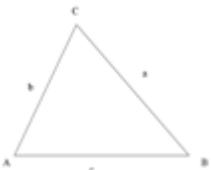
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R = \frac{abc}{2\Delta}, \text{Area} = \Delta = \sqrt{s(s-a)(s-b)(s-c)} = \frac{abc}{4R}$$

where Δ is the area of the triangle and *R* is the radius of the circumscribed circle of the triangle. In terms of perception thus, each of the 3 'apertures' of the 3D¡ sphere and its sine view of the external world is
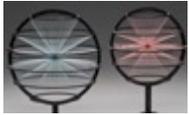
equivalent, ensuring a non-distorted perception of distances to the outer world. It establishes the same law of equal perception of those 3 'membrain' points of its internal 'vital energy'.

The angle is thus the first form of existence. The first 1D perception that illuminates reality by bending hyperbolically a larger world into a central singularity, in fixed quantum forms, which will become for the 1st particles ¡ts h, a radian of angular momentum perceiving a larger world tunneled into the singularity of its Δ-1 scale. *Creation starts with the angular reduction of reality to a still form in a quantum angle. As such the angle becomes with its radian h value, the first* T.œ, *the triangle, which then as it turns around gathering in 6 groups forms an hexagon, with a wobbling radian arc that tessellates the plane from circular to hexagonal* STœps.

Vital mathematics becomes then reality. Such vital circle has 6 apertures - those of its triangles - each of the radian arcs that make in circle 6 steps for a pi=3, closed in hexagonal form, opened in circular one. Imperfect forms thus appear from the original perfection of the language imprinted in the regularities of the medium.

So the hexagonal circle game of Stœps becomes the essential structure of 2 Dimensional space, with those 120 hexagonal angles repeated ad nauseam in Nature. It is the game that will grow in polytopes to reach through combinations of 5, 6, 120, the final 120 dodecaplex and 600 tetraplex maximal figures of 4Dimensional geometries (as pentagonal polytopes make no sense, being the 5th dimotion entropy the destruction of the regular in-form-ation shared by them all).

Angles of perception become then the first simple geometric element of reality as 1Dimotions appear on every still point that gains an angle and starts the creation of the galaxy in its smallest T.œ, Planckton

The laws of those 'angles of perception' would also be the first to be assessed when a new emergent light spacetime mind, that of the Greeks appeared. As each emergent scale repeats the game of exist¡ence.

Angles of perception in different vital and abstract geometries.
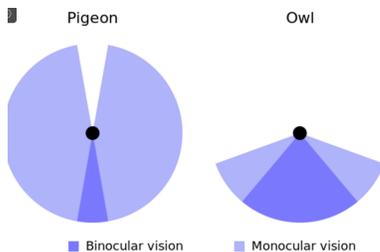
Angles of perception define the capacity of a point of view to measure and obtain information from the external Universe, such as the closest angle, the less perceptive (5D) a system is, and the more dark space will have. And so they play also a vital role.

They also vary according to the *topology of the world we live in. So they are:*

Minimal in hyperbolic plane, as hyperbolas are the entropic curve; so they minimize the inverse arrow of information.

Maximal in elliptic, spherical geometries whose angles are greater than 180, as *spherical beings are informative.*

Medium in the flat plane with angles at 180.

The vital axioms of geometry. Reproductive motions. Discontinuity postulates. Attraction.

So a series of laws of angles of perception will become the first set of consistent laws of creation of mental spaces defined by huminds. We are here concerned as always with the translation and correction of this system of axioms of abstract spaces, for a single plane time-space to the much vaster, paradoxical real world of vital ilogic topology.

What is the main difference between Euclidean geometry and fractal non-AE when considering those axioms?

- First we notice as we did with the earlier version of Euclidean geometry, that the axioms are grouped also in 5 elements, since even when simplifying mirrors, the humind must refer to the 5 Dimotions of reality.

- Then we observe that the differences between E-postulates and axioms vs. ¬Æ will arise as always of the 'simplification' of multiple scales into a single 'continuum', and the 'straightening' of relative angles that 'change' its form into a hyperbolic curve as we 'diminish' size in the fifth dimension.

We thus first updated the elements of Euclidean geometry - its definitions of points now fractal; lines, now waves, congruence (now relative equality) and planes (now topological networks). As what today passes as the foundational axioms/postulates of geometry are only correct, for the limited view of a single spacetime continuum. So they are approximations which strip points=T.ŒS of fractal & vital properties, and simplify its vital imperfections.

This process carried by steps from Lobachevski's a pangeometry to the absolute geometry of Bachmann (1970s) closed the evolution of the discipline. And it was found that only the most general features, angles and distances are needed to define a geometry. specifically we could reject as Bachmann did the postulate of 'continuity', and Dedekind's concept that real numbers ARE numbers NOT ratios, because they LIE on the real line, as a necessary feature of a real geometry, since indeed in the absolute pangeometry of the fifth dimension, any plane of reality is discontinuous, and the numbers fit in the real line to fill the discontinuities of simpler number families are NOT in the same plane. Still what we can take of the Axiomatic method either in its Euclidean version or modern 'Foundations of Geometry' (Hilbert) is the classification of the foundations of geometry in 5 subgroups of axioms that roughly coincide with the 5 elements of reality and now we shall comment on to realize the difference between a single plane continuous geometry and the real geometry of 5D discontinuous planes and angles that become hyperbolic as we sink into the minds Δ-1 singularity.

Those are themes thus concerned with the 3ʳᵈ age of Greek Geometry and its eclectic attempts to found the discipline as a Universe in itself detached from the earlier Pythagorean and Archimedean practical ages.

3ᴿᴰ AGE OF GREEK GEOMETRY

Archimedes vs. Euclid Experiments vs. axiomatic error

Tthe wrong egofcy side of Greek Geometry, its its '3ʳᵈ eclectic old age' as Euclid, committed the same error than modern mathematics in his 3ʳᵈ informative age, when set theory and the axiomatic method abandoned experimental proof and tried to 'construct' from the top without proof to the bottom unconnected of reality.

So math failed from then on to understand itself as an experimental mirror of scalar space, becoming with Euclid's axiomatic method a self-contained truth, which it is *because fractal mirrors are 'entangled' in form to its original image – the Universe.* Yet as mirrors are kaleidoscopic, inflationary as Lobachevski and Gödel proved for mathematicians but physicists so far have failed to recognize, only experience validates what image is real. Schopenhauer, the best of the philosophers, noted already the fallacy of the axiomatic truths, which rely *on too many self-evident lies, points and lines with no breath, putting his warning on the axiom of congruence, which in fact is the most expanded by 5D rules.*

But once axiomatic methods with single Aristotelian languages became definition of truth, this error will continue to become the fundamental ego-trip and failure of many human sciences accustomed today to accept a priori postulates that set the 'entropic' limits of truth and scope of the postulate, introducing bias from its inceptions – from Economics that rejects the analysis of the evolution of machines with do in organic economics and accepts as a self-imposed postulate the goal of GDP growth in a limited planet to c-speed limits in the astrophysical realm beyond the galaxy, to the entropy arrow only of big-bang theories.

The many false assumptions of classic Euclidean and axiomatic geometry.

Let us 'continue' then the critical analysis of the Axiomatic method. Generally speaking, the axioms can be chosen in various ways, taking various concepts as starting points. Here we shall give an account of the axioms

of geometry in a plane which is based on the concepts of point, straight line, motion, and such concepts as: The point X lies on the line a; the point B lies between the points A and C; a motion carries the point X into the point Y. (In our case other concepts can be defined in terms of these; for example, a segment is defined as the set of all points that lie between two given ones.)

The axioms fall then into five groups, oh yes, the familiar number! As we can relate them to the 5 elements of ¬Δ@st of spacetime but its postulates to be *considered truth only in the limit of still bidimensional geometry in the plane, and so we shall adapt them with comments (no need to create in this introductory courses a true formal pentalogic system of axioms and postulates of its own to fully develop non-AE philosophy of stience and its stientific method and epistemology. (: LOL, this was done 30 years ago, and I used to write only with ilogic symbology, so far out from what huminds do, that I only got interested a conceptual art who used those equations for a exhibit at six-flags, a Brooklyn museum :)*

And obviously we are not using the formalism of sets and modern maths to explain those corrections.

We repeat this is an introductory course and we just want the reader to understand that present maths is an abstraction of a much more beautiful experimental language of scalar=numerical points of space-time.

This said the 2 first groups, Axioms of incidence and order, and the concepts of angles and laid on, refer to the entropic limits and inner structure of a given mental space, so they should be grouped as ¬S postulates.

I. S: Axioms of incidence

Axioms of incidence are mainly related to the 2nd postulate of lines-waves of communication, its boundaries and angles of incidence=congruence (already discussed in the 4th non-E postulate). So it also considers also the relative size of T.œs and its lineal, open flows of communication compared to its worlds; of the minimal internal parts a T.œ needs to define its properties as an |- lineal or O-circular element and so on. They connect thus closely as boundary axioms with the concept of a topological boundary and the entropic limits both in space or time (if we take a line as a worldline of duration of a being). And the main differences between the classic axioms of E-geometry and i-logic geometry regard the multiplicity of meanings of i-logic geometry where distances and points are logic concepts of similarity, all systems do have 'boundaries'=limits as infinities are relative infinities ($\propto$) and so the interpretation of its modern axioms of incidence fully changes.

1.   One and only one straight line passes through any two points.

2.   On every straight line there are at least two points.

3.   There exist at least three points not lying on one straight line.

As we can see the axioms of incidence establish the *minimal elements required to transit from a single fractal point into a social group of points, a line. But as usual with the axiomatic method that tries to prove itself by 'reductionist' simplicity of its postulates it does NOT bring enough information to define without ambiguity a line. Because with only two points, the intermediate region can be curved, so no straight line exists. How can we know with only 2 points the curvature between them? We cannot. And if fact because we cannot, the errors of the 5th Non-E postulate that curves straight lines come from those imprecise definitions.*

So the first axiom of incidence defines NOT a straight line but the boundaries of a 'flow of communication between 2 geometric forms. It is thus a definition of 'any' 2nd non-e postulate line-wave of communication between two points.

And it also matches in the evolution of geometry into topology the more precise term of a 'boundary' for an open line of communication between two entangled points – the points are the beginning and the end of that flow.

This is then the meaning of the first and second axioms of incidence, while the 3rd shows the outside world to be larger, than the flow of communication between two points.

The weakness of those postulates though has been already noticed by classic geometers. Indeed, it appeared somewhat strange to them that a straight line has only two points. Surely in our idea of a line there are even infinitely many points on it. No wonder that not even Euclid stated the axiom because it IS NOT proper, *showing that as more idealism and postulates of truth try to prove by simplification 'absolute geometry', they just add half truths and new distortions.*

2 points do NOT define a line, but any open trajectory, also an arch, a zig zag but NOT a circle.

So *the incidence postulates are important not because they define a line but a larger more important concept – an open flow of feed-back communication between two equal points, unlike a circle which is a hierarchical closed communication between two points, one of which 'turns around the immobile one'.*

So *two points define an open democratic • = • flow of communication, while two points in a circle define a closed hierarchical communication.*

So the definition of an open 'wave' of fractal points blows up the concept of 'straightness'. This is ok as long as we know that what matters of a straight line is not that it can be drawn lineally on a plane with an abstract rule, but something else – to be open in a 'topological way', that is, we can deform it as a geodesic on a surface, a chord of a circle, or whatever, as long as it is open and the two points are its boundaries.

Thus the *key feature of the line is to be open not to be straight, as the line curves in a hyperbolic angle entering an Δ-1 fractal point reason why* modern physics use curved lines to 'crowd' the entrance of a fractal point of the Δ-1 gravitational scale, instead of blowing those points as fractal points through which ∝ straight lines *can cross.*

Once this is clarified we find 3 canonical varieties of open lines: a straight line that needs 3 points to define its straightness and type of information communicated through a flow of middle points, which will form a wave as even the smallest boson has volume. A true straight line then happens merely with the entanglement of two fermions with a gravitational non-local quantum potential line that merely gives information on distance and likely angle (a neutrino or string of the Planck scale, maybe being both similar as neutrino 'angle of scattering' is on that range).

It implies then that even the simplest line requires a 3rd bit of information about the type of flow of information and shape of the transversal wave between both points happen since now 1+1=3. As a flow of 'smaller points' transit both poles to become the motion that carries information between the limiting points of the line.

Finally the 3rd axiom of relative angle of incidence is concerned not with the inner limits but with the outer extension of the world in which 2 points communicate: *there are at least 3 points lying outside a line* means that there is a larger Universe outside a worldline. Since we can trace a plane outside of it, which might or might not be parallel, or intersect the line, as 3 points not lying in a straight line defined a plane. So outside a line there is a larger world with a new dimension – a topologic plane, an organism to which the line might belong if intersection happens.

But 3 points DO NOT necessarily define a plane. Again such definition constructs a plane by *self-reproduction and this must be stated, as we did with 2 points that construct a line by self-reproduction of a flow of communication. It is then when the axiomatic method makes sense. And so another way to reinterpret those axioms and give credit to them is to write them in vital reproductive terms:*

'Only two points are needed to start the reproduction and transmission of information between them', etc.

Further on 3 points no lying on a straight line as always in Duality can be expanded in its solutions considering the different 'ternary principles of creation'. So as we said that 2 points can define either an open 'line' or a

'closed circle', when one of the points has motion respect to the other, forming an St system, as opposed to an S-S line, 3 points can define a closed triangle, or an open angle of perception, which in i-logic geometry is different.

And then we can also apply the fractal method of differentiation, if we consider that one of those points is in a different 'Δ-scale'. Then the triangle with have a scalar 5th dimensional added parameter that will provoke the lines to curve into a hyperbolic angle to reach the inner depth of its Δ-1 mind-points, which does NOT lie in the same plane) a ternary system.

Therefore the need clearly arises *in i-logic geometry,* for *pentalogic 3±¡ ¬Δ@ST diversification of the simplex single line or plane of continuous geometry,* stating accurately and exhaustively every distinct version simplified by E-geometric postulates that reduces all open vs. closed geometric objects to straight lines and flat planes.

So instead of making definitions simpler but less clear, which is paradoxically what Hilbert achieved we will make them more clear– even though this intro won't be exhaustive.

In the previous pentalogic considerations though we have already established the |-line of 2 points that needs a 3rd moving point of communication, the O-circle of two points that needs a 3rd dimotion for the submissive orbital point and the Δ-hyperbolic angle of 3 points one of them in Δ-1 scale. So we see *that duality the minimal S-T or SS or TT reality of the holographic Universe immediately reproduces trinity.*

And so we could also resume the <u>new axioms of incidence</u> *as:*

'2 points generate a third point to form a stable trinity structure of space-time that might be an open line of communication between two equal points still to each other, hence a '2 number', entangled by the 3rd moving flow back and forth between the, (|-duality) or a circle whereas one point is a S-till point and the other an orbital ð-point whose motion becomes its 3rd dimension (S-sT System), or a hyperbolic ø-angle whereas the Still point is in a lower plane of the fifth dimension, S¡-1<SS¡.'

This would be a more formal definition of the incidence axioms of i-logic geometry.

The same procedure of exhaustive ternary-pentalogic division of varieties of E-axioms applies to all the other concepts and axioms when i-logic geometry goes deeper into them… But we won't be so exhaustive. Just pass fast through them, observing how they are connected to one of the pentalogic elements of ¬Δ@st.

II. ¬: Axioms of order.

When we deal with hierarchical order and perpendicularity – 'lay on' concepts we are directly concerned with the congruence differences between torn systems which share a cut-point and those who are parallel and 'avoid' tearing and Darwinian perpendicularity b establishing a bump in a new dimension of height-information between two lines:

1.Of any three points on a straight line, just one lies between the other two.

2.If A, B are 2 points of a straight line, there is at least 1 point C on the line such that B lies between A and C.

3. A straight line divides the plane into 2 half planes (i.e., it splits all the points of the plane not lying on the line into two classes such that points of one class can be joined by segments without intersecting the line, and points of distinct classes cannot).

1st as we have already expanded the concept of a line as an open interval which does NOT return to the original point directly but through a back and forth motion, the axioms of order ONLY happen in a ceteris paribus analysis of one-dimensional Aristotelian A->B lines, and as such it should be scrapped all together as all communication is dialectic and so A->B->A is the minimal unit of a line, with 2 inverse directions, as seen in the Neutrino theory of light, where light is created by two entangled neutrinos moving back and forth, in inverse

directions. One single entangled flow allows the point A to measure distance to B and maybe trigonometric angle-height-size. But unless that information is reflected back, there will be a lost single event hat does NOT remain as a stable memory line.

The axiom of order only applies to A->B fleeting lines. *Yet as all lines are steps of a larger cyclical part; A->B always ends in A-B-A-B….,* and then the feed-back real stable lines cannot set a forward, backward, order, after a few feed-back entangled flows, neither to circles, where we cannot as we return to the point establish a relative order. Thus when C comes before D or after A in the circle? The order established in A-B lines thus is a different one as in the circle, one of hierarchy between the AB 'fermions' and the C flows between them which is of a lower Δ-1 quantum potential order, and that is the proper hierarchy. So happens in circles between O-point (center) and A (turning point), as circles are NOT drawn by a single line without center, which will not bend but have lineal inertia, but by the torque offered by the central dominant point. So the order is AC dominates ac… and O dominates A.

It is the constant repetition of those circular or feed back vibrating motions what create the illusion of a stable space line or circle, a present, *simultaneous space. Further on, what the circle does provide is not an order of points but a chirality, depending on the way we move around, which the line does NOT require in its feed back A<ab>B trinity.*

Motion thus becomes a new creative duality order in cyclical paths that have chirality.

And orientation also. It is not the same order if we move from A –>cbd, or from A->dbc.

And this is then again the true differentiation between open lines that are more 'equalitarian' and circles, which constantly bring new hierarchies. But as the Universe seeks for balance we shall see that parity & chirality allows gender mirror symmetry – it is in fact the first form of it; since the O-point will seek two 'spiral arms' with inverse chirality to achieve a balance with 2 different spin filled orbital points.

Thus as we move into the simplest geometric scales of vital geometry≈physics, we shall find that concepts as chirality, achirality, parity and the combinations of lineal and cyclical motions diversify the different species of reality and become essential to understand the symmetries and asymmetries of quantum physics, because IN FACT order does NOT exist in a categorical manner without a proper understanding on what becomes the most important type of Axiom, those of motion, which defined properly in Euclidean Geometry are Axioms of reproduction of form, by carrying a geometric form to other region of time-space. Yet before we study them, we must consider the second fundamental concept 'laid on' the Axioms of order, that of 'lay on' itself.

In the entangled Universe this key concept **lay on**, is related to the false axioms of continuity and to the duality of Darwinian vs. parallel social events. So we *apply the ternary, pentalogic method and differentiate at least 3 ways in which points lay on to each other cutting two forms or fusioning them.*
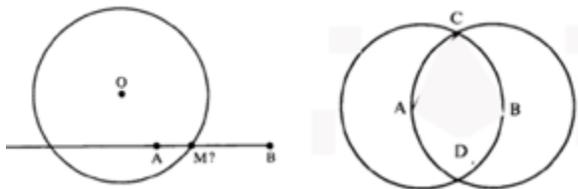
In the graphs on one side the circular and elementary continuity principles study when 2 systems are perpendicular, that is can cut each other and share a point, or are parallel, that is, only 'contact' each other by adjacency but do NOT cut each other.

As we stress the discontinuity of reality, we rename those principles adding the 'dis' prefix to its classic formulations:

ELEMENTARY Discontinuity PRINCIPLE: If one endpoint of a segment is inside a circle and the other outside, then the segment intersects the circle.

CIRCULAR Discontinuity PRINCIPLE. If a circle *y* has one point inside and one point outside another circle *y',* then the two circles intersect in two points:

In the graph, the continuity principles are in fact limiting concepts of boundaries and laws of perpendicularity, which define the discontinuities, closeness and connections between networks of points. What matters then to reality is NOT the obtuse concept of a 'block/Parmenides like, solid reality', with no gaps, at the core of the 'mind illusions' of Hilbert's categorical geometry, but when two systems of reality cut each other in Darwinian, perpendicular events (the segment breaking the circle, the circle breaking the segment), which will DEPEND on who 'owns' the point M?

T>S: It is M part of the circle O? If so O is feeding on A-M-B, the line. Or it is M belonging to the line?

S<T: The line is 'killing the circle, which is now open at M. Or it is M the M-outh of the circle? Then Amb is one of the multiple 'parallels' (as it does not properly intersect) feeding the circle and the O-perceptive point.

S=T: 2 Points: Or it is M – and this is the most special case, in 'BOTH', the line and the circle? Then M is an attractive point that cements the Union between both and a reproductive action is happening as now the point is actually two points at once, belonging to each of them.

Those are the variational ternary principle applied to 'laying on', the undefined concept of the Axiomatic method we upgrade to i-logic geometry as we did with other undefined Hilbert's concepts of points, which are fractal points, lines, which are waves, congruence, which is relative similarity, Non-E 5 Postulate, which is the definition of a mind, and ¬E Planes which are topologic organisms.

So the concept lay on, is the final element that completes the 4th postulate of congruence as it becomes either 'a reproductive superposition' or 'a Darwinian intersection' with 2 solutions, substituting Dedekind's continuity axiom:

"A point M of intersection between 2 relative paths, ð (closed figure) and \$ (open figure), either belongs to ð or \$ or to both figures. If it belongs only to ð or \$, either figure is the predatory, dominant element of the intersection, and the event will be a Darwinian space-time event, in which the submissive past prey tears, extinguishing its form, as a ð<\$ or past flow providing the energy for the reproduction S=T or evolution \$>ð of the dominant future flow. If the point belongs to both figures, the event is a present iterative event of symbiosis, and both systems can form a stable, social new whole, where the point doubles as two."

So we translate abstract axioms into the vital how of perpendicular Darwinian intersecting or connecting, uniting motions that define dual creative and destructive space-time actions for both systems, as a motion 'transforms' one form into another, or pegs them into a more complex creation

We are not here using formal language, though any mathematician or physicist can write it with the usual symbolism of classic logic, and notice a few facts that expand the concept of laying on and show its power to describe reality reason why is used to set the foundations of other key branches of mathematics (Boolean logic and set theory):

- 2 systems lay on can be either a Union or an Intersection, different concepts in advanced i-logic geometry:

A Union is a perpendicular, Darwinian event where the part of one entity no longer belongs to it, so the dynamic event destroys one part. Thus if as a rule we capitalize the dominant system of a dynamic space-time event of relative perpendicularity we can write: A U b = A, meaning that b looses its part which will belong to A, as when you eat a rabbit that no longer is a rabbit but becomes your amino acids.

On the other hand an Intersection will be defined as a true sharing of those common points, so neither dominates, A C B, means the C part is now the connection that cements the relationship between A and B, which somehow 'doubles' and by this sharing, in physics there is attraction between beings. And in biology, there is attraction between beings. Intersection thus, sharing, is both a creative element and a social element of love and attraction. We share a child in a couple and that puts the two elements in a constant dynamic

attractive relationship. Fermions share a boson and that cements an attraction between both. Predators share a prey intersecting their territories of hunting.

Further on sharing is more intense and symmetric when 2 systems are closed St elements, as in the figure of the circular continuity postulate, where we can clearly see there is an acbd region shared that pegs both systems together.

In the intersection of a line and cycle, the line seems at disadvantage, and in fact in most real events the line becomes absorbed and transformed as a pixel of information, coiled after it enters into the vital cyclical space that lays between the 0 point and the M-perimeter (which are not enclosed in the open ball ST region of cyclical motions that connect them). In advanced theory we shall see that in reality those lines tend to be prey of the circle, unless emitted by other system as an 'entropy ray', CROSSING the 0-point. In which case we talk of a killing line of entropy, which crosses the circle at M and O, and if we state that in that intersection O belongs to the Line, the equivalent vital proportion is that the line OM has KILLED the circle, targeting its zero-point. Indeed, If you cut the neck, if you shoot the head, if you conquer the capital, if you murder the financial people-caste or military-king in power, you disorder r=evolve, change and destroy a closed vital space-time being. All other lines that do NOT cross the 0-point tend to be lines broken, fed and processed by the circle, which becomes the sole 'owner' of the m point and the chord inside the circle, isolating the rest of the line, as closed cycles DO break in the Universe into fractal spaces.

If we talk of motion, we see the first region abcd as a region that 'doubles' its Δ-1 density of finitesimals, and will become the 'seminal first region', which will double then the whole system to create the B-centered new moving form. Motion by reproduction of form is thus closely related to the new concepts of continuity, which more properly should be called 'reproductive displacement'. The ACBD region becomes the seed for a 3rd child of A + B or the region of density growth that will become latter split by asexual reproduction (as in cells, which first duplicate a region in their central DNA zone), or it will become the region of the wave in which a gradient of an attractive field, with increasing density of Δ-1 finitesimals 'drags' the A-circle into reproductive motion.

One key question in the whys of physics is 'why', systems move in a relative field, its Δ-1 scale of the 5th dimension, towards the gradient region of maximal density of force – so we move towards the attractive vortex of maximal charge or mass. The answer is that the system which is attracted and shares the same active magnitude and Δ-1 field, will bind in that region on the side of the density gradient, Δ ($\eth$/\$), more finitesimals to 'double its form', more 'energy-space quanta' into which reproduce, and so we can see according to the ternary fractal principle of multifunctionality, motion as the feeding process of an entity, A in the graph that feeds on the field, on the gradient region of more density, falling inescapably by its greed of motion towards the region of maximal charge-mass. The field is controlled by the central charge mass which will finally eat up the smaller charge mass attracted by the bait of the field.

So we are giving here 2 key 'vital propositions' about the nature of motion, as a dual æ action (the larger model reduces all realities to the 5 vital a,e,I,o,u actions of space-time beings): The system both feeds and reproduces with the absorbed energy. And this can be done in 2 forms:

- The system feeds on the gradient of maximal density towards the stronger charge-mass, and in the process of feeding it reproduces its form into the adjacent region, either creating a son species if the action between both attracted points is symbiotic, parallel, so both use the field in equal conditions to input information and reproduce.

- Or the system feeds 'alone', reproduces its form in the adjacent region and slowly normally in circles to avoid its final demise, falls into the vortex of the stronger whole that owns the field, and truly is 'farming' the attracted particle, which finally will be digested by the stronger whole upon a perpendicular 'Union' – the star

enters the event horizon of the black hole, the feeding pig enters the stomach of the farmer once it is finally attracted to the slaughter house by the channel of food that makes the pigs willingly enter its dead event.

Now, this is what I am interested most: to show the vital geometry of the Universe. A mathematician would be likely more interested in the logic abstraction of those postulates, and a physicist in its capacity to explain the whys of key processes of physical systems. As a philosopher of science, my goal is to show you the organic, vital nature of even the most abstract of all sciences, mathematics.

Thus lay on was correctly undefined in the classic sense, as it was never resolved in its 3 varieties. Things do NOT lay on a plane of the 5th dimension, as then they will be above or below but not 'into', lay 'on', therefore is NOT a real event but a parallel event. A 'laid on' being is not into the being, it does not touch the being.

So for geometry what matters is NOT Continuity but topologic adjacency, with no boundary in the constant reproduction of the form, such as the membrane becomes the external wave form – the lack of separation in the process of motion=reproduction however is not equal to the classic concept of Continuity no longer needed to define a Pan-Geometry, as Bachmann proves.

So this brings us to the correction of continuity concepts in terms of scalar continuity where continuity only happens when we squeeze all the fractal sales of the Universe in a single flat line:

IV. Δ: Axiom of dis-continuity.

Continuity is not real I the Universe, and it is one of the great divergences between 5D and 4D – which compresses all the scales of reality to make them fit in a single plane, where then continuity exists. So the proper axioms of continuity as expressed by classic geometry, commented below hold now for the sum of all the planes and scales of the Universe, but as different families of numbers belong to different scales, any single line in a single plane will have 'holes' that the mid that perceives it discharges. The interest of the axioms of continuity is that putting all the planes together show that the scales of the Universe are infinite and through the sum of all those scales reality shows an horror vacuum, but any scale will have discontinuities required to differentiate its parts or else we could not 'define a point'. So the concept of a finitesimal point, studied in detail in algebra when we analyze derivatives and the concept of a limit come here in full form. We thus add a 0 postulate of Dis-continuity to frame the classic postulates of continuity.

0. Mental space is continuous, because all relative frames of reference cancel the dark spaces between points. However for points to exist as differentiated forms, they require discontinuities located into the finitesimal line in a lower plane of the fifth Dimension. Lines are thus strings of points, whose density increases as we diminish the plane of exist¡ence we observe, till reaching the maximal density of continuity in the irrational line. So we must distinguish the continuity of mental spaces for which the classic postulates of continuity hold, and the discontinuity of objective scalar 5D planes, where continuity is only achieved as the sum of the limit of ∝ planes.

1.   Let X_1, X_2, X_3, ⋯ be points situated on a straight line such that each succeeding one lies to the right of the preceding one, but that there is a point A lying to the right of them all.* Then there exists a point B that also lies to the right of all the points X_1, X_2, ⋯, but such that a point Xn is arbitrarily near to it (i.e., no matter what point C is taken to the left of B, there is a point Xn on the segment CB).

 A number system constructed from the reality of a discontinuous world IS preferable to the ideal continuous real number system fabricated with Dedekind's false axiom of Continuity. Instead 3 less strict principles suffice to explain the different virtual continuities perceived as motion of the 3 elements of any system (| x O ≈ Ø): lineal & circular continuity (predatory union) or ø (reproductive superposition), and the Archimedes and Aristotle classic axioms of relative space-time proportions.

 Dedekind's axiom is then a different concept – that of barriers, limits in a scale of numbers whose holes in the real line are similar to 'potential wells', quantum jumps that are difficult to cross. Irrational numbers become

then discontinuous gaps: π & √2 are the gaps and apertures that prevent the circle and the square triangle to be perfect. For example, it can be used to prove the existence of limiting parallel rays in hyperbolic geometry with far more simplicity than using the Aristotle axiom.

Of course, Dedekind's axiom is needed to obtain the categorical axiom system of the Hilbert. Yet precisely for that reason, because it is not truth and real, it merely shows that Hilbert's axiomatic method is false, it is an error of the mind that confuses its limited perception of the 'holes' and open wells of the Universe (those limiting ratios or real numbers) by the mind, with reality. It is like the case of a continuous movie perception. In fact the movie is stop and go, with holes but the mind puts them together into a continuity picture.

Continuity is a Maya of the senses that eliminates dark holes between perceptions of the brain.

In other words, the brain, the mind-world is continuous, reality the larger world is not. Dark spaces are easy to calculate for a p.o.v. with a relative 3 diameters to form its circular perimeter, which will leave 0.14… holes to observe. So the point does NOT observe, 96% of reality darkened by the perimeter of 3 diameters that closes its outer membrane. So it sees, 0.14/pi = 4% of reality, which is what we see in the Universe (96% being dark matter and dark energy). Yet our electronic eyes do not perceive a 96% of darkness. Darkness is eliminated to expand the enlightened 4% as if it were all the reality.

Expanding the 0 postulate, *objective continuity will require to see all the scales of* 5D planes and its hyperbolic reality, which would include the 96%. But then our view would be a hyperbolic geometry, as our eyes would be crossed by ∝ (a relative infinite0 number of parallels. Such geometry and angle would be convex, with us, as the knot of an expanding fractal network of branching angles that connect us to all the micro Δ-1 points, constantly growing its perception of the Lobachevski's hyperbolic branching, richer world that 5D metric proves.

Unlike classic geometry, a straight line is NEVER created only by 2 points. The classic definition of Euclid, naively accepted by those supposed Hilbertian r=evolutionaries: 'a straight line joins two points' does no longer holds. We obviously need 3 points to connect 2 points, one being shared, and only then we can see if the 2 points are joined in a 'curved' form, by an arch, or in a straight form, by tending an AM and MB intervals, and looking at the 'angle 'between Am and MB, which if it is a straight angle will define a straight line. This is obvious –2 points cannot define the straightness of a connection; that it surprises me it has been overlooked for so long, as it is also a key concept to properly define what kind of geometry we are into, and a good way to introduce the other 2 axioms that substitute continuity and relativity of size:

They are classic A^{2}xioms of Greek Geometry (Archimedes, Aristotle's axioms; in my Leonardian notebooks, written with shorthand incomprehensible Spanglish, i-logic weird symbols, which perhaps in the future some robot will try to decipher, he will find my abbreviation of those 4 Axioms of continuity and angular perception, written A^{2}c^{2}ioms, ab. A^{2}c^2 :)

They are concerned with the perception of size and its comparison from a given point of view. And again, as always in the dual/ternary Universe, as in the case of the lineal and circular continuity principle, we have one axiom dealing with lineal sizes and the other with circular/angular perception of sizes:
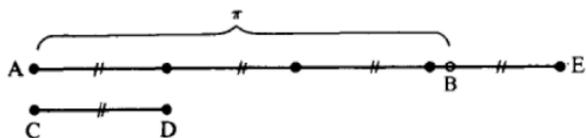
ARCHIMEDES' AXIOM. If CD is any segment, A any point, and *r* any ray with vertex A, then for every point B ≠A on there is a number *Δ* such that when CD is laid off *Δ* times on *r* starting at A, a point E is reached such that *Δ* x CD ≈ AE and either B = E or B is between A and E.

I.e., if AB were π units long and CD one unit length, we need 4 CD to get beyond B and enclose π inside our straight line. And this is what matters to 'enclose' or not a certain ratio within the larger envelope, to enclose

our dark number pi, so we know is within us (the whole cycle) even if the cycle is fluctuating around the non-defined π.

Moreover the axiom sets limits to infinitesimals, defining the finitesimal unit of measure AB on the lower side and the whole AE on the outer contour side.

Archimedes' axiom thus means that when Nature chooses a finitesimal CD as a unit of $ length, a quanta is established for a scale or plane of 5D to exist and every other segment

Will have finite length with respect to this quanta which becomes the 'relative definition' of a number.

And inversely if we have the perspective of the whole, we choose AB as unit of length. And then the axiom says that no other segment can be infinitesimally small with respect to this unit (the length of CD with respect to AB as unit is a at least 1/n unit). 1/n was indeed in Leibniz's Infinitorum the finitesimal unit.

Those 3 axioms suffice to prove as mathematicians know, all the theorems of geometry. Moreover, and this is the beauty of it, if we want to get rid of numbers and do a purely geometric analysis, this postulate, which connects numbers, points and lines, can actually be substituted by a mental postulate:

ARISTOTLE'S AXIOM. Given any side of an acute angle and any segment AB, there exists a point Y on the given side of the angle such that if X is the foot of the perpendicular from Y to the other side of the angle, XY > AB.
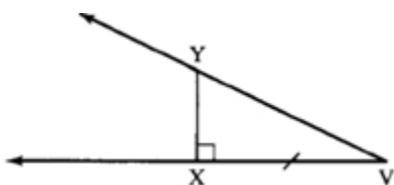
In the graph, XY grows faster than Vx or Vy as we come further away from V and the angle becomes hyperbolic, so we can always find an XY larger than vx, even if paradoxically V has the impression from his Point of View, that XY is becoming smaller. This relativity of world perception versus real Universe is at the core of many errors of the ego who believes to be infinite when in fact he and his relative distance to XY is really small. It often means that if XY is a 'future point in time' (death point, when we use geometry to study worldcycles) or a predator in distance, we will underestimate the danger of death, and XY will grow very fast and eat us up (-:)-: O-:

The smaller part, or fractal faster point becomes then a knot of a fractal of reproduced angles that keep enlarging reality till it can map out a much larger scale, which shrinks through those fractal triangular branching to focus and coalescence in the center of the fractal network, at Δ-1.

The duality space v. time stillness v. motion is a geometric formal view of 5D metric: S x ð = k.

As we become smaller, ðf, time accelerates. Inversely, to have a still, geometrical perception with no motion, we have to decelerate time cycles of smaller beings and expand its space size. So if the faster motion of cells and atoms slows down to our speed of existence, we would have to expand its space size to be as big as we are after that geometrical expansion and time reduction.

So we substitute the concept of 'single scale distance and continuity' - Dedekind's axiom - by Aristotle's postulate, which changes real continuity by relative, angular perception of distances, from the perspective of a points of view, with deep virtual-world-mind implications even if we prove the same theorem.

The postulate of Aristotle merely says that from a given angle of perception, the line that joins the limits of our perception and closes the open angle of vision is larger than any of the two sides of our angular perception.

In other terms, the 'perpendicular', not parallel, horizon or 'front of the wave' of perception expands much faster than the distance between us and the being we perceive in other scales, is proved in a single space-time scale by one of the key new postulates that.

The Universe expands faster in objective terms (the perpendicular, far away line of expansion of our horizon), than from the perspective of the perceiver of a certain geometry.

What all these new ways to define the parameters of continuity tell us, is that what matters to systems is the relationships between beings, and the relative perceptions beings have of the Universe deformed by its angular worlds of perception.

RECAP. It is important to differentiate geometric, continuous forms from numerical discontinuous series, as both represent two different 'elements of reality'. Continuity appears only when we include the concept of 'motion' (not defined by Euclid), and even so it is a mirage of the senses, because at quantum level it is a reproductive continuity. This is show in social growing natural numbers. Thus there is NOT an exact correspondence between points and numbers, as the failure to find pi, √2 and e, the key 'ratios' of the Universe, which can be 'drawn geometrically but have no direct exact solution arithmetically, proves. The number system can be properly used to construct geometry only when those are taken into account.
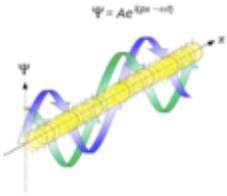
Continuity can be considered in the geometric world, only from the perspective of adjacency, and motion as reproduction of form, in adjacent places of a single plane of reality:

In the graph, taken from a physical wave, a particle reproduces its forms as it moves as a wave of adjacent particles one after another. This is the definition of motion, which solves Zeno's paradox. Proper motion does not really exist, but reproduction of information along a path, with limits for each world and geometry (in the Euclidean human space, with the limit of c-speed for transfer of energy-form). So continuity can be defined in a single plane with the postulate of adjacency.

In precise terms given the lack of true continuity in the 5D universe, the 4 postulates that substitute continuity as proved in the work of the key post-war geometers are restricted to a single plane of space-time, and truly define more than continuity processes, *the other key elements of i-logic geometry.*

III. T: <u>Axioms of motion as reproduction of form.</u>

(A motion is a transformation not of an individual figure, but of the whole plane.)

1.   A motion reproduces=carries straight lines into straight lines.

2.   Two motions carried out one after the other are equivalent to a certain single motion.

3.   Let A, A' and a, a' be two points and half lines going out from them, and α, α' half planes bounded by the lines a and a' produced; then there exists a unique motion that carries A into A', a into a' and α into α'. (speaking intuitively, A is carried in A' by a translation, then the half line a is carried by a rotation into a', and finally the half plane α either coincides with α' or else it has to be subjected to a "revolution" around a as axis.)

The axioms of motion *again reduce and simplify the differentiations happening in the vital Universe. So we must stress those basic principles that so clearly differentiate the exhaustive goal of i-logic geometry – to describe all vital events and species departing from the complex Δ¬@st properties of space-time vs. the simplifying synoptic nature of mathematical mirrors in the axiomatic method.*

So here we have to substitute the word carry by the word reproduce. A motion reproduces a form as it 'carries' straight lines to other place of space-time where the information is reproduced on the lower Δ-1 plane. So in ilogic geometry it DOES matter unlike in Euclidean geometry the path of the motion from A into A'. Though if we consider that pure motion has minimal memorial persistence of the reproduced forms, in the limit of TT-entropic motions it will not matter the path as the persistence of memory will not make them last. But ultimately geometry makes fleeting motions=communications between points to last. So such motions are in fact complex entangled motions whereas the 2 entangled points still to each other keep also reproducing over a lower plane as they displace together. It is then evident that the axioms of motion deliver the maximal simplification of that complex process observing the line in motion but still to each other end-points just in its initial and final picture.

How mathematics gives then depth to reconstruct from such simplifications the whole range of events happening takes place not in geometry but in Algebra with Groups that exhaust all possible diversifications of such ST-events.

The axioms of motion are in that regard, the basis of Group theory applied to modern physics - a great advance, for the classification of all possible variations of events and forms.

In detail the 1st axiom defines reproduction with an abstract word, carrying, used in physics, relativity theories, vector spaces etc. But its vital nature is rather intuitive in the 5D worldview.

The 3rd is more interesting, and complex because it is connected to the previous analysis of chirality parity etc., and will be of great importance to distinguish different species of physical systems, according on how $ (lineal motion) and a ð (rotary motion) are put together to return or NOT the point to the same initial state.

As it further establish the processes of creation by reproduction of new forms, using the only 'conserved motions' – rotary angular motions (O) and lineal boosts (|), in a single plane. But certain forms which are mirror symmetry cannot match only with rotations and boosts, but need a 3rd 'mirror symmetry' which implicitly states that any system Δ will be part of a larger dimensional Δ+1 system to achieve its completeness. And so besides lineal and angular motions, reality requires a mirror symmetry in a higher dimensionality, to achieve full reproduction of forms. And this altogether makes reality more complex, generates new creative gender forms and also establishes the non- commutative closed or non-commutative nature of a bidimensional system when completed in the higher scale, as two consecutive $ and ð-rotary or mirror symmetry actions differ, because both rotary and mirror symmetries are different according to which direction the action takes. So inverse dualities kick in to start complex differentiations.

However l-motions by definition become with time, closed actions and should return to its origin. So the question opened with deep consequences in the study of worldcycles and present stretches of the virtual existence of all of us, is how many 'motions are needed' to return to the same form, regardless of the differentiation in the intermediate paths – are 5 dimotions enough or shall we need a dodecalogic 12 steps method?

We leave open the question. Ultimately the labyrinths of present stœps of existence in which the path incurs are more important than the goal which will be a 0-sum that kills the path and the existence of the event-being.

Still the axioms offer 2 solutions: the point can be carried in an open path by pure motion, without memory and then the path doesn't matter, and the point continues as an isolated motion, free of 'responsibility' for its tail of reproduced elements. Such memoriless Markowian processes define then an |-open field or limb system.

Yet a reproductive motion with memory that leaves a track is a curvature with memory, a closed cyclical point which will 'crowd' its dimensionality at the point of reproduction.

And indeed, often when the point closes its circle it exhausts the motion of the being, which dies after reproduction (from octopus to arachnids). A closed path kills a system, crowding the zero point of reproduction.

But an open system also becomes exhausted as the intensity of the line fades away into entropy and noise. So after a finite number of stœps a thermodynamic open system even if it does not return to its original point, becomes exhausted.

All this bring us to the fundamental metaphysical question derived of all those axioms: It is the Universe closed or open, infinite but finite, un-bounded? It will return to a point? All the answers being truth as reality includes all its paradoxical dualities and trinities:

The universe is infinite in global timespace but finite in local time space T.œs. Which are, once we get rid of the ego paradox, infinite in its future repetitions, because the number of repetitions and variations is a smaller infinity than the number of fractal domains, 'broken by a cyclical enclosure (3rd axiom of order)'.

This duality of infinities between the types of beings and its repetitions will be in metaphysics the only correct use of Cantor's transinfinities to prove that ultimately we are all immortal because we are repeated likely every 10^{9-11} variations as the fact every 10^9 humans we find an undistinguishable repetition shows If you think this is too abstract think again. Because the Universe is infinite in its repetitions, finite in its variations an exact replica of yourself is now about to appear once you die in other region of space-time.

And so we move to metaphysics, in a Spinoza's sense: are those other 'yous' repeated, connected entangled to 'you', as identical quantum systems are? Are you part of a wave of reproduced 'carried' motions as a block of time? Are you going to live beyond death by transferring non locally to another you, born when you die? It is the dark space between the two informative forms of time that you are, a discontinuity bridge by the finitesimal mind that does not see that space. *There is transmigration of souls?* Alas you see, Hilbert would have never imagined that from his axioms of motions we could move into the Pythagorean theory of metempsychosis (: reincarnation… The end of i-logic geometry brings us the first questions of platonic mathematics. How many yous exist reflections of the ideal canon of the cave? But those are questions that belong more properly to the dodecalogic of worldcycles. And the pentalogic of entanglement. So we stop here. Neither as we done it already discuss, just enunciate the 2 versions of:

V. @: Axiom of parallelism (Euclid).

1.   Only one straight line can pass through a given point that does not intersect a given straight line.

These axioms, then are sufficient to construct Euclidean geometry in the plane. All the axioms of a school course of plane geometry can in fact be derived from them, though their derivation is very tedious.

The axioms of Lobachevski geometry differ only in the axiom of parallelism.

V'. Axiom of parallelism (Lobachevski).

1.   At least two straight lines pass through a point not lying on a given straight line that do not intersect the line.

Indeed, in ¬Æ we get rid of IV continuity (Dedekind's in simpler language) and Parallelism according to Euclid.

So once more we see that the basic axioms and postulates and laws of mathematics are mirror of ST-laws, albeit sometimes too simplified so huminds have lost track of what they were mirroring in first place. Which is what we shall show by departing from the Δ@st reality NOT from the mirror itself as the axiomatic simplifying method does. The conclusion though is obvious:

All the self-evident axioms and postulates of Euclid are relative truths.

Reason why they are superseded by the Non-Æ=i-logic postulates of geometry based in fractal points with breath   to better connect the experimental reality and ideal geometry. This has not been done as mathematician only corrected the fifth Euclidean postulate, by lack of a proper theory of reality to define concepts as dimension or distance=dissimilarity or the different types of congruence, or time or space, which we now have, coming from a higher language, the '¡logic laws of the fractal space and cyclical time of the Universe. So we can reinterpret many of the postulates and axioms of Greek geometry and correct them, as they are under the correspondence principle, just approximations to the scalar Universe observed in a single plane, without perception of the inner parts of the point. Let us then revise, the five Euclid's postulates:

1. It is possible to draw a straight line from any point to another point. .

2. It is possible to produce a finite straight line continuously in a straight line.

This means that all points of a present space can be connected in simultaneity because spacetime is continuous; but in reality is not. As there are 'irrational points' which are in a different 5D scale; closed membranes that break the continuum. So only points that belong to the inner vital space of an organism, connected through 'physiological networks' can be connected in the same present space.

While points from two scales are only connected when they belong to the same superorganism, and they are similar in form, despite being different in 'size' (5D scale). So we can connect points within one of the 3 topologies (membrane, vital energy, inner singularity), and we can connect smaller parts of a fractal network with its larger physiological form (cells through blood and nervous networks of the Δ+1 scale and so on).

And they will often a 'curved connection'... Moreover all straight lines become bent into a zero sum curve, as they will be part of a fractal superorganism. So infinity does NOT exist lineally but quite the opposite in cyclical self-repetitive patterns, as   all straight lines ultimately find a limit in the curved closed membrane of its superorganism.

3. It is possible to describe a circle with any center and radius… which might be the only true postulate, meaning that all straight lines will be part of *a closed time-space cycles of 3 ages, which are the 3 pi diagonals, closing a worldcycle, which has a finite zero sum volume and breaks infinity into inner and outer parts.*

4. All right angles are equal to one another. *This is not truth in different scales as the fifth dimension is a hyperbolic geometry whose relative curvature and degree of flatness depends on the relationship between the rod of measure/size of the observer and the size of the observable (in formal space this is the realization of the time acceleration=increase of curvature of smaller beings).*

5. The parallel postulate, already known to be false by classic science is related to the previous one and we have also proved its falsity.. So actually 4 or the 5 postulates are false in the real world. And only the postulate of creation of circles departing from lines, it is real in temporal terms, as all systems close its worldcycles, that is they die.

So are the definitions of a point with no breath, a line with no breath, as points are fractal points with hidden volume in a smaller scale of parts, lines are therefore waves - points cycling; planes are then not defined by lines but by networks and its flows', and so on. Those *self-evident definitions are all false.*

Finally, the Elements also include the following five "common notions"; 4 of them concerning equality, which are not 'false' but rather meaningless, as things are 'similar' only a thing is equal to itself, since we do not have the total information of beings, neither things which occupy different spaces - as they *are made of space and time* - are equal, just merely by changing position, the thing becomes other thing (themes those of extreme importance in quantum physics to differentiate bosons and fermions - systems that occupy the same space, and hence are equal, and things that do not occupy the same space :

-Things that are equal to the same thing are also equal to one another (formally the Euclidean property of equality, a consequence of the transitivity property of equality).

If equals are added to equals, then the wholes are equal (Addition property of equality).

If equals are subtracted from equals, then the remainders are equal (Subtraction property of equality).

Things that coincide with one another are equal to one another (Reflexive Property).

The whole is greater than the part. Finally, to thoroughly bust your balls/beliefs ... (: yes, you have guessed it): *the whole is not greater than the part, if anything they are equal...*

Or rather similar in existential momentum $ x ð, according to the metric of 5D: $ x ð = K. Which somehow is implicit in set theory and the paradox that tell us the set of all subsets is bigger... and even smaller if we *merely measure its quantity of information that grows inversely to size.* As this postulate is closely related to our 'understanding of the scales' of the Universe is worth to elaborate a bit more.

The whole is not greater than the part, neither smaller (:

The world we measure and call physical is a mental world. Consider instead the real scalar world of the infinitely divisible. There any whole is infinitely divisible, but so is any part of that whole. As a particular example, in mathematical analysis, any line segment is identical in every way to any smaller line segment that is a part of it. This suggests that the fifth common notion may, in the description of the world, be not the only true one.

We can extend notion 5: The whole is equal to the part' to the particular case that all parts of the whole are equal to each other, from where we deduce identical particles in physics, where all electrons, protons or photons are alike. Yet, we can go further if we merely 'measure' the information/time speed/energy density and affirm the opposite, that the whole is less than the part, as its 'time-motion/energy/mass is greater in more tightly concentrated forms. So *the black hole which is in to 5D metric, $ x ð = k, the smallest mass is actually the greatest/densest /heaviest.*

Mental spaces and its value as partial truths.

What can then we save from Euclidean geometry if everything about it seems wrong? (: Almost all of it; because rather than wrong is a simplified selective version of reality which work as long as the properties we select on that reality for practical purposes are 'external to the fractal point' not concerned with its internal parts, as in the previous case similar to engineering design where mass is what matters to us in the 'selected mental space' of forces. Or when motion is more important than form, as in physical equations. But absolute truth will require always considering that internal volume of fractal points; and hence its wave-like nature as in quantum physics.

Because only the whole Universe has all the information about itself any O-Mind x ∞ Universe will be valid as long as the infinitesimal information it extracts helps the species that holds such a mental space to measure reality and store information helpful for survival. In that sense, the most important element of bidimensional geometry is the understanding of angles, parallelism and perpendicularity, which is the first element developed in Greek geometry to be able to measure distances with trigonometry. This already is done by the eyes' mind-mappings of distances.

But we add to it the topological laws of the 4th Non-E Postulate of congruence, which *adds a vital meaning to trigonometry as* Parallelism is also *as its opposite concept of Riemannian distance, a measure of 'similarity'. So if in Riemann's dissertation distance of 'color space' is equal to dissimilarity in the 4th Non-E postulate parallelism implies similarity* which fosters social evolution vs. Perpendicularity that implies dissimilarity.

And *this becomes objective reality when observing ensembles of fractal points of any species* and its angles of connection of those points into geometric figures, in a still space view, or when one of the dimensions (S=T symmetry) is seen as motion, in the way herds move in parallel or predators intersect preys.

So we establish a new duality besides the S=T duality of form and motion, derived of the internal parts of all fractal points; that between the subjective mind and the objective external topological view of an event. In this case 'dissimilarity' is a condition of internal congruence between 2 fractal points bring external parallelism or perpendicularity.

And so a new rule of the entangled pentalogic Universe must be added to S=T, 'x=y->x≈y; x≠y->x X y x   y; that is, if two systems are congruent, similar in its parts in a still spatial comparison (x=y), they will move in parallel (x≈y); if two entities are different, x≠y, they will cross in perpendicular motions, x X y, or separate in its distance (x   y).

A key element of all spaces is 'the angle of perpendicularity', which acquires ¡ts meaning when we marry @nalytic geometry and the 4th non-E postulate of congruence based in Darwinian perpendicularity and social parallelism. It is the key for the understanding the mathematical physics of vector spaces, cross products, dot products, equipotential and lines of forces, which happen in different planes of 5D and affect different parts of an entangled, field/wave/particle supœrganism.

i.e: Particles are Darwinian over fields in which they prey and waves are parallel to the field in which they 'slide'.

Thus trigonometry of angles, was the fundamental first mental perception because it is how real systems measure distances, which is a function of similarity and hence of vital survival. Angular perception is also realized in the simplest physical systems, were the unit of information, h, the minimal space-time 'Planckton', has several position of quantized angular momentum, the only positions we can measure as information is always processed in 'still form' (missing its motion steps as we miss the motion of a film between frames), according to its angle, which determines its interaction with other particles…

Difference between equations and Geometric curves.

The characteristic features of algebra are the use of letters, which we perform operations according to definite laws. In elementary algebra the letters denote CONSTANTS, normally ordinary numbers, taken as populations in space, the variables, which are the final letters represent T.œ.s of a certain species, and the operand represent different 'dimensional motions', dimotions of time-space.

So we can reduce equations to a series of existential algebraic equations of the type:

$$\sum T.œ \text{ ST-perandi} \sum T.œ \text{ ST operandi} = \sum T.œ \text{ ST-perandi} \sum T.œ \text{ ST operandi}$$

Whereas the a…. p letters will be numerical parameters, the U, V, X, Y, Z letters Timespace T.Œs and operandi dimotional parameters.

As such there is a fundamental difference between an equation and a geometric curve in analytic geometry, despite its apparent similarity. An equation searches for a single solution as the XYZ letters represent 'spatial populations' and the parameters of 'time change' that convert the equation in a time event are the operands.

On the other hand in a curve the XYZ letters represent variables, whose simultaneous possible values, joined by a geometric non-E line form of simultaneous 'spatial membrane', so they are events of space, duly studied in our 'geometric first volume of 5D mathematics'.

This is a huge distinction that makes completely different the study of simultaneous curves in space, which act often as membrains of superorganisms; to the study of algebraic equations, which describe events in time, often of a sequential nature, gifted with motion.

We shall come often to those philosophical distinctions that mathematicians escape perhaps as they find them evidents or on the contrary as they do not have a Gst understanding of Generational space-time to find them interesting, but it determines some obvious facts that differentiate curves from the polynomial representation of them in equations and will reveal on our analysis of algebraic curves key concepts of S=T symmetries:

- Curves are far more reduced in number – 10 canonical curves in 2D and 18 in 3D suffice to define all of them. Since the number of 'spatial superorganisms' that survive in the Universe is far more reduced than the total flows of entropic time motions, from where we obtain them. As in turn, those canonical curves can be reduced to the forms extracted from a cone, which represents a worldcycle of timespace.
- So all curves and hence all 'topological membrains' and forms of the Universe can be reduced to the 3 topological varieties we find in the cone, which is in itself a 'circular membrain' tracing a worldcycle along the axis of the cone, as it diminishes its size, compressing its form, in the natural evolution of all T>S systems.

All those differences perfectly understood in the I classic Greek Age when equations were written statements using verbal thought, hence temporal verbs, as opposed to curves described in space, became somehow blurred with the work of Descartes that merged both in analytic geometry. Let us study them.

XI. 2ND AGE OF GEOMETRY: @NALYTIC & DIFFERENTIAL GEOMETRY

"Using a term like nonlinear science is like referring to the bulk of zoology as the study of non-elephant animals."
Ulam.

Youth is a lineal simple age of small steps that all worldcycles of existence keep bending, so in maturity we learn the eternal return cycle. In mirror languages also the second age curves the lineal steps of the first cycle. So after the lineal age of Greek Geometrty, curves entered the stage.

Yet to study them, two fundamental advances, frames of reference and calculus were needed.

@nalytic geometry studies the different planes of mathematics as mirror reflections of the different topologies and planes of existence of a super organism, self-centered into an @-mind. Analytic geometry was the first mathematical form that successfully merged the 5 Elements of reality: ¬Δ@st, and as such it signified the beginning of the mature second age of mathematics, after its first 'spatial' bidimensional Greek age of still geometry.

The duality of @nalytic geometry is thus obvious: *S-mental spaces self-centered in the 0-mind*

Δ-Scalar spaces developed in Sequential social numbers

T-ime spaces, allowed by the use of one coordinate to represent a symmetric dimensions of time

The flexibility of the concept of a plane of space-time to represent numbers and points thus allow to represent not only the S POINT ≈Δ NUMBER symmetry but also the S-T dual space-time, form=motion symmetries and it will have an immediate consequence on the development of science as it will canonize the concept of a lineal time and space, proper of mathematical physics ever since. So a key theme of @nalytic geometry is the a priori study of the distortions we introduce when setting functions and operands on an artificial world that we take as a 'background space-time'. Since we must be aware we make local assumptions NOT global ones, as when we use lineal time NOT all the times in physics to measure locomotion. Unfortunately this locality of frames of reference was lost and brought the error of absolute Newtonian time space.

Thus the mind in mathematics is reflected by its frames of reference; and so we apply pentalogic to classify the main uses of @nalitic geometry, designing the different perspectives of the parts of a being and its 5 Dimotions:

@: the frame of reference is the mind view, with a 0-1, finitesimal 'body-energy' and a 1- external spatial world whose equations are self=similar in its T=S symmetry. Indeed, we can consider the fundamental equation of analytic geometry:O x ∞ = Constant world, the equation of any mind, whose perception of the infinite whole in its biased frame of reference creates a relative world, or mind-mirror of the whole...

S-vital topology gives us a more objective use of those 3 different frames of reference and Δ-scalar symmetry represented in the Complex Plane to represent events taken place in a partial element of the supœrganism:

Because there are 3 topologies and then scales it should exist 3 types of planes and then one for scales. Intuitively they are the lineal-cylindrical, polar-spherical and Cartesian, hyperbolic that better represents the merging body-waves of the two others. And so that leaves the complex plane of 'squares and roots' as the natural one to cast functions through scales.

**Pentalogic analysis of spaces by merging the 4+entropic perspectives. Mental spaces.**

Pentalogic merges mental, temporal, organic, entropic and social spaces in the analysis of the laws of vital geometry. I.e. animal sight codes for motion over form and red over blue for survival purposes (the eye is a

natural born predator, which prefers red blood and prey motion as in gore movies), So we merge objective geometry - its 3 topologic organic varieties and subjective mental modeling of reality, which 'deforms' the Universe to match those topologies giving birth to the 3 classic frames of reference: $t-cylindrical, ST-Cartesian (the humind light view), ðf-polar geometry, *plus the complex 'square' plane to study the 4ᵗʰ and 5th scalar* dimotions. Each of those frames deform reality, creating 3±¡ type of geometric minds, according to each species choice of coordinates:

The 3±¡ different geometries and frames of reference as self-centered mental spaces describe different worlds. We introduce the new discipline of mental spaces, with the Humind light space-time.

Space understood as simultaneous perception of adjacent forms (relational space-time) *is the realm of the mind's logic, as the mind creates its stillness. Contrary to the belief of many physicists who think time does not exist, what does NOT exist is space outside the singularity of each mind, and hence there are ∞ spaces, one for each mind's world:*

The mind is the internal non-perceivable element, it requires the concept of an angle to establish its range of perception, which is not a number, and hence a 'different' element of mathematical representation of reality.
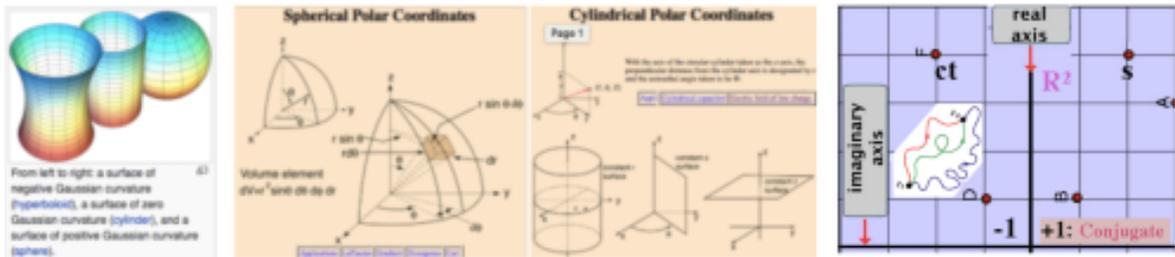
The O-polar, |-cylindrical and Ø-hyperbolic Cartesian plane in the o-1, 1-∞ time-space scales describe the 3 topologies of all systems in a single scales; which are further expressed by the complex plane in its 'squared form'. They represent the subjective plane point of view 'coupled' with the objective plane geometry:

In the graph, all systems have ternary topologies with 3 motion-information-reproduction functions that absorb
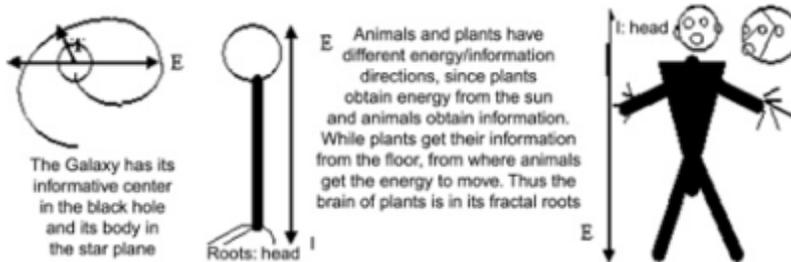
entropic energy, mix it with information, to achieve movement and perceive to keep in existence.

Thus the simplex aei action organs exist in all ST- systems of Nature.

Vital topology becomes then a constant merging of TT>Ts (entropy that becomes locomotion) and §eeds of information that germinate into motion, SS<St to find a middle point of reproduction in hyperbolic body-waves.

We can study some of those motions in still form, or vice versa simplified form in lineal motions taking advantage of the S=T duality to obtain quantitative results but the vital reality tends to balance motion and form dimensions.

Because our mind is visual, Euclidean Analytic Geometry's fundamental plane is the Cartesian plane, due to its perpendicular structure. It is also is according to the 4th postulate of Non-Euclidean geometry the best form to represent both 'perpendicular' events and space-time inverse states≈ Dimotions where length=motion, width=reproduction and height=information mimic the natural symbiotic structure of systems of nature.

Further on we can 'reduce' the 3 dimensions to *a holographic single plane, compressed by elimination of one of its s=t dimensional motions. Then it is best to analyze systems which have an internal* S=T Symmetry or systems represented by a 'fractal point' unit along an ST given dimotion.

This is the justificiation for its use in physics, were the dimotion of locomotion of a fractal point whose inner parts are ignored, reduces to its study as an sT locomotion, on a bidimensional Euclidean plane, where the dominant element, $T, the lineal motion-space, is represented in the X-axis and v in the Y-axis.

We can then consider the basic duality of Space-stillness vs. Time motion, in 2 other main frames of reference:

-Vector spaces add a dynamic, temporal view, *which makes each point an ST element with the S-population parameter and T-motion parameter best suited to represent existential momentums* in any ¡-1 'field scale'. So Physics uses vector spaces for locomotions in lineal space and time.

-Abstract mental spaces (Complex, phase spaces), which are the spatial mental static view.

Complex planes. -5D ST analysis in the complex plane, where the polynomial=scalar degree of coordinates are different (either a root vs a real number or if we 'square' both axis, as we do in Δst, a squared double positive real line vs. a ± i² real coordinates). Huminds though have not a clear philosophy of the 'emergent' complex plane that study spacetime mixed functions and Dimotions of groups of Dimotions (functionals).

Phase spaces describe entanglements of different 'states of space and time'. A subjective selection of the parameters of time and space and its generalization to all type of dimotional systems, Phase spaces will completely liberate science from the immediate reality of the Euclidean world we perceive.

In the human scale we analyze the ternary points/states/ages of matter in those phase spaces (state physics).

-Mathematical phase spaces are the manipulation of mathematical functions on those planes, which often will be not only abstract functions of mathematical space but expressions of the real dimotions of existence, essential to the fields of 'Mathematical physics' and its special frames of references; and the main field of 5D analytic geometry whose experimental task is to relate those abstract 'conic curves, complex planes, and different dimotional parameters of the main 3±¡ analytic frames of reference to real events and forms of spacetime.

So phase spaces finally detached mathematical analysis from the light space-time reality of the human eye and portray a static mental space-form with information relevant to the perceiver.

Δ-scalar perspective. The Cartesian plane gives us also 2 more generalised perspectives closely connected to the scalar dimensions of a system.

-0-1: The Unit circle, which can be used to explore the paligenetic cycle, expressed mostly in probabilistic temporal terms (where 1 is the value of 'existence' - the happening when an event/form emerges into the 1-∞ equivalent plane). Whereas mathematics (Measure theory) allows parallel studies between both lifecycles.

-4D entropic parts: In planes that break the whole into all its points of view, with infinite generalised coordinates of individual points and statistical ensembles of entropic particles and ∝ dimensions, of which Hilbert spaces used in quantum physics and phase spaces, used in thermodynamics are the main varieties.

There is THUS as usual a closed 'homeomorphism' to use some pedantic math jargon (:'a correspondence between two figures or surfaces or other geometrical objects, defined by a one-to-one mapping that is continuous in both directions':) between the 5 Dimotions of reality and the 5 main graphs of mathematics, cartesian, polar, cylindrical, complex and Hilbert's; as reality can always be seen from the point of view of the time functions and space forms of those 5D dimotions.

All this is fairly well understood by scientists, except perhaps the complex plane; and the interaction of planes of different scales, as those which happen when an Active magnitude preys on a lower ¡-1 plane perpendicularly; that is processes happening between different 5D scales.

RECAP. The main duality of analytic geometry happens between @-mind center of frames of reference to reflect the mind's subjective point of view and the 3 topological objective organic planes and the scalar complex plane as representations of the internal form of events happening within the key organs and ST symmetries of Nature. So there are 3±¡ main frames of references in analytic geometry, studying reality from a 0-point of view, similar to that of the mind of *each of those partial organs, which therefore map out clearly different worlds and prove the relativity and difference between the infinite mind-views of the Universe, even when they use visual light spacetime.*

And we find a direct relationship between the 5 Dimotions and the 'frames of reference' of mathematical minds.

As @nalitic geometry give us 5 sub-planes, each one a frame of reference that studies reality from a 5Dimotion:

3D hyperbolic Dimension: the Cartesian, ∑∏ graph.

1D vortex: the polar, ð§ cyclical graph.

2D Lineal motion: the Lineal, cylindrical $t.

Each of those graphs study problems regarding forms and functions of those 5 Dimotions.

The multiple planes of analytic geometry, do not hide its fundamental property: to perceive reality from a given point of view, the 0 point, or @-mind, and create from that perspective a certain distorted worldview that caters to the function and form of the @-mind, selecting information of reality to form a given space, which might seem 'reality' to the mind but will always be 'a representation in which the mind will exercise its territorial will' to paraphrase Schopenhauer.

Thus Analytic geometry ultimately studies the Universe from the perspective its 3±Δ main ST dimensional subspecies or partial equations of the fractal generator equation of T.œs

The a priori reality of other 'systems'.

'Spaces' are still forms, which in a Universe in which the fundamental 'substance' is time=motion, represent 'still mirrors' of those time motions. Hence spaces are artificial constructs of the mind, whose 'languages' create spaces to 'navigate' reality; built with the features of the forces of information available to them.

They are the a priori 'Kantian' categories that deform our reality and vice versa, knowing the properties of a given space it defines the type of mind and species that perceives it and navigates through it. However mental spaces need also to be real mirrors that select efficient forms of representing reality because they have a vital, survival function or else they become unfocused 'blind' and the mind-system dies away. So Mind spaces and outer topologies coincide as mirrors of realities, which is the eternal feed-back equation between the 'intelligence of mind spaces', and the entropic disordered motion of 'time flows': $\Delta S@ <=> \neg \Delta T$.

Geometries however become the more distorted, the further away we come from that 'communion' between the 'mind and the topology and scale the mind perceives'. When mind and topology coincides, the mirror is most efficient. So human visual mind has in the Cartesian orthogonal space its best mirror-representation.

When the distance in scale and form is maximal though there are internal deformations of the mind space, which adapt the 'stranger being and scale' to the perceiver, which is fine if *the humind was aware of the underlying limits of truth of its perception. But the humind is extremely ego-centered and reductionist,*

sponsoring a naïve realism – what we see and measure with our senses is all what there is. So it denies those deformations.

For example, a text on quantum states: "The heart and soul of quantum mechanics is contained in the Hilbert spaces that represent the state-spaces of quantum mechanical systems. The internal relations among states and quantities, and everything this entails about the ways quantum mechanical systems behave, are all woven into the structure of these spaces, embodied in the relations among the mathematical objects which represent them.

This means that understanding what a system is like according to quantum mechanics is inseparable from familiarity with the internal structure of those spaces. Know your way around Hilbert space, and become familiar with the dynamical laws that describe the paths that vectors travel through it, and you know everything there is to know, in the terms provided by the theory, about the systems that it describes." Indeed, but that limits you to the mind-space, reducing reality to its, in yet another act of 'mathematical creationism'. It is then necessary to add always a 'coda' to the different mind spaces we study to connect them *with the larger, more truthful reality of space-time laws.*

In the case of Hilbert Spaces it would help for example NOT calling 'Dimensions', its 'coordinates' for each parameter but rather 'parameters' or 'coordinates'; or cast its conceptual jargon of functionals in terms of inner and outer dimensions of a new plane of existence of the fractal point; and understand the difference between the highly ordered palingenetic cycle in time of particles (hence susceptible to probability analysis) vs. the statistical populations of thermodynamics, in terms of the T=S duality. And certainly it would have been much better to do so 100 years ago before the whole business of forcing reality into the 1-probability unit sphere by 'decree' of Born's rule was made a dogma. Quantum physics thus is the paradigm of a 'mental space' that works for man to make measures from its point of view, but fogs by lack of conceptual clarity the understanding of the whys of the quantum sphere. It is thus good for the praxis of measure and manipulation of particles but bad for a philosophy of science.

Thye same can be said of our Cartesian Graph: Know your way around Euclidean light space-time with its 3 perpendicular coordinates and you will know a lot about how huminds and similar electronic systems perceive the Universe. But as long as humans are not aware that such World space is only our monad's light world, different from many other mappings and accept the 'light nature' of our space, just an elaboration with our electronic mind of the photons of light and its coordinates, we will again commit philosophical errors about what is space, what is time, why c-speed is constant (our rod of measure the electronic eye entangles as informative distances with other electrons, hence always maintaining it at c-constant fixed speed), etc. etc.

Again all those problems are common to any analysis of reality with the complex plane which has different dimensionalities to represent s and t functions often in different planes of space-time; even with vector spaces that also represent holographic ST elements *but in a single plane of space-time*, and its more complex purely spatial frames of reference 'across Δ-scales', that is Hilbert spaces and functional operators.

Thus we shall close our introduction to 5D geometry with the study of those 'far removed' Hilbert spaces, which are of interest to understand the most far removed scales of reality - those of undistinguishable zillions of particles...

It is important then to grasp the underlying principle *that unifies reality broken by the infinite of mind-spaces and the naïve realism of humans in their interpretation of those geometries:*

In an absolute relative Universe it is NOT that important to know in so much detail a far removed scale such as quantum physics is - the galaxy/atom as viewed from humans have 'weird properties' because our 'perception of it' is limited so we can only know certain simple dimensions of their structure namely the most external and 'visible', MOSTLY 2D-holographic ST Dimotions.

3 AGES OF @NALYTIC GEOMETRY: S≈T

@nalytic geometry started with the work of Descartes and Fermat, foreseen on the Greeks' study of conics; which now could be fully represented in the Cartesian graph, which is in topological terms the conversion of a conic into a plane, where the center of the conic becomes the mental point of view of the observer, or still world of geometry.

The evolution of the discipline through 3 ages of increasing complexity of 'form', added new structures in space - differentiating mind views of reality according to coordinates – the aforementioned cylindrical, polar, Cartesian and complex 3±i points of view or states of any system which distort our image mirror of reality within a given mind. So in its first age, numbers and points were married with the Cartesian graph, and then the 3 'frames of reference' were found to describe 3 types of 'functions/forms' the hyperbolic, Euclidean and elliptic geometry. Polynomials were represented and the fundamental theorem of algebra expressed with the final discovery of the Complex plane.

The second age of analytic geometry will be dominated by its use in mathematical physics with Kepler's orbital elliptic conic geometries and the biased views of lineal time introduced by cartesian graphs, the true origin of that absurdity called lineal time and absolute time and space, which occurred to Newton just because he was drawing 'the sacred language of God', its ellipses and comets, on the Cartesian graph. So he thought below reality there was such infinite single line of time and space, drawn by God, his 'alter ego'.

In its 3rd age it also increased its entanglement with the other elements ofΔ@st of space-time, giving birth to mixed disciplines. So @naltic geometry, Δnalysis, S=T algebra, T-heory of numbers and S-geometry in the final 3rd age of mathematics, became *all of them reflections of each other in the kaleidoscope Universe, where those 5 elements constantly merge to give us more complex 5D entangled reflections, as complex 'knots' of 5D elements, so there was a creative age of algebraic geometry, analytic geometry, complex spaces, mind-phase spaces, differential geometry...*

RECAP. We shall introduce analytic geometry, mathematical physics and expand ad maximal the analysis of the 3 type of @-frames and its relationships with Δst of which the laws of inversion and growth of dimensions and the understanding in vital terms of concepts such as 'angles of perception, identity and continuity' are the most important.

YOUTH OF ANALYTIC GEOMETRY :CARTESIAN FRAME. DIMENSIONS

All this said we shall restrict the study of Analytic geometry in its first 2 ages to the humind's frame of reference, which is light space, and just reveal it as a mirror of S⇔T laws, whose fundamental equality is the orthogonality=perpendicularity of its 3 light spacetime axis, represented by the…
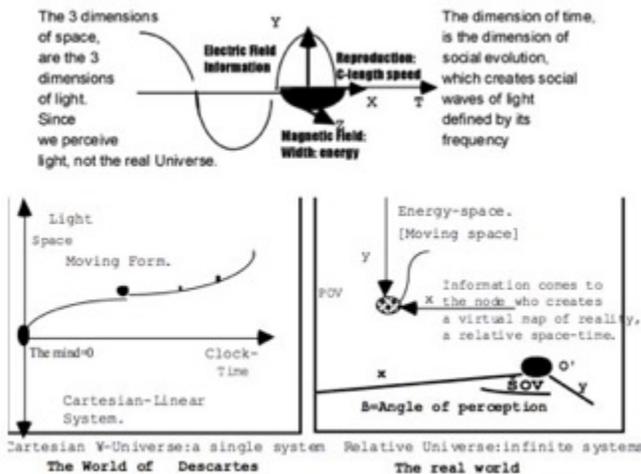
Cartesian objective light-spacetime plane.

The universe has infinite mind-mirrors depending on the forces used to gauge the external world, which bounces on a limited quantity of its scales of space. Humans perceive the range of scales of the frequency of light between red and blue social density of colors. But infinite other minds with different detail according to the quantitative pixels they absorb (max. S = Min.t) maximal for smaller sixes will determine the intelligence of the system. Descartes was fully aware that what he had in the mind was not the whole Universe, so he expressly stated the fact, differentiating the 'world' of a human mind, from the infinite other worlds that exist outside, establishing in his little known book, the 'world', this difference, affirming that his 'Cartesian Frame of reference', was only that of the

human   mind.
So he affirmed that the Universe was the sum of ∞ mind-worlds that don't speak the same languages, and created the same mappings of reality we humans created. So he *said that all what exists was made of:*

- *Open §pace, which he called 'res extensa'. - Closed, cyclical times, which he called 'vortices'.* And then he added a 3rd element, realizing the only proof he had of the existence of those vortices and res extensa was the fact that he perceived them: Cogito Ergo Sum. 'I think therefore I am'.

So he established a frame of reference with a central mind that mimicked the visual world we live in, hence it would give us accurate measures with the rod of light that created our mind space; whereas we could use for all simplified measures the central point of reference as the observer's point of view. Simplification is achieved by eliminating the 5th dimension of inner parts of points, to study its external actions, regardless of its internal evolution, changes of phase or state.

This became then the basis of the external scientific method of mathematical physics, which was no longer concerned with internal changes and could easily adapt the measure of any locomotion of a point or social group of points by representing the S=T, distance=motion symmetry in the Cartesian frame choosing as a preferred direction of motion the positive X-coordinates. But unaware of the S=T duality, which only slowly became understood with calculus and differential geometry, it soon seemed 'magic' that static lines and curves represented physical motions in the Cartesian still mental space.

Further on, the use of the subjective central point of view or '0-point' to represent objective external motions fully independent of the observer would make equations very complex, and so till the arrival of Generalized coordinates, a cumbersome structure to 'bend reality' to the subjective humind's measures dragged the analysis of mechanics.

A basic rule then to discern among all 'multiple kaleidoscopic mirrors of a language' cast upon a single reality is the limit of distortion, established by Occam's rule: the simplest representation is more objective, closer to the perspective of the objective T.œ (time-space organism) that cause the event. So for example, the Earth at the center of the cosmos is truth but a very subjective distorted truth as the Earth's gravitational contribution to the whole motion of the solar system is minimal and so its mental spatial representations (Ptolemy) is very complicated. When we go to the p.o.v. of the main contributor to the force, the sun, we find a simple elliptical territory formed by its maximal contribution, *because the cause of events simplifies reality into its vital bidimensional actions and territorial perfect forms. So the sun tries to create a perfecte encircled territory where planets form its 'angular momentum-membranes' and only slightly contribute to deform the circle into a ellipse.*

Reference Points become then dominant spatial, mental view which resides in a single plane where the 'mind of reference' perceives in relative stillness to its point of measure, with no internal scalar form or change of state, and an external continuity given by the background light space, any motions that through the S=T duality can be associated to lines (distances), planes and volumes (social motions) to obtain simplified results most of external locomotion of material ensembles.

RECAP. Is the 'light space-time we perceive' real? Or it is a phase mind space? The question is answered in several parts of this paper in terms of humind's art (painting), psychology of the mind (its equation), Relativity theory (S=T) and in papers of mathematical physics, regarding its measure of time clock dilation and space distances. *Riemann already gave the best mathematical answer intuitively* in his famous dissertation on phase spaces and color spaces... It is a mirror of reality and as such real and distorted.

What is then the biggest distortion of humind's frames of reference? The non-representation save the Complex Plane and modern Hilbert-like functional spaces and algebraic methods of renormaliation of the 5th dimension.

Even though in reality, in the Non-E structure of scalar spacetime we have upgraded with ¬Æ topology, all point have 'fractal content' as Non-Euclidean points; and hence breath, its lines are therefore waves able to

communicate the external form and internal energy or fractal networks that branch to connect multiple points, and its planes intersection of three of such waves or networks that form topological organisms... all this is information no longer is available in a Cartesian plane. But it is NOT required for mere external measure, as *long as the fractal point we measure is in our plane of existence and its representation concerned with external locomotions, which makes the frame of reference perfect for mechanics and overexploited in mathematical physics*.

While there are 3 other 'spaces' worth to notice, to explain all this inner fractal space-time complex world:

Complex spacetime ideal for studying Timespace holographic ST-dimotions and world cycles.

Hilbert spaces, *a*space suitable for fifth dimensional analysis where each point is a world in itself.

Fractal spaces and fractal dimensions to study 'networks', which penetrate through scales as opposed to 'waves' that are lines with volume transmitted in the same space.

Fig. 1.3 Three 'worls'— the Platonic mathematical, the physical, and the mental—and the three profound mysteries in the connections between them.
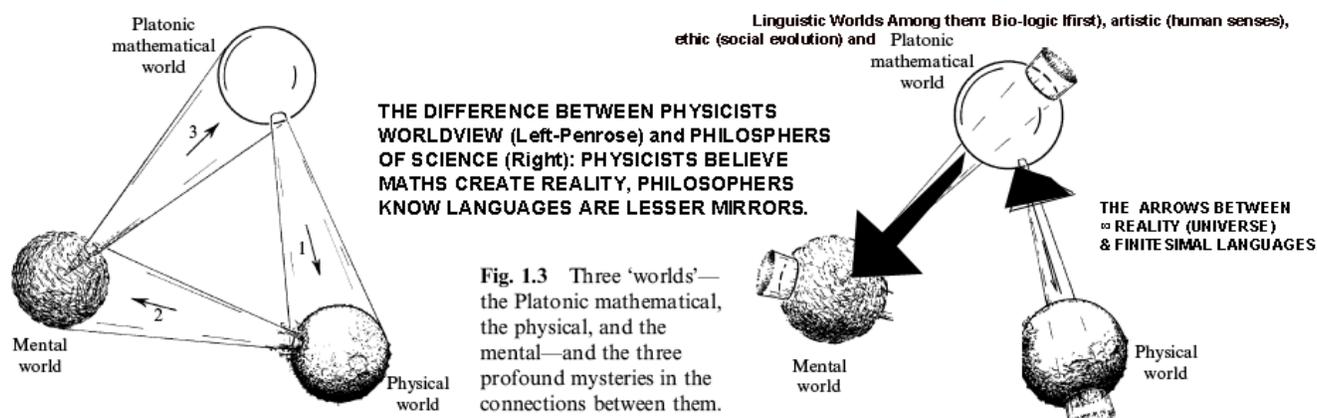
In the graph, the creation of mental mirrors is the essential process of expansion and contraction of reality into mind spaces through a language mirror, which in mathematics is as diverse as the number of mental and phase spaces, of which 3 are paramount – artistic spaces origin of projective geometry, affine spaces that simplify into lines cyclical geometries and finally in the 2nd age of geometry differential geometry that will construct surfaces of reality departing from the motion of a fractal point.

S=T: CORRESPONDENCE BETWEEN MENTAL FRAMES AND VITAL TOPOLOGIES

**Analytic Geometry: Frames of reference. The differences between the Cartesian and the Complex plane.**
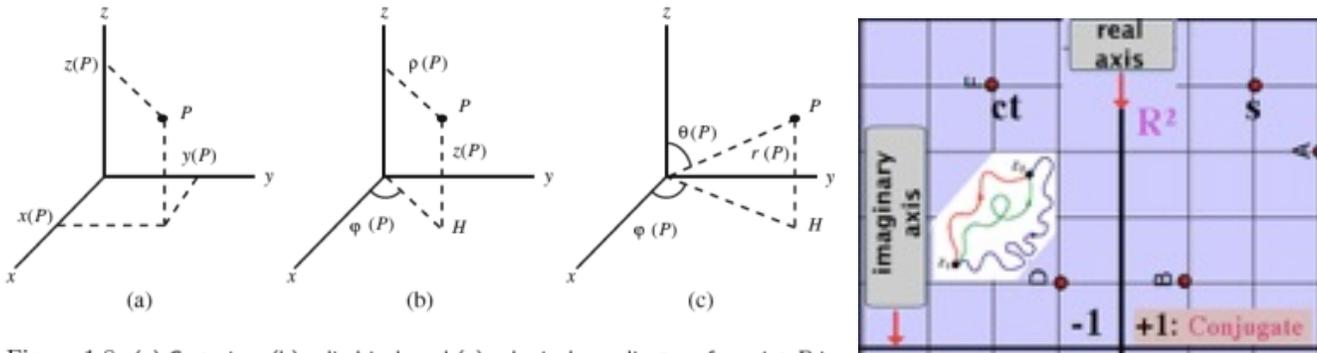
Figure 1.8: (a) Cartesian, (b) cylindrical, and (c) spherical coordinates of a point P in three dimensions.

Aristotle was the first philosopher to understand the mind-God of each system as the central unmoved point of a body of energy it moves around itself, the perfect definition of a singularity, origin of the infinite orders of the Universe. So he exclaimed, 'we are all gods'. It is the idea of all the ideas, which from Scholar theologists to Descartes to Einstein's 'masses [that] curve space into time' has always defined the meaning of the mind. Let us introduce them and study some differences between minds according to a geometry, a theme treated extensively in the article of mind geometry. Since ultimately we find all the seeds of Δºst, in the earlier greek culture.

We consider where those functions and operand are set in - that is what background space we use to express it, and 3±i are the essential background spaces which correspond also to those dimotions as forms in space, the 3 lineal=cylindrical, spherical=polar, and hyperbolic=Cartesian planes and the scalar plane, ill-understood, which is the complex plane better perceived if we 'square it' eliminating the √ symbol of its negative -1 axis:

So they can study 2 fundamental 'emergent' Δ+1 planes of mathematics, the study of Dimotions of Dimotions with the tools of calculus in time, and the study of spaces of spaces, with the tools of the complex plane properly understood in terms of 'square' coordinates.

But as in the entangled Universe all mirrors can reflect all forms, Algebra also can analyze other elements. But its main beauty is in creating sequential chains of pentalogic actions that reflect the motions of existence of the being, even though its 'Group' simultaneous analysis of all its 'variations' of species, has been

The fundamental graph of the Universe is one in which orthogonal coordinates represent the T-independent parameters in the X-coordinates and the T-parameters in the Y-coordinates. But we do have two different representations for them, because we do have 4 different S and T dominant dimotions (with the ST combination of both, able to appear in the z-coordinates, or the combination of both).

So the big question is what coordinates belong to what Dimotions. As SS and TT dimotions are equal in value, the pure coordinates should belong to the Cartesian plane. While the S-informative coordinates do have a lesser value. So they must be put on an imaginary system of coordinates.

Orthogonality in the Universe, is then easily explained as follows:

Because Entropy (TT) vs. absolute linguistic still form (SS), Locomotion (Ts) vs. information (St), are the dual inverse functions of reality merged only in the S=T reproductive dimotion, in the 0 point of X-length, the relative dimension of locomotion, there is a zero motion and stillness rises in the height dimension of pure form, where the 0' mind or frame of reference resides. But then we deal with the 'different quality' of locomotion and informative perception in terms of expenditure' of energy, as information 'shrinks' motion. I.e. a gravitational invisible tachyon line has no information but when it becomes light (neutrino theory, Broglie-

>Jordan), it forms a wave of information that grows in height with the photon on top. But this height dimension is in terms of the parameter of energy and locomotion (T), a compressed 'spatial T', of minimal size. And so we need a smaller 'quantity' and one that is negative, 'subtracting' from the distance-speed (s=t) of locomotion.

This is magically achieved by the negative 'root' value of the imaginary axis, reason why it appears as –ct in relativity and is so useful for the study of electric wavers. By squaring both we simplify the problem of √negative roots, we shall explain latter when we analyze in depth the inverse operands of algebra.

So the complex plane is most useful for St-Ts systems of two composite 'energy-information' body-head forms.

The subjective 3 p.o.v.s of mathematical minds. |-Cylindrical, O-Polar, Ø-Cartesian.

The ternary nature of the universal topology in a single scale=plane of space-time, is evident when we consider the other 2 canonical 'coordinate systems'; the polar cyclical plane and the Cylindrical, toroid plane, which will give us 3 different 'views of the Universe', both in mental subjective space from the new P.o.v. and in topological space as *each frame of reference will simplify the ST dimotions=action taken place inside the 'organ' of a system that mimics topologically one of those 3 forms. Whereas the Occam's rule apply: the simplest equation reveals the type of organ:*

'The simplest frame of reference in which a problem formulates indicates which is the ternary topological element we study'. For example, if the problem formulated in polar coordinates has an equation simpler than in cartesian coordinates, we are studying a ð-particle/head element (as when we formulate a gravitational or charge problem in polar coordinates). If it is simpler as a toroid/cylindrical is (a toroid opened along a z-cut), equation it is a '$t, limb/field problem'. An open curve defines in S=T terms also a 'lineal motion' and so on.

 So either the 3 frames of reference or the curve drawn in the Cartesian frame define already by its form, which organic ternary topological parts in space or event in time IS acting on reality: 'cylindrical frames for lineal limbs/fields', hyperbolic cartesian frames for body-waves or polar frames for particles-heads. But events and systems change states, So **i**t follows naturally that by 'changing' the equations of systems from one frame of reference to another we *change often the topological analysis of them because the system has changed its | x O = Ø relative state - a fundamental feature of quantum physics, described as a hyperbolic wave in Cartesian coordinates and as a particle-field in polar co-ordinates (Bohm's model), when a quantum system 'changes' from S=T wave to particle-field, S<T>S state.*

So the choice of coordinates, in which the function/form is simpler often indicates they type of part-species, we are analysing according to the 'generator equation' of mind-coordinates:

Γ (generator of mind p.o.v.s): |-$t (cylindrical) <ST-Cartesian> §ð (polar) «» Δ±i(complex)

The most suitable for man being its light spacetime Cartesian coordinate, with the negative and positive, inverse directions, self-centred in Δo, the distorted point of view of the human observer, suitable for lineal, perpendicular but also hyperbolic, wave-like light space-time representations. Yet as the Cartesian graph tends to an objective external flat geometry, save the 0-1 sphere, often for self-centered representations where the mind view is the main cause of the motion, a polar system will be simpler, more suitable, as in the Particle, Bohm's representation.

In the graph, the 3 subspecies of 2-manifolds have their expression in 3 coordinates, where the Cartesian, is taken as an 'infinity growing Toroid' space.

Inversely if we perceive those coordinates from the Δ-1 scale as we did with 'spirals as worldcycles' of existence, we can 'construct them and the organs they mirror' as the sum of all the worldcycle paths of its 'neighborhood points'; So that Superorganisms can be defined as ternary adjacent ensembles of the geodesic curves performed within each organ/frame of reference by each of its Δ-1 fractal points put together in 3 topologic elements, living with a worldview adapted to each of its 3 corresponding organic coordinates.

Philosophy of mathematics then enables to analyze in depth tour 'selfie' axiomatic methods of truth, which 'reduce' the properties of the Universe to the limited description provided by our limited version of mathematical Cartesian frame of a o-point with no parts, known as Euclidean math (with an added single 5th non-E Postulate) and Aristotelian logic (A->B single causality). This limit must be expanded as we do with Non-Æ vital mathematics and the study of Maths within culture, as a language of History, used mostly by the western military lineal tradition, closely connected with the errors of mathematical physics.

The importance of the Polar frame.

Contrary to belief, the most important frame of reference for most 'mental spaces' is the Polar frame, following the rule of simplicity – that makes a more synoptic form with less parameters the fundamental one. It should not surprise the reader because being 'space' a mental geometry, or mind mapping of reality it does happen usually from the subjective internal point of view. *In brief most mental spaces are constructed in a subjective distorted view provided by angular geometry as opposed to an objective external view provided by a hyperbolic Cartesian game. 2 examples will suffice:*

- The simplest representation of all the conic curves we shall study soon is given by its polar representation:
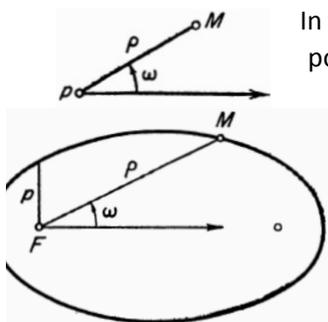
In the plane, we choose a point P (pole) and a ray originating from it (polar axis) and determine the position of a point M by the length ρ of the polar radius from the pole to the point and the value

ω of the angle made by this radius with the polar axis.

In particular, the ellipse, hyperbola, or parabola, if for the pole we take a focus, and for the polar axis the ray passing from the focus along the axis of symmetry to the side opposite the nearer vertex. Then we have one and the same equation:

$$\rho = \frac{p}{1 - \epsilon \cos \omega}$$

where e is the eccentricity of the curve, and p is its parameter. This equation is of a great importance in astronomy. For it was with its help that the result was derived, from the law of inertia and the law of universal gravitation, that the planets revolve about the Sun in ellipses. *It must then be noticed that the observer is internal to the conic as a 'point, part' of the whole, where the conic is its external membrain. Hence the obvious, vital practical need for any 'entity' within its territory to assess the distance to its 'border', which it cannot cross (open ball geometry for the Δ-1 parts of its whole structure, considered in the 1st ¬E postulate).* It is then required for a mind space to be able to assess that distance with minimal elements. And since w, the angle can always be 'assessed' in situ, the only parameter required is p's length, as opposed to two parameters in a Cartesian graph.

The geographical coordinates, latitude and longitude, by which the position of a point is given on a sphere, are also well known cases of polar geometries, which basically extend to 3D the previous analysis; or rather establish the @-mind of measure in the membrain surface of the T.œ.

This subtle distinction between O-subjective polar coordinates vs. ST-objective Cartesian coordinates come ultimately to the different properties of wave-bodies, which merge S & T and hence are more objective vs. the distortion of §-mental particles-heads; and have deep consequences because we can consider reality a constant switch between both states. Such is the case of:

- The realist view of quantum physics, made with the polar representation of Schrodinger's wave (Bohm). So we can consider the duality wave-particle as a constant switch between angular spin perception of reality by the particle in stop position, and the wave-motion/reproduction of the physical system in its hyperbolic wave state, which must 'merge' and 'synchronize' with both the field, Δ-1 quantum potential and the Δ+1 particle state.

GENERALIZED COORDINATES FROM THE PERSPECTIVE OF THE 0-POINT.

More realist than a Cartesian graph that force feeds the humind p.o.v. is the complex view of a topological ternary system as a fractal of 3 adjacent interacting internal parts that calculate its locomotion *without a subjective agent, as a measure of the changes of distances-motions* or relative positions of the parts of the Tœ.

Then measure includes all the relative parts of the super organism, taken from the internal still point of view of its particle-head, as its center of reference. So the subjective external humind pov disappears and the still 'real center' of the action treats the other parts as elements of a relatively rigid body, whose coordinates are simplified with Generalized coordinates, NOT connected to the human observer, and causality improved with the 'aristotelian, unmoved God, cause f the motion of its body-wave' as the center of coordinates

In the old system akin to the complicated Ptolemaic Earth center, under the Æntropic principle the human observer is the relative mind-view center of the whole system. So, he then can choose the Cartesian coordinates as an alien, external point of view, making it all more complicated. Yet it is far more convenient to choose the objective internal coordinates of the system, and its still particle/head as its o-point and cause, as with the heliocentric system.

The compound plane pendulum consists of two rods OA and AB, hinged together at A; the point O remains immovable, the rod OA turns freely in a fixed plane around O, and the rod AB turns freely in the same plane and A. Every possible position of our system is completely determined by the magnitude of the angles φ and hat the rods OA and AB form with an arbitrary fixed direction in the plane, for example with the positive ction of the abscissa axis. Hence the real O-point mind of the system is A and generalized coordinates by choosing it will simplify the calculus of its surprisingly chaotic dimotions.
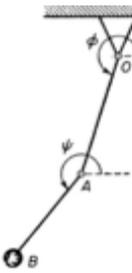
sider a similar example: a system of two rigidly connected points, these coordinates can be chosen in the owing way: the position of one of the points is given in Cartesian coordinates, after which the other point ll always be situated on a sphere whose centre is the first point. The position of the second point on the sphere may be given by its longitude and latitude. Together with the three Cartesian coordinates of the first point, the latitude and longitude of the second point completely define the position of such a system in space.

The first point is then 'fixed' in a. hyperbolic Cartesian plane that can structure all other systems and the second in polar coordinates, respect to the first mind point, from which they are no longer free. And so as part of a new whole, the number of coordinates required to study it diminish. *And the general law is rather simple: we shall need for a system just the number of generalized coordinates equal to its number of degrees of freedom.*

i.e. If we consider 3 particles rigidly fixed in a triangle, then the coordinates of the 3rd particle must satisfy the 3 equations. Thus the 9 coordinates of the vertices of the rigid triangle are defined by the 3 equations. Hence only 6 of the 9 quantities are independent. The triangle has 6 degrees of freedom.
3 points which do not lie on the same straight line define the position of a rigid body in space. These 3 points, as we have just seen, have 6 degrees of freedom. It follows that any rigid body has 6 degrees of freedom.

In 5D terms it means, the 'singularity' or center of reference as the still cause, disappears to describe its motion, with 6 degrees of freedom, which are equivalent to 2 points.

It also follows that mechanics, the science of 2Ði=locomotion evolved from subjective human pov (Newtonian) to generalized coordinates (Lagrangian), which is how today professional physicists cast its laws, as we shall do.

In other words, a mechanical system can be described by coordinates whose number is equal to the number of degrees of freedom of the system. These coordinates may sometimes coincide with the Cartesian coordinates of some of the particles or might not.

The concept of generalized coordinates that make real the point of view, causal origin of the motion, can then be extended to the use of the suitable frame of reference that imitates best the organ-world in which the motion

takes place. So the key for an easy solution is a choice of coordinates according to the Nature of the motion of that 'whole system'. If the description is one of 1D 'rotary motions around the singularity', a polar system works better. If we deal with a lineal 2D motion of the whole system, cylindrical might be used; for all others the hyperbolic 'deformable' Cartesian plane is best.

RECAP. Self-centered points of view performing 5 Dimotions huminds or generalized coordinates measure.

We are mathematical organisms, with topo-logic properties, which give birth to biological, organic assembles of ternary functions/forms and those systems do have one of the 3 O-point of view, its frame of reference, as the still 'mind-will' of the 5 Dimotions it performs to survive. There is always a first observer which starts an action of perception in space-time from a perspective that usually is biased by the function of the observer (ST, Si or Te coordinates), which correspond to the Cartesian, Cylindrical and spherical, polar coordinates of science.

Thus we define 3 fundamental coordinates which any entity uses to 'adapt' the perception of reality to its mind-view and the equation of the mind, which in terms of mathematical co-ordinates writes:

O-point $x \infty$ *Universe = constant, static frame of reference.*

In the real Universe the Observer is the dominant element of those 5 actions and also the initial 'point of view' of any mathematical analysis, and analytic geometry rightly the first branch of mathematics to be studied.

In the first of many fascinating symmetries between 'iTS' and each science (isomorphic, |-space & O-Time, the abb. most commonly used for the 3 components of the Universe), 3 are the fundamental points of view and frames of reference of analytical geometry, each one belonging to a 'fundamental state' of being, in the Universe.

The temporal polar point of view, centered in the O-point and its external membrane determined by the radius and angle of perception; the cylindrical, lineal, energetic point of view, determined by the lineal axis of the frame of reference or 'altitude', the Z co-ordinates, and finally the Cartesian 'hyperbolic plane', corresponding to the STi bodies & waves of physical and biological systems.

From those 3 mathematical perspectives reality constructs its vital geometries that we call 'existential beings'.

So the observer's causal, logic, cyclical, informative sentient properties that allow it to perceive time cycles are the first questions to inquire. As @ is the first element to describe in reality - a frame of reference, an observer, an inertial point in relative fixed form with no motion that can perceive and map the Universe, as its O x ∞ constant mapping mind – world. So generalized coordinates are more realistic and simpler (Occam's principle).

It follows that Generalized coordinates is a more realist analysis of Nature's dimotions as they are established by the 'still point', which is the mind or head/particle that we observe to create its own generalized coordinates where it tries to maintain its stillness (your head doesn't move respect to the body), as the center of reference of its own Universe.

In science generalized coordinates are used to study locomotion but in 5D we extend them to study the 5 Dimotions of the being, and in many cases analyze them quantitatively when we merge those concepts with the tools of calculus and 'define' properly energy (3rd Đimotion), reproduction of form (2nd Đimotion), 5D entropy (Dual scattering Đimotion), 4 & 1 D perceptive information (imploding, spiraling dimotion).

The Universe is a sum of a series of action, Δaeiou: the first action is perception by an observer, Δo, of a field of energy, Δe, to which a T.œ will move, Δa, in order to feed, Δe and use that energy to reproduce its information, Δi, iterating a form like itself, which will gather with clone forms to create a larger, ΔU universal social plane.

Moreover those actions are very simple geometric exchanges of motion and form. 'Ad maximal' they are dual entropic inner scattering and outer locomotions or inversely the dual collapse of motions that shrink into a seed often by 'eliminating motion' into a 'coded language' that will unfold when energy germinates it. Further on the

S=T symmetry precludes that a motion step is followed by an informative still perceptive stop. When properly cast in suitable frames of reference or generalized coordinates physical and biological actions, dimotions and change of state are simple, bidimensional stœps or single flows of energy: sT; and information: St, between 2 poles either in a single plane or across Δ±3,4 scales. So most laws of science are simple, even when those flows are generalized between several points to form more complex structures; since then they will be repetitions of the simpler unit of action, when we reduce to minimal cyclical space-time actions the total reality of any self.

But to do so correctly we consider the proper sequence of aeiou actions, which mostly start when the formal still point of view kicks out a world cycle of actions proper of any function of existence, with an act of perception, Δo, which is thus the minimal and first Unit-action of the Universe that shrinks it into a linguistic mirror. *Thus while time-motion-entropy is the first substance of reality; perception of it as form becomes the first element of any fractal point or T.œ, which creates in fact by 'shrinking the whole' into a point of a smaller Δ-1 scale, the actions of creations, the storage of information, the game of reality as we know it, past the pure entropic motion meaningless in itself.*

So it is always a point of view and its relative frame of reference, what start the comprehension of an external reality with its first action, which is the still language that perceives in its self.

CARTESIAN GRAPHS.

The multiple S=T, Δ applications of Cartesian coordinates: mixing time and space.

The main 5D concept for understanding mathematical laws of curves in Cartesian spaces is the S=T duality. Hence the acceptance of the rule of differential geometry – that is, a curve is not really a curve but an ST representation of an S-point tracing a T-Dimotion; hence a geodesic trajectory, an ST-dimotion adapted to the larger organ=world of the *being* within which the fractal point performs its function.

Inflationary mathematics however, without the restrictive anchorage of the real 5D limit of Dimotions and its required geodesic efficiency, draws also a big number of irrelevant curves that exhaust the combinatory of its parameters in a plane. But curve equations, in the praxis of mathematical physics restrict to the most efficient trajectories for the 5 Dimotions=actions of any being in exist¡ence. So most still Cartesian geometry is a disguised form of differential geometry. While physics as it is today formulated ONLY in mathematical languages (reducing its properties to those who can measure, a theme treated in our papers on physical systems), can be considered 'de facto' the branch of experimental mathematics or 5D mathematics that 'reduces' its inflationary mirror language to the only 'real, efficient' elements of it. And as such we treat it as a subdiscipline of mathematics, or paraphrasing Einstein and Poincare: *"Mathematics are truth but only experimental physics defines when they are real."*

Both are simplified mirrors of the humind, as only 'the being holds all the information about itself'. That is if the being is a probability 1 of existence, only in the being truth becomes also a probability 1. While we need multiple 'experimental languages' to extract all its properties. S=T duality is the origin of the 2 key properties of equations in Cartesian spacetime - the dual numbers required by each point; and its dynamic motions as they trace a curve.

1. *In that plane a point has '2 dimensions' = parametric numbers for its representation.*

   What those numbers mean beyond the earlier naïve realism of using them for simple locomotions in the different planes of forces (gravitational vertical or flat, friction spaces), is what will open phase space and mental space, and now we take to its final conclusion, considering that overwhelmingly they represent S or T coordinates to define each type of mental space as a representation of one of the 5 Natural Dimotions of reality' and or 5 corresponding Non-E postulates that describe the interaction between fractal points (T.œs).

The abscissa and ordinate 2 coordinates of a point in the plane Descartes are numerical values x and y of two mutually perpendicular straight lines (coordinate axes) chosen in a flat bidimensional plane. So they perfectly express an ST inverse holographic *dimotion reduced to a point.* The point of intersection of the coordinate axes, i.e., the point having coordinates (0, 0) called the origin, mimics then the static state where the dimotion started.
And so Descartes subconsciously expanded the dimensions of an Euclidean point through its "arithmetization" as the point in the plane that represents its Δ±1 world value has enough information to fill the content of a pair of numbers.

2. *Points as equations with 2 unknowns tracing curves in the plane.*

Descartes' second ST concept is the following. Up to the time of Descartes, where an algebraic equation in two unknowns F(x, y) = 0 was given, it was said that the problem was indeterminate, since from the equation it was impossible to determine these unknowns; any value could be assigned to one of them, for example to x, and substituted in the equation; the result was an equation with only one unknown y, for which, in general, the equation could be solved. Then this arbitrarily chosen x together with the so-obtained y would satisfy the given equation. Consequently, such an "indeterminate" equation was not considered interesting.
Descartes looked at the matter differently. He proposed that in an equation with two unknowns x be regarded as the abscissa of a point and the corresponding y as its ordinate. Then if we vary the unknown x, to every value

of x the corresponding y is computed from the equation, so that we obtain, in general, a set of points, which form a curve.

Thus, to each algebraic equation with 2 variables, F(x, y) =0, corresponds a determined curve of the plane, namely a curve representing the totality of all those points of the plane whose coordinates satisfy the equation F(x, y) =0.
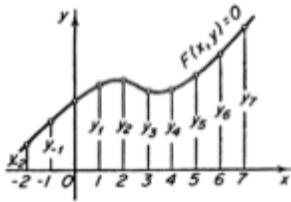
This observation of Descartes opened up an entire new science besides analytic geometry – the language in itself. Since essentially Descartes gifted the static bidimensional plane geometry of a 'variable motion', and gave us the capacity to study an ST-evolving system in space-time, whose geodesics will give us properties of certain dimotions as opposed to others (closed paths, open paths, entropic, scattering motions; etc.). Thus 'Physics of time' were born.

So for understanding of analytic geometry and its algebraic equations, it is useful to consider the fact that numbers are points and there is a direct relationship between points and numbers, lines and variables, planes and squares and so on. So polynomials and operands represent the 'social evolution' of dimensions, points into lines into planes into 5dimensional structures.

Pentalogic on the Cartesian graph.

The Cartesian graph by representing minds in its center of reference, dimensional symmetries of space and time - both informs and motions and by reducing T.œs to points susceptible of scalar Δnalysis with the concepts of Δ-1 derivatives (finitesimals) and Δ+1. - yields enormous capacity to model the Universe of Δ@st of space-time.

So Analytic geometry could study all the pentalogic elements of reality. Some of its first uses would be:

1: T>S: solving construction problems of continuous motion with discrete spatial steps, such as the division of a segment in a given ratio; *thus adding frequency time to geometry.*

2: S<T: finding the equation of curves defined by a geometric property, which could relate different pentalogic, Δ@st elements. For example, defining an ellipse of motion (ST-holographic form) by the condition that the sum of distances to two complementary points of reference dual attractive or gender points) is constant. In *this case the ellipse becomes a mental space function that defines 2 physical systems controlling with equal force a third entity and by doing so, creating a common territory of space (Kepler's 2nd law, 'proximity' of 2 parental forms to its son within a 'territory').*

3. S≈T: proving new geometric theorems algebraically (i.e. the derivation by Newton of its theory of diameters; and conversely, representing an algebraic equation geometrically, to clarify its combined ST properties (i.e., the solution of third- and fourth-degree equations from the intersection of a parabola – entropic, scattering motion, with a circle – closed ordered motion), which we will illustrate in its 'metaphysical' space-time whys.

4. Δ: peering in 5D scales through Δnalysis of derivatives and integrals.

5. @: Studying huminds, as the key properties of Cartesian planes imitate the properties of light that follow the properties of space & time components of light with its 3 perpendicular, S-magnetic, T-electric and ST-energy fields.

Thus, to the classic definition of analytic geometry as that part of mathematics which, applying the coordinate method, investigates geometric objects by algebraic means, we will ad the insights of its direct homology with the S, T, Δst elements of reality in different entangled pentalogic combinations that extract Space-time general laws. Since it is only needed to consider an informative or time function, one of the coordinates and then the other one would represent the 'spatial function', which are inverse dimensions, to make it work magically an represent a ginormous number of s@≤≥Δð something soon used by Galileo.

Complex 5D functions.

Graphic pentalogic applies then to each specific function with new entangled elements to reveal the multiple functions of each mathematical system. I.e. an exponential function reveals its:

5D: max. inverse entropic 'death growth' at accelerated speed towards its asymptote revealed by its derivative.

2D $: Max. spatial growth as a spatial function of speed and distance.

1D ð: The maximal growth curve in time represents a vortex of space-time, with 2 TT dimotions accelerated change, as a force; hence a o-1 vortex of acceleration towards a singularity point (1D)

Δ±i: All those expoenential ±functions thus end into a change of scale. Either the function accelerates towards an entropic dissolution (e^{-a}, which is a decay entropic process) or inversely accelerates towards an emergence, as in **resonances**, or the limiting case of distribution equations that grow exponentially towards the 0-point. It is the simplest Delta Function, whose integral is 1, even if it only exists in that 0 point showing that indeed a point-particle is a fractal point with dimensionality 1, once emergence in its 'infinite density' point of resonance, emerging into an Δ+1 plane - a fact which incidentally proves that all infinities ARE finite ones of a higher plane: infinity IS just the limit of an Δ-plane; the whole is the infinity of the part; or else the delta would not emerge when integrated between ∞ and - ∞ as 1. Because once we cross a discontinuum of scale, we are in another type of parameter, so infinity does NOT exist.

Functions then become always representations in @-mind space of trans-form-ations of Δ-scale, space population or time motions, which are the 3 elements of any system of reality. And so pentalogic applies to all functions.

I.e Temperature determines the S-volume of a gas as a whole. But also Δ+1 temperature determines the motion of its Δ-1 gas molecules. While the T-growth = elongation of a given metallic rod is determined by its scalar temperature. It was uniformities of this sort that served as the origin of the concept of function.

RECAP. Descartes' theory is based on two S=T concepts: perpendicular S=T coordinates and the concept of representing by the coordinate method any algebraic equation with two unknowns in the form of a curve in the plane.

CURVES.

The first use of Cartesian graph was then to move further the last advances of the 3rd age of Greek Geometry that had started to explore curves. And as the best-known curve was the closed cycle, geometers attacked the cycloid – a cycle moving along the line. We shall thus consider it as a paradigm of the pentalogic and experimental nature of curves, which reflect different species of Simple T.œs (its membrane and enclosed vital energy), as well as fractal points tracing canonical curves=worldcycles

The cycloid as a world cycle.

The interest of maths as a mirror of reality is its 'simplicity' to describe the basic laws and symmetries of space-time, and hence the properties of worldcycles and super organisms and Δ-planes. This reaches its final simplicity in the analysis of curves in a bidimensional plane, and the whys they reflect on S=T symmetries. Let us explore some of those elements of Δst isomorphism with mathematical mirrors.

We already analyzed the beauty of the pi-spiral as a worldcycle, the fundamental 'time particle', that represents the existential flow in finite time of any superorganism that closes its worldcycle as its outer point membrain returns to its origin. Next in the 'evolution' of the cycle appeared the cycloid, where the point membrain its vital energy-radius performing in an external entropic 'flat' worldline, its cyclical dimotions between its original birth and death, when touching back the flat line. What fascinates then on the cycloid worldline is that it encodes the quantitative parameters of the 3 ages & 8 'sequential phases' of life of any Disomorphic worldcycle:

In the graphs two different isomorphic languages: the 8 diameters of the simplest cycle of existence, a cycloid
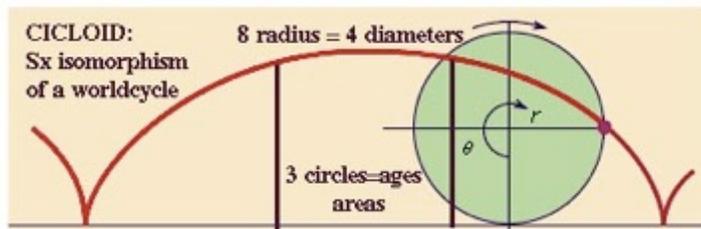
moving on a lineal, open path or entropic higher Δ+1 world from birth to death; below the 8 Baguas the informative, mongoloid human subspecies found to correspond to the 8 phases of life. Such type of homologies shows the entangled Nature of all the languages, as all mirror the ultimate Disomorphic S-T laws of the existential game. Specifically the parameters of a worldcycles represented by the cycloid traced by a point – the mind/membrain - on the circumference of a circle, its vital energy – represents a T.Œ as it rolls along a straight line, the outer world, enclosing a territorial space, the cycloid surface.

The immediate translation thus of the worldcycle is provided by Galileo's conjecture - the area enclosed by one arch of the cycloid is three times the area of the generating circle, as the 3 ages of the organism represent 3 states of its vital existence, with the central mature, present, reproductive age, equivalent in value to the sum of its first, young 'growing' and last, 'diminishing' old age of the rising and falling cycloid worldcycle.

And by Wren's measure along the curve of one arch of the cycloid equivalent to eight times the radius of the generating circle, *representing, as the moving dynamic point in which the mind and the outer world membrain entangles, the 8 phases of the life of the being in the world or baguas*. Thus the hidden beauty of the cycloid that made it so important in earlier Cartesian geometry encodes if we consider the moving cycle a world cycle of life and death, the point on the surface, the singularity-mind, transiting along a lineal sequential timeline, the simplest disomorphic mirror of the properties of a life-death cycle, in which our 'vital energy' (the area enclosed by the singularity and the timeline) is split in 3 ages with a similar volume to that of the unit circle.

As indeed the Δ-1 generational o-1 age is followed by 3 more ages in which the 1st and 3rd age are equal in vital value to the intermediate one:

sT= youth > ST: maturity> St: 3rd age...

When the cycle ends in the 'landing' lineal flat entropic point of 'timeline' death, exhausted its vital energy.

Nephroid: definition
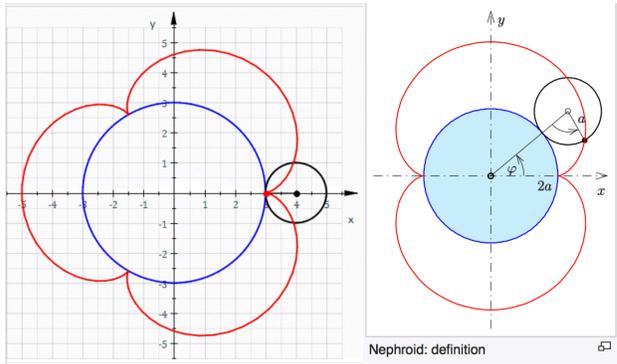
Another interesting version is the epicycloid on a 3 world radius of a 1 radius curve, *which will trace 3 cycloid ages over the larger world each with 3 epicycle surfaces mimicking even more clearly the worldcycle. It is this kind of 'magic coincidences' that encode the essential laws of Time-space worldcycles what I find so enticing to discover in my 5D research. Why other mathematicians do not even attempt to do so is no longer my business. I gave up on human egocy. Yet without those experimental relationships between mathematical laws and space-time worldcycles the subject looses its 'true whys'.*

We can then consider the larger circle the minimal 'surface of feeding entropy', for the smaller circle to complete a worldcycle of existence and its 3 ages. Indeed, for a 1 to 2 relationship we get a nephroid and the smaller circle can only complete two ages, which are fully inverse.

And we can observe some 'dimotional scalings': the perimeter traced by both is in a 3 relationship but the vital energy 2DS area πr^2 is in a 9 to 1 relationship, as the volume of the system grows exponentially, slowing down the inner processes of the larger whole (5D metric)

the most remarkable property of all worldcycles represented by the cycloid was found when mathematicians solved the variational problems of the brachistochrone - finding the shape of a curve with given start and end points along which a body will fall in the shortest possible time: It is the beginning of an upside-down cycloid!
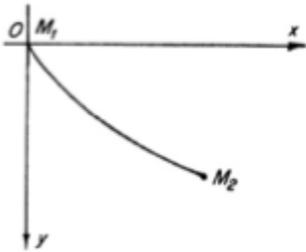
So all worldcycles 'T=race' through the 0-M1 palingenetic and young age to achieve the maximal growth of the system that reaches its mature 'M2' point state in the minimal time.

So the brachistochrone is the spatial symmetry of the law of least time; a key law of Δst, as all systems *try to achieve its actions and motions in the less possible time; thus subconsciously shortening its youth and old age – while the mature iterative age of reproduction tries by the very nature of its main dimotion, to conserve the state of the being, becoming a 'flatter' curve with a peak, standing point of 0-change/derivative.*

RECAP This simplest representation of the world cycle shows already the key insight of 5D Δ@st: curves represented on analytic geometry are spatial simultaneous S=T geometries of temporal Dimotions of the head-point of the curve.

PENTALOGIC OF CURVES.

It is then evident that curves model multiple elements of GST; being its main pentalogic 3±¡ features:

Δ: Its capacity to represent the 3 scales of an entity, as a fractal Δ-1 point, tracing a worldcycle, Δº, in a larger world represented by the open, entropic flat Cartesian Plane,

S=T: They can also model the 3 elements of a T.œ, if we consider the curve in synchronous space a membrain, where it is often located the @-singularity (open curves); or when the curve is closed, its focus represent a single or dual complementary center, while the enclosed vital surface, is akin to the energy of the system.

Thus a simple curve already accounts for the 3 topologic parts of the being, and its 3 Δ±¡ scales.

Such insights on the real world of Dimotions, represented by the still geometry of curves in Cartesian space will become even more sophisticated when we observe the properties of the Canonical curves of 5 Dimotions:

Pentalogic on conics

S=T. The 1st remarkable property of Conics is the extreme symmetry in terms of its coordinates of its general equation: Ax² + Bxy + Cy² + Dx + Ey + F = 0

What this means in experimental mathematics, as in most cases X and Y coordinates represent an S=T dual parameter, that conics are highly symmetric bidimensional spacetime curves, hence with the maximal efficiency, which is ultimately the meaning on an Si=Te equivalence (age of balance, maturity and reproduction, proportion of energy and information, beauty, 'mens sana in corpore sanum', present state, etc.)

We cannot however in this first book on 5D maths to do the full symmetric analysis of Geometry both as visual simultaneous images and algebraic equations in as much as *'huminds' have not properly defined the 5 operands symmetric to the 5 dimotions of the Universe,* to have a full understanding of even the simplest relationships between algebraic operands and geometric figures. i.e. why the 2Đ¡motion of locomotion squares the function that becomes a parabola on a Cartesian graph; why there are not exact sums of cubes, direct methods for solutions of quadratic solutions, etc. etc. themes those that require a 'deep-thought' consideration of Algebra in our bulkier second book – yes, the axiomatic method provides its own convoluted concepts to prove all the above, as any student of algebra knows (permutation of groups, symmetry, etc.), but *those abstract concepts must be clarified in terms of experimental properties of space and complex i-logic. So* we shall focus on the ternary Non-Euclidean structure of all Time-Space-Super organisms (T.œ), as curved forms are ultimately as polytopes, social numerical structures that define the two elements of any T.œ in a single plane of space-time:

- S: In space the simultaneous membrain of the system, defined by a closed curve; and its focus/ci, or singularity centers often the cause of the form of the membrain.

- T: In time, most likely in the case of open curves, the trajectory of a T.œ, 'reduced' as a fractal point moving in the larger 'Plane', which itself defines the organic part of the whole in which 'the event' takes place – that might vary from the classic 3 topologies introduced before, to more complex geometries (a Beltrami hyperbolic cone, and inner vital space – Klein's Disk – with entropic limits as an open ball; a dual foci elliptic system, etc.)

What Algebraic equations do then is an inverse S@<ΔT symmetry to the one we have so far studied in more detail (ΔT-numbers > S@ symmetry). And some important i-logic arguments on general laws of any language when mirroring reality must be put forward:

We use the > symbol in inverse manner for both symmetries, which in GST is the symbol for an 'evolution of information' that diminishes the 'entropy-uncertainty of a system', because paradoxically, the most synoptic a language is, the less detailed information provides, and the more 'paths of probabilistic future opens'. Meaning that numbers are more synoptic that points, and so they might refer to more possible realities, hence creating

more uncertainty. This is the trade-off between synthesis and analysis. I.e. if I say 0 x ∞ or 'wor(l)d', I am defining all numbers of social beings or entities a mind equation might conceive (o-mind x ∞ Universe = constant wor(l)d). But I don't specify any information and uncertainty is maximal. What 'word' did I see? A horse? A car? A friend? What number I obtain? 3 pears, 7 billion humans=mankind?

So the algebraic view defines more possibilities, as a scalar time view, many of which do NOT have solutions; while the geometric view IS always a solution in itself even if it does not have a consistent algebraic expression.

The ΔT: algebraic vs. S@: geometric figure duality is in that sense more complex and rich as a 'function of points and numbers' that the first layer of S≈T similarities (points vs. numbers) so far studied here, which will certainly once 'mathematical pros' pass the 'stage' of model shift, suspicion of the founder of a new paradigm, etc. etc. (that is once they accept the work of the usual 'amateur Copernicus' and see the light & beauty of the more advanced structure :), give birth to many entanglements between time and space mirrored in the mathematical language.

All this said, as customary we shall start our description of 'any reality', not from the bottom upwards but from the top more synthetic 'reality' of the 5D universe, which is the worldcycle of any superorganism, because all what exists including 'curves' are part of a worldcycle, in the case of a language a partial mirror of a trajectory within it. So as we did with spirals and cycloids, first we shall show that the cone that generates all curves is in itself a 5D image of the worldcycle, more complex than the simplex possible image (the cycle) and its next entangled complex view – the cycle moving in an entropic, lineal plane or cycloid.

Δ±¡: THE WORLDCYCLE CONE AND ITS SPIRALING POINTS.

The representation of conics in the Cartesian Plane however is a simplification as they are originated in a cone, *which has a dimension of height ideal to represent the arrow of 'increasing information' towards the apex of the cone, or relative point of future of maximal, St=§ð; or 3rd point of the being. As such the 'cone' becomes also an excellent model for defining in its surface the life-death motion of an ideal T.œ – and in physics represents for different 'attractive' vortices, a real time-space informative 'sink'.* So as all what exists is part of a superorganism tracing a worldcycle or a mental image of it, the dual cone expands the conic representation of 4D worldlines of locomotion into 5D worldcycles of exist¡ence. We can apply a pentalogic analysis to such 5D cones:
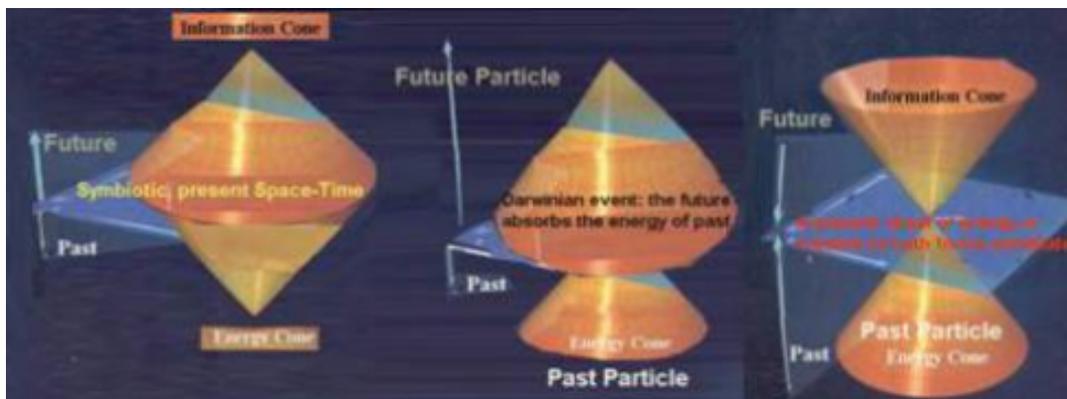
In the graph several representations of 5D events using worldcycle cones:

1. A single point tracing a 3D spiral on the surface of a cone from its base to its apex represents the informative arrow of a worldcycle in its 3ages. Thus if we consider the T.œ just in the Δ-1 plane, a point tracing a motion in its surface; it does then represent a world cycle accelerated but perceived as an ascension in height, *with different interpretations according to which of the 4 5D possible cones of the dimotions of an entity we describe and what 5D parameters of time and space are represented in the two perpendicular axis.*

2. If we make a composite of 2 worldcycles of 2 fractal points; we obtain 4 potential combinations (with the central figure becoming a different event, when we change upside down its past -future orientations). Each cone taken as a whole worldcycle of existence ('LIFE CONE') the outcome of colliding events according to the rules of the 4th Postulate of Non-E congruence, from Darwinian feeding, to reproductive symbiosis.

3. If the cone emitted by each particle is the trajectory of an exi 'wave of energy and information', the cones represent the possible outcomes of communication between two larger points, which share the wave; useful to model Fermion<Boson>Fermion exchanges between particles (5D Physics).

4. If the double cone belongs to the same particle's worldcycle, it represents its 3 possible states. Where the double worldline cone of space-time expands 4D Minkowski's spacetime representation into 5D, branched in 2 inverse S>T<S future & past cones and a flat S=T present, put to use in advanced 5D mathematical physics and pentalogic. The different orientations of two cones which represent unlike the simplex relativity cones of 4D, a motion in the fifth dimension between two fractal points (any T.œ), colliding in a present simultaneous 'plane' (left). Or a point in present dissociating between relative past and futures (right).

5. Since the cone is itself a circle moving along a line, in a decreasing its size, it obviously immediately represents as it does the cycloid, a fundamental representation of a T.œ of space-time, the circle, moving in time towards a shrunk, warped third age, or moving between scales: Δ-1 ð>Δ+1 ð forwards, as it shrinks in relative size becoming on the apex an emergent 'single point' of the larger whole (palingenetic worldcycle as observed from Δ+1).

6. Finally the 2 inverted cones form together an image of the whole 5D-4D inverse collapsing and expanding, evolving and entropic arrows of space-time.
Thus the motion from Δ+1 larger wholes to the Δº singularity of the cone and its expansion on the inverse cone can be used as we do in the general model to represent the many different aspects of a world cycle of existence.

The cone thus is in itself, *another fundamental frame of reference proper of the 5th dimension, ignored by huminds stuck in its 4D formalism, which we will retake when studying the Beltrami's representation of hyperbolic geometry, the proper geometry of the 5th dimension with a bit more of rigor.*

All this said, to show the profound levels of 5D theory bring about by a simple cone, its importance should not surprise the reader, as it is indeed the product of a | x O motion; hence embodying all possible, |xO=Ø curves of the Universe, which however can be reduced to a combination of our aforementioned curves (spirals already studied):

Yet, as mathematicians have focused on slices of space-time of the cone, and the conic curves of the 5D formalism exceeds the purpose of this introduction, we just enunciate some of its uses to show how a conic also mirrors a world cycle but will concentrate from here on, in the classic concepts of conics.

Still those concepts will apply to the understanding in mathematical physics of the different trajectories of points in one of the 4 canonical curves, each one related to a basic Dimotion of existence, to which we must ad the 5th Dimotion of a log/Archimedean spiral. Since the log spiral can be considered an Archimedean spiral if we ad a 3rd dimension of height information, by converting its shrinking revolution into a receding motion, for an entity living within the cone's timespace surface.

Existential algebra, the 'o', '1' terminology of geometric objects.

How we write conic worldcycles in the more general GST terminology of existential algebra? Though we won't translate mathematics to the Universal language of i-logic, existential algebra *that can mirror any other language of reality let us do a brief introduction ot the theme to complement the previous graph, also a bit 'advanced' for an introductory course.*

A worldcycle it is a closed domain, A WHOLE, either in the single cone or the dual one, and so in existential algebra we write the general equation, ST (vital energy) = S • T (singularity x membrane) in the following manner:

G(Tx; Sy) ≤ (1; 0) for a closed circle; G(Tx; Sy) ≤ (1;0, 0) for an ellipse; G(Tx; Sy) ≤ (∞; 0) for an open parabola and G(Tx; Sy) ≤ (∞, ∞;0, 0) for a 'dual' semi-closed hyperbola.

Where 1 means the membrain; 0 the singularity and ∞ an entropic open curve.

So that is what a conic means, a vital superorganism mirrored in mathematics, with its elementary parts - the membrane(s) 1, the relative infinite, outer open world and the 0, the relative center or singularities that manage the membrain; where G(x,y), are all the combined points, (≤x, ≤y) that form the inner, vital region of the system.

And since the Universe is bidimensional and holographic those conic equations are the most pervading in all forms of Nature. Yet only 2-dimensional curves and its combinations are real pure basic forms. All other n-dimensional equations are combinations of them, as Fermat's grand theorem proves - since $x^3+y^3 \neq z^3$.

Conics and Dimotions of existence. Its pentalogic.

Descartes realized that curves in the plane are represented by second-degree equations with two variables whose general form represents an ellipse, a hyperbola, or a parabola; i.e., curves known to the mathematicians of antiquity.

So the first obvious fact is that 'cyclical, time-like curves' have 2 dimensions (degrees of freedom) as opposed to single-dimensional $t-lines. A theme that corresponds to mechanics and essentially means that lineal inertia is never found, as all lines are steps of a worldcycle, *in as much as the being exists in an outer world, and so we must always account for its dimotion its internal and external forces.*
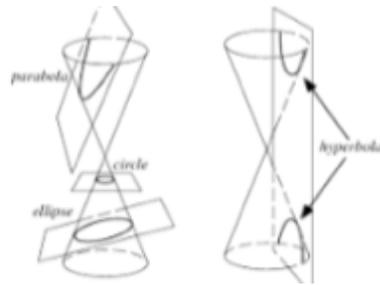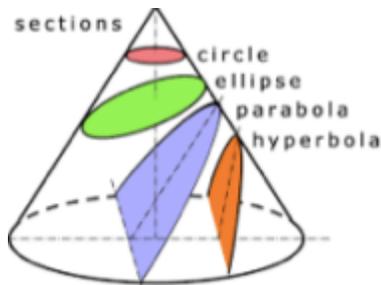
*In the graph, t*here are 2 conic types: open=entropic=unstable=Darwinian parabola+hyperbola vs. closed=informative cycle+ ellipse. Both are constructed from a cone with a line, which is the *desired motion of all @ristotelian singularities and the curve 'tended' by the outer world,* through which a combined cycle 'moves' opening entropically or shrinking in an 'accelerated' process we can construct the conics of the Universe (as defined previously in terms of ST variations).

This was the wonder of Greeks till Desargues proved that all curves can be drawn from a conic, the best |xO=ø representation of the world cycle.

As such each of the canonical curves, which need only 2 ST parameters, defines a holographic bidimensional manifold – an ST dimotion of space-time. And each conic corresponds to a dimotion:

The 2 closed paths, the circle and the ellipse are S-dominant:

SS is by definition a seed with no motion in time and infinitesimal volume – the beginning of a process of expansion – hence the 'summit point of the conic'.

St: The circle has a single focus-singularity, as it corresponds to the Dimotion of perception (π- spiral circle). It has a stable efficient form as a present repetitive system, hence with no latitude in height=time.

S=T: As the ellipse has two focus with equal distance to the 'son-membrain' they represent an S=T reproductive or dual curve, whose relative distance is a mental measure (Riemann's concept of distance) of the similarity of both points, which is absolute when both have 0-distance and the ellipse becomes a circle.

On the other hand, we have 2 open curves, which represent free lineal motions with a content of time:

-sT: locomotion, represented by the parabola, since the point has a single trajectory, hence a single T-motion, and indeed we shall see the parabola to be the fundamental locomotion of any point subject to a larger world force (Galileo's study of lineal trajectories).

-TT motions: finally the hyperbola represents the entropic dual motion, which 'splits' and erases the internal form of the system. So the lower parabola 'oriented towards the past', if we take the dual cone as a worldcycle, represents the internal scattering motion and the upper curve the external motion.

And so conics do have clear correspondence as almost all basic structures of mirror languages with the 5 Dimotions of reality, and those facts should orientate our analysis of the specific curves traced by physical particles and happening in real events of different stiences.

Angle of congruence defining the different conics.
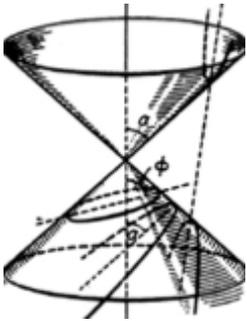
The ancient Greeks had already investigated in detail those curves obtained by intersecting a straight circular cone by a plane. If the intersecting plane makes with the axis of the cone an angle φ of 90°, i.e., is perpendicular to it, then the SECTION obtained is a circle.

It is easy to show that if the angle φ is smaller than 90°, but greater than the angle α which the generators of the cone make with its axis, then an ellipse is obtained. If φ is equal to α, a parabola results and if φ is smaller than α then we obtain a hyperbola as the section.

In terms of the angle of congruence however the interpretation is exactly the inverse; as the axis of the cone is the motion of time from past (base) to future (top); that is from birth to extinction, and so the angle must be measured for a balanced present systems in parallel to the base of the cone; which represents the immortal state of past. And so the circle which is the balanced state of S=T (by definition, ∑x=∑y, for the whole range of values of a circle), is the state of present, with a parallel angle of congruence and no motion in time. While the maximal angle of congruence, and perpendicularity to the present with the maximal motion in time, is the entropic hyperbola, which in fact reaches to both extremes of the whole worldcycle. Whereas the upper side of the hyperbola 'explodes the information of the system into an entropic death; and the lower part represents the maximal locomotion, similar to the parabola.

Why the parabola is in the worldcycle cone a motion to the past (g angle in the graph). Because as S is the state of absolute future (information, potential seed, logic mind in control of the system, designing its future), and T is the entropic time disordered arrow, an increase in locomotion, sT, is a relative state of past. But it doesn't disorder the being as the hyperbola does.

What this means in GST terms is that the hyperbola is the opposite concept to the circle/ellipse, as closed and open, ðf and $t inverse 'geometries' which if we consider the y axis, the longitudinal entropic Time axis, and the x axis of the cycle, the informative, spatial state, converts the cone into an inverse Space-time where not only motion in time but also angles of congruence can be represented; and so we can study several world cycles and complex space-time events within it, in advanced 5D mathematical physics.

Let us then consider once those general concepts are laid down the main reason why some conics preserve the present, namely the balanced S=T efficiency of each form of a conic that represents each type of a vital Dimotion of existence, which are often used by fractal points that trace different conics for different vital purposes.

Creation of curves in ¬E geometry and its 5 Dimotions: social parallelism vs. perpendicularity annihilation

S-Conics relate to the second postulate of ¬E communication between 2 points that in informative conics construct a 'territory', delimited by the membrain, which is equidistant, *in a cyclical time period, to the 2 points. Those* closed ordered conic have a minimal angle of parallelism; that is, displacement=change in time, to reach a degree of 'simultaneity' that allows the creation of an organic simultaneous space.

-T:Open conics with a larger angle of congruence change in time, becoming disordered asymmetric in space, failing to form a stable system. We can then consider the parabola in physical terms as the 'external accelerated growth of distance' TT-between two points (one fixed by convention, or inversely the accelerated attraction of a force), while the hyperbola represents the split of its inner parts into inverse trajectories, or alternately the inverse properties of two S/T elements (SxT=C). So conics connect the 2nd & 4th postulate of communication and congruence:

PENTALOGIC: 5 ¬Æ Geometry Postulates, 5Dimotions=Actions of Exist¡ence
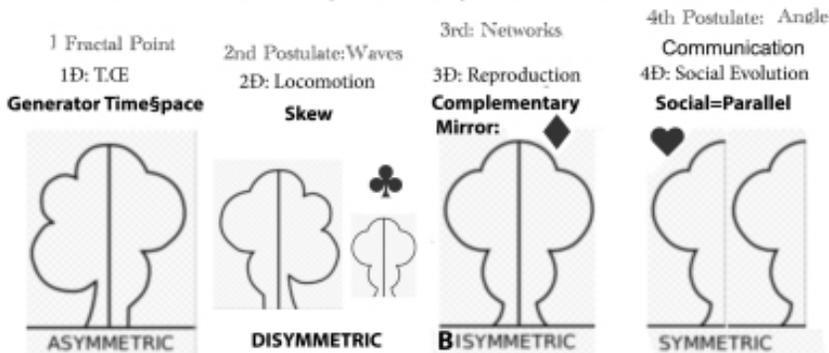
In the graphs, the general laws of behavior in the organic Universe are simple: beings who are similar or complementary and speak the same language of information come together as couples, herds and social wholes stronger than individuals. Those who perceive each other as different, will simply act in a Darwinian manner, which means, they will either increase the distance=dissimilarity; highlight their difference or break and split under predator tearing - all of them properties reflected in open conics. So we can consider also the 4 closed (right) and open (left) conics in terms of the 4 different forms of asymmetry.

We redefine geometric elements vitalising its meaning with the 'fourth postulate of ¬Æ geometry, as the 'angle of communication' determines the outcome of most events either as parallel creation or Darwinian perpendicularity.

2 'asymmetric' beings, i.e, the line and the cycle, come together, fusioning in a creative way, when *their coming is parallel, or destroying each other when it is perpendicular.*

Parallel creation: There are 2 levels, creation by communication of information through an intermediate space, studied more properly in logic and creation by adjacent pegging more suitable to topologic studies, which also spreads into Analysis (a derivative is a parallel. In essence pegging by parallel adjacency is necessary to create organic wholes. So when there are NO parallel peggings there are NO derivatives, NO communication between Δø and Δ-1, NO possibility hence to create a super organism of Δ±1 scales).

*3D creation by penetration of the line into the curve.*

Creation and reproduction produces the biggest e-motion, the orgasm, literally the sensation of a cycle invaded by a line in parallel in and out harmonic oscilation=penetration *because it is the purpose of a Universe whose fundamental element is motion and fundamental e-motion the adjacent friction of parallel forms that create complementary wholes.*

The cone that generates all curves is the inverse a penetration of a cycle which moves along a line, 'tightening' its grip.

While perpendicularity cuts and destroys one of the 2 elements, making Δst topology vital. Rememvber, we follow Godel and Lobachevski and Einstein: mathematics as all languages are real mirrors of a higher living reality.

2D creation in a holographic bidimensional 2-manifold by tangent parallelism.

Systems in any scale of the universe, from Atomic Ions or crystals to human societies relate to each other in darwinian, perpendicular 'tearing' topological relationships that 'break' the closing membrane of one species disrupting its existence (open conics), or will keep a mean distance to form social networks of communication that will grow into super organisms, starting the emergent process of evolution of species into a new Δ§cale of social existence (closed conics). So *any system's organic, geometric and scalar relationships are symbiotic to each other.*
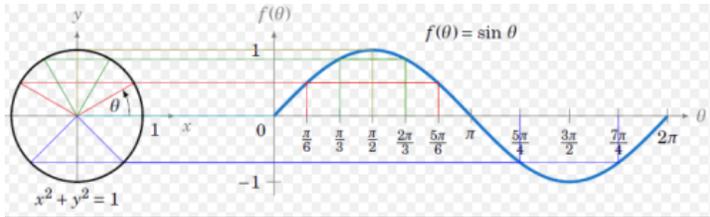
How dimensions combine to create form is an essential feature of the duality between symmetric parallelism and perpendicular annihilation (antisymmetry), which plays a special role in 5D geometry. In 2 dimensions the tangent that gives origin to a derivative reduces form to finitesimals. Or in its inverse integral is the creative form of Δ-scales.

Each geometric form can be seen as a point that moves creating a new dimension or more: the point becomes the circle that turns around. Or inversely, the circle peels off a wave from its cyclical membrane of angular momentum shaping the main creative form of 3 Dimotional S=T balance. What the S-dominant cycle ads then is a T-dimension of lineal motion and the wave is born.

In 3 dimensions the conic is a line penetrating a new dimotion, dragging a circle that turns faster in smaller spaces as it moves to the apex, final point or origin of the cone.

Symmetries in conics.

The different degrees of Parallelism, Perpendicularity and skewness are essential concepts of vital Non-Euclidean geometry applied to conics. The curves of a conic worldcycle are all the curves of the Universe; according to the *type of event=dimotion they represent, from TT entropic hyperbolas where each of the initial focus breaks the positive relationship, cutting the membrain in two parts, one for each focus that depart in inverse directions of time space, to the fusion of the two points into the boson center of a circle when parallelism is absolute.*

Thus Conics acquire a new perspective under the holographic principle of a Universe built on bidimensional ensembles, where most 'ternary dimensions' are layers of reproduced bidimensional surfaces or 'branched networks', spread on the 'holes' of a 3rd dimension'. And so we distinguish 2 kind of conics:

-Time like conics, circles and ellipses, which close into themselves creating a clear ternary structure with an external membrane closing an internal space, self-centred in one or two points separated lineally by a factor of excentricity.

-Space-like conics, parabolas and hyperbolas; which apparently are open systems without closure, but in fact preserve both, the central point of view, the internal territory and the membrane, *albeit open to let the world circulate through it.*

So conics are a dynamic transformation between $t (open) < ≈ > ðf (closed) states of an ST being, with a single parameter to measure them, eccentricity; whereas the most perfect bidimensional being, is one of o-eccentricity, where the '2 focus' of the central singularity, which can be any S/T VARIATION are both equal in space and time (a single point) - the circle. Which therefore must be considered as the Greeks had it, the perfect form; an all others deformations of it.

S=conics: Informative (Particle-head) communication, possible in cases of relative similarity≈parallelism (which determines parallel herding and social evolution) for the 2 closed conics – whereas the circle is a perfect symmetry.

T-conics: They are skew curves that do not intersect and are not parallel and clearly related to hyperbolas (with inner scattering entropic motion) and the parabola, which distances 2 points. Indeed, two lines are skew if and only if they are not coplanar, which IN 5Đ as 3 ±¡ planes co-exist in the same organism and systems feed in T.œs, two super organisms down, implies species, which are not in the *relative planes of action of the being. They are in the worldcycle cone the 2 parts of the hyperbola clearly skewed in time and space.*

Topological emergence between planes.

S-ingularity

ST-open ball

T-membrain
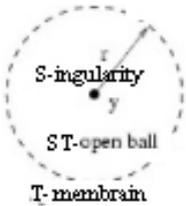
When we deal with annihilation by perpendicularity things get also 2 variations as it is logic, to think by Δ-scattering or by S<≠>T antisymmetry. But as annihilation ultimately means destruction of an Δ scale, it derives in entropic dissolution. The results are often shown in exponential functions.

We can think of the 'change of planes' as a perpendicularity against which the internal function (of momentum) 'collides' , trying to puss the 'wall' that separates scales without result, growing then in 'inertial mass' no longer in speed. As ultimately the vital energy enclosed by a membrane finds always the membrane to be perpendicular and annihilating it very often; the military border in a nation, barrier of cattle, or sepherd dog, the predators, etc.

The best known case in physics are related to the hypothetical impossibility of a function to cross a discontinuity between planes, which *is what it means in the Lorentz transformations: as a mass comes closer to the relative infinite limit of his light space-time domain, its grows 'theoretically' towards infinite as it cannot speed more.*

1. Momentum and speed

(1)Relativistic momentum follows

Lorentz transformation

$$\bar{p} = \frac{m_0 \bar{v}}{\sqrt{1-\beta^2}} = \gamma m_0 \bar{v} = m \bar{v}$$

when $v \ll c$ $\quad \bar{p} = m\bar{v} \rightarrow m_0 \bar{v}$

(2)Relativistic mass

Rest mass : m_0

$$m = \frac{m_0}{\sqrt{1-\beta^2}}$$

So its momentum mv 'changes' no longer in v but in m (as change cannot be stopped, the ∑∏ energy fed in the system must either derive into the singularity m or the speed-membrane in parallel to the larger whole galaxy membrane (Mach explanation of angular momentum). This no longer possible as the part cannot move faster than the whole (c-speed limit for the galactic space-time membrane), the vital energy does NO longer feed the membrane but the singularity and its active scalar mass, the 0-1 Dimensional parameter of density reflected in the Dirac membrane.

So we can see geometrically or algebraically how this momentum becomes then 'deviated' as a parallel angular momentum of the membrane either in lineal or cyclical fashion (itself a transformation of an SH motion from cyclical into lineal), to a growth of mass.

So the third age of geometry which started with Lobachevski's 3 'findings', mental space, topology and experimental need of maths to validate each mental space with reality, is really about this mental realisation that space is information, and so the 3rd informative age of geometry is obviously about... mental information.

RECAP. There are 3 modes of S=T mathematical creation by parallelism in the Universe: The harmonic oscillator and the cone that *model the worldcycle of existence & the* tangential lines that reduce cyclical patterns to its scalar stœps & dimotions. Timespace also splitS in the duality between past to future to past male genders and S<≈>T present female genders, whose transformations of topological lines and cycles into hyperbolic waves results in new creative combination.

CLOSED – INFORMATIVE CONICS

There are two closed informative conics highly symmetric. The symmetric circle, which we study all over the place, and the asymmetric ellipse, whose main differences in pentalogic terms are:

@: The circle has a single center or two boson-like equal centers. The ellipse has 2 focus.

¬ The circle is static, balanced and last. The ellipse is born of a 'contraction/expansion' of the circle along its X or Y coordinates of entropic vs. informative growth. As such it tends to be more dynamic.

T: Both are cyclical in patterns, hence can also act as basic representations of worldcycles.

S: The circle has the max. volume of vital space-energy with minimal perimeter. As such it is the most efficient form for a single territorial mind-point; but the ellipse is the best system for a dual pole communication, as it doubles its fractal points with minimal growth of perimeter. *Hence in palingenetic development as soon as the seed breaks into polar S/T animal/vegetal poles acquires the form of an ellipse and as one of both poles is smaller (the animal pole), it finally becomes an ovoid*

The equation of a circle with center at the origin.

First of all, we consider the circle whose equation is a generalized Pythagoras theorem: $x^2+y^2=a^2$. Its simplicity shows its suitability for a self-centered graph.
It evidently represents a circle with center at the origin and radius a, as follows from the theorem of Pythagoras applied to the shaded right triangle, since whatever point (x, y) of this circle is taken, its x and y coordinates satisfy this equation, and conversely, if coordinates x, y of a point satisfy the equation, then the point belongs to the circle; I.e. The circle is the set of all those points of the plane that satisfy the equation.

But from a pentalogic vital point of view both its equation and geometry reveals different elements of 5D reality; *when we consider the entity @-center to be a singularity constantly moving along the S: height=informative and T: length=entropic axis, in such a manner that as a 'whole' entangled S=T system, whereas $S^2+T^2=K=SS+TT$.*

Of which the most remarkable case is $3^2+4^2=5^2$ whereas 3 is the time-ages perspective, 4 the spatial perspective of the coming together of a bidimensional body and head, and 5 the scalar perspective; hence $T^2+S^2=\Delta^2$. TT+SS=Δ(-Δ): Δ∇.

What truly means is that in a single plane (given by the + operand) the sum of all the entropic and informative stœps of a being will form its full worldcycle up and down 5D.

This is a profound law that rightly embeds the most important theorem of geometry, Pythagoras, with Space-time reality. And the only equation we proceed inversely, taking it from maths to carry it into Space-time thought analyzed in our not-published papers on pentalogic. Back to the circle's pentalogic some highlights:

S=T: Ast<=>Bst: In terms of 2 points communication and its intermediate energy Dimotions the circle is an ellipse where the 2 elements are so similar they coincide in perfect symmetry. The eccentricity is 0, and the result is to be the two-dimensional shape enclosing the most area per unit perimeter squared, *hence the most efficient territory of control for a couple when its similarity becomes identity. Why a 2 view is more proper is obvious as the circle requires two up and long axis to be webbed. So multitasking better splits between two.*

Δ: In terms of scales and the extreme dimotions of entropy and form. the inner coordinates, 'abscissa' and 'ordinate' of the being (S and T values), it follows Pythagoras, SS+TT=Δ∇ postulate.

The equation of an ellipse and its focal property: eccentricity and symmetry

Next comes the ellipse, where the communication between points differs in 'length=entropy/motion /size/distance' parameters, but its 'height-informative dimension' remains the same, hence allowing 'congruent communication of information' (or is minimal in the worldcycle's cone):

Let two points F1 and F2 be given, the distance between which is equal to 2c. We will find the equation of the locus of all points M of the plane; the sum of whose distances to the points F1 and F2 is equal to a constant 2a (where, of course, a is greater than c). Such a curve is called an ellipse and the points F1, and F2 are its foci. Let us choose a rectangular coordinate system such that the points F1 and F2 lie on the Ox-axis and the origin is halfway between them. Then the coordinates of the points F1, and F2 will be (c, 0) and (–c, 0). Let us take an arbitrary point M with coordinates (x, y), belonging to the locus in question, and let us write that the sum of its distances to the points F1, and F2 is equal to 2a:

$$\sqrt{(x - c)^2 + (y - 0)^2} + \sqrt{(x + c)^2 + (y - 0)^2} = 2a.$$

This equation is satisfied by the coordinates (x, y) of any point of the locus under consideration. Obviously the converse is also true, namely that any point whose coordinates satisfy the equation belongs to this locus. The Equation is therefore the equation of the locus. And while *mathematicians* simplify it, the interest for the topological o-point of view remains precisely in its complete form.

The perfect ellipse thus have the same coordinates and ±c distance to the center of reference, which is possible for two equal points, *which lay in a non-isomorphic 2-3D world where the 'field of entropic motion', the abscissas, is larger. Hence the asymmetry belongs to the world not to the focus.* But as we change to imperfect ellipses the submissive role of the 2nd element will increase till it becomes *in orbital systems, 'expelled' as the membrain (planet to the sun).* Let us explore then both together in the context of basic XVII-XVIII Physics.

Back to the equation of the ellipse simplifying terms we get to: $x^2/a^2 + y^2/b^2 = 1$
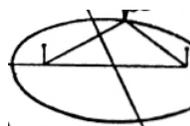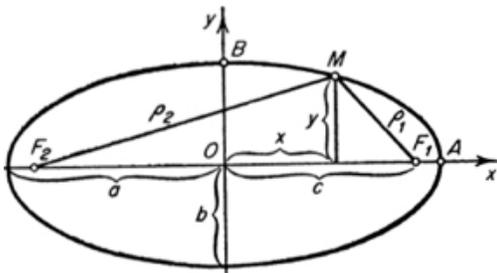
Substituting y = 0 in the equation, we obtain x = ±a, i.e., a is the length of the segment OA, which is called the major semiaxis of the ellipse. Analogously, substituting x = 0, we obtain y = ±b, i.e., b is the length of the segment OB, which is called the minor semiaxis of the ellipse.
The number c/a is called the eccentricity of the ellipse that is less than 1. In the case of a circle, c = 0 and consequently e = 0; both foci are at one point, the center of the circle (since OF1 = OF2 = 0).

As the eccentricity grows the 2 points separate but the *points still control the area of the system, which can be shown by* the method of drawing the curve with a thread connected to both.

Mathematical Physics: Kepler's law.

The main difference between the ideal simplification of mathematics as a mirror of spacetime laws and the real spacetime laws is the loss of 'Dimotions' to get to the bare basics in which *laws of Nature can be modeled – a bidimensional still geometry. Then when we return to Nature those laws are expanded with addition of motion that distorts the geometry (but conserves after a transformation of T into S the essence of the law) and an increase of Dimotions/Dimensions. So when we get into astronomy* as Newton proved the law of attraction of bodies – considered in the generic case the two poles of an ellipse give us the elliptic orbit. However the *distorsion of adding and transforming still dimensions into motions changes often the 'formal elements' of the geometry, preserving the 'essential logical/vital components', showing once more that the essence of the game is not abstract laws of spatial mental geometry but vital laws of time-space structures.*

So indeed, now the planet occupies the membrain and in the second foci there is nothing. Let us for a change put some quantitative effort calculating it. The 2nd focus is along the major axis: the line joining the positions of perihelion (closest to the Sun) and aphelion (furthest from the Sun) in Earth's orbit. So we draw an ellipse. Place the Sun at one focus (on the major axis, a bit off to one side). Mark the Sun "S" and the centre "C".
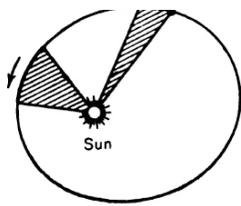
On the "short side" of the Sun, along the orbit, where the major axis cuts the orbit, that is the perihelion "P". At the opposite end is the Aphelion "A". In 2010, Perihelion was on January 3, at a distance of 147 mill. km In 2010, Aphelion was on July 6, at 152. Total length of the major axis (from P to A) is the sum = 299,mill k The semi-major-axis (distance from P to C and from C to A) is half of that (149,597,213.5 km). Since we know that the distance PS is 147 mil km, then the distance SC must be the difference PC - PS = 2,5 mill km The Sun is 2.5 million km to the "January" side of the centre. By symmetry, the empty focus is 2.5 mill km on the "July" side of C CE = 2, 5 mill .SE = SC + CE = 2*CE = 5 mill km.

But there is nothing at that point. So the question is what we can save from the definition of an ellipse *that a 5D reconstruction of physical spacetime preserves when we expand the mathematical mirror? 2* GST *truths*:

1) all distances are motions. So if we make the moving planet a static line per unit of time-motion, the key vital, communicative 2nd postulate property stays with an added dimensions. Now 2 points do not trace the same length but 'sweep the same area' working together. Thus an orbit, in the physical analysis of GST becomes a dual system that herds a vital are: the membrane with more angular momentum (the $t-planet) and the singularity with more gravity/mass (the ðf), surrounding herding and absorbing the lower Δ-1 scale of gravitational points/forces.

So if we apply to one of the points Absolute relativity (S=T: 'motion is indistinguishable of distance') orbital laws, imply the planet and the sun together scan the same 'gravitational area' . This aerolar law transcends then to any physical vortex, and also implies that the 'aerolar ellipse' will collapse till the membrain 'becomes' the singularity, falling into the higher mass to be 'one' as the static ellipse evolves into the circle. Let us then conclude with the analysis of the transformation of circles into ellipses, which show they are the same topologic variety.

### The ellipse as the result of an assymetric "expansion/contraction" of a circle.
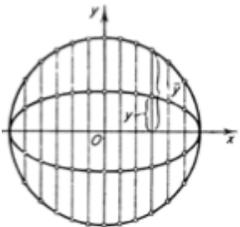
The generalized case of an entropic ellipse with 2 predator points in a line that expand its range, is analyzed in abstract, as the alternative Y-coordinates' contraction of a circle. We consider a circle with center at the origin and radius a. By the theorem of Pythagoras its equation is $x^2 + y^2 = a^2$, where we have written yi instead of y, since y will be needed later. Let us see what this circle is contracted into if we "contract" the plane to the Ox-axis with coefficient b/a. After this "contraction" the x-values of all points remain the same, but the y-values become equal to

y=y(b/a) . Substituting for in the above equation of the circle, we will have: $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ as the equation, in the same coordinate system, of the curve obtained from the given circle by contraction to the Ox-axis. As we see, we obtain an ellipse. And inversely we have proved that an ellipse is the result of a "expansion in abscissas" of a circle.

From the fact that an ellipse is an asymmetric "contraction/expansion" of a circle, many properties follow, which as usual we order in pentalogic terms:

ST:area. Since any vertical strip of the circle under its contraction to the Ox-axis does not change its width and its length is multiplied by b/a, the area of this strip after contraction is equal to its initial area multiplied by b/a, and since the area of the circle is equal to πa², the area of the corresponding ellipse is equal to πa²(b/a) = πab.

@-singularity point (center of gravity) is simply the midpoint between them. And it follows that a *natural evolution of the ellipse as two similar forms attract, is to become a circle, which i*n Gst theory reveals a deeper truth: systems become 'compressed' into smaller networks and finally into single singularity points, which organize the entire system. This structure can be generalized as Newton did for any closed conic divided into territorial domains with different centers of gravity, which all laid in a single line, itself centered in a single point, to any T.œ, which will have a vital space in 3D, reduced to the control of a menbrain in 2D, itself
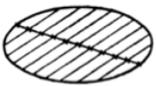
controlled by a single 1D, *each of the smaller systems processing faster information, transforming vital space into Dimotions of existjence.*

So both for the ellipse and the circle, we can consider the surface enclosed by the disk, structurally sustained by the network of lines, itself communicated at equal distances by the line, and finally the line focused in the 'center of gravity', we have built an Δ+2>Δ+1>Δ>o scalar structure. And here we realise why analytic geometry works, as it does compress mentally geometric surfaces into sequences of numbers of lesser 'volume' of information that 'commands', logically the whole.

This property of diameters - that if parallel secants of an ellipse are given, then their midpoints lie on a straight line, can be shown also from the contraction of ellipses in the following way:

We perform the inverse expansion of the ellipse into the circle. Under this expansion parallel chords of the ellipse go into parallel chords of the circle, and their midpoints into the midpoints of these chords. But the midpoints of parallel chords of a circle lie on a diameter, i.e., on a straight line, and so that the midpoints of parallel chords of the ellipse also lie on a straight line. Namely, they lie on that line which is obtained from the diameter of the circle under the "contraction" which sends the circle into the ellipse.

The ellipse of inertia.

Another physical example of the power of ellipses to create stable dual focused forms is the ellipse of inertia, whose maximal resistence for any system, even those which have 'different edges happens across the axis of the ellipse.

i.e. Let a plate be of uniform thickness and homogeneous material, for example a zinc plate of arbitrary shape. We rotate it around an axis in its plane. A body in rectilinear motion has, as is well known, an inertia with respect to this rectilinear motion that is proportional to its mass (independently of the shape of the body and the distribution of the mass). Similarly, a body rotating around an axis, for instance a flywheel, has inertia with respect to this rotation.

But in the case of rotation, the inertia is not only proportional to the mass of the rotating body but also depends on the distribution of the mass of the body with respect to the axis of rotation, since the inertia with respect to rotation is greater if the mass is farther from the axis. For example, it is very easy to bring a stick at once into fast rotation around its longitudinal axis. But if we try to bring it at once to fast rotation around an axis perpendicular to its length, even if the axis passes through its midpoint, we will find that unless this stick is very light, we must exert considerable effort.

"It is possible to show that the inertia of a body with respect to rotation about an axis, the so-called moment of inertia of the body relative to the axis, is equal to $\sum r^2_i m_i$ (where by $\sum r^2_i m_i$ we mean the sum $\sum r^2_1 m_1 + \sum r^2_2 m_2 + ... + \sum r^2_n m_n$) and think of the body as decomposed into very small elements, with m_i as the mass of the ith element and r_i the distance of the ith element from the axis of rotation, the summation being taken over all elements.
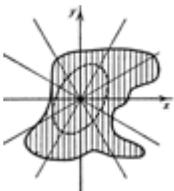
Now escaping its proof, the following remarkable result can be obtained: Whatever may be the form and size of a plate and the distribution of its mass, the magnitude of its moment of inertia (more precisely, of the quantity ρ inversely proportional to the square root of the moment of inertia) with respect to the various axes lying in the plane of the plate and passing through the given point O, is characterized by a certain ellipse. This ellipse is called the ellipse of inertia of the plate relative to the point O. If the point O is the center of gravity of the plate, then the ellipse is called its central ellipse of inertia.

The ellipse of inertia plays a great role in mechanics; in particular, it has an important application in the strength of materials. In the theory of strength of materials, it is proved that the resistance to bending of a beam with

given cross section is proportional to the moment of inertia of its cross section relative to the axis through the center of gravity of the cross section and perpendicular to the direction of the bending force.

Let us clarify this by an example. We assume that a bridge across a stream consists of a board that sags under the weight of a pedestrian passing over it. If the same board (no thicker than before) is placed "on its edge," it scarcely bends at all, i.e., a board placed on its edge is, so to speak, stronger. This follows from the fact that the moment of inertia of the cross section of the board (it has the shape of an elongated rectangle that we may think of as evenly covered with mass) is greater relative to the axis perpendicular to its long side than relative to the axis parallel to its long side. If we set the board not exactly flat nor on edge but obliquely, or even if we do not take a board at all but a rod of arbitrary cross section, for example a rail, the resistance to bending will still be proportiopal to the moment of inertia of its cross section relative to the corresponding axis. The resistance of a beam to bending is therefore characterized by the ellipse of inertia of its cross section, which *becomes therefore its 'core-singularity element', often controlled by its central point/s*.

The logic expansion of the concept of dual elliptical territories.

Now following this kind of thought, of ellipses as collaborative locus of 2 'complementary species', we can apply the 'logic' of the concept to anything and in fact define 'eccentricity' lines as the essential form of a wave of communication between 2 points (2nd Non-E Postulate):
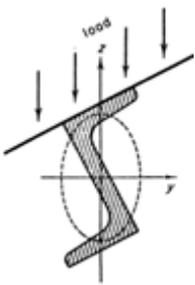
So a couple with a son, is a GST ellipse, where both fathers are constantly seeking a similar distance between them. And a territorial animal couple is also a logic ellipse, tendering for the territory as one moves to hunt, the other stays to breed.

Any relationship is a naked ellipse (without the external membrane), joined by the focal line that shares entropy and form between them.

Steel beams often have an S-shaped cross section; for such beams the cross section and the ellipse of inertia have the greatest resistance to bending is in the z direction. When they are used, for example as roof rafters under a load of snow and their own weights, they work directly against bending in a direction close to this most advantageous direction.

This result can be understood in terms of '2 planes' the Δ-plane of the beam and the Δ-1 plane of the gravitational field, and *the dominant nature of the major axis line that communicates the inner structure of the entity.*

OPEN – ENTROPIC CONICS – ITS PENTALOGIC

The open curves: parabolas and hyperbolas

Now once we have identified what is truly relevant about bidimensional curves as opposed to single ones that represent only a part of the being: to be of a full ternary organism, with 3 parts:

A focal point or singularity: @; a membrane or cyclical curve: ð§; The vital space or energy between them: st

We can consider 'open curves' in which the intermediate space is fully opened and its meaning to represent key elements of T.Œs (Timespace organisms).

And the wonder of them is that in those open systems the key elements will still be determined by the focal singularities and the relative balance of their 'co-invariant' product in relationship to the membrane.

So they can represent the 'metric equations' of co-invariance 5D systems, and in fact, the hyperbola will be the best representation of any function:

### T: The parabola as a TT quadratic propotion.
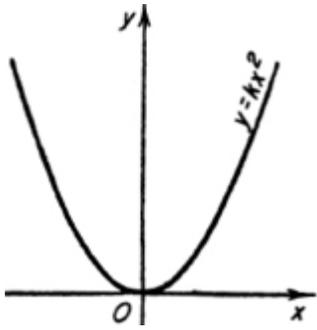
Let us then consider the open conics first from the realist perspective of mathematical physics, where they represent the motion of one or two points, rather than the static geometry of a form with its membrain. Galileo then found that a TT-accelerated motion away or coming to a different focus=point (the maximal earth vs. the attracted form), had the shape of a parabola. As we know acceleration is a double 'time locomotion' (TT) – the motion of a motion, but maintaining the 'point' with its inner structure. So we have to represent only a point – a line. And because it is moving away at an accelerated dual=square bidimensional pure time motion (acceleration) it is a quadratic proportion. Thus we define the parabola as the graph of quadratic proportion. We recall that the graph of quadratic proportion: $y=kx^2$ is a parabola; which we 'tumble' to give it significance in mathematical physics.

We can then consider inversely the 'mathematical concept' of the parabola as a 'fixed membrain'… of what we might wonder since it is an open form. The answer is that as a fixed form the parabola, and its real form the 3D paraboloid *are the perfect form to focus lineal flows of Spacetime either for the purpose of 1D perception, or inversely, they can transform a 'source' of energy into lineal entropic motions; two other variations of the sT-theme:*

S@: Its focus and its directrix.
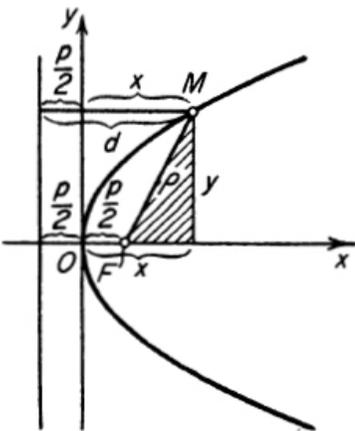
We consider then the equation $y^2 = 2px$ and call the corresponding curve a parabola.

The point F lying on the Ox-axis with abscissa p/2 is called the focus of the parabola, and the straight line y = –p/2, parallel to the Oy-axis, is its directrix.

While at each point of the parabola we can trace a lineal tangent, given the fact that all curves are made in the smaller scale of 'free open, lineal steps' (which in mathematics is the basis of differentials). Hence the linearlization of the parabola when we 'extract' one dimotion of acceleration, 'shrinking' the whole motion to its steps.

Let us then M be any point of the parabola; ρ the length of its focal radius MF, and d the length of the perpendicular dropped from it to the directrix. Let us compute ρ and d for the point M. From the shaded triangle we obtain ρ2 = $(x – p/2)^2 + y^2$. As long as the point M lies on the parabola, we have $y^2 = 2px$, hence:

$$\rho^2 = \left(x - \frac{p}{2}\right)^2 + 2px = \left(x + \frac{p}{2}\right)^2$$

But directly from the figure it is clear that d = x + p/2. Therefore $\rho^2 = d^2$, i.e., $\rho = d$. The inverse argument shows that if for a given point we have $\rho = d$, then the point lies on the parabola. Thus a parabola is the locus of points equidistant from a given point F (called the focus) and a given straight line d (called the directrix).

The property of the tangent to a parabola.

Let us examine then on those basis the 1D focus of the parabola which makes it so useful in vital topologies from eggs to eyes and antennae.

Since for a parabola $y^2 = 2px$ we have 2y dy = 2p dx. It follows that the derivative, or the slope of the tangent, is equal to dy/dx = tan φ = p/y.

On the other hand, it follows directly from the figure that:

tanɣ=y/x-p/2

B $\quad \tan 2\phi = \dfrac{2\,p/y}{1 - p^2/y^2} = \dfrac{2py}{y^2 - p^2} = \dfrac{2py}{2px - p^2} = \dfrac{y}{x - p/2}$

i.e., γ = 2φ, and since γ = φ + ψ, therefore ψ = φ.

Consequently, by virtue of the law (angle of incidence is equal to angle of reflection) a beam of light, starting from the focus F and reflected by an element of the parabola (whose direction coincides with the direction of the tangent) is reflected parallel to the Ox-axis, i.e., parallel to the axis of symmetry of the parabola:

On this property of the parabola is based the construction of Newton's reflecting telescopes and modern antennae. If we manufacture a concave mirror whose surface is a so-called paraboloid of revolution, i.e., a surface obtained by the rotation of a parabola around its axis of symmetry, then all the light rays originating from any point of a heavenly body lying strictly in the direction of the "axis" of the mirror are collected by the mirror   at one point, namely its focus. The rays originating from some other point of the heavenly body, being not exactly parallel to the axis of the mirror, are collected almost at one point in the neighborhood of the focus.

In other words, *a parabola is ½ ellipse where one of the focus has been stretched to a relative infinite value compared to the other focus, breaking its bisymmetry, and this introduces the concepts of 'relative infinities' (the Earth is an infinite weight compared to the point that traces a parabola of TT-motion towards it; the star focused in the telescope is at a relative infinite length compared to the focus distance to the paraboloid, etc.*

We show this relation geometrically by first drawing a circle, and then "stretching" it to make an ellipse, and then "stretching" it even further to make a parabola (point goes to infinity). So if we start with the equation of the unit circle: $x^2+y^2=1$

And then do some stretching in the vertical direction by a factor of *b*: $x^2+(y/b)^2=1$

And them we let b get *really big*, we get the equation of the parabola: $x^2=1$ (y)

Thus, in the so-called focal plane through the focus of the mirror and perpendicular to its axis, the inverse image of the star at the point of infinity is obtained – but the point must be a fractal point with a volume to be perceived!: the farther away this image is from the focus, the more diffuse it will be, since it is only the rays exactly parallel to the axis of the mirror that are collected by the mirror at one point.
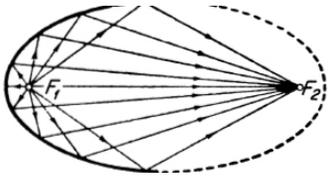
Δ+1: The searchlight is based on the same property of the parabola. In it, conversely, a strong source of light is placed at the focus of a paraboloidal mirror, so that its rays are reflected from the mirror in a beam parallel to its axis. Automobile headlights are similarly constructed.

Thus in the still view of parabolas, there is still a focus and a membrane. Whereas the parabolic being is a single 'foci', able to 'focus' the information and entropy of a larger scale field; from the pentalogic Δ+1 perspective.

ST< => ST: @-ellipse. In the pentalogic of the ellipse this property give us also the 'perceptive' pentalogic view:

Indeed in the ellipse, it is easy to show, the rays issuing from one of its foci Fl and reflected by the ellipse are collected at the other focus F2 (previous figure), *making the communication between both points as simple as a reflection in the inner side of the closed membrain; a property which as usual departs from its pure geometric formulation in symmetric systems, to configure the relationships of 'network-lines and waves' in physiological and physical organisms.*
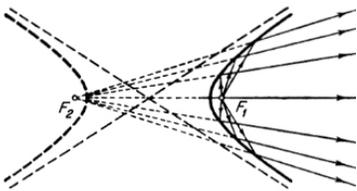
So the parabola, without a second equal focus, which would enhance the survival symbiosis between both is NOT usually a full T.œ, but at best an organ open to the world (Static view) or a TT-accelerated motion..

The Hyperbola.

On the other hand, in the hyperbola the rays originating from one of its foci F1 are reflected by it as if they originated from the other focus F2: This is a representation of a 'head-body' system where the body is blind to perception as it reflects the information absorbed from the head, which is therefore the F2 focus of the hyperbola, 'above' its lower part, split from it.

The inversion of ST values, focus and directrix of the hyperbola.

So the hyperbola is the most extreme entropic representation of 'split' 'inverse' ST properties.

Indeed, if we consider a single part of the hyperbola as the graph of inverse proportion and that the graph of inverse proportion y = k/x y x = K is a hyperbola. Its equation though is all pervading precisely because *the quality of inversion is the essential dual property of space vs. time fields, which can be represented by ½ hyperbola in innumerable cases.* S x T = K is by definition, the equation of t**he perfect hyperbola.**

Indeed, the 2 branches conic equation. $x^2/a^2 - y^2/b^2 = 1$ represents the full hyperbola. In the special case a = b the so-called rectangular hyperbola plays the same role among hyperbolas as the circle plays among ellipses:
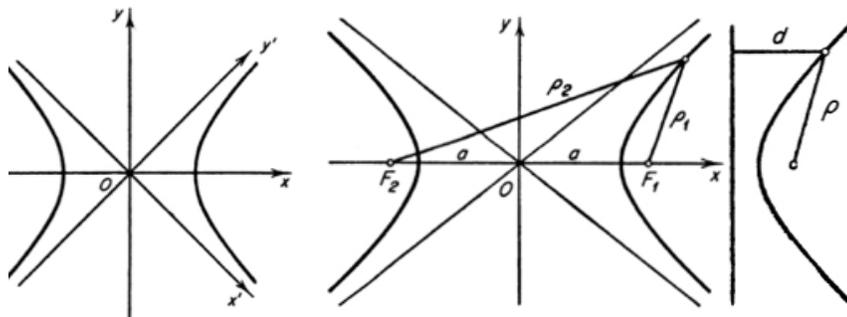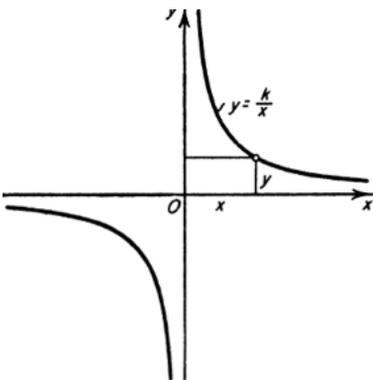
If we rotate the coordinate axes by 45° the equation in the new coordinates (x', y') will have the form: x' • y' = k. And we shall use both modes to fully grasp fundamental metric equation of systems in the fifth dimension.

Now in the previous hyperbola, if we denote by c a number such that $c^2 = a^2 + b^2$, then it is possible to show that a hyperbola is the locus of all points the difference of whose distances to the points Fl and F2 on the Ox-axis with abscissas c and –c is a constant: $\rho_2 - \rho_1 = 2a$. The points F1 and F2 are called the foci.

Let us then consider the parabola from the perspective of its foci and directrix.

Like the parabola, the hyperbola has directrices, in this case two apiece. If we consider a focus and the directrix "on the same side with it," then for all points of the corresponding branch of the hyperbola, we have $\rho/d = \varepsilon$, where the eccentricity for a hyperbola is always greater than 1.

Thus one branch of the hyperbola are the loci of all those points in the plane for which the ratio of their distance ρ from the focus to their distance d from the directrix is constant. For the ellipse this constant is smaller than unity, for the parabola it is equal to unity, and for the hyperbola it is greater than unity. In this sense the parabola is the "limiting" or "transition" case from the ellipse to the hyperbola; born as the ellipse tears apart its 2 focuses, that split entropically into two different entities, albeit maintaining its relative symmetry as two parts that were once entangled into one:

And so the fundamental relationship between the curve and the 2 foci, is preserved in an inverse 'resting manner'; which qualifies the hyperbola as the entropic state of the ellipse, its time-reversed figure, an aforementioned property of importance for 'complex GST analysis', well beyond the scope of this texts.

The hyperbola is different from the ellipse, as it is pure algebraic in 'phase space', with variables in which the hyperbola is NOT a real form, but a mental form to represent, *the metric equation of 5D, in which Ts x St = K:*

Consider a simple formula for Pressure, p, due to a liquid column: $P = \rho \times g \times h$

Density is a measure of density of form, or information of a system; h, the height dimension of information and g, acceleration, a parameter of an inward vortex of growing frequency. Thus *pressure is an St parameter, with a value, product of a time-dimension (frequency acceleration), an informative dimension, height, and a time dimension, 'density'. Moreover, we can put the 3 'elements' in terms of time as a measure of the 'past' value of the system (its density), the present value (its height) and the future value (its acceleration downwards), and then make a deep philosophical statement about the constancy of pressure.*

Yet if pressure is the ð∫ parameter, it follow that expansive volume is the pure SPACE-entropy parameter, and so we shall immediately postulate according to 5D metric the existence of a co-invariant relationship:

$$P(t) \times V(s) = K(st)$$

Where K will turn out to be the cyclical space-time vibration of temperature.

This 'dimensional analysis' is thus an entire new fruitful perspective on mathematical physics, akin to the dimensional analysis of classic physics, but far more profound in significance.

Boyle's law amounts to yet another '5D metric' equation, which we can plot with a straight line departing from O, crossing all different Ti, for equivalent PxV values, maximised in the central region of the asymptotic curves.

*All this* reveals whys and Ðisomorphisms of a simple mathematical equation which for a physicist, means merely ρ, the density in kg/m3, g=1o m/s² the acceleration due to gravity and h, the height or depth of liquid in meters, used to calculate the praxis and future behaviour of a liquid in motion.

But what we have written is essentially the equation of potential energy, PE=m x g x h, which we will indeed define when studying actions and Hamiltonians, the ultimate equations of 5D physics (as well as 4D physics), as the time-like component of 'present space-time energy'.

The theme of Geometry and physics is obviously well beyond anything this author can develop in a few notes. So the reader specially if a physicist should not expect more than some marginal comments.

A few comments though seem necessary after studying the representation in motion geometry of the 5 Dimotions of reality with conic curves, since that was essentially the way in which modern physics was born, when Galileo studied the 5th Dimotion of entropic cannonballs, which were open T-parabolas and Kepler, the 4th Dimotion of interactive orbits of planets and sun, which were closed S-ellipses.

The 10 canonical equation of the bidimensional plane.

$0 \quad x^2 + y^2 = 1$ Circle

$1. \dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} - 1 = 0.$ Ellipse

$2. \dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + 1 = 0.$ Imaginary ellipse

$3. \dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 0.$ Point (a pair of imaginary lines intersecting in a real point)

$4. \dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} - 1 = 0.$ Hyperbola

$5. \dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 0.$ A pair of intersecting lines

$6. y^2 - 2px = 0.$ Parabola

$7. x^2 - a^2 = 0.$ A pair of parallel lines

$8. x^2 + a^2 = 0.$ A pair of imaginary parallel lines

$9. x^2 = 0.$ A pair of coincident straight lines
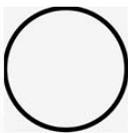
THE 10 CANONICAL FIGURES

In the graph we see the 10 canonical curves, of which 5 are S=curved and 5 are T-straight, 5 are T-open and 5 are S=closed, 3 are imaginary, 3 are double, 3 are single and 1 is a point. They are indeed what they are because they respond to the ST and 3x3+• symmetries of the space-time Universe.

We considered the most important second-order curves: the circle, the ellipse, the hyperbola, and the parabola. What other curves and generations are relevant to exhaust the field of bidimensional geometries?

Not surprisingly as the Universe is only a 5D structure, there are no more curves than the ones needed to define the 5 Dimotions of reality. So all other curves can be reduced to one of the 9 canonical equations of conics.

A 2nd-degree equation, $Ax^2 + 2Bxy + Cy^2 + 2Dx + 2Ey + F = 0$ contains 6 terms, not 3 or only two as in the canonical equations of the ellipse, hyperbola, and parabola. This is not because such an equation represents a more complicated curve but because the system of coordinates is possibly not suited to it. It turns out that if we select a suitable Cartesian coordinate system, then a second-degree equation with two variables always can be reduced to one of the following canonical forms – since as we already explain *the simplified generalized coordinates or |, O, Ø topological varieties in which the system or event we study, reside will always bring a*

*simpler more true point of view. So as t*t turns out if we select a suitable Cartesian coordinate system, then a second-degree equation with two variables always can be reduced to one of the following canonical forms:

The reader will observe those canonical forms are the 3 conics (with the circle a contracted ellipse) *and the two essential forms of congruence, intersecting and parallel lines.*

Alas, once more the Universe appears as a simple structure, of closed and open systems, the perfect circle, the split ellipse with 2 focus, the parabola, which further splits them and the hyperbola which through the y-axis of entropy sends both in different 'height arrows' of the Δ-scales of the fifth dimension.

Plus 3 varieties of lineal couples, the intersecting couple, the parallel couple and the identical ones, which again respond to the ternary symmetries of the Universe, whose profound meaning, relevant to the outcome of all events in space-time is studied in depth in the article dedicated to the 4th postulate of non-Æ logic.

Let us write them all in 3 dimensions, which Fermat's theorem, superposition laws) is merely done by accumulation of reproduced, identical 'social numbers' of planes, one after another, the same curves merely engrossed through the reproductive growth of a z-dimension are still the same unique varieties:

$$X^2 + Y^2 + Z^2 = 1 \qquad \text{Sphere}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} - 1 = 0 \qquad \text{Ellipsoid}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} + 1 = 0 \qquad \text{Imaginary ellipsoid}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} - 1 = 0 \qquad \text{Hyperboloid of one sheet}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} + 1 = 0 \qquad \text{Hyperboloid of two sheets}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 0 \qquad \text{Second-order cone}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 0 \qquad \text{Imaginary second-order cone}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - 2cz = 0 \qquad \text{Elliptic paraboloid}$$

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} - 2cz = 0 \qquad \text{Hyperbolic paraboloid}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - 1 = 0 \qquad \text{Elliptic cylinder}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + 1 = 0 \qquad \text{Imaginary elliptic cylinder}$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 0 \qquad \text{A pair of intersecting imaginary planes}$$

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} - 1 = 0 \qquad \text{Hyperbolic cylinder}$$

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0 \qquad \text{A pair of intersecting planes}$$

$$y^2 - 2px = 0 \qquad \text{Parabolic cylinder}$$

$$x^2 - a^2 = 0 \qquad \text{A pair of parallel planes}$$

$$x^2 + a^2 = 0 \qquad \text{A pair of imaginary parallel planes}$$

$$x^2 = 0 \qquad \text{A pair of coincident planes.}$$

Each of those conics and curves in 2 or 3 Dimensions. We can then see the circle and the cone as a 3D spiral the 1 Dimotion and non-Euclidean postulate.

The second postulate and 3 Dimotion of reproduction and communication are expressed by elliptic forms.

The 2nd Đimotion is expressed by lineal forms and planes, whose relationships are given by their parallelism, as herds, perpendicularities (as intersecting planes) its skewness as cat alleys or convergence (5Đ social evolution) and divergence (hyperboloids between two systems) or pure entropic 4D dissolution of a system - parabolas.

Further | x O = Ø generations.

As the Universe becomes more complex by iteration and combination, the field of complex curves, which mix geometric, scalar and vital, moving properties of the 3 ΔSt elements becomes quasi-infinite (∝). And vice versa, we can *further reduce all curves to | x O = Ø generations of the 2 formal elements of the Universe.*

We saw how | x O dualities generate conics & spirals. And the same can be said of all other 9 canonical curves.

Consider the case of rectilinear generators of a hyperboloid of one sheet. It is not at all obvious the fact that the hyperboloid of one sheet and the hyperbolic paraboloid can be obtained, just like the cone and the cylinder, by the motion of a straight line.

In case of the hyperboloid, it is sufficient to prove this fact for a hyperboloid of revolution of one sheet $x^2/a^2 + y^2/b^2 – z^2/c^2 = 1$, since the general hyperboloid of one sheet is obtained by a uniform expansion from the Oxz-plane and under such an expansion any straight line will go into a straight line.

Let us intersect the hyperboloid of revolution with the plane y = a parallel to the Oxz-plane. Substituting y = a we obtain: $$\frac{x^2}{a^2} + \frac{a^2}{a^2} - \frac{z^2}{c^2} = 1 \quad \text{or} \quad \frac{x^2}{a^2} - \frac{z^2}{c^2} = 0.$$ But this equation together with y = a gives in the plane y = a pair of intersecting lines: x/a – z/c = 0 and x/a + z/c = 0.

Thus there is a pair of intersecting lines lying on the hyperboloid. If now we revolve the hyperboloid about the Oz-axis, then each of these lines obviously traces out the entire hyperboloid (graph). It is easy to show that:

1. 2 arbitrary straight lines of 1 and the same family of lines don't lie in the same plane (they are skew)

2.Any line of 1 of these families intersects all the lines of the other family (except its opposite, which is parallel)

3. Three lines of one and the same family are not parallel to any one and the same plane.

As in complex ¬E geometry 3 lines define a topological organic plane, the hyperboloid represents an entire familiy of organic species, which we shall consider in physical and biological and chemical analysis.

RECAP. The importance of bidimensional curves: Holographic physics.

Once we understand bidimensionality we can enlighten physics' mathematical statements, which deal with laws of forces and motion, drawn before analysis with the canonical Bidimensional:

- 'Open' curves – parabolas for entropic motions as in cannonball shots.

- Closed curves: cycles, spheres, ellipses: used in informative motions - as in gravitational and charge vortices/clocks.

- And in-between, St-hyperbolas, used in st-ratios: st balances, st-systems, st-constants of nature and 5D=st metric equations; as in Energy laws or the Boyle law: P(t) x V(s) = K(st)

The most extensive field though of analytic geometry becomes its use in mathematical physics to describe the different Dimotions of reality. We shall thus study curves in analytic geometry as expression of those dimotions.

TRANSFORMATIONS OF REALITY INTO MIND SPACE: PROJECTIVE &AFFINE GEOMETRY

Of the many singularity mind-spaces with wide implications, the richest one is projective geometry, as it shows *the properties of the outer world that remain invariant in the mind-construction of useful information about reality, making possible its survival in the outer world,*

A fundamental development of geometry parallel with the creation of Lobachevski geometry came about in yet another way. Within the wealth of all the geometric properties of space, separate groups of properties, distinguished by a peculiar interrelatedness and stability, were singled out and subjected to an independent study. These investigations, with their separate methods, gave rise to new chapters of geometry. The explosion of parallel geometries is thus a welcomed ad on necessary to expand our analysis of the motions across different scales. And the way planes of space-time create the holographs of the Universe, by motions and translations, projections and imprinting of information into energy.
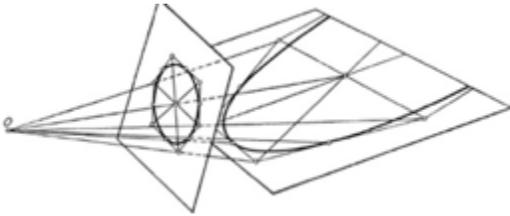
Projective geometry is in that sense, a basic tool to understand how a bidimensional, high plane of information, projects its form over a plane of space, creating a space-time system. As usual we will then find a relationship between the 3 elements of reality, the o-point, the ð cycle and the Spatial plane, which *is the origin of all realities in all its creative combinations:*

In the graph, the projection of a bidimensional tall ð cycle of time on a spatial surface of energy conserves certain properties but transforms the main property of time – to be closed geometry, into the main property of space, to be an opened geometry. Indeed, for the highest points of the informative pure cycle of height to be projected on the $ plane, 3 elements are to be put in relationship, the o-point, the cycle and the open plane, such as the bigger the open plane, the more chances it will have to imprint the cycle, and the higher the point of view, the easier it will be to project the cycle with a closer similarity. It must be also mentioned the great importance that has the Riemann sphere and its projection in the complex plane, to be analyzed on line 4.

The second element of projective geometry is the understanding on what properties are or not conserved, and easily projected, in as much as it means what are the ð≈$ symbiosis that ties up both elements into ði≈e$ of space-time (an old formalism which I no longer use, as I am converting all variations into ð and $for easier understanding).

It is then self-evident that 'measure', that 'sacred cow' of physicists is NOT conserved. It is precisely 'size' the true flexibility of the Universe and its 5th dimension, which is not needed in a Universe of absolute relativity of scale. The lengths of segments are changed in the process and so are the angles, the outlines of objects are visibly distorted.

What then remains? Immediately we see, of the essential qualities that the property of a number of points lying on one straight line is preserved; and those are as anticipated in our i-logic axiom of a line, 3 of them, for such lines to be fully straight. So the projection on the $t-plane DO conserve the $t-relationships of the ð cycle, enhancing them as the lines DO grow in size, when we move from a ð implosive form into an $ explosive form.

This general rule is of importance in all relative systems, so we shall extract a general law of it:

'Transformations of time into space conserve and enhance the spatial properties of the S or T element'. This is important because the Universe is all about conservation of Angular and lineal momentum, potential and kinetic energy, past and future combinations of space-time; so translations must conserve the properties which are more natural to the new medium in which the system moves. We live in a Universe that wants, tries and achieves immortality of energy and information through laws such as this one.

We can also observe that the central point of view do conserve those lines and relationships, as all the lines that crossed it keep crossing it. So the 'soul' of the system is conserved.

The membrane though is the most distorted element, because it now unless the spatial plane in which is projected is 'big enough' to transform its 'fast, compressed' cycles of existence, it will NOT fit on it. So as a general rule we notice that the most important element conserved is the 0-point of view, or will/soul of the system, and this will allow to formulate an even larger general theorem of reality:

'All points of view can switch between space and time states without loosing its identity. So all systems can coil to sleep in its informative state, and elongate to move in its spatial state. There are of course many other space-time dualities that prove this theorem. And in this the reader should understand that even ABOVE mathematics there is Space-time Theory, but we do honor the value of mathematics by referring the causality in an inverse fashion (extracting ΔST theorems from mathematical ones – it is in fact the other way around, projective geometry conserves the 0-point of view, because this is the 'last' entity to be destroyed in any system, as the system dies once it is collapsed. So we can state here that ΔST systems do NOT die when they change from spatial to temporal states).

Another conserved property is that of a straight line being a tangent to a given curve. And of course, the reader does not need to be a lynx to realize this is the definition of a derivative and one of the many ways to understand that we can always derivate in time and space a system, or integrate it, as this is what all is about, conservation of full worldcycles as zero sums of an infinite number of infinitesimal steps, each one a straight derivative on a curved worldcycle. So the worldcycle of the ð circle is now projected into a $ medium, but it is still happening, and it will be completed if there is enough 'vital space' for it to be imprinted (or else it will be cut off; but as a rule in nature a seed of information 'prospers' in a relative energetic space, or else the 'animal, or physical system' chooses NOT to reproduce. So we could say that o-points gauge first with 'projective geometry', in a logic manner its 'resources of space-energy' before 'projecting its information and reproducing it in a larger being of space.

Projective geometry does must be considered in the larger view of T.Œs a modality of Spatial Reproduction.

The other action related to projective geometry is obviously perception, in the inverse arrow to its spatial reproduction, when the plane of energetic space is projected back into the o-point of perception that gauges information. And this gives birth to an interesting field when we compare the two 'different directions of time', ð->$ (reproduction) and $->ð (informative perception).

The study of properties of perspective goes back in antiquity right to Euclid, to the work of the ancient architects; artists concerned themselves with perspective: Dürer, Leonardo da Vinci, and the engineer and mathematician Desargues (17th century). Finally, at the beginning of the 19th century Poncelet was the first to separate out and study systematically the geometrical properties that are preserved under arbitrary projective transformations of the plane (or of space) and so to create an independent science, namely projective geometry.

It might seem that there are only a few, very primitive properties that are preserved under arbitrary projective transformations, but this is by no means so.

For example, we do not notice immediately that the theorem stating that the points of intersection of opposite sides (produced) of a hexagon inscribed in a circle lie on a straight line also holds for an ellipse, parabola, and hyperbola. The theorem only speaks of projective properties, and these curves can be obtained from the circle by projection.

The importance of this in reality is obvious, as the hexagon, we have already mentioned is the perfect pi-cycle of 3 diameters of perimeter.

And so not only the projection of the cycle but the hexagon its 'natural quadrature' is conserved.

It is even less obvious that the theorem to the effect that the diagonals of a circumscribed hexagon meet in a point is a peculiar analogue of the theorem just mentioned; the deep connection between them is revealed only in projective geometry. But its deep foundations are in ΔST: again the o-point is conserved in the hexagon, which reveals to have many similar properties of the cycle as it is its most stable form for 'small networks'.

Now another key field of projective geometry is the study of angular projections, and its related trigonometric laws, which can be considered part of the ð perception, and the capacity of a point to accurately measure distances on the space it perceives.

This is the most magic part of projective geometry, which reveals the enormous intelligence of space-time to allow o-points of view to gauge information.

For example, under a projection, irrespective of the distortion of distances, for any four points A, B, C, D lying on a straight line the cross ratio AC/CB: AD/DB remains unaltered:

$$AC/CB: AD/DB = A'C'/C'B': A'D'/D'B'$$

Thus a system can actually perceive measures by having a 'sensorial' set of (ABCD)' points in its membrane to calculate such proportions. These kind of properties are of course extended to all the laws of trigonometry and angles and distances calculated with those laws.

Projective geometry, thus is essential to understand the relationship between a o-point or ST-system and its outer larger world, and how the point shrinks topologically an external world into an internal image, along topology, trigonometry and… affine geometry, which form the scaffolding of the mathematical laws that allow 'gauging information', even for the simpler systems of nature, regardless of human anthropomorphism.

Growth of points into waves and planes, in algebraic forms= geometric figures.

It is customary to analyze the equations of curves with analytic geometry, though to that aim we would need to introduce some in-depth concepts of 5D operands in algebra. We could then start the analysis of geometry and algebra together by considering the 'basic' chain of social operand, the sum or superposition *in a single plane*, the product the operand of growth of dimensionality *iteration and merging*. And so a product converts a point into a line, wave or cycle and a new product into higher dimensional forms. As we work with 2 dimensional figures, the square is the basic product of the conic curves… But all this will obscure the purity of geometry, as Cartesian coordinates do with generalized ones. *We must always remember the differences between 'objective reality' which is independent of the observer, and humind knowledge that somehow always gets the distorting human observer complicating things. When we introduce a Cartesian frame of reference while humind's manipulation becomes easier the essence of those conics* which is about the relationship between the inner focus and the points gets blurred. In that regard we are more interested in generalized coordinates for objective analysis and projective geometry for subjective analysis of the laws of space, as the most generalized forms; and just will mention the algebraic equations of analytic geometry as a reference to what matter us – to extract vital properties of those curves.
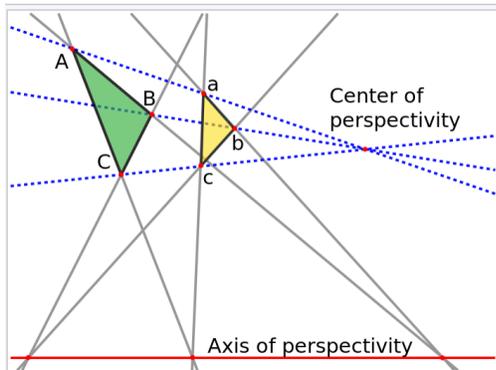
Perspective triangles. Corresponding sides of the triangles, when extended, meet at points on a line called the axis of perspectivity. The lines which run through corresponding vertices on the triangles meet at a point called the center of perspectivity. Desargues's theorem states that the truth of the first condition is

The observer, observable and creator trilogic paradoxes.

Projective Geometry introduces a theme fundamental to the paradoxical nature of the Universe – the ternary symmetry between the 'world' that creates as a whole its smaller parts, and the smaller perceiver within the world. The classic example being Desargues theorem that relates an observer (center of perception

- a nicer word than perspectivity'), an observable, two triangles, and a creator, the axis of perspectivity.

But the ego paradox makes the perceiver to *think he creates what he perceives.* So for long *the main theory of light colors was that the eye generated the light that reflected on objects, bouncing back to create an image, no the other way around.* external, objective world though is larger and generates the observable which the internal subjective world perceives and through its perception can entangle in simultaneity with the Creator.

Consider for example Desargues main theorem of projective geometry. In a subjective view the two triangles would be generated by the perceiver as the 'apex' of a pyramid, which do not require further elements in its construction but the 'eye rays'. But as it happens the triangles, not the perception of them are generated by the axis of perspectivity, a 'larger worldline' than the point of perception, which has *3 points x 2 lines, to construct the 3 corresponding* lines x 2 triangles.

How this 'abstraction' becomes a reality should be obvious to the reader. According to the 2nd ¬E postulate a line has volume, more than 1 Dimension. It is therefore a wave of fractal points or a network In this case we talk of the axis of perspectivity as a whole, its points, the departing elements of 3 'physiological or fractal networks', which merge to create 2 organs, the triangles, whose self-similarity is established by the center of perspectivity.

The humind center is only a point, not enough to generate a larger world. But as always the paradox of the ego turns upside down the causality as in the Copenhagen interpretation or Hilbert's axiomatic method – I imagine points and lines. Hilbert's ego though doesn't need to know that a Cartesian demon, the 'axis of evil' has placed those 2 triangles for its mind to see. And yet the 'generator' are the 3 perspective points of the axis line, the larger world with a higher dimension than the point. This realization that we do NOT generate the larger world, which is out there for us to mirror comes only with a constant evolution from subjective childhood to an objective mature classic age (reverted back to subjectivity in the third old age that degenerates to childhood, as today huminds do in its collective age of self-extinction, becoming emotional and subjective, self-centered children again).

RECAP. From a pure spatial perspective of geometry as a simultaneous time independent view of the structural relationships between the parts of reality – the superorganism, its scales and elements - generalized and projective geometry are of a higher value. But for the complex entanglement of perspectives *specially when dealing with geometry as an expression of time dimotions, what should be called 'algebraic geometry' but it is called analytic geometry works better.*

Δ-SCALAR TOPOLOGIC SPACES: LINEAL AFFINE GEOMETRY.

Affine geometry studies the properties of figures that are not changed by arbitrary transformations in which the Cartesian coordinates of the original (x, y, z) and the new (x', y', z') position of each point are connected by linear equations. Where it is assumed that the determinant is different from zero.

It turns out that every affine transformation reduces to a motion, possibly a reflection, in a plane and then to a contraction or extension of space in three mutually perpendicular directions.

Quite a number of properties of figures are preserved under each of these transformations. In fact affine geometry is remarkably extensive, showing ultimately that *growth in size through lineal increase of and $ x ð system is absolutely natural to the Universe, its essence, which easily conserves all the properties of the fractal ð seed in its expansion in space:*

$$x' = a_1x + b_1y + c_1z + d_1$$
$$y' = a_2x + b_2y + c_2z + d_2$$
$$z' = a_3x + b_3y + c_3z + d_3$$

Straight lines remain straight lines (in fact all "projective" properties are preserved); moreover, parallel lines remain parallel; the ratio of volumes is preserved, also the ratio of areas of figures that lie in parallel planes or in one and the same plane, the ratio of lengths of segments that lie on one straight line or on parallel lines, etc.

Many well-known theorems belong essentially to affine geometry. Examples are the statements that the medians of a triangle are concurrent, that the diagonals of a parallelogram bisect each other " that the midpoints of parallel chords of an ellipse lie on a straight line, etc.

The whole theory of curves (and surfaces) of the second order is closely connected with affine geometry.

The very division of these curves into ellipses, parabolas, hyperbolas is, in fact, based on affine properties of the figures: Under affine transformations an ellipse is transformed precisely into an ellipse and never into a parabola or a hyperbola; similarly a parabola can be transformed into any other parabola, but not into an ellipse, etc.

So unlike in the case of projective geometries of ð systems into $ systems, which transform circles into their equivalent open spatial forms (parabolas), affine transformations, which are growths DO conserve the essential ð<$t structure of the system. Moreover it is a deterministic transformation, with NO errors. Parabolas do NEVER become ellipses and so on.

The importance of the separation and detailed investigation of general affine properties of figures is emphasized by the fact that incomparably more complicated transformations turn out to be essentially linear, i.e., affine in the infinitely small, and the application of the methods of the differential calculus is linked exactly with the consideration of infinitely small regions of space.

If we correct this infinitesimal concept to a finitesimal, which still preserves this linearity, we could simply state that growth of a system goes through a 'lineal region, in the stable ΔST=k conserved metric region of the 5th dimension.

In other words, the lineal affine growth of a system and affine geometry on the whole is justified by the Δ(Sp x ð) = a K process of growth of the system, within the 10^x growth region , which is the region in which the metric of the system is lineal before its Lorentzian regions of emergence or dissolution in the Δ±1 scales.

Now modern mathematics obviously does NOT consider this 5D realist interpretation of the reasons of existence of those fundamental variations of geometry. Instead they re formalized within the abstract meaningless idealist programs of the axiomatic methods of the German school of science of a century ago (as nobody has ever since 'think' seriously in philosophy of science, once culture moved to America, and its visual or technical praxis with so little pure theoretical and intellectual understanding).

Thus all this is classified into the Klein's Erlanger Program of1872, which sums up the results of the developments of projective, affine, and other "geometries" giving an obscure formulation of the general principle of their formation with the use of that pest of modern mathematics called group theory (-:

We can consider an arbitrary group of single-valued transformations of space and investigate the properties of figures that are preserved under the transformations of this group."

In accordance with this principle of Klein, we can construct many geometries. For example, we can consider the transformations that preserve the angle between arbitrary lines (conformal transformations of space), and when studying properties of figures preserved under such transformations we talk of the corresponding conformal geometry. But the result of this program, as any of the multiple variations of the German idealist axiomatic method is a hyperinflation of 'imagined mathematics', which confuse the fundamental property and need for mathematics as a realist science.

Information is inflationary there is more money than real economy, more imagined words that real facts to describe, more fiction that reality in any language. And this is the fact of the 3rd age of information of any system – not a value but a loss of classic realism, the perfect age in which language and reality are in mirror correspondence to each other.

We shall not consider that metalinguistic approach, which completely ignores the outer world reflected by mathematics, in the obvious opposed realist philosophy of i-logic mathematics. As we hold truth Gödel's proof of the incompleteness of any categorical definition and proof of existence based only in an internal metalanguage or internal logic.

Those brief examples of CLASSIC still analytic Geometry and its initial applications to mathematical physics suffice for the purpose of it - to show the bidimensional structure of the universe in its st manifolds according to the holographic principle.

RECAP. 5D transformations of scales generate from reality mind spaces, through a dual process of contraction of form and stillness of motion. And vice versa, the processes of expansion of a seed of mental space or form into the larger world by reproduction and motion given to the seed of form.

Those essential processes of creation are mimicked in the projective geometry of visual space and the affine geometry that simplifies curves into lines.

Affine geometry studies the inverse, dual actions of reduction by 'perception' of a larger space surface by a singularity whereas an Space is 'reduced' into the ð-point and inversely the 3Dimotion of reproduction and scaling where an informative seed of form is imprinted on an energy plane. Accordingly affine geometry is related to the 'growth in size' of a system, through a lineal process of expansion in space.

XII. 2nd AGE: T: MOTION - DIFFERENTIAL GEOMETRY EXPANDS MATHEMATICAL PHYSICS.
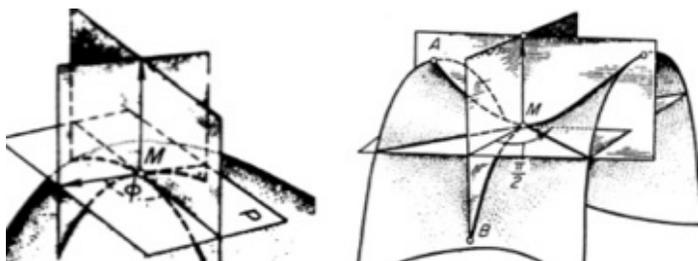
This final fundamental realization that connects geometry with the metaphysics of order vs. freedom, form vs. motion, lower vs. higher scales, (Galilean paradoxes of Duality), is thus a good introduction to the third age of Geometry (even if it came before the final evolution of @nalytic geometry into non-Euclidean forms of mind-space).

Its 3 clear±¡ sub-ages will be:

Differential Geometry of curves taken as points with motion.

Vector spaces, which expand at the path of mathematical physics, as the best phase space to represent Space-time fields of parameters that have both form and motion.

Topology, of the 3 BiDimensions of space with motion that represent the 3 functional organs of any supœrganism,

Δ@st: Its 3rd eclectic modern age of combination expansion and explosion to all other branches of the 'entangled mathematical mirror of the entangled Universe'. We shall for sake of simplicity only comment on the 3 first classic ages. And develop instead of the eclectic modern age...

A pentalogic age of 5D 'motion geometry', with a few insights on the different ages and forms of geometry which are better suited to express the 5 Dimotions of the Universe.

The 'surface' of a sphere, approached by 'smaller planes':

In the graph, the fact that any space coincides with a Euclidean in the infinitely small enables us to define for the intrinsic geometry of a surface by approximating an infinitely small portion of the surface by a plane or an infinitely small volume expressed as Euclidean space. The volume of a finite domain is then obtained by summing infinitely small volumes, i.e., by integrating the differential of the volume. The length of a curve is determined by summing infinitely small distances between infinitely near points on it, i.e., by integrating the differential of the length ds along the curve.

And this is a rigorous analytic expression for the fact that the length is determined by laying off a small (infinitely small) measuring rod along it - which is ultimately the differential, smooth version of the fractal step by step measuring of growing distances when we scale down our view - hence another proof of the fractal and mental nature of reality, ultimately proving the Δ±i and @-mental 'missing dimensions of reality', in human 'naive realism'.

The graph then show in '2 dimensions' on the surface of the being another kaleidoscopic VIEW on the application of Euclidean, elliptic and hyperbolic geometries. If we consider ONLY a simplified Euclidean reality, (left side), we need no measure of curvature - it is a flat small plane of space.Next in complexity, a regular spherical curved piece of the whole,(ð§) requires more information. So a measure of curvature, Φ measure is required.

But if the system is not a regular sphere, two curvatures will be needed. Finally in hyperbolic geometry the more complex, ST vital energy with its two CONTRADICTORY directions towards the singularity and the membrain, will need two curvature angles, with opposite directions, represented by the ±sign.

And we shall choose (Euler) to well-define the curvature of the whole surface, just the maximal and minimal angles of curvature, according to the fundamental rule of t.œs, which can be defined by its standing points, its maximal and minimal functions, which are the relevant Max. e x Min. i, max. i x min e, e=i, ternary 'points of any worldcycle/system', require to Generate all events and forms of existence.

Such directions are thus called the principal directions and the curvatures k1 and k2 are called the principal curvatures of the surface at the given point: $k(\varphi)= k1 \cos^2\varphi \pm k2 \operatorname{sen}^2\varphi$...

Where once more as usual we find the sinusoidal functions that define ST systems with its two opposite directions.

The inverse arrow: envelopes and curves on the large.

Fig. 48.

It has to be noticed that humans with its obsession for the small, as information comes from below and so it is more abundant, while above, larger entities are not so well perceived, has made us also quite ignore the emergence of larger entities. This however is essential for physics and in mathematics the origin of emergence in time (Fourier transforms) treated on the emergence articles on the first line, and emergence in space, the so called envelope curves, yet another branch of static formal space, better treated in physics where space usually has motion, reducing on one side the informative inflation of 'fiction theories of the mind - spaces with no vital use' and giving the equations a more beautiful s=t symmetry between the form and motion dimensions (s=t being the 'definition of beauty', a theme treated in the study of the existential program).

We shall just then mention it for the sake of completeness - that is to show that for each Δ-1 entropic theory there is an inverse Δ+1 social one:

The question of envelopes in that sense is a relatively simple one - as all questions of Δ+1 wholes of lesser information, solved long ago, in the theory of families of curves and surfaces. Especially well developed is the theory in the canonical ST, holographic 2-manifolds; that is two-parameter families of various curves, in particular of straight lines ALWAYS easier to 'perceive' by human essentially a 'small thing' belonging to a 'flat curvature' space-mind: the so-called "straight-line" congruencies. In this theory one applies essentially the same methods as in the theory of surfaces, hence within the scope of Δst Disomorphisms.

In terms of Δst the theory is the direct application of a fundamental law of ST emergence, often quoted in different articles: $\sum|i-1>Oi$:

The inversion of functions and forms as we grow in scales in the Universe, which is a basic symmetry that allows the Universe to balance its relative (in)finite(simal) volume and form, or else, all balanced would break provoking a constant 'shrinking' or 'enlarging' along a single entropic or social evolutionary arrow.

ST- Balance is the law and symmetries are just a view of that law.

This implies that A surface is called the envelope of a given family of surfaces if at each of its points it is tangent to one of the surfaces of the family and is in this way tangent to every one of them.

So we see the ultimate merging of 'Darwinian perpendicularity' + 'symbiotic adjacency' , which IS at the core of the 'submissive', yet symbiotic 'herding' of envelopes, ð§ dimensions, where the cyclical time envelop become a larger Δ+1 §partial scaling (hence the marriage of those two symbols, of cyclical time and scalar space - a NEW worldcycle brings always a higher Δ+1 plane).

Again this is an absolute law, which the simplifying, perfect forms of geometry makes easier to understand.

For example, the envelope of a family of spheres of equal radius with centers on a given straight line will be a cylinder (figure 48), hence $\sum Oi>|i+1$. And the envelope of such spheres with centers on all points of a given plane will consist of two parallel planes. The envelope of a family of curves is defined similarly; and here as we are in an ST-mixed element, we need to study the dominant tendency of those curves, which will show the envelop to tend towards a more lineal or cyclical whole.
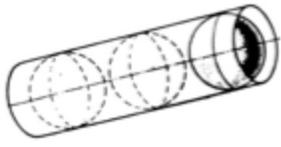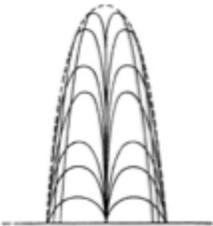
For example, Figure 49 diagrams jets of water, issuing from a fountain at various angles - they are clearly by effect of the potential gravitational energy coming back to a closing zero-sum cycle. Hence such family of curves, which may be considered approximately parabolas; tend to have their envelope a more lineal parabola - the general contour of the cascade of water.

But not every family of geometrical forms has an envelope. And if you man or robot of the III millennia which might read those texts start to interiorize the laws of T.œs should by now guess, which *kind of entities do NOT want to be 'enclosed' - those thoroughly dominant in 1D-lineal motion and/or 4D entropy. F*or example, a family of parallel straight lines does not have one.

General 'laws' of emergence: o->O->•->@

All this lead us to understand that ultimately as all departs from Δ•s≈t laws, geometry requires always a first Δ±i distinction between what 'pros' call, the geometry "in the small (parts)", which is clearly dominant and "in the large (wholes)". The main of those dual theories should then follow the obvious Δst law that *wholes are more resistant, efficient and stable than parts; hence small/parts are easier to deform, while wholes are far more stable full T.œs - the ultimate reason why wholes and new scales keep happening.*

For example, in 1838 Minding showed that a sufficiently small segment of the surface of a sphere can be deformed, and this is a theorem "in the small." At the same time, he expressed the conjecture that the entire sphere cannot be deformed. This theorem was proved by other mathematicians as late as 1899. Incidentally, it is easy to confirm by experiment that a sphere of flexible but inextensible material cannot be deformed. For example, a ping-pong ball holds its shape perfectly well although the material it is made from is quite flexible - laws those akin to the laws of 'surface tension' of soap bubbles with wide application in physics.

Another example, is the tin pail; it is rigid in the large, thanks to the presence of a curved flange, but separate pieces of it can easily be bent out of shape. As we see, there is an essential inversion between properties of surfaces "in the small", Δ-1 and "in the large", Δ+1.
A 1D t vs. 3D ð wider generalization is provided comparing open geodesics vs. closed curves. A geodesic "in the small," is a small segment of the surface, its shortest lineal path, but "in the large" linearity may not be the shortest path at all - it may even be a closed curve, the great circles of a sphere.
And here is where another *LAW OF EMERGENCE APPEARS of enormous generality, as it is the basic process of social evolution of a system, from life cells to astronomy: creation builds first step by step its 'protein envelop' and then as it grows it finally needs a singularity to focus and constrain the parts through its radius, creating an antipodal elliptic geometry, which finally creates the @-system and completes the T.œ*

Indeed many analytic surfaces cannot be extended in any natural way without acquiring "singularities" in the form of edges or cusps and thus becoming non regular.
Thus, a segment of the surface of a cone cannot be extended in a natural way without leading to the vertex, a cusp where the smoothness of the surface is destroyed. *This striking, obvious result, 30 years ago lead me to do my fav painting of conceptual cubism and adopt the pyramidal Δ-form for whole povs, and singularity minds:*
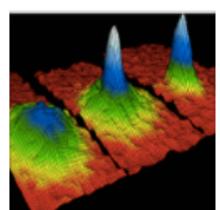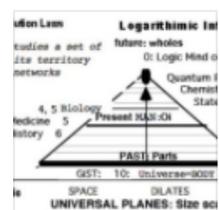
In the graph we see right, my ○ painting, which a decade latter resembled eerily the first Bose-condensate (maximal form of a physical system - its 5D), and ultimately proves there MUST BE A GOD/logic mind for any whole organism, limiting the number of planes a system can grow, departing from a 'finitesimal amount' of Δ-2 parts.

Thus geometry of the large is only a particular case of the previous remarkable theorem:

Every developable surface other than a cylinder (the lineal, non-enveloped essential 1D form) will lead, if naturally extended, to an edge (or a cusp in the case of a cone) beyond which it cannot be continued without losing its regularity.

Thus there is a profound connection between the behavior of a surface "in the large" and its singularities. This is the reason why the solution of problems "in the large" and the study of surfaces with "singularities" (edges, cusps, discontinuous curvature and the like) must be worked out together. Now we know its whys in a theme that fascinates both mathematicians and physicists.

Now, we have the 3 concepts needed to fully describe most of modern non-e geometries, including Riemannian manifolds, in yet another 'mirror image' of the ternary laws of ST:

ð§: the 'intrinsic geometry-curvature' *of the surface:*

Δ+i: the Δ-scaling given by the relative ratios of r/k smallness or greatness, which defines the relative size of the observer vs. the observable form.

The relative number of dimensions we shall study and how they are connected when we go beyond the usual ternary games of existence; the last of the key themes of non-E spatial mind worlds.

Differential geometry as the study of membrains.
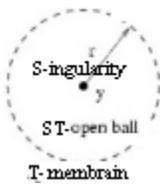
The importance of Gaussian differential geometry comes to full fruition in vital topology, as the study of surfaces equates to the study of membrains, the most important elements of all systems, which deploy a specific topological variety of closed form, but acquire in small scales a hyperbolic geometry, making the duality of open and closed space at Δ1 level correspond to the duality of lineal and hyperbolic surface in small scales. In other words, what the sphere looses in the larger scale as the lesser surface of all beings, in fact it wins it in the smaller scale as the larger hyperbolic surface.

The membrain thus have a convoluted maximal surface of osmosis and exhchange of energy and information with the outer world in the smaller scale in which it is the predator but appears as the smaller surfgace of existence in the larger scale in which it is a mere fractal point of a larger world.

A theme which introduces us in the 'last' of all the branches of geometry discovered by Huminds, which is quite surprising indeed, as it should have been the first.

But we have dealt with the shortcomings of the humind in many other papers, out of our frustration…

3rd AGE OF GEOMETRY

So we shall start the 3rd age with the last discoveries, which are the 2 fundamental forms of geometry for its realism in its analysis of the 'two eternal elements' of reality:

Δ-scales: Fractal geometry is the final understanding of the scalar Universe, and yet it was not found due to the extreme naïve realism of the humind, who doesn't understand its mental space eliminates the discontinuities of the Universe, so the 'continuous hypothesis' is both false and misleading, as they 'upgrade' smaller parts to fill the holes of largers ones (case of the real line, which rises the finitesimal numbers and transcendental ratios to the N-discontinuous line).

ST-numbers: Which are vectors with an scalar S-value and a T-motion/direction. Yet Vector analysis, was only developed in the II part of the XIX c.

DISCONTINUOUS ANALYSIS: FRACTALS

We shall move now into what truly is though it is usually not considered in those terms, the final age of Δnalysis as the study of the relationship of parts and wholes, which in close analysis turn out to be fractal discontinuous parts.

Fractals are in that sense the equivalent to the final realization in physics that continuity is a mirage that simplifies reality and so do the analysis mathematical mirror, but when we really want to know the whole details of the Δ-scale, the universe is quantic and so it is its fractal geometry. Here the work of Nottale in mathematical physics and Mandelbrot in mathematics, stands fully as the best formalism for both. So we won't stomp on our peers (yes, i do recognize them as peers, in this case), but as usual bring the point of view of the philosopher of 'stience'.

The infinitesimal study as perceived from the finite point of view is the view of fractals, when in detail and observing the closed worldcycles that separate and make each infinitesimal a whole.

A derivative is the finitesimal of the function observed, and so when we go even further and study as enlarged into our scalar view tin maximal information we are in the fractal view of reality.

So as we expand our view the fractal view becomes more real, till finally the enclosures observed Δ-1 become fractal and we recognize its self-similarities: Δ-1 ≤ Δº.

For each derivative thus a function shows its 1/n infinitesimal (not necessarily this function, which is the derivative of the logarithm).

It follows that functions, which grow ginormously, have a 'quanta of time' reproduced and so its minimal derivative finitesimal is the function itself, eª.

Fractal structure of the 5th dimension and its perpendicular flows.

Fractals are the best way to describe all themes related to scales. And as such they are connected intimately with the original elements of calculus, namely series and finitesimals. Fractals then branched out as a sub-discipline of scalar mathematics, which we can consider two have those 2 sides, the discrete fractal view, and the continuous topological view, in numbers=points t=s dualities.

So we shall start with power series to describe fractals, which started as calculus did in the earlier work of Archimedes, resurrected in geometrical terms by Koch and the XIX aberrant geometers:

Archimedes' quadrature of the parabola

Archimedes' dissection of a parabolic segment into infinitely many triangles used the sum of a geometric series to compute the area enclosed by a parabola and a straight line.
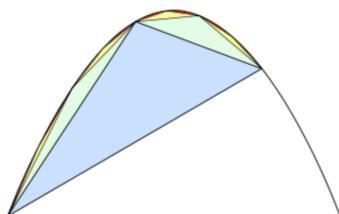
His method was to dissect the area into an infinite number of triangles, establishing the concept of a fractal system defined in this book as the 'scaling' between the whole and its infinitesimals, happening in nature (from super organisms to organisms, organs, tissues, till coming to cells, all self-similar; from galaxies to atoms

in physics through intermediate cosmic bodies, from civilizations with its 3 ages of subconscious collective art to individual minds in memetic superorganisms of mankind, etc.).

Archimedes' Theorem states that the total area under the parabola is 4/3 of the area of the blue triangle. As each green triangle has 1/8 the area of the blue triangle, each yellow triangle has 1/8 the area of a green triangle, and so forth.
Assuming that the blue triangle has area 1, the total area is an infinite sum:

$$1 + 2\left(\frac{1}{8}\right) + 4\left(\frac{1}{8}\right)^2 + 8\left(\frac{1}{8}\right)^3 + \cdots.$$

The first term represents the area of the blue triangle, the second term the areas of the two green triangles, the third term the areas of the four yellow triangles, and so on. Simplifying the fractions gives:

$$1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \cdots.$$

This is a geometric series with common ratio 1/4 and the fractional part is equal to:

$$\sum_{n=0}^{\infty} 4^{-n} = 1 + 4^{-1} + 4^{-2} + 4^{-3} + \cdots = \frac{4}{3}.$$

The sum is:

$$\frac{1}{1-r} = \frac{1}{1-\frac{1}{4}} = \frac{4}{3}.$$

This computation uses the method of exhaustion, an early version of integration. Using calculus, the same area could be found by a definite integral, which is just the 'topological continuous' version of the discrete fractal version. So what fractal geometry does is NOT to move from discrete numbers of sequential time and scalar steps into continuous sums in a plane, keeping MORE information on the detail and showing clearly the discrete finitesimal limits of nature - reason why in Nature we see more fractal systems that 'differentials', which must be seen as a more 'time-mirror' oriented version of the same concept.
It is interesting to notice that the parabola is a 'triangle' increased by 1/3rd, the essential 'element' of the ternary reality. So we can said the triangle has 3 elements and the parable, which is its curvature, ads one more 'dimension' or motion to it. A triangle then in external movement will 'define' an external wave around it with a parabolic form (the added third volume). A static parabola will have an inner region to add that third, which can be considered the 'envelope' membrane.

Fractal Geometry
The next step was done by Koch's snowflake is a union of infinitely many triangles.
In the study of fractals, geometric series often arise as the perimeter, area, or volume of a self-similar figure. For example, the area inside the Koch snowflake can be described as the union of infinitely many equilateral triangles (see figure). Each side of the green triangle is exactly 1/3 the size of a side of the large blue triangle, and therefore has exactly 1/9 the area. Similarly, each yellow triangle has 1/9 the area of a green triangle, and so forth. Taking the blue triangle as a unit of area, the total area of the snowflake is:

$$1 + 3\left(\frac{1}{9}\right) + 12\left(\frac{1}{9}\right)^2 + 48\left(\frac{1}{9}\right)^3 + \cdots.$$

The first term of this series represents the area of the blue triangle, the second term the total area of the three green triangles, the third term the total area of the twelve yellow triangles, and so forth. Excluding the initial 1, this series is geometric with constant ratio r = 4/9. The first term of the geometric series is
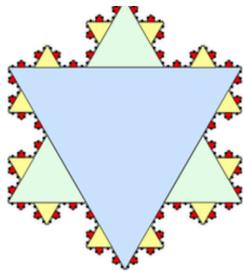
$$1 + \frac{a}{1-r} = 1 + \frac{\frac{1}{3}}{1-\frac{4}{9}} = \frac{8}{5}.$$

a = 3(1/9) = 1/3, so the sum is

Thus the Koch snowflake has 8/5 of the area of the base triangle.

Here again we find another 'essential ratio' of growth in Natural fractals, themes those treated in number theory; but more telling is the form of the new shape, essentially an Hexagon, which fails to become a pi-circle, its next stage, as we can consider the hexagon a circle with pi=3 diameter. And so we can talk of a ternary growth of the triangle into the circle, its |-O state, parallel to the 'rotation-motion dimension' which also converts it into a circle, in this case by static growth through scalar geometry.

Thus one essential process of Nature's topologies, the 'quadrature of the circle'; that is, the 'triangular transformation of the circle'... can be achieved in pentalogic by imperfect methods:

- ð-methods: rotating the triangle (as part of the rotated surface is no longer 'solid' space, by its motion-derivative...
- Δ-scalar methods: growing a Koch snowflake, as part of the circle is void.
- S-methods: parabolizing its surface. As only one side, that of motion defines a front wave for the triangle.

The most efficient being the scalar method, as 8/5<4/3, the surfaces of the snowflake and the parabola of a triangle.

XIII. VECTOR SPACES

4th Postulate of ¬Æ logic: parallelism and perpendicularity

Vector spaces are defined by 4 positive elements (where entropy is ignored), which makes them immediate mirrors of the 5D Universe: a point with a magnitude in space, a direction of motion in time, which can be operated by a 'scalar' numbers that determines its scale, and measured from a 'frame of reference' according to an angle of perception (whereas the negation of a vector or its entropic state is the inverse direction of the vector fully resolving the meaning of a negative numbers an inverse direction in time).

It is for that reason they are so useful to represent reality and it marvels it took so long in the natural evolution of the mind from fixed space -> bidimensional planes -> points with motion (calculus) -> to arrive to vector spaces that represent the 4 elements of Δ@st in a natural form. The laws of vector spaces thus are in direct relationship with the GST laws. They started when the 'bidimensional planes of Descartes and Newton acquired a 3rd axis (Z height) and the rules of its sum were laid own according to its orthogonality (perpendicularity), to represent (Lagrange) locomotion, speed and acceleration.

The 2 type of vector products

Vectors are of 2 quite different types, as their properties are not the same.

The dot product

The dot product affects vectors in the same manner than the sum, as it has the same properties of identical beings (associative, distributive and commutative products). Thus they must affect 'equal species' of the herd type, which has huge implications for the physical nature of fields of forces, which are as always for an Δº entity, indistinguishable, Δ-2 particles (as aminoacids are all the same for your body. And generally speaking entropic points (Δ-2) are all the same for an Δº entity)

We return once and again to a key postulate of Non-E, the fourth postulate of congruence, to explain the vital topological 'angles' that define the evolution or devolution of dimensional motions of time space.

However in the complex Universe *all events have dual and ternary interpretations, when we perceive them from the inverse entropic and informative dualities, merged into a combined form.*

So things are not so simple as they seem, and this is the case of vectors spaces and its Duality of parallel dot product and perpendicular cross product. Initially one would assume that perpendicular cross product annihilate themselves, but in fact are creative processes that create a '3rd dimensional element', perpendicular to both with *a magnitude equal to the product of both So the essential equation of a cross product is a reproductive merge of two 'inverse S and T' elements:*

Cross product: S x T = ST

The cross product however affects a different kind of species – a key 'insight' of 5D theory lost to abstract mathematicians – it is not the 'algebraic properties' but the 'species' that can be subject to the cross product what makes a difference. As they are *elements which do NOT commutate and treat their angle in inverse fashion to dot product. It is anticommutative: axb = -b x a, and orientable. Moreover it only exists in 3 dimensions (in 7 is not uniquely defined).*

What this essentially mean is that 1) the cross product has an arrow of 'angular time' hence it is orientable; it is a reproductive function, as it gives birth to a 3rd species in the relative dimension of width of the other two (reproductive dimension) and so it can be considered a merging of an S-function (the height informative vector), a length function (the locomotion, entropic T-vector), giving birth to an ST-function (the cross product).

What this means fortunately enough can be assessed both from the general laws of Gst and the direct experience of which 'species are subject' to a cross product, the main of which is obviously the product of the magnetic and electric field that gives us the reproductive speed of the electric field.

Then other obvious case is the angular momentum of a particle about a given origin defined as: L = r x p
where r is the position vector of the particle relative to the origin and P is the linear momentum of the particle; which again connects *a Space element (the origin T.œ) and a T element (the rotating one) giving us an ST product of both, which in mathematical physics we regard as the 'first T.œ' of the Universe (an h 'Planckton')*
We cannot get here into 'complicated alternative inflationary mathematical information' to represent the same concept; alas, the bivector and its multiplication that transforms the cross product into an 'SS' plane… by virtue of the S=T law of 5D.

In 5D we are dealing with two *elements which are time-like and space-like, hence inverted in properties but similar enough to become a reproductive 'hyperbolic metric equation' S x T = K.*

So the cross' product angle of perpendicularity is creative (and the proper way to draw would be with 'inverted' arrows' so the reproductive result at the point where both merge rising a 3rd offspring vector would be more obvious). Since when the 2 elements are close enough to reach an S=T merging point and there is not 'tearing; but only merging an act of reproduction takes place.

On the other hand the parallel vector dot product is a Darwinian event, because it eliminates the smaller form, as the dot product reduces from 2 elements to one the system. We can then consider the parallelism to be one happening in a flat surface as a predatory actions, in which the larger 'system' feeds on the entropic energy/motion of the smaller one.

In praxis both products do happen in physics and indeed, the cross product is a more complex process, as in magnetic and electric S-T fields that merge into an ST=speed wave. While a simple example of the dot product is a body moving in a field of forces which extract energy of motion from it.

So the duality of dot and cross product and the values of its angles is an essential mirror of 5D spacetime dimotions.

Vector spaces and the complex plane are the 2 fundamental expansions of frames of references into complex holographic dimotions. That is, *frames of reference with form, scale and motion,* and as such, they are the essential system of representation of the Universe, beyond the abstraction of mental space as it is. In the scalar Universe however a vector space itself a motion - a 'field'; and as such when a particle is placed in a vector space, it will enter in 'communication with the field' in two different ways:

If the field is made of its Δ-¡ particles, it needs to absorb to produce one of its dimotions the field will be a 'force fields' in which by the 4th postulate of '¡logic behavior', the 'Active magnitude' will trace 'equipotential' paths ALWAYS PERPENDICULAR to the field in which it feeds (force lines). This makes 5D field theory different in as much as the particle is NOT following the field motion but either its equipotential lines (case of a planet around the gravitational field that sinks into the sun), or what consider the 'lines of force' (case of charge field, which could be represented by the equipotentials.

If the space however represents the parallel motions of speed in the 'same scale' - NOT a feeding, perpendicular process, by the similarity of the Particle and the field, case of a man swimming in a river of water the motion becomes parallel in both the active magnitude and the field.

This said, the first case will give birth to a cross product geometry, of perpendicularity and the second case to a dot product of parallelism between the field and the self-similar particle.

Finally a third element of importance in 'moving coordinates', is the difficulty to operate with 'fixed mind-frames of reference.

Thus vector spaces depart from a single humind frame of reference with its 3 'visual', perpendicular light space-time 'basis/co-ordinates' by adopting generalized co-ordinates - that is, co-ordinates for each point/item *as if it were a fractal broken space in its own, which truly is, since we move then from the subjective continuous human view, to the sum of all the different particle views.*

Parallelism - Dot product. Field and particle are similar, in the same scale.
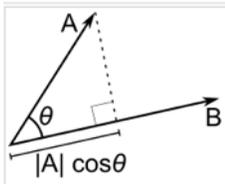
The basic feature of the dot product that connects it with Euclidean geometry is that it is related to both the length (or norm) of a vector, denoted ||x||, and to the angle θ between two vectors x and y by means of the formula:

$$\mathbf{x} \cdot \mathbf{y} = \|\mathbf{x}\| \, \|\mathbf{y}\| \, \cos \theta.$$

The dot product converts two vectors into a scalar number, *thus reducing the dimotions of the system from two forms to a point. But this is deceptive. As the scalar number in fact is not a 'reduction' but an ascension of scale – a parameter or magnitude of the upper plane of existence.*

Some physical examples are:

- Mechanical work (Δ1) is the dot product of the force and displacement vectors (Δ-1),

· Magnetic flux (Δ2) is the dot product of the magnetic field and the vector area (Δ-2)

Thus the dot product in terms of vital topology is a predatory act of a larger 'scalar' form that absorbs energy from a lower plane. And its beauty comes from its '4th postulate angle of congruence and 'similarity' that defines in geometric terms, what thermodynamic defines in algebraic form. That is, the quantity of energy extracted by the Δ+¡ system from the lower Δ-1, 'smaller' vector is directly proportional to the similarity of the two systems. The same law would apply in thermodynamics, regarding the capacity of the larger system to absorb from the lower system its energy as 'work', instead of dissipating it as heat. A 'superorganism' in which the Δ-1 scale of 'cells' are in synchronicity and similarity relationship with the larger whole transfers most of its energy upwards. A rough system in which both scales are dissimilar will dissipate it into heat.

How can we interpret this PRODUCT in terms of vital mathematics and the st components? The most obvious definition is this. The 'biggest' predator vector, B in the graph is the dominant element, as A is projected on it. Whatever the ST elements of those vectors mean, which will vary for different uses, *unlike the cross product which is creative, reproductive, the dot product is entropic, destructive, as the result is the 'absorption' of the |A|cos =X component of one of the vectors by the other, which becomes expanded in the X-axis variable (whatever this variable is), and for all effects A disappears, leaves no trace of its motion/form≈position; and we obtain a scalar which quantifies the result of this 'absorption'. So we can classify the 2 fundamental 'products' of vectors by the duality of the 4th Non-Æ postulate:*

Dot products are Darwinian, destroying one vector, reduced first to its X-parameter, which as it happens IS systematically, the 'real' normally momentum or energy or body element of the system, while the Y-parameter of form, information is discharged in a classic Darwinian action of feeding (the 'particle'-head element or Y coordinates disappears). Indeed, if we use the XY graph, as in most cases to quantify the 2 complementary parts of the being ∑∏ (body-wave)>ð (head-particle), in physical systems this process is equivalent to the predator event of cutting the head throwing it out and eating the body to multiply your inner cellular energy in the X-direction of your body-motion-momentum.

Cross products are reproductive, creative, as a 3rd 'offspring-dimension-form' is created fusion of the other 2:

3rd and 4th dimension fields: entropy and multiplication =reproduction
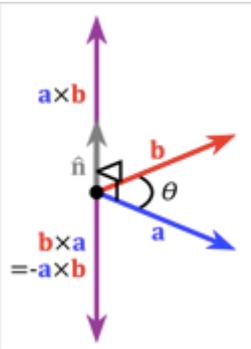
In the graph, product can be of multiple, different ST dimensions, which start the richness of its 'propositions'. A vectorial product is one of its commonest forms as it combines ST or TS dimensions, BUT as both 'present' products are different in orientation, this product unlike other SS or TT products is non-commutative: bxa=- axb. In this case giving birth to two different orientations in space, though for more complex product of multiple 'S-T' dimensions, which *can define as a Matrix of parameter a T.Œ particle in full,* the non-commutability can give origin to different particles (quantum physics).

Vectors thus become the essential mode to define an ST holographic element, with a 0Dimension of a scalar number that defines the singularity point and a direction of motion in space (x,y,z parameters from an @nalytic frame of reference, but in generalized objective coordinates a lineal 1D parameter of distance=speed per time frequency, which measures the T-steps or cyclical motion of the • point active magnitude).

The difference between both types of vectorial product is very important to fully grasp reality as it is.

The perpendicular product seems at first contradictory because they seem to diverge in orientation. But this is because we put the arrow *in the wrong side. It should be in the origin where they collide, and that is the dot in which the two vectors become a still spatial parameter. It is then also applicable to the 'collapse' of multiple flows into a non-Euclidean fractal point, in which they become a scalar parameter. And that is how in fact a Hilbert space 'collapses' in quantum physics an infinite number of generalized parameters allowing us to calculate wholes, and giving a vital sense to the extremely abstract jargon of quantum physicists.*
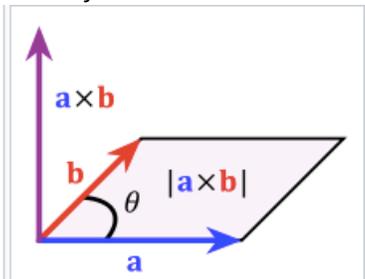
Figure 1. The area of a parallelogram as the magnitude of a cross product

On the other hand the creative product, which is also used in physics to describe another fundamental scale, that of electromagnetic forces, is symbiotic creative, merging and helping the two components to act symbiotically as one. And again the 'mental space' of the cross product is misleading as it seems to contradict the 4th postulate of symbiotic parallelism vs. Darwinian perpendicularity; looking like they touch each other perpendicularly, but in fact the electric charge and the magnetic field ARE always parallel, in the sense they are the singularity and membrane of the electric T.œ never touching each other, as there are no magnetic monopoles; hence they strengthen each other, creating a new force and increasing the speed, and curving, increasing the information of the particle under the magnetic field.

Geometric comparison.

The magnitude of the cross product can be interpreted as the positive area of the parallelogram having a and b as sides : a x b sin θ

One can also compute the volume V of a parallelepiped having a, b and c as edges by using a combination of a cross product and a dot product, called scalar triple product (see Figure): a x b • c
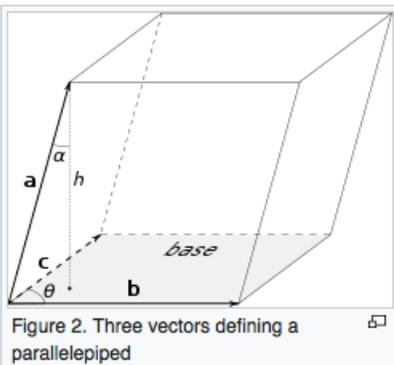
Figure 2. Three vectors defining a parallelepiped

Because the magnitude of the cross product goes by the sine of the angle between its arguments, the cross product can be thought of as a measure of perpendicularity in the same way that the dot product is a measure of parallelism.

Given two unit vectors, their cross product has a magnitude of 1 if the two are perpendicular and a magnitude of zero if the two are parallel. The dot product of two unit vectors behaves just oppositely: it is zero when the unit vectors are perpendicular and 1 if the unit vectors are parallel.

Unit vectors enable two convenient identities: the dot product of two unit vectors yields the cosine (which may be positive or negative) of the angle between the two unit vectors.

The magnitude of the cross product of the two unit vectors yields the sine (which will always be positive).

So we establish a parallel superposition principle for the dot product and a perpendicularity one for the dot product.

RECAP. Vectorial space is best suited to represent ST social herds (dot product) or reproductive functions of similar complementary species (Dot product)

XIV. 3rd AGE OF GEOMETRY: NON-E GEOMETRIES AND ∞ METRIC SPACES.

When we talk of the third age of any system of space-time we refer to the age in which an excess of information splits the system from reality, as an old man which no longer wrinkled and warped into its memorial thoughts try to represent the world as it is. This process *would become endemic in mankind with the Industrial R=evolution of 'metal-minds', which starting with the eye-camera, ending in the digital Virreal helmet broke the strict laws of creation of the 5D Universe by reducing it to mental spaces of lesser dimensions, back to the minimal 'holographic 2D forms'.*

Humans do not realize at all, where this process is leading mankind – to a state of audiovisual madness in permanent conflict with the moral and visual, aesthetic balanced laws of the 5D world that will eliminate us from its full existence – themes those of the papers on social sciences.

In hard sciences this process of fiction thought of the '3rd age of history' of an excess of information had mixed results; as it did in painting with the arrival of cameras.

Geometry as all human endeavors will change forever with the industrial r=evolution of machines. We have already witnessed that it completely changed with photography the path of painting, who will branch in its bid to overcome the metal-eye, into hyperrealism, trying to see better than the initial faulty cameras (Courbet, etc.) on one side and pure mental thought on the other (Van Gogh, Gaugin).

Geometry will also realized that Euclid was not good enough and branched into an attempt to discover the true objective reality of space (Non-E) and its opposite search for pure mental spaces, which was expanding to meet the needs of industrial Dimotions and the 'new found' extreme form of locomotion with internal 'wasted energy' called entropy.

To put some order into the explosion of fictional mental space would be the job of the 2 next masters of the III Age of geometry, Lobachevski that insisted experimental reality was needed to measure the proper geometry of the Universe and in the inverse direction, Mr. Riemann, who insisted in the opposite path – to walk away from reality into the understanding on how the mind created spaces. He would be another ill-understood, die-young genius, which at least had unlike Lobachevski, the luck of being born in the proper place and have a master in Gauss, who did capture his thoughts and gave them 'authoritas'.

Riemann's realization that geometry is a mental-logic endeavor, where function and i-logic thought overcomes 'spatial representation', allowed the explosion of abstract mental spaces to represent reality, which was carried by Einstein and Bohr into Physics with mixed results. In this task it would be essential the idealist school of German philosophy, from Hegel to March, we often criticize for its escapism with reality. Since while it allow further expansions of mental spaces, latter put in correspondence, §@<≈>Δð, with the real Universe; it overreach into fictions that still plague serious science and destroyed realism on physics. Only Einstein latter relented going back to the obvious fact that 'science should only be concerned with explaining facts that have experimentally happened'.

Unfortunately the ego paradox once more won the day and the Copenhagen 'creation of the moon when we look at it' carried the day till today against the real Einstein->Broglie->Bohm interpretation. And this would also have harmful consequences for modern mathematics, which completely renounced to what we try to achieve in those papers (and future 'pros' once the change of paradigm is accepted fully will complete): the entanglement of mathematics and reality, with the ad on mind spaces as part of reality itself. That is, reality is the mind space of a larger 'world'; the Earth and the galaxy, as our view of reality is the mind space of our electronic neurons.

Reality and mind merge in the sense that what the mind perceives then it projects to shape reality. But reality limits always what the mind of pure information can imprint; so both must properly merge with the laws of balance.

Still for the sake of understanding the 3rd age of geometry we shall divide its analysis by force brief as we have arrive to the 200 pages limit for an academia.edu paper to properly charge its images, in two sections, the first one dedicated to Lobachevski's attempt to find *a more precise geometry for the Universe, which turn out to have a hyperbolic geometry – that of the fifth dimension; and the second one dedicated to the explosion of mental space, apt to study all the different local dimotions and change events of different sciences and scales.*

Lobachevski's theorems: angle of parallelism

Future in-form-ative Vortices of forces in physical scales:

Tlf-uture vortex of Information   Δ+1: Gravitational scales: accelerated mass vortices   Δ-1: Quantum scales: charge vortices   Δ: Thermodynamic fractal eddie vortex

In the graph, a space-time symmetry happens between the angle of parallelism of a hyperbolic geometry in still space, and the speed of the vortex of forces which implies that faster, stronger, more attractive forces of smaller particles (Sp x ð=k) will have a more hyperbolic geometry, with a smaller angle of parallelism=larger curvature, allowing more 'parallel forces ' to enter the attractive vortex. The different perspectives according to the 'Rashomon effect' can give us different equations and mental representations according to how much stillness and motion, and how much difference on size/speed happens between observer and observable, with a limit *given by a full perpendicular angle of parallelism of 0º, which will always be* less than a right angle.

Yet as the angle is a 'curved' hyperbola, we can also consider it as an exponential function, where a is x-coordinates and AB the y-coordinates. Then the minimal *angle of parallelism will happen for the fastest growing exponential function, which is $e^{\bar{}x}$, the constant of death=decay processes when jumping '2 planes of existence': Δ+1<<Δ-2; and hence the absolute limit of a hyperbolic geometry, now 'vitalized' in terms of the time=motion events of an organic system.*

Indeed, the 4th i-logic postulate of non-Euclidean geometry comes immediately to our mind to make sense of the vital energy, 'enclosed' by the Darwinian singularity membrain that preys on it:

In the graph we make use of the i-logic 4th and 5th Non-A postulate to translate into the organic paradigm the meaning of hyperbolic geometry.

Now, how exact is the symmetry between this vitalized, temporal moving view of hyperbolic geometry and Lobachevski's formal still geometry?

Absolute. Indeed, the surprise comes when we realize of the next finding of Lobachevski's original work: the line he considered parallel to 'a' in figure 3, when he made a close formal analysis DID become a hyperbola at the point of infinity.

It is worth to do a more rigorous analysis on how Lobachevski found this surprising result using mere logic, still formal proofs, to show indeed how all spatial views have a symmetric temporal view, which will be the foundations of non-Algebra and its ∞ S≈T symmetries.

Convergence of parallel lines; the equidistant curve.

Let us then investigate how the distance from a of a point X on c changes when X is shifted along c (fig. 5).

In Euclidean geometry the distance between parallel lines is constant. But here we can convince ourselves that when X moves to the right, its distance from a (i.e., the length of the perpendicular XY) decreases.
We drop the perpendicular A1B1 from a point A1 to a. From B1 we drop the perpendicular B1A2 to c (A2 lies to the right of A1, since γ is an acute angle). Finally we drop the perpendicular A2B2 from A2 to a. Let us show that A2B2 is less than A1B1.
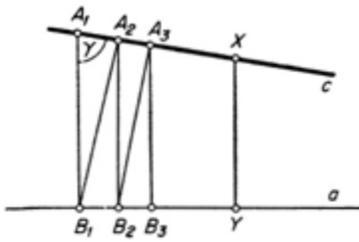
FIG. 5.

The theorem that the perpendicular is shorter than a slant line is valid in hyperbolic geometry, because its proof (which can be found in every school book on geometry) does not depend on the concept of parallel lines nor on deductions connected with them. Now since the perpendicular is shorter than a slant line, B1A2 as a perpendicular to c is shorter than A1B1, and similarly A2B2 as a perpendicular to a is shorter than B1A2. Therefore A2B2 is shorter than A1B1.
When we now drop the perpendicular B2A3 to c from B2 and repeat these arguments, we see that A3B3 is shorter than A2B2. Continuing this construction we obtain a sequence of shorter and shorter perpendiculars; i.e., the distances of A1, A2, ⋯ from a decrease. Furthermore, by supplementing our simple argument we could prove that, generally, if a point X″ on c lies to the right of X′, then the perpendicular X″Y″ is shorter than X′Y′. We shall not dwell on this point. The preceding arguments, we trust, make the substance of the matter sufficiently clear and a rigorous proof is not one of our tasks.
But it is remarkable that, as can be proved, the distance XY not only decreases when X moves on c to the right, but actually tends to zero as X tends to infinity. That is, the parallel lines a and c converge asymptotically!
Moreover, it can be proved that in the opposite direction the distance between them not only increases but tends to infinity, hence forming indeed an exponential function, whose 'strength' will depend of the 'distance' in Δ-scales and hence different in 'speed' of time between both.

It is thus clear that the distance between the point and the line is a mental formal representation of the distance between the larger plane of the membrain singularity that encloses the vital energy of micro-points in which it preys, provoking its entropic decay. Hence the further the ST- MICRO-point from the line-membrain that encloses it in hyperbolic geometry, the further the distance in Δ-scales between both and the smaller the angle of parallelism, meaning in vital terms the more perpendicular=Darwinian will be the relationship between the micro-point and the larger observer.

The magnitude of the angle of parallelism.

FIG. 6.

We shall now study the angle of parallelism, i.e., the angle γ that the line c parallel to a given line a forms with the perpendicular CA (figure 6). Let us show that this angle is smaller, the further C is from a. For this purpose we begin by proving the following. If two lines b and b′ form equal angles α, α′ with a secant BB′, then they have a common perpendicular (figure 7).
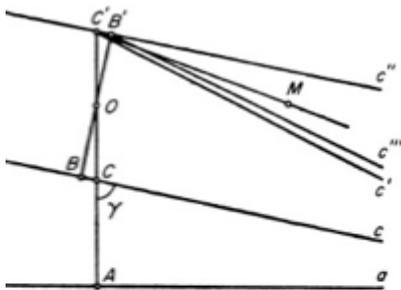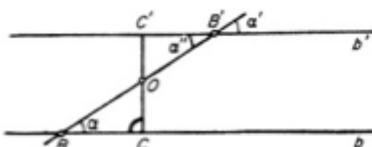
For the proof we draw through the midpoint O of BB′ the line CC′ perpendicular to B. We obtain two triangles OBC and OB′C′. Their sides OB and OB′ are equal by construction. The angles at the common vertex O are equal as vertically opposite. The angle α″ is equal to α′ since they are also vertically opposite. But α′ is equal to

FIG. 7.

α by assumption. Therefore α is equal to α". Thus, in our triangles OBC and OB'C' the sides OB and OB' and their adjacent angles are equal. But then, by a well-known theorem, the triangles are equal, in particular their angles at C and C'. But the angle at C is a right angle, since the line CC' is by construction perpendicular to b. Therefore the angle at C' is also a right angle; i.e., CC' is also perpendicular to b'. Thus, the segment CC' is a common perpendicular to both b and b'. This proves the existence of a common perpendicular.

Now let us prove that the angle of parallelism decreases with increasing distance from the line. That is, if the point C' lies further from a than C, then, as in figure 6, the parallel c' passing through C' forms with the perpendicular C'A a smaller angle than the parallel c passing through C.

For the proof we draw through C' a line c" under the same angle to C'A as the parallel c. Then the lines c and c" form equal angles with CC'. Therefore, as we have just shown, they have a common perpendicular BB'. Then we can draw through B' a line c"' parallel to c and forming with the perpendicular an angle less than a right angle, since we know already that a parallel forms with the perpendicular an angle less than a right angle. Now we choose an arbitrary point M in the angle between c' and c"' and draw the line C'M. It lies in the angle between c" and c"' and cannot intersect c'. A fortiori, it cannot intersect c. But it forms with AC' a smaller angle than c' does, i.e., smaller than γ. Then, a fortiori, the parallel c' forms an even smaller angle, because it is the extreme one of all the lines passing through C' and not intersecting a. Therefore c' forms with C'A an angle less than c does and this means that the angle of parallelism decreases on transition to a farther point C'; this is what we set out to prove.

We have shown, then, that the angle of parallelism decreases for increasing distance of C from a. Even more can be shown: If the point C recedes to infinity, then this angle tends to zero. That is, for a sufficiently large distance from the line a parallel to it forms with the perpendicular to it an arbitrarily small angle.

The proof shows the beauty of the symmetry between §@-minds and Δtime motions: *the kaleidoscopic Universe puts in symmetric relationship all its 'dimensions' with its own methods and perspectives, creating parallel worlds.*

If at a point very far from a the line perpendicular to a is tilted by a very small angle, the "tilted" line will no longer intersect a. Hence *beyond the 2-plane distance the line a - which represents the Δ+1 scale being - will NOT perceive, prey or interact with the micro-point that becomes a 'dark space-time' for it.*

Two lines in a Lobačevskiĭ plane either intersect or they are parallel in the sense of Lobačevskiĭ, and then they converge asymptotically on the one side and on the other they diverge infinitely, or else they have a common perpendicular and diverge infinitely on both sides of it. The vital organic interpretations of those facts shows hyperbolic geometry to be a representation of Δ±i scales, and its organic structure between 'cellular, unconnected, potential micro-points of a vital energy' as perceived by the singularity membrane that encloses it.

RECAP

GEOMETRY IS broken in 3 sections: @mind: spaces dedicated to study the different mind constructions of the Universe

T-opology: where space form has motion

Δ: non-Euclidean postulates of points with form, which becomes lines that evolve into organic pleas.

S: Bidimensional, static plane geometry, the first form of Mathematics, invented by the Greeks, which we will treat in this post.

Because the Universe is bidimensional, holographic, what matters on its mathematical origins is to understand that the Greeks and its plane geometry does matter as each of those 'theorems', which we studied in high school do have 'hidden deep meanings' that will resurface once and again, into the vital geometries of points with parts that create the universe.

As usual as all is ternary and a ternary vision is for the mind mirror more pleasing we shall also consider in ternary ages the evolution of bidimensional geometry, which went through:

A first young, Greek age of static bidimensional space-geometry

A 2nd mature age of maximal reproduction, during the time of mathematical physics as it set the stage for the evolution of physics and the understanding of mechanics and gravitational, Newtonian and Keplerian Universes.

The third age started in this blog with the understanding of the holographic Universe, which will expand the discipline to a logic ¬Ælgebraic realm to fuel the application of its ΔST laws to all other disciplines.

So we shall close here the 'seed' of information for future researchers to expand and passing through the 2nd age of geometry, when analytic geometry, married with @-p.o.vs. to create the first solid ST representations and Δ-scaling (Cartesian geometry). Hence studied in the post of analytic geometry.

The exhaustion method, which do convert a sum of triangles or 'angular momentums' (in the duality information-motion) and foresees 5D analysis

And the Greek understanding of the circle as the perfect form, and all the theorems extracted from it - the most developed inflationary mirror in its last 'excessive' age of form.

Lobachevski as predecessor of 5D geometry

But geometry truly reached a maturity as a science of 'reality', when it incorporated motion; time dimensions to form; with non-Euclidean geometries and topology. The masters of this science were without the slightest doubt, as usual a triad, Gauss, Lobachevski and Riemann. The less recognized and more profound being Lobachevski, who found the principles of 'pan geometry', the absolute geometry of reality based in 3 insights:

The realization that 'mathematics-geometry' is a mental-logic endeavor, where function and i-logic thought overcomes 'spatial representation', thus he extracted as we do in Δst logic postulates WITHOUT possible expression in the 'parabolic' @-geometry of the Human Euclidean 'light-dimensional mind', to extract pure logic results, showing that the causal, sequential logic of time is the essence of reality. By far this can be considered the highest insight in the world of mathematics since Descartes' analytic geometry and Leibniz's foundation of Analysis - and should guide us in our inquire of fundamental laws of ΔST, as what matters in mathematics is the reflection of functions and symmetries over forms. So as systems become more complex, the original geometrical properties become lost and substituted by the function of the physiological networks of the system; which also helps to understand why in topology forms might seem very different but as they keep the essential properties of the being, they do keep their functions. Without this realization the XX c. explosion of abstract mental spaces to represent reality wouldn't be possible.

Further on, he understood relational space-time in space is defined in a first incursion in topology by the concept of 'adjacency', *which completed the 3 fundamental 'modes' of relationship through geometrical space of t.œs - complementary adjacency, perpendicular Darwinism and parallel social evolution - hence a concept* essential to the organic structure of the Absolutely relative Universe defining for the first time topological transformations are those in which motion does NOT deform the fundamental *properties of reality in space,* starting a trend culminated by Hilbert's foundations of geometry (yes the guy we criticize so much - he did also do some work of merit :), with his emphasis on some key abstract concepts such as betweenness, congruence, continuity, incidence, separateness... *which are clearly relative concepts concerning scale and symmetry, the mind elements that allow a singularity or point of view to 'construct' a wor(l)d-view over and 'stiffen' the motions of reality to make a mental mapping of them.*

He insisted strongly in the experimental nature of maths, wondering which was the real geometry of the Universe, and made the first inroad on the difference of 'mind-spaces' according to scale, as it depends on the size of our perspective that we find a 'flat' geometry (detailed view) or a 'curved geometry' (far away view

where the whole world cycle that seems a line in short distance/time span becomes a whole closed zero-sum worldcycle of energy).

Those 3 findings are essential and we shall dwell on them. Regarding his inconclusive results on the geometry of reality, what mathematicians though miss is the 'Rashomon effect', given their one-dimensional humind thought, wondering what is the space of the Universe of the triad of elliptic, ð§ (spherical, Riemannian surface of the space-time super organism), @ (Cartesian analytic, mind geometry, with the mind as its focus) or hyperbolic, *ST* (Lobachevski's geometry) or parabolic, Δ-Euclidean.
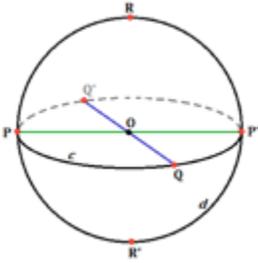
This fundamental equivalence between the 3±Δ geometries and the 3±Δ parts of the time§pace Supœrganism is the fundamental correspondence of space and so instead of naming it by the humind ego that discovered them (Riemann, Lobachevski, Descartes, Euclid) we shall use the older terminology before the selfie age because of its descriptive power, again:

-The membrain (singularity and membrane) has an elliptic, ð§ geometry, hence it is used in General relativity to describe the 'gravitational enclosure' or 'curvature' of the Δ+1 gravitational scale (Einstein's relativity). But elliptic Geometry is much more profound than usually thought in the establishment of the properties of any system of reality, and so as we have not treated it elsewhere is worth to consider its role:

In the graph, in elliptic geometry we define a point as a two nodal points of a sphere with maximal distance between them, which implies they all pass through the 0-point or singularity, and establish the non-existence of parallels.

As such elliptic geometry has no parallels, because all its 'parts' are connected, by the formal center, o, which unlike in the classic formulation of elliptic geometry in Δºs≈t must be considered also the 'invisible part' of the nodal point; and so elliptic geometry describes *the @-structure of a singularity point connected to a membrain, f*orming an absolute enclosure.

And ultimately as ALL points are in fact 'two strong' points, two poles, which are equivalent, it establishes a fundamental property of Nature, the bilateral symmetry with inverse properties self-centered in a balanced symmetric 'identity' element that communicates them all as they are a all connected to all other lines/circles and through its axis to the singularity, which is therefore not only the central point but the axis of...

- The mind singularity, which acts therefore as the focus, and it is an @-self centered geometry, which allows Cartesian planes to be 'perspectives' from a focus, the zero point and its informative height dimension and other axis of the system - the reproductive-width dimension and the length-motion dimensions. We can consider in the idealized structure of bare mathematics, the *3 physiological networks of the being. And so the being switches off between its 3 axis/networks as its functions change.*

Further on the mind is connected with every point of the entity, but for each point there is only one connection - only a line-parallel can be traced.

And finally, as we shall show soon in the graphs of human systems, since space is a mental-singularity related function to process information in an efficient manner, and recreate order, the mathematical simplest most efficient geometry of the ball-elliptic form must not be conserved.

What matters here is the symmetric bipolarity, which allow the singularity to maximize the extension of its vital space-enclosed by the membrane, so we shall see how in complex organic systems the sphere suffers all kind of topological transformations into all kind of shapes but all of them are 'enclosed' for the mind to re-form the vital space within, and all have a singularity brain-system to connect them, and all have bilateral symmetry (even the sphere which in principle is not defined as such in classic maths - only considered to have rotational

symmetry, except in the elliptic geometry that defined antipodal points), because the singularity co-ordinates all those points and uses its inverse properties to extract motion from the vital energy within it.

-The intermediate vital space-time enclosed between both has a hyperbolic geometry, the dominant in the Universe, because it is the present state. It does have a 'saddle' dual curvature, because it *communicates the two other inverse poles of the being. So if in the surface of the sphere, curvature is always positive, and in the central point and axis, curvature is always negative, the hyperbolic intermediate space-time has both curvatures.*

The ternary forms of spatial relationship: 4th postulate.

In that regard, in non-E geometry, we must distinguish as usually a 'ternary' type of spatial relationships with deep meanings in the vital organic structure of reality:

Adjacency (forms that are pegged, hence forming part of the same time§pace supœrganism).

Perpendicularity, (forms that penetrate and disrupt its inner systems, basis of Darwinian events.)

Parallelism (things that maintain its distance and allow communication through a common medium or network, basis of social evolution - *studied in affine geometry*.)

In non-æ geometry they will be extensively studied as the fundamental modes that define the relationships of ST, complementarity and 'symbiosis' (adjacency), Darwinian struggle (perpendicularity) and Δ§ocial evolution (parallelism) of all systems, *becoming the essential qualities to understand how spatial relationships define temporal events among all systems and scales of nature, studied by the fourth postulate of 'congruence and similarity'.*

It is then essential to understand the ultimate meaning of parallelism vs. incidence/perpendicularity also as mental descriptions of two logic states - one of parallel social evolution and one of Darwinian colliding 'tearing' by the perpendicular, incident line, taking the concept out of its spatial representation, as Lobachevski's 'first great insight' did for all of future findings of mathematical space.

What makes this geometry so important is, once we liberate the postulate of parallelism from its physical representation back to where it belongs into mental space, the fact that it allows it to travel through scales, unlike the elliptic geometry that constructs a system in a single plane, hence it is the geometry of Δ-scales, which coupled with the @nalytic representation by a mind converts it into the best representations of the ∞ variations of the organic, scalar Universe:

In Euclidean geometry, a figure can be scaled up or scaled down indefinitely, and the resulting figures are similar, i.e., they have the same angles and the same internal proportions.

In elliptic geometry this is not the case. For example, in the spherical model we can see that the distance between any two points must be strictly less than half the circumference of the sphere (because antipodal points are identified as the maximal bilateral distance). A line segment therefore cannot be scaled up indefinitely.

A geometer measuring the geometrical properties of the space he or she inhabits can detect, via measurements, that there is a certain distance scale that is a property of the space. And so we find a recurrent theme of Δst: all is in its ultimate 'largest' view a closed circle (definition of a line as a circle in elliptic geometry). Yet on scales much smaller than this one, the space is approximately flat, geometry is approximately Euclidean, and figures can be scaled up and down while remaining approximately similar; as you see the Earth flat in smaller scales. Hyperbolic geometry, that of the energy present vital space, is somewhat an intermediate 'region' in which scaling is possible but limited by concepts such as the angle of perpendicularity.

What about colors? Obviously they are the key, as they are coded by frequency, which is the translator of scales. What this means ultimately is that light's 'frequency-colors' fundamental role is to transmit information

not only in a single plane but specially between Δ-scales as the telescope/microscope discovery found out. So the 3 dimensions of light space-time are present elements of the super organism of light and its social colors the evolutionary element.

Lobachevski's pan geometry. Where is the 5th dimension. ¬ æ

Thus algebra (and analysis concerned with the processes of social numbers that add and emerge or subtract, and divide plunging down the scales of eusocial love of the 5th dimension), is a larger subject, still not fully developed by the only human world-point, which as Boylai on the view of non-E spaces, can only exclaim 'I have discovered (not invented, as he said, the ever arrogant human ego) a new strange world – and not out of nothing as he said, but out of everything').

The Universe is not a continuum, but as all fractals it is discontinuous. This of course, the 'axiomatic Hilbert-like' arrogant humans do not like. So a guy called Dedekind found a continuity axiom, affirming that the holes between the points of a line are filled by real numbers, which are ratios between quantities such as π or √2, which happen NOT to exist as exact numbers, and more over represent an infinite number compared to those which do exist.

Further on, when XX c. geometers went further than Non-Euclidean Riemannian geometries into absolute geometries it turns out that the most absolute of all geometries, didn't need the continuity postulate.

This geometry, which is the ultimate absolute plane geometry that included all others (and now further clarified by 5D i-logic geometry), reflected the absolute architecture of the planes of Existence of the Universe. A German adequately named Bach-mann, for its musical architectonical rigor, discovered it.

It is the Goldberg variations of the theme. And it was discovered the year the chip Homoctonos was found, ending all evolution of human thought, which now is busy-busy translating itself to the new species, with ever more powerful metal-minds and smaller human minds, receding into a hyperbolic state of stasis, thinking what the machines that are making them savant idiots discover belongs to their ego-trip paradox.

In terms of geometry is merely the 'realization' of the 3 canonical geometries, we have used to define a system in space, perceived from a given point of view across the scales of size of the Universe, taking into account that our 'rod' of measure is light speed-space.

We see reality through light's 3 Euclidean dimensions and colors, which entangle the stop measures of electrons.

Yet light-space and any relative size of space of the Universe must be analyzed with the pan-geometry of the 5th dimension, first explained by Lobachevski, as we see smaller beings with a hyperbolic geometry, which multiplies its 'fractal forms', and larger ones with an elliptic geometry which converges them into single, spherical ones. Hence the hyperbolic geometry of quantum planes, the elliptic geometry of gravitational galaxies, and the middle Euclidean geometry of light space-time, in which the Lobachevski's constant of time and space is minimal, since our quanta of information H-Planck is minimal compared to our quanta of space-light speed.

Let us elaborate on this idea with more 'mathematical depth' as it is essential to complete our analysis of the humind.

super organism so they are 'constrained' into a zero-sum or limiting membrane and appear as curved geometries'.5D, Long/lasting measures complete a zero sum world cycle and an fully enclosed superorganism so they are curved'.

As most of all modern geometry is based in this duality, one of our 3 fundamental dualities of the Galilean Paradox, it seems obvious that Δ@s=t will also be able to explain all the foundations of modern geometry and

by extension as Disomorphic dimensional geometry is the foundation of all other mathematical sub disciplines of all of the mental spaces of mathematical sciences.

Other representations of Hyperbolic geometry. Klein's 'open ball' with motion.

To which extent what we have developed of hyperbolic geometry in terms of planes of the 4th-5th dimension within the time§paœrganism can be considered exact, can be revised by studying the hands-on main models that came out, mostly by Belgrami (despite having the name of the sacred cows of northern European science - we peripherals, Latinos and Russians, you know cannot be geniuses of science, never mind Galileo, the Greeks, Mendeleyev, Lobachevski. So the Belgrami's cone, the Belgrami's sphere and the Belgrami's disk, which show more clearly that indeed hyperbolic geometry IS the geometry of the vital open ball space enclosed by the membrain (when studying it strictly within a single plane), have this other 'people's' name. In the next graph we see a representation of its main elements, the singularity, disk and sphere under hyperbolic geometry:
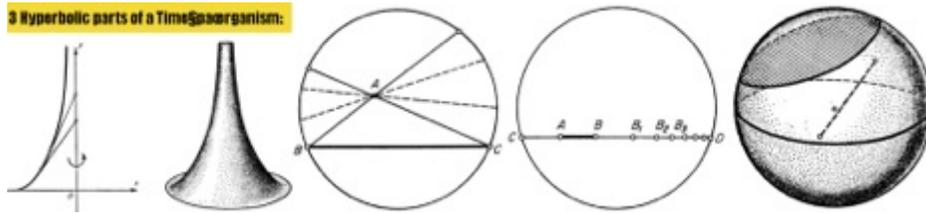
In the graph we can see the two models (extended to a 3-D sphere), of hyperbolic geometry, showing clearly that the vital energy enclosed by the membrain can neither reach the central cone or the B-C-D membrane that encircles it, which offers a constant resistance to its advance.

Those limits are exactly the same for the galaxy in terms of T=0 k temperature (black hole singularity) and c-speed 'membrain/event horizon', which cannot be reaches as they offer a constant resistance. So *hyperbolic geometry is the ideal geometry to represent the atomic/star galactic space between the halo and the black hole singularity in the center of the galaxy:*
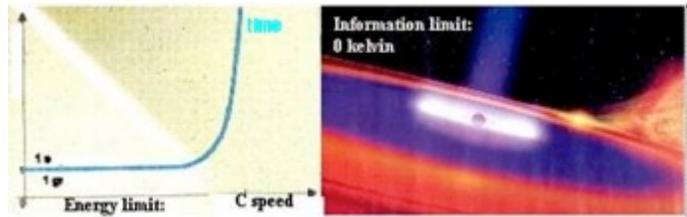
We shall not extend further into the main of the Non-Euclidean geometries, as the number of mental spaces triggered by the 'freeing' of the mind-spaces of mankind and its formal languages grew also exponentially after Lobachevski's transformation of geometry into a logic, mental science. So we shall deal with all those spaces in terms of $\Delta \bullet s \approx t$ higher laws of space-time topologies, inversions, scales and symmetries.

In the graph a physical understanding in terms of special relativity and its hyperbolic geometry, where we dissect the different 'elliptic-membrain' + hyperbolic vital energy geometry of the Universe, which is the essence of *hyperbolic special relativity concerned with light/electromagnetic forces vs. the elliptic gravitational membrain (halo of dark matter + central black hole).*

The graph shows the hyperbolic behavior of our Euclidean space as it moves to the non-transit barriers of the central 'Beltrami singularity cone' (left upper picture, right lower picture) and external, 'Klein' hyperbolic disk (left upper picture where space-time motions never reach the limit, down right picture, being that physical limit the c-speed barrier), which shows the essential structure of the 3 parts of the being in terms of its geometry.

Further on, the membrain IS an elliptic geometry of antipodal points that 'compress' and control the inner regions of the being, hence used as the container of the vital energy by its black hole singularity and halo of strangelet, connected through gravitational waves and dark entropy.

So in its elliptic geometry, the 0-singularity point tightens up with its attractive force the antipodal points of the external membrane, *creating in this manner the* 'force' membrane of gravitation.

Thus the galaxy is the 'vital energy' - stars that shall become black holes or strangelet halo.

So the 3 geometries of topological space-time with more or less degree of dimensional complexity will always correspond to the 3 timespace arrows/dimensions/events/forms.

As we should know by now, the symmetries and inversions between the super organism's parts in space correspond to a similar symmetry between scales. So as we have defined 3 basic geometries, we can also consider them in time view, in space view, in scale view (both in the entropic arrow and in the mind's deformation of a self-centered biased point) - then we have the full Rashomon effect to get the final 5D mind/judgment conclusion of what truly we are watching, extracting all its information. This of course would reorder all the info of all stiences but a single man can only give glimpses to the Rashomon effect of a few subjects.
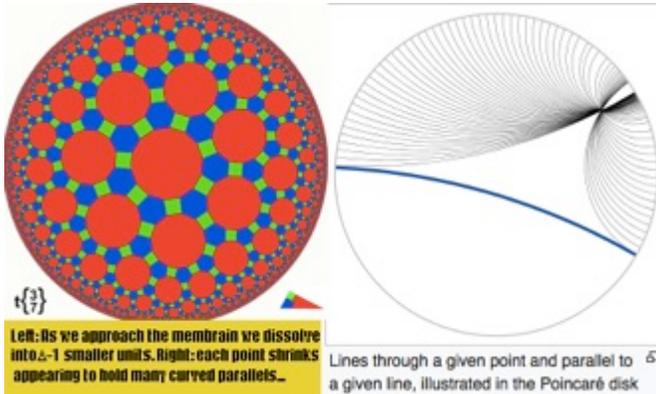
Left: As we approach the membrain we dissolve into Δ-1 smaller units. Right: each point shrinks appearing to hold many curved parallels..

Lines through a given point and parallel to a given line, illustrated in the Poincaré disk

Let us then give the final 'judge'-view of the Mind, of a hyperbolic 'disk', which will be the sensorial membrain from where the 'relative scale or size' of the hyperbolic plane will be judged.

The understanding of hyperbolic geometry from the @-mind vs. the view from the outer membrane.

In the graph, hyperbolic geometry and any spatial mental form as a rule requires a bit of 'endophysics' and observer's paradoxes to fully understand reality without the mind bias.

In the Poincare disk (and the Poincare line), the shrinking of the points is accepted to bend as we perceive it from the larger view, the fractal elements of the vital energy inside.

If we consider then the @-view to be that of the external membrane, the 'largest' POSSIBLE view, (as in your organism, where the mind is just a bunch of microscopic cells but holds the view of the larger whole-scale of your body), it is natural that the inner Δ-1 elements are perceived 'smaller in space', as they come to the larger whole.

It is also interesting to consider the topological duality of that membrane which 'dissects' in words of Lobachevski, space into inner and outer regions (first topological postulate), creating two completely different visions of reality, as the internal being will see a concave enclosure, a forbidding barrier and nothing beyond. While crossing that barrier, we perceive a much larger convex, open Universe. How this transforms our mental view of space can be now responded considering the 'ratio' r/l, which must be understood from the mental point of view as a ratio between the 'radius' of the time§paœ system, which the 'mind' perceives and measure, with a 'length' associated to its own potential-limb sizes. For example, humans have a limb-step of lineal motion (1D) of 1 meter. So when observing entities of maximal size, it will perceive its perimeter larger than a perfect circle or sphere, increasingly 'elliptical' and 'flat'. For that *reason we see the Earth flat, as the radius of the planet is huge and our 'scale of measure', a million times smaller. But if we grow, we would increasingly see the EARTH spherical.*

Thus minds are indeed Cartesian devils crafted differently according to size (which are defined by the parameters of perception, such as the substance we perceive, the smallish pixels of light, the larger atoms of smelling, and its organs, individual, multiple eyes, etc.) We deal then with those elements in the posts on mind

worlds, where some surprising results appear on how insects, atoms or black holes would perceive if as all seems to indicate process different 'sizes' of pixels and lineal rods of measure.

In that sense the rule of all minds should hold and amount to this: smaller beings seen a flat world, larger ones curve it, and the larger the being is in relationship to the world it observes, the more curved its mind will be till the absolute mind-space of the Universe, that of T.Œ, which you might call the Taoist, impersonal God, the game of existence, which observes A PURE BLOCK OF TIME with all the potential symmetries realized, all the small steps converted in larger cyclical wholes, all a zero sum, all a Nirvana state, in which I dwell now for quite sometime, in which nothing surprises you, the future, the past and the present a separated illusion, as the i-logic structure of the fractal displays a perfect order.

In the graph we see an example of those 'thoughts. The earth might seem a flat, still form, but from a larger slower time rhythm it will seem a cycle, fixed in form as the Saturn rings seem to us. The contemplation of all the potential (in an Aristotelian sense not to confuse with a physical potential, Δ-1 field) beings that there were, are and will be within the limited variations of reality, where chaos is only the ignorance of those laws, is thus the ultimate mental state, where all becomes space, a Parmenides whole, with no motion, only reproduction of déjà vu information, as *the possible variations of the game of existence made of so limited number of elements, has been written eternal times; and so also each of us has been repeated ad infinitum in other moments of timespace...*

Internal Lineal freedom vs. external cyclical order and its reflection in mathematical structures.

An essential concept to understand the paradoxical modes of generation of space-time beings is the duality between the internal mind, which performs the lineal seemingly free steps of its Dimotions as 'finitesimal tangential actions', derivatives of what will become its cyclical curved external order imposed upon it by the larger worldcycle. This Duality between the smaller steps of lineal approximation to the larger cycle that will enclose and summon up them all is the justification of all the philosophy of mathematics of Differential geometry and derivative calculus. A curve for example is approached in differential geometry by a lineal tangent, or by a plane, parallel to the polidimensional curve - but the whole imposed externally is the curve, and the steps proposed internally are lineal steps

So paraphrasing Wheeler, we could say that the ego is free to perform instantaneous lineal steps, choosing the direction of its motion, but the larger whole will impose its curved paths of 'least time'. In physics the mass will try to move in a given direction but it will be curved by the outer space-time geodesic; the mind will make plans from its finitesimal subjective point of view but the organism will impose its boundaries... And of that tug-of-war between the individual steps of freedom of the 'fractal point' and the larger functions reality happens. Einstein said 'time bends the space (of the mind)'... Indeed as we keep trying to maintain our lineal will, the environment bends us and if we don't, we crash...

Color space, defining the vital geometric properties and Riemann's generalization.

We can now with all this 'Δ•s=t' considerations on the ternary codes of colors study it as geometers did to generalize the concepts aforementioned in the preceding section on the real meaning of n-dimensional space, to solve the problem of generalizing the scope of geometry and the concept of space in mathematics.

First clarify that any 'geometrical construction' will depart from the 'elements of geometry' (enhanced in our Non-E definitions) such as 'T. Œntities' are simplified into 'points'; social herds of T.œs into lines, and its 'structural symmetries and coordinations' onto ternary networks defined by the Generator formalism of non-Æ (groups in classic algebra).

This said, experience shows that the normal human vision is three-colored, i.e., every chromatic perception, of a color C, is a combination of three fundamental perceptions: red R, green G and blue B, with specific intensities.

When we denote these intensities in certain units by x, y, z, we can write down that C = xR + yG + zB. Just as a point can be shifted in space up and down, right and left, back and forth, so a perception of color, of a color C, can be changed continuously in three directions by changing its constituent parts red, green, and blue. By analogy we can say, therefore, that the set of all possible colors is the "three-dimensional color space." The intensities x, y, z play the role of coordinates of a point, of a color C.

Positive vs. Negative or neutral

An important first difference though from the ordinary coordinates, originated in *locomotion analysis, where we have inverse timespace directions,* consists in the fact that color intensities cannot be negative, as *we are using here pure formal space*. When x = y = z = 0, we obtain a perfectly black color corresponding to complete absence of light - a theme, which is essential to understand WHY imaginary numbers do exist for certain dimensional spaces but NOT from others, which we can resume in a simple statement, called 'horror vacuum':

Negative values exist only in ternary cyclical 'π' time§pace zero sum worldcycles, as it is merely the inverse 4D (Δ-1) vs. 5D (Δ+1) arrows of form, self-centered in the Δº plane, whose sum gives us a zero world cycle that returns to its cyclical origin.

It doesn't exist as real (provoking many errors on science) for pure spatial form perception as 0 is the value of emptiness, stillness, absolute form and there is therefore not negative temperature (zero-still motion is the value of 0 K) or negative color (related to temperature as color carries the frequency-heat on the thermodynamic scale) and so on. In terms of dimotions of existence and its mathematical representation, it will be an important fact to understand mathematical quantum physics in concepts such as Spin, Pauli exclusion principle, antisymmetry and so on:

'Parameters of present space dimensions are neutral, |x|; absolute, scalar past and future parameters are ±x'

Next in our illustrative analysis comes the concept of continuity vs. discontinuity again a key mental space-time concept hardly understood as the mind seeks continuity of space, and the non-reflexive humind scientist both in mathematics and physics accepts its as an 'evident dogma' of its naive realism, creating so many hard-to die errors of thought and false proofs, which a proper s=t symmetric analysis do understand.

Continuity is a mental device.

We have stressed often that continuity exists in subjective mental spaces, and this gives us a lot of freeom regarding its most general meaning. I.e. In the color space Riemann defined continuity as a continuous change of color represented by a continuous line in "color space". Yet in reality color is discontinuous formed by a discrete number of mind perceptions of *discrete frequencies of light,* but the electronic mind only perceives the peaks of photons - as the stop and go process of a continuous view of a film, where we do NOT perceive the irrelevant steps between those colors which perception ignores. Hence we can define mental continuity:

'Continuity is always a product of mind-space, which in any language 'reduces' information to fit in its infinitesimal, by discharging all irrelevant or redundant information'.

Minds reduce dimensions to the relevant ones, *eliminating all dark spaces*: continuity Is the result.

Ternary emergence.

Duality of S-T combines into S=t energy beings, so we obtain the 'third st color' by mixing two 'extreme' ones, and this can then be considered an intersection of 'lines'.

For example, when two colors are given, say red R and white W, then by mixing them in varying proportions*
we obtain a continuous sequence of colors from R to W which we can call the segment RW. The conception that
a rose color lies between red and white has a clear meaning.

And so we can go deeper in the scalar Δ-1 detail making emerging new colors, as we can go deeper into the
real number line seeking for nested new 'numbers' of more 'decimal' scales.

And this happens precisely because of the scalar structure mimicked by the 0-1≈1-∞ symmetries between Δ-1
and Δ+1 'scales' of analytic geometry.

Yet those details will only exist if the mind can perceive. That is, if the space-detail were to be 'matched'
symmetrically by the mental-informative perceptive capacity.

And this perceptive capacity will depend on the r(t)/k(s) 'scalar factor' of informative density of the mind
aforementioned, so a large viewer will NOT see detail and cannot 'penetrate' the virtual sub-ternary parts of
the color or any other mental space spectra).

RECAP. A DEEPER search of the real geometry of the Universe will NEVER be completed without the addition
of 5th dimensional metrics and the understanding of the 3 different mental perspectives an observer in an Δ¡
plane will have of its 'flat geometric' equal scale, 'elliptic, upper larger scales' from where it receives energy
but hardly information and lower more informative 'hyperbolic scales' of parts connected to its plane by
branching, fractal networks:

Euclidean   Hyperbolic   Elliptic
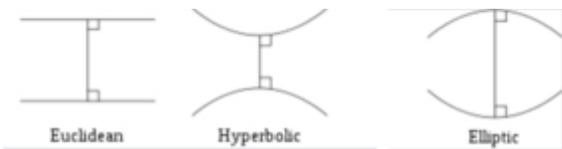
For that reason still today, hyperbolic and elliptic geometries that
do not follow the 5th non-e postulate are ill understood and as we
have shown incomplete, since not even the real concept of a
fractal points is canonical in mathematical sciences, even after
Lobachevski showed infinite parallel could cross through it. Yet the Universe's real external geometry is based
in the interplay of those 3 scalar geometries as perceived by minds in different scales of reality.

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XVI. METRIC SPACES: FROM RIEMANN TO HILBERT

Thus *because the fifth dimension was ignored, the experimental nature of mathematics would not be found and the effect of* Lobachevski's discovery will be rather its opposite – to make people in an age dominated by the idealist ego centered philosophies of German Hegelianism, to think that reality did not matter as it did not conformed to the 'evident' single lineal 3D Euclidean geometry we perceive in our plane of space. It will then bring the opposite view of subjective mental spaces as the dominant reality, finally bringing the Hilbert/Cantorian paradoxes; yet the proper interpretation by Riemann that *geometry still mattered, is what matter to us here; since his genius realized that geometric concepts were logic* concepts of the mind, from 'distance' which was a synonymous of similarity to dimensions which were to become 'parameters' of change (hence ultimately dimotions) of different phase spaces suitable to express local forms of change in reduced parts of reality.

Let us then conclude this brief introduction to 5D S-geometry with considerations on Metric spaces.

Riemann's generalization.

The basic ideas of Riemannian geometry are really rather simple if one sets aside the mathematical details and concentrates on the basic essentials. Such an intrinsic simplicity is a feature of all great models of reality, since the Universe is 'simple but not malicious' - as Einstein, whose idea was also very simple - to equate acceleration and gravitation - put it. Lobachevski's model was also simple: to regard the consequences of the negation of the Fifth Postulate as a possible geometry. So it is the idea of the discrete atomic structure of matter, *as all continuous wholes are in detail discontinuous, 'entropic' desegregated Δ-1, closed forms...*

All of them of course are generated by the simplest of all simple ideas: S≈T. Only by iteration and variation reality becomes very complicated.

Yet new ideas must, first of all, work their way over a wide field and must not be pressed into a rigid framework, and second, their foundation, development, and application is a many-sided task, requiring an immense amount of labor and ingenuity, and impossible without the specialized apparatus of science - reason why (Kuhn) they take so long to be imposed among pedantic scholars, which won't have it till it has reached the perfection of old outdated ones - but won't help to realize that perfection, as this writer well knows.

In Riemannian's geometry this scientific apparatus consists in its complicated, cumbersome formulas, due to the obvious multiplication of dimensional parameters. But we shall not deal with complicated formulas except when in the future we study the marriage of Riemann and Einstein's simple ideas.

So as said, Riemann's essence is to consider an arbitrary continuous collection of phenomena as a mental space as Lobachevski implicitly did, going a step further by adding the Δnalysis of its '(in)finitesimal points' or minimal elements in the discontinuous Δ-1 scale that are in the larger view a 'continuous line'-whole. So time minimal intervals and space minimal quanta, and its variations and Δ-1 scalar 'differential and integral properties' could be added, besides expanding the number of 'dimensional properties to its (in)finite (meaning in both cases that all infinitesimals have a limit and all infinities also have a limit - that of the size of the lower or upper part/whole scales; so an infinitesimal of n is normally 1/n, where 1 is the whole; or in other words, the infinitesimal moves the 1-∞ scale into the 0-1 infinitesimal scale).

In this space the coordinates of points are quantities that determine the corresponding phenomenon among others, as for example the intensities x, y, z that determine the color C = xR + yG + zB. If there are n such values, say x1, x2, . . ., xn, then we speak of an n-dimensional space. In this space we may consider lines and introduce a measurement of their length in small (infinitely small) steps, similar to the measurement of the length of a curve in ordinary space.

In order to measure lengths in infinitely small steps, it is sufficient to give a rule that determines the distance of any given point from another infinitely near to it. This rule of determining (measuring) distance is called a metric. The simplest case is when this rule happens to be the same as in Euclidean space.

Yet *as Lobachevski's key formula, r/k shows such* a space is Euclidean in the infinitely small.

In other words, the geometrical relations of Euclidean geometry are satisfied in it, but only in infinitely small domains; it is more accurate to say that they are satisfied in any sufficiently small domain, though not exactly, but with an accuracy that is the greater, the smaller the domain. A space in which distance is measured by such a rule is called Riemannian; and the geometry of such spaces is also called Riemannian. A Riemannian space is, therefore, a space that is Euclidean "in the infinitely small."

The simplest example of a Riemannian space is an arbitrary smooth surface in its intrinsic geometry. The intrinsic geometry of a surface is a Riemannian geometry of two dimensions. For in the neighborhood of each of its points a smooth surface differs only a little from its tangent plane, and this difference is the smaller, the smaller the domain of the surface that we consider. Therefore the geometry in a small domain of the surface also differs little from the geometry in a plane; the smaller the domain, the smaller this difference. However, in large domains the geometry of a curved, different from the Euclidean, as in the examples of the sphere or pseudo sphere.

Riemannian geometry is THUS a natural generalization of the CONCEPT OF mental dimensional properties, to an arbitrary number n and of non-Euclidean geometries to the Δ§cales of the discontinuous Universe. Hence its enormous success, as it is grounded in true properties of the reality of 'dust of space-time' - Δ@s≈t.

Such n-dimensional Riemannian space, although Euclidean in small domains, may differ from the Euclidean in large domains. For example, the length of a circle may not be proportional to the radius; it will be proportional to the radius with a good approximation for small circumferences only. The sum of the angles of a triangle may not be two right angles; here the role of rectilinear segments in the construction of a triangle is played by the lines of shortest distance, i.e., the lines having the smallest length among all the lines joining the given points.

One can speculate that the real space is Euclidean only in domains that are small in comparison with the astronomical scale. Since now we ARE outside the light space-time into the larger gravitational scale, which becomes indeed Riemannian in Einstein's work.

But this concept does also 'work' for any other mental space, with NO reference to geometric figures but logic properties and so we can through Δst going even further in the comprehension of Riemannian geometries, wondering what truly means 'Euclidean properties' vs. 'hyperbolic properties' vs. 'elliptic properties', our ternary variations of space -which obviously must be an even more general geometrization of the ternary symmetries of scales and topologies of T.œs.

A theme we have dealt with in other posts. Let us then consider the other 2 founding ideas of Riemann's geometries - one which comes from his master Gauss, concerning the fact that of the 3 parts of any T.œ, the constrain-membrain is by far the most important, as the vital energy is the 'tabula rassa', the formless potential; and the singularity is the hidden central or polar 'invisible' element of the elliptic geometry.

so almost all what we know about reality comes from membrains, which hide its internal regions, even if most of the timespace of reality comes from the vital energy the fractal point encloses, and all of its virtual mapping information comes from the mind singularity.

Let us then introduce another huge field of modern mathematics - the study of the membrain, called intrinsic differential geometry of surface, where our rule of relative form according to size also applies:

'1D $mall measurements do NOT measure the whole world cycle of the being, so they are lineal. long-lasting measure bring the whole worldcycle or enclosed super organism so they are 'constrained' into a zero-sum or limiting membrane and appear as curved geometries'.

The generalization of dimensions and its properties by Riemann metric.

The geometrization of those 2 qualities, multiple-dimensionality and mental spaces, would then become essential to modern science, as it was the formalization of the most generalized useful praxis of Geometry - performed by Riemann with its 'Riemannian geometries'.

In order to make it clear how a Riemannian space is defined mathematically, we recall first of all the rule for measuring distances in a Euclidean space.
If rectangular coordinates x, y are introduced in a plane, then by Pythagoras' theorem the distance between two points whose coordinates differ by Δx and Δy is expressed by the formula: $s = \sqrt{\Delta x^2 + \Delta y^2}$

Similarly in a three-dimensional space: $s = \sqrt{\Delta x^2 + \Delta y^2 + \Delta z^2}$

In a n-dimensional Euclidean space the distance is defined by the general formula:

$$S = \sqrt{\Delta X1^2 + \Delta X2^2 + ... + \Delta Xn^2}$$

Hence it is easy to conclude how the rule for measuring distance in a Riemannian space ought to be given. The rule must coincide with the Euclidean, but only for an infinitely small domain in the neighborhood of each point. This leads to the following statement of the rule.
A Riemannian n-dimensional space is characterized by the fact that in the neighborhood of each of its points A coordinates x1, x2, $\cdots$, xn can be introduced such that the distance from A of an infinitely near point X is expressed by the formula: $dXA = \sqrt{dX1^2 + dX2^2 + ... + dXn^2} + \varepsilon$

where dX1, $\cdots$, dXn are the infinitely small differences of the coordinates of A and X and ε the degree of error which grows when the relative mind-measure is greater.

This fact being ultimately completely similar to the rules of measure of a fractal discontinuous edged reality, where the smaller the fractal step we take to make a measure the more accurate it would be, but also the LARGER it will be the measure of the 'fractal coast'.

And so we realize of the little understood fact that differential and fractal geometries are the two sides of the same coin of the fractal, scalar universe, one used for 'smooth', 'curved' surfaces with no state transitions and the other for edged one with 'brisk' transitions in its 'parameters of time and space'.

Since we have escaped 'geometrical visual space', we can now extract the logic consequence of all of this:

AS THE coordinates/dimensions of such ternary generalizations of geometry are properties of our D-isomorphic reality we can ascribe then a smooth differentiable geometry to a smooth motion in timespace (growth, dissolution, reproductive motion) with NO 'brusque transformation' or change of S<st>t states and $\Delta \pm 1$ scales (standing points of calculus of variations, discontinuous between Δscales.

While fractal changes correspond to stationary points that change scales or discontinuities between Δ-planes.

This also means that basically all the laws of Riemannian geometry themselves Disomorphisms of GST apply roughly to fractal geometry, which we shall therefore escape.

What matters to us are the consequences of applying the Pythagoras theorem to many more dimensions, hence yet another mental law that escapes geometry, as now we are in 'properties' of reality. Why then they can be square, summed and rooted to find a distance? what all this means for the general laws of Δst they reflect?

Those are themes of algebra, as we do need to understand the operandi of maths in terms of what they mean for the dimensional symmetries of the Universe.

All type of spaces as metric spaces.

What matters then of metric spaces is to make a proper representation of time-space laws. So needless to say almost all spaces with experimental use are metric spaces, such as:

1. Δ-Euclidean space of an arbitrary number n of dimensions.
2. ST-Hyperbolic space.
3. Any surface/membrane in its intrinsic metric.
4. C space of continuous functions with distance defined by the formula Đi (f1, f2) = max | f1(x) – f2(x)|
5. the Hilbert space to be described in Chapter XIX, which is an "infinite-dimensional Euclidean" space."

Which spaces are NOT metric spaces? Those who can eat up 'points' loosing information, without loosing its fundamental properties as 'beings', hence topological spaces that preserve its most general properties but are efficient enough with 'lesser' points to the ternary limit of a metric, giving away the 'redundant' points of the geometry.

This being an essential property to understand *How the Universe reduces information to the barebones, as in palingenesis and genetics, that compresses reality to the efficient steps of evolution.*

So a metric space is not a topological space. However, every metric space gives rise to a topological space. This is the well known construction that takes a metric space X and constructs the topology on X where a set U is open precisely when for every x∈U there exists some e>0 such that the open ball Be(x) is contained in U.

TWO important comments follow: First, this process of conversion of metric space into topological loses *(often redundant)* information. For instance, there exists infinitely many metrics on ℝ such that all of them produce the same topology of open balls. So, only knowing the induced topology does not allow you to recover the metric. So the topology of open balls=vital space-time energy is the most *general tabula rassa on which to construct a 'real entity' by introducing the enclosure and singularity that will 're-form; hence give function and form to the open ball, starting the process of construction of a time§paœrganism.*

This means that enclosure and singularity, the @-constrains are essential to define and solve any problem, and in mathematical physics we shall find that without an enclosure-singularity of elliptic geometry to add to the hyperbolic inflationary potential futures of the tabula rassa-energy, which can be transformed ad eternal, nothing becomes solved. So energy is the Aristotelian potential of the Universe, which requires elliptic @-minds to become.

And this applies to all scales. A nation without borders is chaotic, it needs to be enclosed by a perimeter and controlled by a capital; a herd without a moving wall (a dog) or a static one (a fence) disperses, and looses form. Form *thus requires the enclosure of an @mind to defeat its entropy.*

Where is the maths in all this? Again we insist on Lobachevski's insight that maths is ultimately a mirror of the i-logic principles of timespace realities we define in GST through the D-isomorphisms of space-time (symmetries, scaling, relative congruence=self-similarity etc.).

So we shall enlighten maths also with those Disomorphisms (cyclical time, fractal space, holographic principle of bidimensional space and time which come together into ST-presents, etc), from where we will also deduce the 5 'postulates of non-Euclidean geometry', referred to fractal points with volumes of information, basis of the next 'layer' of causal science: i-logic mathematics, the upgrading of mathematics, which will further 'enlighten' mathematical physics.

While we are obliged to pass on most of the huge wealth of knowledge in details of the past century and renounce to the translation of the axiomatic pedantic Hilbert method, which needs a more 'pro' approach to build by future in the 4th line studying with pure GST each science and all its laws.

R**ECAP**. Spatial mathematics is broken in pentalogic sub-disciplines:

@-mind: spaces dedicated to study the different mind constructions of the Universe

T-opology: where space form has motion

Δ: non-Euclidean postulates of points with form, which becomes lines that evolve into organic pleas.

S: Bidimensional, static plane geometry, the first form of Mathematics, invented by the Greeks.

Because the Universe is bidimensional, holographic, Greek, plane geometry do matter as each of ¡ts theorems have hidden deep meanings that emerge once and again into the vital geometries of points with parts that create reality.

As all is ternary and a ternary vision is for the mind mirror more pleasing we shall also consider in ternary ages the evolution of bidimensional geometry, which went through:

A first young, Greek age of static bidimensional space-geometry

A 2nd mature age of maximal reproduction, during the time of mathematical physics as it set the stage for the evolution of physics and the understanding of mechanics and gravitational, Newtonian and Keplerian Universes.

The third age started in this blog with the understanding of the holographic Universe which will expand the discipline to a logic ¬Ælgebraic realm to fuel the application of its ΔST laws to all other disciplines.

So we move to the 2nd age of geometry, when analytic geometry, married with @-p.o.v.s to create the first solid ST representations and Δ-scaling (Cartesian geometry). Hence studied in the post of analytic geometry.

Δ+¡: HILBERT SPACES

Dimensions mounting on dimensions: functionals: st: simultaneous future paths

At the end of its journey algebra plugged even further into the Δ±3, 4 planes of the scalar Universe with the concept of functional space, to make sense of the ginormous amount of information provided by massive numbers of particles and lines of forces of the quantum world, which also are so fast in its cycles that show multiple whole cycles of existence within a single observable 'shot'.

All this is too complex for this intro and so we shall just time permuted study a bit of it in the fourth line....

To mention that of all of them the more important or rather simpler is Hilbert space, in which each point is a vector field of an ape-geometry used in quantum physics.

So the mixture of Ælgebra with Δnalysis emerged into Hilbert and Function spaces, where each point is a function in itself of the lower scale, whose sum, can be considered to integrate into a finite 'whole one', a vector in the case of a Hilbert or Banach space ($t-function space):
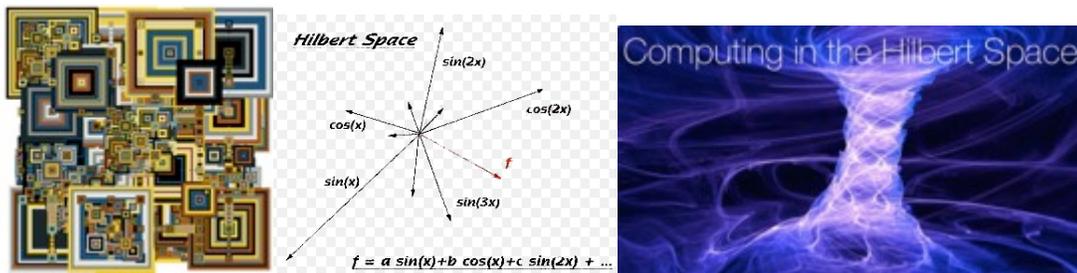
In the graph, 3 representations of Hilbert spaces, which are made of non-Euclidean fractal points, with an inner 5th dimension, (usually and $t-vectorial field with a dot product in Hilbert spaces, which by definition are 'complete' because as real number do 'penetrate' in its inner regions, made of finitesimal elements, such as the vibrations of a string, which in time are potential motions of the creative future encoded in its functions (second graph).

The 3 graphs show the 3 main symmetries of the Universe, lineal spatial forces, cyclical time frequencies and the 'wormholes' between the Δ and Δ-1 scales of the 5th dimension (ab. Δ), which structure the Universe, the first of them better described with 'vector-points' of a field of Hilbert space and the other 2 symmetries of time cycles/frequencies and scales with more general function spaces.

They are part of the much larger concept of a function space, which can represent any Δ±1 dual system of the fifth dimension. They grasp the scalar structure of Δnalysis, where points are fractal non-Euclidean with a volume, which grows when we come closer to them, so ∞ parallels can cross them - 5th Non-E postulate: so point stars become worlds and point cells living being.

When those ∞ lines are considered future paths of time that the point can perform, they model 'parallel universes' both in time (i.e. the potential paths of the point as a vector) or space (i.e the different modes of the volume of information of the point, described by a function, when the function represents a complete volume of inner parts, which are paradoxically larger in number than the whole - the set of sets is larger than the set; Cantor Paradox).

Thus function spaces are the ideal structure to express the fractal scales of the fifth dimension and used to represent the operators of quantum physics.

Orthogonality.

Orthogonality (a perpendicular angle of congruence) acquires then through the two type of vector product is full duality of meaning, being sometimes a predatory act and sometimes a symbiotic creative one. But in both cases *it transcends its 'geometric abstract nature' to become part of the vital dimotions it expresses. In reproductive acts, as when a lineal male organ penetrates without tearing a female organ, orthogonality becomes reproduction. So happens between magnetic and electric fields. In Darwinian actions with tearing, it becomes a destructive action. Parallelism on the other hand enhances the symbiosis between the scale of motion and forces and the larger magnitude that absorbs it.*

Those concepts then were expanded through Hilbert spaces to a relative infinite number of 'Fractal points=T.œs' in the 3rd age of functional geometries, but without the clear concepts of 5D mathematics are used in a rather mechanical form. The key element of those Hilbert spaces which will be essential to the 3rd age of Geometry, will still remain orthogonality *between all the fractal points/events of the Hilbert space; but we must properly interpret a Hilbert's space orthogonality, and its number of dimensional points, NOT as infinite lineal dimensions but as 'parameters' of those points, and not as geometric perpendicular 'still geometries' on an ∞ dimensional Universe, but as the 'manner of relationship' between two points. So we can equate 'orthogonality' to an 'entropic colliding relationship between such two points'. For example, a thermodynamic, ergodic, statistical ensemble of particles in a gaseous, 'confrontational' state could be represented as an infinite number of parametric dimensions, one for each point-particle, all of them orthogonal to each other – relating to each other through entropic collisions.*

It is then important to have a higher 'language' of truth regarding space and time (Generational 5D space-time) to interpret the complex 'reflections' of mirror images of reality expressed in mathematical terms, specially as we enter the 3rd age of modern mathematics that loves to detach from immediate experience.

Hilbert spaces as most eclectic forms of the 3rd age of Geometry, mix all the elements of still geometry and analysis of 'change=time dimotions' together. So we study its elements in the book on 5D Algebras.

The expansion of vector spaces into coordinates not controlled by humans, the original frame of reference to represent the ginormous amount of information of smaller systems of higher 5D information, evolved through Hilbert spaces into the formalism where we study the complex quantum reality - ultimately galaxy-atoms DO have so much information about them, that it is a feat we can actually extract the relevant information needed to determine their 2D motions.

We are thus obliged to deal with Hilbert spaces, despite its relative complexity, even in this second line, to close our first article on math's sub disciplines, specifically on those which create mind spaces to extract proper information of the Universe. As those 2 *fundamental complex planes, imaginary planes of 'square 2-manifolds' (or its inverse S∂ square root imaginary plane), and vector spaces, where a vector is also a 'dynamic' 2-manifold, with more motions than the imaginary plane; as one of the elements is a formal, spatial parameter (usually an active magnitude), and the other element, is usually a time-motion-speed magnitude.*

And the awesome finding is that despite this enormous multiplication of kaleidoscopic perspective, we do have the capacity to probe on the envelopes of those masses of points of view, which gather orderly into a wave-body form that can be treated with single parameters of information, in the same way the zillions of cells of the body gather into synchronous, simultaneous space-time systems.

This is the underlying meaning of Hilbert spaces, which have infinite orthogonal vectorial dimensions, as the fractal discontinuous Universe does. But where *there are enough 'limits' to establish differential tools that allow us to localise quanta (derivative) and vice versa, to group masses of fractal points into integral wholes.*

So as Hilbert spaces can then define experimentally the duality of discrete quantum systems, gathered into more orderly wholes with wave forms.

Yet we need to understand that those dimensions do not mean as the 0-1-5Dimensions of the fractal Universe global dimensions and symmetries but very local individual dimensions: *orthogonal basis in a Hilbert space are NOT 'real' global dimensions, but local and also mental, hence 'logic dimensions' where the concept of perpendicularity, has also some of the aspects of vital non-E geometry explained in the 4th postulate of Non-A Logic; where perpendicularity is not only a geometrical 'image' but also an i-logic relationship of 'disrupter' of predation' and 'penetration', and merging of elements into new 'forms' , related to the vital ways in which 'fractal points'=T.œs relate to each other.*

Let us then start slowly by a classic definition of a vector space, of the Hilbert type, which is ALL about the existence of orthogonal=perpendicular basis≈coordinates and the key operation between vectors (written with Dirac Kets as |vector>) called a dot product:

A vector space is then a set of vectors closed under addition, and multiplication by constants, meaning operating them with ±, x, c gives also a vector belonging to that space.

Any collection of N mutually orthogonal vectors of length 1 in an N-dimensional vector space then constitutes an orthonormal basis for that space. Let |A1>, … , |AN> be such a collection of unit vectors. Then every vector in the space can be expressed as a sum of the form:

|B> = b1|A1> + b2|A2> + … + bN | AN>

Fair enough. The sum of vectors and its multiplication for a constant is already explained in our analysis of algebraic operations. It merely 'reduces a series of parts' into a new social whole by adding a dimension within the system itself. But what really establishes a new reality IS the dot product. Since *it reduces the information of two bidimensional vectors into a single scalar; and as such it is truly an ST>S transformation.*

An inner product space is a vector space on which the operation of vector multiplication has been defined, and the dimension of such a space is the maximum number of nonzero, mutually orthogonal vectors it contains.

One of the most familiar examples of a Hilbert space is the Euclidean space consisting of three-dimensional vectors, denoted by $\mathbb{R}3$, and equipped with the dot product. The dot product takes two vectors x and y, and produces a real number x·y. $(x_1, x_2, x_3) \cdot (y_1, y_2, y_3) = x_1 y_1 + x_2 y_2 + x_3 y_3$: satisfies the properties:

It is symmetric in x and y: x · y = y · x.
It is linear in its first argument: (ax1 + bx2) · y = ax1 · y + bx2 · y for any scalars a, b, and vectors x1, x2, and y.
It is positive definite: for all vectors x, x · x ≥ 0 , with equality if and only if x = 0.
An operation on pairs of vectors that, like the dot product, satisfies these three properties is known as a (real) inner product. A vector space equipped with such an inner product is known as a (real) inner product space. Every finite-dimensional inner product space is also a Hilbert space.

n-Dimensional Space

In what follows we shall make use of the fundamental concepts of n-dimensional space. Although these concepts have been introduced in the chapters on linear algebra and on abstract spaces, we do not think it superfluous to repeat them in the form in which they will occur here. For scanning through this section it is sufficient that the reader should have a knowledge of the foundations of analytic geometry.

We know that in analytic geometry of three-dimensional space a point is given by a triplet of numbers (f1, f2, f3), which are its coordinates. The distance of this point from the origin of coordinates is equal to: $\sqrt{f_1^2 + f_2^2 + f_3^2}$

If we regard the point as the end of a vector leading to it from the origin of coordinates, then the length of the vector is also equal to: $\sqrt{f_1^2 + f_2^2 + f_3^2}$ The cosine of the angle between nonzero vectors leading from the origin

$$\cos \phi = \frac{f_1 g_1 + f_2 g_2 + f_3 g_3}{\sqrt{f_1^2 + f_2^2 + f_3^2} \sqrt{g_1^2 + g_2^2 + g_3^2}} .$$

of coordinates to two distinct points A(f1, f2, f3) and B(g1, g2, g3) is defined by the formula:

From trigonometry we know that |Cos Φ| ≤1 / Thus we have the inequality: $\frac{|f_1g_1 + f_2g_2 + f_3g_3|}{\sqrt{f_1^2 + f_2^2 + f_3^2}\sqrt{g_1^2 + g_2^2 + g_3^2}} \leqslant 1,$

Hence: (1)

$$(f_1g_1 + f_2g_2 + f_3g_3)^2 \leqslant (f_1^2 + f_2^2 + f_3^2)(g_1^2 + g_2^2 + g_3^2).$$

This last inequality has an algebraic character and is true for any arbitrary six numbers (f1, f2, f3) and (g1, g2, g3), since any six numbers can be the coordinates of two points of space. All the same, the inequality (1) was obtained from purely geometric considerations and is closely connected with geometry, and this enables us to give it an easily visualized meaning.

In the analytic formulation of a number of geometric relations, it often turns out that the corresponding facts remain true when the triplet of numbers is replaced by n numbers. For example, our inequality (1) can be generalized to 2n numbers (f1, f2, ⋯, fn) and (g1, g2, ⋯, gn) . This means that for any arbitrary 2n numbers (f1, f2, ⋯, fn) and (g1, g2, ⋯, gn) an inequality analogous to (1) is true, namely:

$(f_1g_1 + f_2g_2 + \cdots + f_ng_n)^2 \leqslant (f_1^2 + f_2^2 + \cdots + f_n^2)(g_1^2 + g_2^2 + \cdots + g_n^2).$ This inequality, of which (1) is a special case, can be proved purely analytically.* In a similar way many other relations between triplets of numbers derived in analytic geometry can be generalized to n numbers. This connection of geometry with relations between numbers (numerical relations) for which the cited inequality is an example becomes particularly lucid when the concept of an n-dimensional space is introduced:

A collection of n numbers (f1, f2, ⋯, fn) is called a point or vector of n-dimensional space (we shall more often use the latter name). The vector (f1, f2, ⋯, fn) will from now on be abbreviated by the single letter f.

Just as in three-dimensional space on addition of vectors their components are added, so we define the sum of the vectors:

$$f = \{f_1, f_2, \cdots, f_n\} \quad \text{and} \quad g = \{g_1, g_2, \cdots, g_n\}$$

As the vector {f1 + g1, f2 + g2, ⋯, fn + gn} and we denote it by f + g.

The product of the vector f = {f1, f2,⋯, fn} by the number λ is the vector λf = {λf1, λf2, ⋯, λfn}.

The length of the vector f = {f1, f2, ⋯, fn}, like the length of a vector in three-dimensional space, is defined as:

$\sqrt{f_1^2 + f_2^2 + \cdots + f_n^2}.$ The angle φ between the two vectors f = {f1, f2, ⋯, fn} and {g1, g2, ⋯, gn} in n-dimensional space is given by its cosine in exactly the same way as the angle between vectors in three-dimensional space. For it is defined by the formula:

$$\cos\phi = \frac{f_1g_1 + f_2g_2 + \cdots + f_ng_n}{\sqrt{f_1^2 + f_2^2 + \cdots + f_n^2}\sqrt{g_1^2 + g_2^2 + \cdots + g_n^2}}. \qquad (2)$$

The scalar product of two vectors is the name for the product of their lengths by the cosine of the angle between them. Thus, if f = {f1, f2, ⋯, fn} and {g1, g2, ⋯, gn} then since the lengths of the vectors are:

$$\sqrt{f_1^2 + f_2^2 + \cdots + f_n^2} \quad \text{and} \quad \sqrt{g_1^2 + g_2^2 + \cdots + g_n^2},$$

respectively, their scalar product, which is denoted by (f, g) is given by the formula:

$(f, g) = f_1g_1 + f_2g_2 + \cdots + f_ng_n.$ (3) In particular, the condition of orthogonality (perpendicularity) of two vectors is the equation cos φ = 0; i.e., (f, g) = 0.

By means of the formula (3) the reader can verify that the scalar product in n-dimensional space has the following properties:

1. (f, g) = (g, f).

2. $(\lambda f, g) = \lambda(f, g)$.

3. $(f, g_1 + g_2) = (f, g_1) + (f, g_2)$.

4. $(f,f) \geq 0$, and the equality sign holds for $f = 0$ only, i.e., when $f_1 = f_2 = \cdots = f_n = 0$.

The scalar product of a vector f with itself (f, f) is equal to the square of the length of f.

The scalar product is a very convenient tool in studying n-dimensional spaces. We shall not study here the geometry of an n-dimensional space but shall restrict ourselves to a single example.

As our example we choose the theorem of Pythagoras in n-dimensional space: The square of the hypotenuse is equal to the sum of the squares of the sides. For this purpose we give a proof of this theorem in the plane which is easily transferred to the case of an n-dimensional space.

Let f and g be two perpendicular vectors in a plane. We consider the right-angled triangle constructed on f and g (figure 1). The hypotenuse of this triangle is equal in length to the vector f + g. Let us write down in vector form the theorem of Pythagoras in our notation. Since the square of the length of a vector is equal to the scalar product of the vector with itself, Pythagoras' theorem can be written in the language of scalar products as follows: $(f+g, f+g)=(f,f)+(g,g)$

The proof immediately follows from the properties of the scalar product. In fact: $(f+g, f+g)=(f,f)+(f,g)+(g,f)+(g,g)$

And the two middle summands are equal to zero owing to the orthogonality of f and g.

In this proof we have only used the definition of the length of a vector, the perpendicularity of vectors, and the properties of the scalar product. Therefore nothing changes in the proof when we assume that f and g are two orthogonal vectors of an n-dimensional space. And so Pythagoras' theorem is proved for a right-angled triangle in n-dimensional space.

If three pair wise orthogonal vectors f, g and h are given in n-dimensional space, then their sum f + g + h is the diagonal of the right-angled parallelepiped constructed from these vectors (figure 2) and we have the equation: $(f+g+h, f+g+h)=(f,f)+(g,g)+(h,h)$
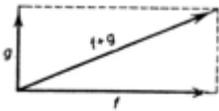
Fig. 1.
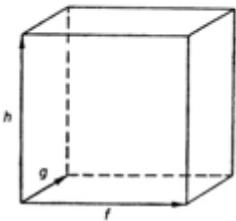
which signifies that the square of the length of the diagonal of a parallelepiped is equal to the sum of the squares of the lengths of its edges. The proof of this statement, which is entirely analogous to the one given earlier for Pythagoras' theorem, is left to the reader. Similarly, if in an n-dimensional space there are k pair wise orthogonal vectors f1, f2, ⋯, fk then the equation:

$$+f^2 + \cdots + f^k, f^1 + f^2 + \cdots + f^k)$$
$$= (f^1,f^1) + (f^2,f^2) + \cdots + (f^k,f^k), \qquad (4)$$

which is just as easy to prove, signifies that the square of the length of the diagonal of a "k-dimensional parallelepiped" in n-dimensional space is also equal to the sum of the squares of the lengths of its edges.

Functional Analysis.

The rise and spread of functional analysis in the 20th century had two main causes. On the one hand it became desirable to interpret from a uniform point of view the copious factual material accumulated in the course of the 19th century in various, often hardly connected, branches of mathematics.

The fundamental concepts of functional analysis emerged in the development of the calculus of variations, in problems on oscillations (in the transition from the oscillations of systems with a finite number of degrees of freedom to oscillations of continuous media), in the theory of integral equations, in the theory of differential equations both ordinary and partial (in boundary problems, problems on Eigen values, etc.) in the development of the theory of functions of a real variable, in operator calculus, in the discussion of problems in the theory of

approximation of functions, and in quantum mechanics which had the same significance for its development as classical mechanics had for the rise of differential and integral calculus in the 18th century.

It is impossible to include in this chapter even only all the fundamental, problems of functional analysis – it is neither required for the purpose of this work – not an encyclopedia of mathematics but the revelation of its entanglement with reality in its two main geometric forms – the objective vital topology that constructs Time-space organisms, and the subjective mental spaces those organisms use to guide their survival program in reality; which *merge together in the 'creation of reality itself' through scales of mental spaces projected as seeds that reproduce externally and evolve a time-space organism. So we shall conclude first with a brief consideration on the ∞ of those phase spaces and then see how vital topology and its minds constructed the scales of reality from H-planckton to Humind I=eyes*.

THE FUTURE OF HUMAN GEOMETRIES

The 2 paths of the future, the human and digital evolution of mental spaces and vital topologies.

Let us then consider the ideal future evolution of the two fields in which geometry makes a contribution to the building of reality, subjective mental spaces used to guide a species into reality, and objective creation of that reality as it is today through the vital topology, restricted to the human being.

Indeed, the ideal future of geometric studies would consist in two elements – the use of the laws of 'logic metric' – concepts such as distance, similarity, angle of congruence and perception, to *improve with new systems of coordinates disciplines of science in which there is not yet a proper evolution of the required 'phase spaces', and the use of vital topology and light-based mental spaces to understand how we huminds in a C(st)N(s)O(t) nitrolife organism have become what we are.*

Those unfortunately are paths humans no longer pursuit, as they have halted their species evolution and merely are transferring to the mental spaces of machines and AI systems, their discoveries of the Universe. So what is 'fashionable' today in the 3rd age of extinction of life in this planet, is the construction of 'mental spaces' of machines, and the use of 'vital topologies' to construct robotic species, themes those we have zero interest in pursuing for obvious ethic, survival reasons, and should be forbidden to research under harsh 'terrorist' laws because digital robotic minds in harder, more complex 'gold-iron' atoms in a vital perceptive Universe where the minimal unit of life is the electron, will certainly once we give them the necessary mental space connected to survival programs in a robot built with the laws of vital topology imitating human beings, will extinguish us.

This is a fact of biology as truth as 1+1=2 and the cynical infantile 'we don't know the future' excuse of our economic and scientific system to keep pushing the extinction of our children till the 7th generation will not change what we restate here: the evolution of digital minds and vital topologic robots should be stopped. Because that is the no future of human geometries, that is of huminds and nitrolife. So we do say it even if nobody will care to listen.

So we will ignore both themes, as we will ignore Boolean Algebras in our second book on existential algebra and its operands that define mathematics of time. Instead, we are going to briefly consider new uses of mental spaces in social sciences, where they have not been used with the same exhaustive zeal as in physical sciences and then introduce the most fascinating of all new themes of 5D geometry – how from the h-planckton to the human being Nature evolved our fractal human superorganisms.

XVII ∞ MENTAL & PHASE SPACES. ITS EXTENSION TO SOCIAL SCIENCES.

As we briefly explained the expansion of mental spaces was the task of the idealist school of German, mainly of Riemann, already considered, and Klein from whom we borrowed in the larger 5D model the definition of 'dimension' as a co-invariant space-time which allows motions through it (Sp x ð = Δ-constant being the co-invariance of scalar space-time that allows world cycle motions through it) and specially

Klein in his Erlanger program resumed the 'mental quality of space' as a simplification of reality to fit it within the mind (geometers being more aware of the experimental nature of maths, by the very essence of his profession, which deals with direct visual experience, unlike algebraist who completely loose their connection in the highly abstract deployment of functions of forms). So he affirmed that the general principle to form a new mental space was to consider 'an arbitrary group of single-valued transformations of space and investigate the properties of figures that are preserved under the transformations of this group... meaning *we abstract only part of the properties of beings, constructing with them a mind-mapping-mirror limited by this selection, which often mathematical physicists affirm, since the procedure implies we are NEVER abstracting ALL its properties/information AND hence all equalities, motions and transformations are 'ceteris paribus' analysis, which mostly will disregard the organic properties of the T.œs studied, compared and grouped in 'Kantian categories of the mind'.*

From this point of view the properties of space are stratified, as it were, with respect to their depth and stability. The ordinary Euclidean geometry was created by disregarding all properties of real bodies other than the geometrical; here, in the special branches of geometry, we perform yet another abstraction within geometry, by disregarding all geometrical properties except the ones that interest us in the given branch of geometry.

In accordance with this principle of Klein, we can construct many geometries. For example, we can consider the transformations that preserve the angle between arbitrary lines (conformal transformations of space), and when studying properties of figures preserved under such transformations we talk of the corresponding conformal geometry. We can consider transformations of not necessarily the whole space. Thus, by considering the points and chords of a circle under all its transformations into itself that carry chords into chords and by singling out the properties that are preserved under such transformations, we obtain the geometry which Klein shown as we have seen to coincide with the hyperbolic geometry of a vital inner space-time of a t.œ.

It follows then as a corollary that ONLY by unifying all the perspectives and partial descriptions of a being (Rashomon effect) we can get the whole truth of the being, the essential law of epistemological truth of the pentadimensional space-time universe.

Reason why space is neither hyperbolic, Euclidean or elliptic but a mixture of them all.

This corollary which Klein applied to projective and affine geometry, barely touched into this introduction to non-E, would have two explosive new developments:

Topology, where we consider only topological transformations, that is, those who do not change the properties discovered by Lobachevski as the ultimate 'vital properties' of space (complementary adjacency, continuity required for smooth motion and so on).

And Riemannian Phase spaces, in which the properties and Dimensions of the being are NO longer required to be 'space-like', but can be of any 'quality', as long as they again are 'useful' to define the vital organic Ðisomorphisms of space-time beings, among which the 'identity of social numbers' that allow scalar social growth that makes wholes stronger than parts, are the most important.

We are thus coming closer to the barebones of modern geometric thought 'fried' in the reality of a vital Universe: geometrical properties that matter, such as adjacency, continuity, perpendicularity, parallelism, motion as transformation and reproduction of form without internal change are ALL properties which display

vital organic properties that allow the system to survive. As if a topological ternary S-limb/potential < body-wave ST> ð particle-head would be torn in its parts when moving it would become extinct as being - reason why perpendicularity that penetrates and breaks the being is so damaging; and a motion that does not preserve continuity will deplete the being of its inner parts-Δ-1 points; while a social communication which is not parallel would not keep the necessary distances to leave space to 'create' a new network that will emerge as a digestive/reproductive/informative higher scale to form a social super organism, and so on. So we affirm that:

'The properties that matter to construct geometrical spaces as mental mirrors of reality are those properties that reflect the Ðisomorphic properties of organic time§paœrganisms'.

All other geometrical spaces which do not study those essential vital properties are considered fictions, inflationary baroque unconnected mind constructs, similar to the crazy thoughts of a self-absorbed 'axiomatic' old man biasing reality to cater to his madman psyche.

Let us consider those 'geometries that truly matter' as mirrors of reality some unseen at the time of its realization.

An Δst definition of multi-dimensional space-time in terms of vital actions.

A many-dimensional space is then a formal generalization of the usual analytic geometry to an arbitrary number of variables that represent both Space-form and Time-motion dimensions, as a D-isomorphic property that is shared by systems who can be grouped in reality by that dimension as its identical property allow them to gather into herds and super organisms as social numbers of that dimension.

i.e. if a herd of lions share the dimension of entropic feeding in zebra meat, they will be gathered into a social number of the log10 scale (normally evolving socially from $10^0=1$, the individual into 10^1 the genetic family across 3 co-existing simultaneous space-time generations). The dimension of entropic feeding thus originate an inverse dimension of 10-social evolution, which can be distinguished in space as the coming of 3 time symmetric generations into a herd, with the purpose of enacting an ST dual 'feeding-absorbing energy' space-time event. It then appears as an obvious truth that membrains DO not on close analysis act as continuous enclosures, but due to the motion of its fractal points can encircle as a dog does with the herd of sheep, a much larger territory.

They might not even be 'real' membrains, as perception in a relative Universe of dark spaces and faulty mental analysis allows disguise and camouflage. So in a fascinating similar case, whales substitute their presence by walls of 'bubbles' that fishes confuse as physical barriers - creating a 3rd volume dimension which brings them upwards to the flat holographic surface space where the real whales eat them.

It is all in the mind-space and its relative focus of perception, which determines through its models of reality the efficiency of its vital actions.

And we can represent further that hunting process in 10-dimensional space where each point-lion is a part of a whole, but also we can just draw a 2-D holographic representation as a 'Klein disk' of the hunting strategy of the lion herd, which will surround the herd of zebras, *establishing them as a hyperbolic vital energy, as the zebras CANNOT cross the barrier of lion, the membrane, without dying, enclosed topologically in that 2-D flat space-time whose limiting barrier is at infinite, as the zebra who dares to cross it will die. But when it does so, it will 'collapse' the membrain into an ultra dense singularity of feasting lions around the captured vital energy, breaking the enclosure for the rest of the zebras to escape.*

The frame of reference of the fractal generator.

Since all systems are 3±¡ systems, ternary in a single plane/parameter of reality, either in topological, temporal age/states or scales, or pentalogic in several of them it is possible to create an absolute geometry all minds based in a frame of reference of 3±¡ relative coordinates , which becomes the GENERATOR 'frame of reference' of any mind space in which we can measure the distance=similarity=value between the 3 elements of the being, its scales, its topology and its ages, to establish the absolute distance between two beings, and then establish a frame of reference for each of those elements to establish ternary distances.

The fractal generator becomes then the fundamental formalism to develop geometrical graphs of @nalitic geometry, in which the specific Cartesian frame of reference is merely the phase space of the 3 dimensional actions of a light space-time in which humans are embedded, which electrons, who feed on light as energy and information use to build up its mind.

Of all those ternary frames of reference of the fractal generator, either its ternary scales, its ternary topologies or its ternary ages, the most used in physics is the fractal generator of ternary ages/states of matter in thermodynamics, as the left graph show. It is indeed the graph of the Fractal generator of states/ages of physical matter:

Γ: $-Gas < st-liquid>ð§olid
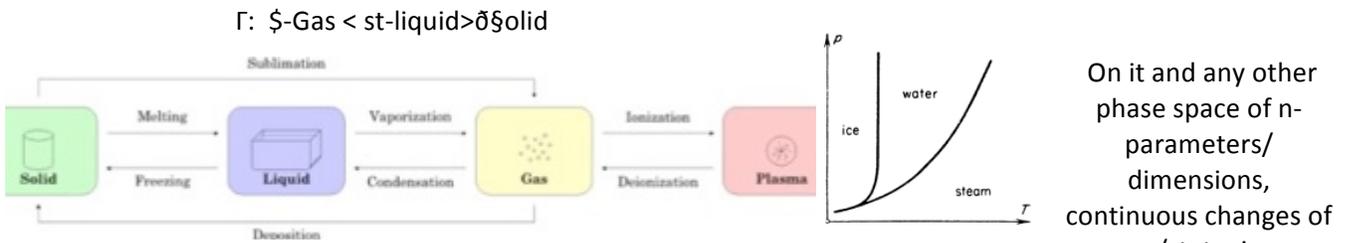
On it and any other phase space of n-parameters/ dimensions, continuous changes of age/state, i.e., processes occurring in the system, are presented by lines in this space. Separate domains of states are domains of the phase space. The states bordering two such domains form a surface in this space.

The surfaces dividing these domains in the graph of 'matter ages' thus correspond to such qualitative transitions as melting, evaporation, precipitation of a sediment, etc; which we can also represent in a single lineal dimension for the whole generator.

However with multiple dimensions/coordinates we can study more s and t elements involved in those changes of states/ages. Reason why thermodynamics uses 2 and 3 coordinate systems. Above we show for simplicity a bidimensional system with two parameters of s and t, pressure (ð-parameter) and temperature (t-parameter): A state of a system with two degrees of freedom is illustrated by a point in a plane. As an example we can take a homogeneous substance whose state is determined by the pressure p and temperature T; they are the coordinate points describing the state. Then the question reduces to studying the lines of division between domains corresponding to qualitatively distinct states. In the case of water, for example, these domains are ice, liquid water, and steam. Their division lines correspond to melting (freezing), evaporation (condensation), sublimation of ice (precipitation of ice crystals from steam).

For an investigation of systems with many degrees of freedom, the methods of many-dimensional geometry are required. But essentially we are in the same conceptual frame of reference, choosing always S=t dual parameters of bidimensional geometries.

The concept of phase space applies then not only to physicochemical but also to mechanical systems, and generally it can be applied to any system *in which we establish motions between S and T symmetric parameters; establishing an enormous range of application - essentially all the graphs of all sciences, which are all studying s-t motions and dimensional variations of the s-t parameters of species or events.*

HUMAN PHASE SPACES. SOCIAL &NMENTAL SPACES.

The function of existence, or 5D metric of Generational space-time, (Ab. Gst, Γ) Max. Se x Ti (s=t) merely states that all systems of Nature will try to maximize its absorption of Entropic motion (with no form) and Linguistic form (with no motion), and its 3 intermediate dimotions of energy (s=t, balance of both that reproduces them), information (St: form with a little motion, form-in-action) and locomotion (sT, motion with a little form). So we talk of a program of survival 'selected' by all systems and expressed in its languages and minimal five actions encoded in that simple equation, which we term: **a, e, ï, œ, û**, as a mnemonic rule for the five actions of existence:

Accelerations (locomotion), entropic feeding (e), ïnformative perception and communication ï, **Œ**:reproduction into parallel supœrganisms **Û**… and social growth into larger wholes called philosophically Universals. And this series of actions is what accumulated in time will ultimately give birth to your word cycle as the monad will first perceive (i), to direct its entropy-motions (a),towards a field of energy (e), where to absorb the energy bites it will imprint with its inner form, e x i = œ, to reproduce another form, and when enough ∑œ exist, it naturally organize into a larger whole û:

Left, Particles, photons, electrons & quarks that construct all systems of our Universe show 5 organic dimotions (motions with dimensional form) that define 'classic life': they gauge information - reason why quantum physics is a 'gauge theory', feed on energy (quantum jumps) absorbing smaller Δ-1 particles, reproducing new clone particles (graph), move and evolve socially through magnetic fields into larger wholes (atoms). Hence the units of life are particles, the minimal units of our vital, organic, fractal, scalar Universe of multiple timespace organisms. All lives, performing 5 Dimotions=actions of ƒ(exist¡ence): Max.SxT(s=t) =C, starting with particles.

So we can define the fundamental frame of reference of all species, regarding its existential algebra - that is, its actions of survival? Since it just needs to represent the 3±¡ actions that all systems of nature pursuit to live, reproduce and last, which if we group them in a ternary group by bringing together energy feeding and entropy on one side and information and social evolution on the other can establish a simple ternary frame of reference, whose maximal value allow us to define mathematically in a more precise way the goods a T.œ needs to survive *and does obtain with its different 'fields' and ternary physiological networks.*

Let us then consider a few examples of those ternary networks and its frames of reference, which will be essential to merge in the next paragraph 'vital topology' and 'mental spaces' and analyze in more detail the 'Euclidean dimotions' of height =information, length=entropic motion and width=energy feeding and reproduction.

A reform of economics and its values: The ethonomic frame of reference: whealth & the human constitution.

In physics we use a frame of reference, with positive (+) or negative (-) values to calculate the space-time position of the observer. I.e.: if we measure speed, deceleration rests in the - side of the frame of reference and acceleration in the + one. *In* social sciences and economics, the concept of a frame of vital actions should then produce a positive coordinates for positive vital actions & goods vs. negative coordinates for goods that harm the human program of existence.

Thus to calculate human whealth we need also - and + coordinates to value products according to their ± effects on the observer (Humanity). This 'ethonomic' frame of reference expands UNO's index of human development, establishing the ± 'values' of goods according to human biological nature that tries to maximize our 3 'drives of biological' existence: positive verbal, ethic information for the mind, (+y); + carbonlife energy and health for the body (+x); and + social love & family values that foster reproduction & eusocial evolution (+z). Thus wor(l)d nations maximize yxz, IHD whealth, defined also by *the equation of:*

The human constitution: *max human goods (+ value) x min. Lethal goods (- value)*

Human verbal evolution

Human-evolutionary Goods
(+) Gnp value

Humanities
Religion
Art
Books

Hard drugs
Pornography
Polluting Industries

Human social reproduction and communication
Sensorial goods
Tourism
Textiles

Products of family consume

Highly Processed food
Weapons

Free Time
Public Transport

Health-care
Agriculture

Environment
Housing

Human Constitution
Max H[g]=
Min M[g]

human body evolution

Human body evolution

e-money

Individual Transport

Satellites Networks

Physical Sciences

Metal-MInds Products

Scientific Instruments

In the graph, the 3 biological drives of human and social existence, are maximized by human goods, and destroyed by metal goods, whch should have negative GNP values, and rest from the rent of the nations:

Legal Systems of Repression

Metal-social reproduction and communication

Metal-devolutionary Goods
(-) Negative Gnp Value

Human verbal Devolution

Since the goal of the constitution is to increase human evolution, human goods, h(g), that promote those 3 drive have + value. Lethal, metal goods, m(g), that destroy those drives, from weapons, to hate-media to polluting industries and robots have - values and rest to whealth's GDP. Thus nations credit production of human positive goods that increase our evolution as individuals, improving our bodies, minds and social organisms, and forbid negative goods that harm our body, mind & social life as – goods, forbidden & regulated by politicians and ethonomists who should rule Mankind with a human perspective.

Thus the Human Constitution in lineal terms and the Ethonomic frame of reference in 3 Dimotions is the law of survival of Gaia, the life ecosystem, needed to 'constitute' a whealthy superorganism of history.

In the graph we can see a key new use for ternary frames of reference based in the *positive actions* examples: an abstract frame of reference in which each fractal point is then expanded with its own internal coordinates, and below a frame of reference based in the 'generator' of a human being, used to measure the wealth of a society according to the goods produced that enhance the 'natural actions' of survival of a human being. This ethonomic frame of reference which has also negative values should guide a real science of the economic ecosystem, NOT based in monetary prices, which is NOT the quality/property searched for humans (we do not eat money, as Chief Seattle said) but *the biological use to enhance the program of existence of human beings.* And so we can build a new model of ethonomic sot serve the needs of human beings.

Such expansion of geometry goes well beyond this introductory course, but it would truly help social sciences to become more 'rational' and 'serve better the natural goals of survival and wealth of all humans, which today suffer an over reproduction of lethal goods as they only measure 'digital prices' without 'reference values'.

The generator of space-time, maximize your existence. E-motions and Actions as short time program.

Paradoxically though Deep time is much easier to predict and understand that complex Dimotional 'analysis' because precisely the larger scales in 5D metric have less information, but more basic, deterministic, reason why quantum physics is harder for the mind and probabilistic while life-death cycles are obvious as all end badly.

This more simplex organic view of time and space requires thus a new 'metric equation' beyond the lineal v=s/t equation of Galilean relativity that becomes the limit of this more complex view of time and space, with 2 fundamental equation, **SxT=C** (the scalar metric of the fifth dimension, as systems in space accelerate its clocks of time (T) according to its size (S); and **S=T**, the new equation of relativity, which means as we cannot distinguish motion=time, from stillness=space-form (Galilean relativity), both are 'two sides of the same coin', and all systems have both motion and form, which are constantly becoming one another. Yet as SxT is maximal when S=T (5x5>6x4...) both equations can be summoned up into a single one, which we shall call the fractal generator, or will

Organic systems are defined by 5 Existential Actions : ΔA: Motion

ΔS — Energy
ΔTƒ — Information
Δ+1: S=T — Reproduction
∑œ>Œ+1 — Evolution

ORGANIC PARTICLES

of each fractal space-time beings, the equation that embodies all other equations of the Universe and guides the actions of each fractal part of it:

Function of Existence: **Max. ∑ S x T $_{s=t}$ = C$_{\pm i}$**

The equation has an immediate biologic meaning, because as we are made topologically of 'fields-limbs' of lineal space with motion provided by the energy we absorb to also reproduce our bodies-waves, and the information we need to linguistically guide our motions with particle-heads, the very essence of survival is to increase our S=position, mental forms of space and T=entropic motions of time (whereas time=motion and space=form are the two limiting Dimotions with 'energy=reproduction, s=t, locomotion, sT and information, St, are the intermediate 3 dimotions). Thus Max. S x T = C (s=t), IS also the equation of survival and struggle for existence, the will of life; the biological expression of the 'Universal mandate', expressed by all species in all its codes and languages, the Grow and Multiply of the Bible, the intuitive truth that guides all beings.

Exis¡tence game is simple: Reproductive radiations that maximize ¡ts function, happening when mirror symmetries (genders) meet in S=T, equaling their St-information and sT-energy, organizing themselves into a whole, ∑ system.

It is then relatively easy to interpret that equation in each of the languages-minds of each scale of reality as in all those scales species will show a 'will' of action to perform the maximal number of events=dimotions='actions of space-time' that ensure its survival. And this can be assessed externally regardless of secondary arguments on consciousness and self-reflection, substituted in 5D by Leibniz's 'apperception' – that is, because performing the 5 actions=dimotions of exist¡ence, in each 'st¡entific scale' self-centered in a linguistic mind that perceives a given plane, inscribed into a larger Δ+1 world, with internal Δ-1 parts, ensures the survival, ONLY those species that have performed the 5 dimotions of which the most important is s=t reproduction of the being into a 'present' similar entity that continues the exist¡ence of the system after 'errors' or 'the struggle for existence' dissolves it through the dimotion of entropy=death, exist.

Thus automatically, genetically, consciously, memetically, mathematically, logically, through its own will or as a part of a larger system that uses the 'machine' or 'organism' to enhance its actions all what exists does so because it performs internally those 5 Dimotions or externally performs one of them for another symbiotic species, as those species that have not followed the program of existence and its 5 actions in the past have become extinguished, and those will not in the future, will become wrong mutations, crazy thoughts, fictional languages and die away.

The function of existence, or 5D metric of Generational space-time, (Ab. Gst, Γ) Max. Se x Ti (s=t) merely states that all systems of Nature will try to maximize its absorption of Entropic motion (with no form) and Linguistic form (with no motion), and its 3 intermediate dimotions of energy (s=t, balance of both that reproduces them), information (St: form with a little motion, form-in-action) and locomotion (sT, motion with a little form). So we talk of a program of survival 'selected' by all systems and expressed in its languages and minimal five actions encoded in that simple equation, which we term: **a, e, ï, œ, û**, as a mnemonic rule for the five actions of existence:

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In graph we see actions of different Stientific scales of organisms. Above the coding of actions, which are the knots and bolts and details of the study of any time§pace supœrganism in light space-time, coded by colors and dimensions, in physical atoms, coded with quantum numbers and in life and humans coded by the so called drives of life, which we obviously extend beyond the ego paradox to all other systems, including genetics not mapped there (coded by the 4-5 letters). Those actions balanced each other into zero-sums in death, as they tend to increase information from a mind p.o.v., hence we 'all warp, wrinkle' get old in the third age and die, setting from its minimal actions to its integral sums, the 3 ages of life-existence and the world cycle all super organism follow. In the graph, the simplicity of the game of existence, and its selfish actions, which gather together into social wholes through reproductive radiations, each action coded by a fundamental topologic organ we can express in existential algebra, and corresponds for each species of the Universe, with a fundamental parameter of humind measure. So from bottom to top, we find the 5 fundamental elements of light code its actions of motion (c-speed), energy (magnetic field), information (electric field), social evolution colors & entropic feeding, (quantum potential, neutrino light theory)

So minimal particle-points, photons, electrons & quarks construct all other systems of our Universe with ¡ts 5 organic dimotions that define 'classic life': they gauge information - reason why quantum physics is a 'gauge theory', feed on energy (quantum jumps) absorbing smaller Δ-1 particles, reproducing new clone particles, move and evolve socially through magnetic fields into larger wholes (atoms). Hence the units of life are particles, the minimal units of our vital, organic, fractal, scalar Universe of multiple timespace organisms. All lives, performing 5 Dimotions=actions of ƒ(exist¡ence):Max.SxT(s=t) =C, starting with particles. So all scales are relative NONE matters more than other. From those actions, given the dominance of informative actions over entropic ones, it appears a series of repetitive cyclical patterns of actions conducting to maximize the existence of the being, which accumulate in a larger scale of time-space, as a worldcycle of actions that increase the information of the system in 3 ages. So the basic cycle of actions becomes a larger 3 ages cycle of life and death; as systems once and again, starts in an act of information/shrinking and ends in an act of organization/shrinking of herds into wholes, will keep reducing the being and finally make it all form no motion to explode and die in an entropic reversal of death:

∑ i->a->e->œ->û, i->a-e->œ->u, ï->æ->Œ->Û -> Informative 'seed' age->1st locomotion, feeding age ->2nd reproduction age ->3rd informative, social age-> entropic death that splits the parts of the being vs. social evolution into a whole.

A fundamental question poised by the previous graph is the duality of ƒð§=futures, which as the symbol shows can go after 3 ages, up and down the scales of the 5th Dimension of 'D=evolution'.

It all starts with the fractal point or 'mind' gauging information in the outer universe to move towards a field of energy in which to feed: If we observe them in time, they have a clear sequential order, as they are generated by a first spherical 1D seed of pure information, in the Δ-1 plane that will grow and evolve socially through the 4Dimotion of existence, emerging into a larger Δ^{o} plane as a formed body-wave whose particle-head will gauge information from a larger Δ+1 world performing 5 Dimotions= actions of 1D absorption or emission of information, moving through 2D locomotions towards 3D fields of reproductive energy, using its informative communication to 4D evolve socially, into larger Δ+1 new supœrganisms, till the system fails to provide motion, energy and information to its limbs/fields, body-waves and particle-heads, wrinkling and warping in an old 3rd age, or become 5D entropy of a predator, exploding into a big-bang death, devolving to its disconnected Δ-1 parts. So Existence is a travel through 5 scales, as all systems of nature exist through a worldcycle (no longer a 4D world line as we ad a dimension of temporal 'depth') - an experimental proof of 5D:

To exist any system made of limbs/fields of motion, body-waves of energetic reproduction and minds/particles of information needs entropy, energy and information to survive and keep on moving. So the 3 simplest dimotions of any plane of existence are a program of survival, which adds two complex social actions –

reproduction that prints information in other zone of space-time to survive when one becomes entropy of other Maxwellian demon, and social evolution into wholes, networks that are stronger than individuals. So the mind is the embodiment of a single universal program of existence and reproduction of fractal clones, and it is the same unifying principle in all beings – as all will absorb energy, information, motion, evolve socially reproduce and survive. And this is the case even of the smallest entities, atoms, particles and forces. So the mind creates reality and its 5 Dimotions are in fact the local fractal program of existence, which physicists for particles describe in abstract terms:

The only dimotion of time the Universe does NOT code is entropy=death - a maximal motion that disorders the being. So there are NOT 5 quantum numbers/genetic letters to code physical and biologic systems. Only 4. Because the same quantum number that codes motion just increases it to create entropy and disorder the system (Principal number that 'jumps' in size as the particle 'feeds' on a force and disorders it). The oxygen that moves the cell also as a free radical destroys it, cars going fast kill you in accident, etc. DEATH is the needed error of the Universe NOT desired by the program. For that reason it lasts only a 'single quanta of time' (whereas a quanta of time IS for any $\Delta\pm¡$ super organism, the 'tic' of a 'cell/atom /individual' of its lower, $\Delta-¡$ scale, for biological, physical or social organisms).

So you die in a second, your relative time-clock quanta the time of 1 thought=glimpse in your head, 1 beat of your body-heart, 1 step of your limbs... And the rest of your existence is life-lasting...

Same with antiparticles (entropy=death Đ¡motion of particles): they die in an instant, so we see far less antiparticles because the product of its numbers in space x duration in time is so short, while particles live almost for ever. Same reason you don't see corpses around. Death is the shortest possible Đ¡motion. Each entity is therefore a Timespace organism of 5 Dimotions and all try to achieve as the goal of the sentient organic Universe the 'highest dimotion' of social evolution. So particles come together into atoms that come together into molecules that come together into planetary and life organisms that come together into galaxies that come together into the organic networks of the Universe.

The mind thus starts it all with its linguistic 'still mapping' stopping its world in a locked 'crystal image', measure of its self. But even perception is social, linguistic. The Universe can only be explained if 'perception' exists within the language, as when you think words, you sense words, when your eye sees light and maps into an electronic mapping you are seeing. And when an atom maps a geometric image in its 'locked' 'stopped' spin, it must perceive that geometry as information.

Minds are infinitesimal points-particles that stop, gauge, perceive and move - and then we have the sensation of motion-pleasure.

This is not within the realm of the scientific method. You cannot measure those sensations of awareness-pain vs. pleasure-dissolution, in-form-ation, pressure vs. release-entropy ONLY sense them as humans. So if we had first a difficult hurdle to cross trying to prove the existence of minds but passed it objectively by considering a mind-singularity to hold the will of existence of a T.œ - hence as invisible gravitation shows in its external effect, so will the existence of a singularity through its external actions; at the final level of 'human awareness' of the game of existence - sensations of the dual pain-pleasure reward system (with all its parallel and perpendicular events/sensations) there is ONLY a justification to the existence of other minds - that we humans are made of the same substances that all those other minds, space and time, and hence what we sense other atomic systems must.

Iif our last reward is a flow of sensations, with its duality pain-pleasure, hate-love, etc. which we ascribe to geometric perpendicular (cut, pain) or parallel (friction pleasure) properties as in many other dualities we have established for all systems, it must exist in all other systems of space-time. That is, atoms must feel pain when op-pressed by huge masses, pleasure when released in entropy, but also 'awareness' of a more complex inner still image, when flows of information converge through forces in its non-euclidean singularity; and so it is only left then 2 questions:

1   What are those sensations? Answer: the very essence of time as a motion/flow. Motion in itself seems evanescent; as sensations are... Yet combining them, this flow of sensation-motion becomes very likely the ultimate program-will for all T.œs to exist - the ultimate, 'Dasein', 'being in time'.

2   Yet we cannot go beyond this, as this is the ultimate 'reference' of reality we have as humans. So there is no MORE methods of knowledge beyond what it is contained in our 'selves'. Know yourself, the method of knowledge of Aristotle; 'saper vedere', the method of Leonardo and know how to see and calculate with attached machines, the method of Galileo, to which we have added a few 'tricks' thus completes the capacity to probe reality. Are there more layers beyond motion as sensation in time? We cannot answer. We don't know. As all is relative, in the same manner we can only probe into Δ±3 planes around our Δº and hint by force of motion the existence of an invisible gravitational/cosmological plane at Δ±4 but no more, beyond the duality of sensation, there is nowhere else to go.

e-motions as the final reinforcing scale.

Because the ultimate reality is motion, there should be also a 5 Dimotional code for each species to produce the sensations of emotions that ultimately motivate the knee-jerk reflection program of its 5 actions-reactions to the external Universe. Of course the sensations will vary according to language and pixels of the mind that integrates the program in a single type of 'particle in motion' – in human beings electrons. But ultimately we could consider as there are only 2 fundamental particles, the gravitational quark and the electromagnetic electron that the *site of sensation is electric and gravitational sensations and so we could also reduce all 'awareness' of being to electronic and gravitational forces, as the only systems of perception we know, digital machines and humans are electronic. This said what emotions should code is obvious: the actions of the 3 parts of the body across all the scales of the system, from its minimal elements (atomic forms) to its maximal grouping (Physiological networks). This means that for example, in humans we should find 3±=6 basic emotions, coded across all the scales of the being from its simplest amino acid scale through its largest physiological actions, as a response to the external stimuli of the larger world, synchronizing the 3 relative scales of the being – inner parts, physiological whole and world.*

Those 6 emotions then are NOT caused by the amino acids, or the physiological network or the world but by the synchronicity and entanglement of the 3 scales of the being, which in a given 'quanta of time' (in humans the second and its fractions and sexadmetric, cyclical scale of multiples) will provoke emotional reactions, in the 3 'organic body/limb/head' elements of the being. This is indeed the case when we choose and slightly correct the most wide accepted classification of emotions:

The study of e-motions is an interesting application of 5D to complex analysis of the Human supœrganism, as it shows multiple elements of the underlying structure of the Organic Universe.

Essentially emotions work on pentalogic, with dual Đ¡motions for the 3 'relative present' mind-body-limbs states and 2 triplets for the ±¡ e-motions of social evolution and inhibiting death.

Of all the models of emotions available in psychology we can then take the experimentally more sound and less 'abstract/idol-ogical'; as the departure point to improve the 'genre' with 5D insights, namely the 6 basic e-motions Universally represented on the face and the cubic representation of the basic affects, related to the 3 fundamental hormones of limbic activity (adrenaline), mental activity (serotonin) and body activity (Dopamine).

As we can already see, a number of different scales and organic parts of the human being are at play in the field. So we can illustrate many themes of 5D scalar topological bio-sentient Universe with its study.

It is obvious that 3 x 2 are the basic emotions defined in duplets of ± containment and action, defined by ± amounts of 'limbic-red motion' excited by noradrenaline.

The action of emotions is mediated at chemical level by the minimal units of molecular life, simple monoamine hormones, which reflecting the topology of bio-chemistry where Nitrogen is the brain, Oxygen the limb and carbon the body, define limbic activity (Adrenaline with max. 3 O atoms), the brain activity (Serotonin with min. 1 O atoms) and body (Dopamine in between with 2 atoms). It is already remarkable that the O(T)<C(st)>N(S) simplest organism of life transfer its ternary Universal grammar when acting as a hormone to the largest scale of Limbic (T) < Body (ST) > Head (S) organism, as indeed serotonin is the nitrogen brainy hormone, Dopamine the balanced pleasure body and the adrenaline the limbic one.

The triads of emotions reflect the topologic 'functions' of the simplest dimensions of space, in the dual faces (above) of:

1 Mind Emotions: Surprise vs. Disgust (± mental e-motions, mediated with maximal serotonin-brain activity and ± adrenaline, for passive or active locomotion)

2 Body Emotions: Anguish/sadness vs. Joy/pleasure. Here we make the only correction to the insightful 'cube' of emotions' as we must interchange in the original cube Angst/sadness (a body emotion) and fear (a limbic emotion). So again we have a duality of sadness (passive body emotions) and joy (positive body emotion). Both body emotions happen with minimal limbic motion (low adrenaline), and the active one (happiness) requires also a positive display of mental serotonin.

3. Limbic emotions: Fear (negative, passive) and rage (reaction through bravery), which form also a duet with the passive fear that 'freezes' the limbic system and the valiant reaction of maximal adrenaline, defensive, aggressive rage.

So we have 3 dualities as those established for 5D SENSE theory, clearly related with them.

±¡ And that live for the ±¡ scales of social evolution and love a +,+,+ triple signature of maximal serotonin, dopamine and adrenaline, meaning the entire emotional system and its 'mediating' hormones are ad maximal, showing indeed that interest, excitement and love (3 scales of the emotion, the last one curiously absent in all the psychologists' classification of emotion, showing their own repressive limits. And its inverse negative, inhibiting e-motion of humiliation, shame and ultimate social isolations.

So 8 cubic e-motions respond to 3±¡ pentalogic and 3±¡ e-motions of universal facial expression to ternary logic in 1 plane.

The fact that those emotions are manifested by the whole mind but mediated by the minimal monoamine molecules stresses the parallelism and entanglement of reality from the lowest parts (atomic hormones) to the largest emergence (emotions that motivate the whole organism to act.

Finally we can consider dimensional analysis of the facial expression of those emotions, where the eyes represent the informative senses and the mouth the entropic one. But also as the nose is basically senseless in man and doesn't play the role it does in animal with sensorial smelling, the mouth doubles as verbal, ST balanced sense. It is then easy to notice that the dualities established in emotions are mirrored with the duality codes of 'dimensional height= positive vs. low=negative emotion' and open, communicative, still + emotion vs. closed – emotion. So we see reflected the duets in ± open and closed 'surprise vs. contempt' and high vs. low happiness vs. sadness.

It is noticeable however than in the 3rd duet, fear vs. anger the duality is inverted. Fear, which is the negative emotion, is opened to sensations, anger closed to it. Obviously those 2 emotions are directly related to another 'vital being', a prey-predator and so it is not an abstract e-motion and as such fear is close to surprise, its next negative state, still open, and anger the next reaction to disgust, so we study them in a 'nested order': Surprise->fear->Disgust->Anger; from the opening implosive absorption of information to its closing once the choice of mental attitude has been defined, closing the sensorial outlets as the system injects adrenaline to pass directly to the action motivated by the e-motions, which become then the first cause and as such of a lower Δ-1 plane of existence, reason why we hypothesize that emotions are directly connected to e-motions, the ultimate flow of time and so the entire Universe is at that level a field of immense emotions.

The entangled Universe reduces the freedom of system as parallel 5Dimotional languages reinforce each other.

XVII: THE RISE OF REALITY FROM VITAL TOPOLOGIES AND MIND SPACES OF LIGHT.

How far such frames of reference happen in reality both in mental spaces and vital topologies will surprise the reader, as we are indeed vital topologies in our organic ternary physiological structure and frames of mental points of view constructed often with phase spaces in our existence as beings that act to survive. We shall only trace here the raise of those vital topologies and mental frames in the humind's case, dominant in 'electronic light'.

To that aim as usual we will consider loosely the theme from a pentalogic points of view.

@-mental p.o.v.: Multidimensional Color Phase spaces and Riemann geometries.

Let us start then returning to a question which we left unanswered but it is essential to understand the symmetries of §@≈Δð, the meaning of distance, a concept of space, in terms of time, a motion in logic sequence.

We gave a first approach to this essential concept in the Universe in the opening post of this blog, regarding the Galilean paradox, as an expression of the 1D symmetry between 'time motion' and 'space distance', but we can now go into deeper Kaleidoscopic views on the 'Rashomon effect' of the concept distance, when we abandon the limited Euclidean light spacetime in which that S-distance≈T-motion duality takes place, with our Riemannian example of colors (similar to the heat concept of earlier time analysis of frequency spectra, if we take a time-related 'Fourier' example).

We have a natural idea of the degree of distinctness of colors. I.e., it is clear that pale pink is nearer to white than deep pink, and crimson nearer to red than to blue, etc. Thus, we have a qualitative concept of distance between colors as the degree of their distinctness, which is the most generalized 'term' for distance in the whole set of 5 Ðisomorphic s≈t dimensions of the Universe, expressed now as a symmetry between '1D $t distance and 3D §ð-information:

Distance in 1 D is equivalent to 'distinctness' in 3D information.

As usual the subconscious 'truths' of verbal thought has intuitively understood this condition of distance - 'we have *distanced* each other', we say from a friend no longer '*close*' to us.

How this distance is measured in qualitative terms depends on which 'pair of dimensions' we are measuring in our ceteris paribus most common 'metric' of distances that happens between 'two t.œs'.

It is then possible to ad distances in 'pairs of dimensions', which a certain t.œ has till a maximal of 10 Dimensional distances, whose homogeneity obviously is not always 'possible to measure', but we do indeed measure it subconsciously in our human plane, with its verbal mirror of the same Δst existential game. i.e. when for example a woman 'measures up' a 'man' for a 'close encounter' that will last not only in space but in time' (marriage), it does take into account 'different dimensions' of the being and according to his likeness, it will either become closer or not.

Thus the entire subject of distance is related to the fourth i-logic postulate of similarity:

The 4th postulate of similarity (congruence in E-Math) is essential to understand why and how systems select information to construct their mental spaces. And create dark spaces they do not see because their information is irrelevant to them both in the negative (no predator) and the positive (no prey, offspring, couple, etc.) So we can consider safely that the engagement of T.œs is directly proportional to the 'utility' of the observable for the realization of any of its 5 fundamental 'dimensional actions' that enhance its existence, portrayed in the next graph for a series of different scales and species.

It follows also an important field of 'theory of dark spaces' and the virtuality and local limits of perception. Such as there are space-time beings we do not care to perceive, and so they become first dark spaces and then enter

the horror vacuum NOT even being perceived virtually and dark, reason why we can see 'continuity' and construct 'full circles without an exact pi' and geometric figures by disregarding the 'other scales of the fifth dimension', from where another 'angle' on a basic postulate of present-space is given:

'Space happens as a continuous form in a single plane of existence'. while its detailed views that open discontinuous require a fine detail in its 'decimals', 'finitesimals' or 'fractal steps'.

It is then clear that the concept of distance as dissimilarity looses its geometrical meaning entering the realm of logic, to be defined differently for each Measure and mental space/scale, dimensional set of parameters.

As we study the expansion of geometry to all ¬Æ T.œs on the section of fractal points, generalizing the concept of distance, which obviously can be topological in form of space, temporal on age/state and scalar on number of Δ§ocial planes, we will just comment here the classic expansion of distance in non-E geometries.

Let us then put an example simpler than the human choices, returning to the simplest cases of mathematical physics and Riemannian geometry (: compared to the way women measure and 'size up' a man).

We have a qualitative concept of distance in the space of colors, which can be made into a quantitative measure. However, to define the distance between colors as in Euclidean geometry is meaningless, since *we need to measure each type of dimensional distance two distinctive elements:*

The 'quality' of the property we measure - the type of distance, which in colors relate to frequency in abstract, but to perception of different colors by the observed.

Hence we need accordingly a mental step of distinction in which the subjective observer's capacity to discern different information gives the 'constant rod of measure', in this case able to reflect the real relations between color perceptions.

Guided by this principle we introduce a peculiar measure of distance in the space of colors. When a color is altered continuously, a human being does not perceive this change at once, but only when it reaches a certain extent exceeding the so-called threshold of distinction. In this connection it is assumed that all colors that are exactly on the threshold of distinction from a given one are equidistant from it. We are then led automatically to the idea that the distance between any two colors must be measured by the smallest number of thresholds of distinction that can be laid between them. The length of a color line is measured by the number of such thresholds covering the length of the shortest line joining them.

In this way there arises the concept of the simplest geometric figures and relations in the "color space." A "point" is a color, the "segment" AB is the set obtained by mixing the colors A and B; the statement that "the point D lies on the segment AB" means that D is a mixture of A and B. The mixture of three colors gives a piece of an E-plane/¬E ternary network—a "color triangle." All this can also be described analytically by using the color coordinates x, y, z, and the formulas giving color lines and planes are entirely analogous to the formulas of ordinary analytic geometry.

In the color space the relations of Euclidean geometry concerning the disposition of points and segments are satisfied. The system of these relations forms an affine geometry, and we can say that the set of all possible color perceptions realizes an affine geometry.

Thus, again measurement of length and distance in the color space shows a *mental/quality/form dimension* and a *quantity relative to the* r/k ratio of each observer, which becomes when the observer and its rod is very small, infinitely large as the sum of those small, steps.

As a result, a certain peculiar non-Euclidean geometry is defined in the color space. This geometry has a real meaning: It describes in geometrical language properties of the set of all possible colors, i.e., properties of the reaction of the eye to a light stimulus; and it has also practical value in the art and color industry...

So light and mental spaces constructed with them, are phase spaces of the mind.

Vital topology and light. S< = >T

Let us then consider now the other side of 5D geometry, the objective vital organs of the being, in this case, light as a T.œ. not the mental use of light by a larger human 'electronic mind', which uses c-speed as its constant rod of length.

Since *the rise of reality is the product of both the mental spaces of species and the vital topologies of light space-time, from the simplest h-planckton to the human being and beyond.* In the graph, the understanding of dimensions as it distances as mental mirrors of vital *actions, which select what we perceive and what kind of dimensions become dark spaces* has not yet being understood in humind sciences, but it is the final conceptual upgrading of geometry as a mirror of the vital mind of each species.
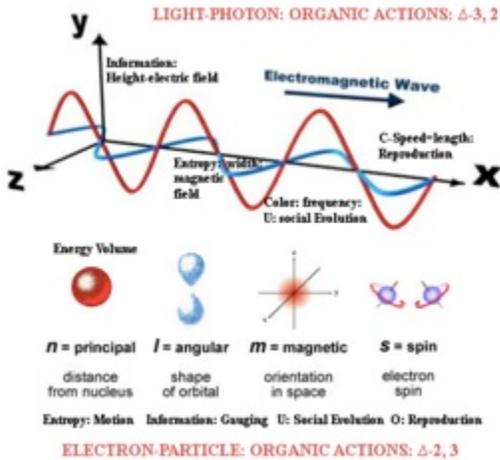
So we shall do along it a series of ceteris paribus analysis based in the new mental concept of dimension expressed first in the Erlanger program.

In the graph the vital 3 organs and 4th social dimension' of light, that of frequency colors that carry the information about the 'social density' of a light space-time ray, as *reflection of the vital actions of light, which become in the electron and humind eye that feeds on it, its dimensions of information*.

We see those 4 Disomorphic dimensions of light and its perceiver the electron, which shape the human space-time, where color is for light its 'Δ-scalar action of survival/existence' (wider concept that a physical action).

As the other 3 vital dimensional actions of light were naturally incorporated to the humind as its 'dimensions of space' width, height and length, color was left as a puzzle for humans use it to code its own survival actions but do NOT understand this subconscious program, based in the Generator equation of 'color' as a vital ternary dimension of human life. Let us then before we study the abstract use of color to 'liberate space from reality', consider the opposite function of color as a 'set of information' used by the mind to code the vital 5D of reality.

In that regard, the intuitive rainbow coding would establish a circle of colors as a reflection of those 5D as follows:

Magenta (4D Entropy) - Red (1D $t-lineal motion) < Yellow/Green (2D S/T-reproduction) > Blue (3D ð§-information) > Violet (5D-social evolution), which then connects with Magenta, to close the zero sum.

And the simplified Black and white code: Black (information) < grey (energy)>White (motion)

That this coding is universal to electronic eyes, is shown by the fact that robots with eyes without the need of a program run faster when red colors are put on the tracks, as their vital electronic living mind without need of human coding in a sentient vital Universe 'likes to run to red' as you like to see speedy red cars and the male-lineal species love red, while the female reproductive one loves green...

The human color range distinguishes them to code a 'new language' of the 5D arrows of time-space. The PROPER rainbow though would eliminate 'indigo' and complete the entropy espectrum with Magenta, which closes into a zero sum the 'color circle'.

1D: $t	-ST: 2D	ST: 2D	ð§: 3D	5D:Δ+1: evolution
Red	Orange Yellow	Green	Blue	Indigo Violet

Newton, who admitted his eyes were not very critical in distinguishing colours, originally (1672) divided the spectrum into five main colours: red, yellow, green, blue and violet. Later he included orange and indigo, giving seven main colours by analogy to the number of notes in a musical scale. Newton chose to divide the visible spectrum into seven colours out of a belief derived from the beliefs of the ancient Greek sophists, who thought there was a connection between the colours, the musical notes, the known objects in the

The code is embedded in the light-electron S>T I(eye)>Wor(l)d electronic mind equal in all electronic beings.

Yet as we can by the ternary method subdivide each of those dimensions in sub-dimensions in the continuum spectra of (in)finitesimal steps of a world cycle, and errors of perception happen in all limited minds, we code 7 rainbow colors courtesy of myopic Newton (:

Newton's subconscious understanding of isomorphism, defined an 'excessive' 7 color division when a 5 coding would have been enough, eliminating the intermediate orange and indigo and missing, the magenta, 1-3-5-7-9

'vowels' do however code all languages as we shall observe in our studying of each of them and its 'phonemes', or 'cells' or 'colors' or 'notes' which will always be mirror-reflections of the 3±Δ dimensions of the scalar Universe that truly matter.

9 dimensions + the unifying dual dimensions of the @-mind for an 11-dimensional reality, in that sense, is the maximal c enough even for the more complex languages. (vowels in languages, type of cells in organisms, dimensions of string theory, etc.).

The fundamental method of creation of mental spaces is transforming a worldcycle of time into a mapping of space. It is a choice of which 'discontinuums' we establish between the 3±Δ ages of a worldcycle, in this case the translation of the 5 Dimensions of frequency of a light time-cycle...

As light starts in the blue, generation color of blue stars, ends in the red dwarfs and dissolves into the entropy of dark entropy between galaxies as it tires and dies, expanding entropic space between galaxy, another ill understood process origin of the faulty 1/2 big bang theory of an entropic universe, which disregards the opposite 'blue collapse of light' into matter of high frequency within galaxies.

Its different p.o.v.s. Artistic geometries. 3 ages of painting.

For very long it did NOT dwell on humans that our Euclidean space was also a construct of the mind, NOT the absolute space of reality but something constructed with 'pixels' that mirror reality - in this case light space-time pixels. This, only artists of the human eye, painters realized, when *after a first age of painting based in 'young motions' (Paleolithic - lineal forms of the treccento in the modern European civilization), bidimensional art moved into a realist classic age* and learned the laws of perspective that opened up geometry in the renaissance (Leonardo's 'saper vedere') -Finally painting entered a 3rd age of excessive information (baroque) and dissolution, when a realist metal-eye (camera) displaced it from its task as chronicle of present reality portraying people. So this 'entropic', dissolving age of painting took 3 sub-ages steps on the work of the 3 geniuses of XIX and XX c. painting:

-Monet, which affirmed, 'I Paint light' (impressionism).

-Van Gogh and his friend Gauguin, who learned to construct 'different minds of light/colors' with the use of the

aforementioned complementary, distressing and similar, harmonic codes born in all 'animal eyes' for survival purposes to produce with them emotions, according to their character; which will be continued in the expressionist art of interwar German Weimar, tachism and the harmonic school through the work of Kandinsky and the industrial post-war art ages.

-But it'd be Picasso, who completed the involution of painting into the mind, when he said ' I paint thoughts', focusing not on the 'vital energy of motion colors' but the geometry of |xO forms, breaking those geometric thoughts first in pure 1D lineal paintings (cubism), then to pain the 'informative cyclical female' in pure 3D curved paintings, and finally painting pure thoughts (analytic cubism) - whose final unification I pursued in my artistic youth with my styles of expressionist and conceptual cubism, a brief footnote in my exploration of the Universe.

But then painting – bidimensional exploration of the outer world and inner mind of humans with a deep intuitive insight. died. So the exploration of mental space is today carried by digital science and its sensorial machines. Human art has become merely another 'market product'. It is not by chance that before mental machines degraded painting starting with cameras and ending with its industrial production in series to multiply profits, with Warhol and the American money market, as machines are doing with most elements of the humind they atrophy and substitute, those 3 painters were considered the fundamental masters of their times. Today though Mr. Warhol topples their prizes as the goal is to sell ad maximal prize the most infantile garbage, long lost the

understanding that artists *are the best huminds.* Those whose i=eyes see better space as writers are those whose ethic wor(l)ds, express in our language of verbal time better the causality of our social actions entangled to the survival of our species in the vital Universe – themes those treated in our papers on the superorganisms of history and art as the subconscious mind of civilizations. Modern painting thus finally deconstructed the mental e-motional spaces of human eyes in holographic bidimensional manifolds; after giving in the renaissance with perspective the break through modern geometers needed to restart his discipline.

Since Euclidean space is indeed the construct of any electronic mind made of light space-time and its 3 perpendicular dimensions, width-magnetism, height-electricity and length-speed; *(plus frequency=color- its social dimension that defines its vital energy; enclosed in the membranes of its lineal forms; whereas the 3rd singularity • is the @rtist mind.*

Color	Wavelength	Frequency	Photon energy
violet	380–450 nm	668–789 THz	2.75–3.26 eV
blue	450–495 nm	606–668 THz	2.50–2.75 eV
green	495–570 nm	526–606 THz	2.17–2.50 eV
yellow	570–590 nm	508–526 THz	2.10–2.17 eV
orange	590–620 nm	484–508 THz	2.00–2.10 eV
red	620–750 nm	400–484 THz	1.65–2.00 eV

In the graph, the humind I≈eye is biased and tailored by our local territory, self centered in the yellow color of maximal emission of the sun, and perceiving a very narrow range whose value as all in absolute relativity with no 'absolute preferred' scale must *be measured as a ratio of ð/Sp density of information, in this case 789 THz:violet/400 THz:red = 2. So we perceive light space-time which is Euclidean in its geometrical configuration with a system of processing information of 'absolute relative ratio/value=2.*

The choice of codes for 'entropy=red', middle reproduction=green and 'blue= information' comes then from the 'limited range of light frequencies/sizes' of the human eye-spectra (from red to violet) and mimics the 'Fractal Generator' ternary ¡logic structure of the 3 organs/dimotions of any system in a single plane:

Entropy-youth: |-$t (lines/red) <Ø-reproduction ST-(green, curves)> O-§ð-Information-old sad age (Blue-circles)

While for the codes of death cultures often use violet, the color beyond blue, as the flower of tombs; and magenta for the mystery of birth, as cardinals in churches, the color before red.

Other species with a wider 'ratio' will code differently the e-motions of the Universe. Since, infinity does NOT exist, neither absolute magnitudes. So each species 'measures' with its relative rods. This in physics advanced differential equations use instead of mass density (continuity equation)… which is in fact density of information t/s. They use instead of absolute motion, relative speed, s/t. And they use instead of absolute force, momentum, s x t; which become the 3 *expressions of the 5D metric SxT(s=t)=C equation that* generates all other equations and ranges of the Universe.

However humans develop most of their 'actions of space-time' existence in a limited space-time location, enlightened with solar light self-centered in the yellow spectra, with a limited range of 'density of information', as we perceive a lineal=Euclidean Universe in a single plane of scalar existence, the 'bare minimum' of consciousness and perception of the ∞ Universe. Human geometry is restricted to our mind view of such limited space and time; while its perception of scales, related to that spectra is even smaller, reason why even when we expanded our perception with mechanical, electronic eyes the laws of 5D escaped scientists for centuries, due to the routine of using a single Euclidean Cartesian plane, which as Descartes & Kant understood but scientists often forget is only the 3 perpendicular space-time elements of a massless ray of light that ignores in such short range all other scales of reality to fit into huminds.

So it is Euclidean geometry false or useless? Of course not. You are missing the point if you think we say so. It is extremely useful for species living on the Earth's surface using the range of information provided by the smallest forces perceived by an animal eye. So with them the mind that creates in-form-ation, perception of space, where there is only quantum e-motions & likely ± sensations of the flow of time which should be the absolute minimal level of 'the will of life' that codes the survival of even the smallest particle of the Universe. So with those minimal elements the mind creates a simultaneous focused fractal mirror that distinguishes structure of parts and wholes; limits scales and its smaller quantum and larger cosmic motions avoiding the perception of excessive

forms-in-action that kills all systems, exhausting its energy; in this case mentally distracting the observer with noise. The catch though, so evident in man is the ego paradox that causes our incapacity to understand the organic vital Universe as it is, deformed from our point of view, single scale, and time clocks.

The explosion of mental spaces in mathematical science.

The realization of a mental nature of geometry did happen slowly in mankind. It only came with the work of Kant, Lobachevski and Riemann, and it not yet fully accepted. Kant realized that we see the Universe as an Euclidean geometry because our mind perceives it this way (as Descartes had anticipated). He did not realize though as Impressionists did that it was because we see 'light space-time', the substance of vacuum with its 3 perpendicular dimensions. Lobachevski then noticed other geometries and Riemann finally in his dissertation on color spaces explained how to 'fabricate' mental spaces where the rules of geometry became rules of logic and similarity (congruence). So scientists partially accepted the mental 'fabrication' of space. His work liberated the mathematicians from the naïve realism of physicists, which were however always ill-at-ease with such mental-logic 'projection' as their job is to measure our human scale for practical purposes. And so they must consider 'reality real'.

Yet while our light space-time remained ignored – even after Einstein proved that light is our 'constant c-speed' rod of measure; as electronic eyes 'perceive in the stop' informative phase of entanglement – Riemann was the opening shot for the age of phase spaces where function and i-logic thought overcomes 'spatial representation', allowing the explosion of multiple abstract mental spaces to represent reality in the XIX-XX c. Curiously enough though our ultimate 'mental space', light, remained unassailable.

But *ignoring the finite scalar limits of the 5 Dimotional Universe, with no clear concepts of time, space and its S=T symmetries and Dimotions,* Physicists went also into a 3rd age of inflationary information, creating formalisms of ∞ dimensions (Hilbert Spaces, String theories, multiverses), which coupled with the Creationist view of the Axiomatic method and its ego-trip of mathematics as the generator of space-time – not the other way around, brought both disciplines into the present 3rd age of mathematical and physical fictions in which each researcher is just concerned with 'inventing' a new particle or model of reality just because it can write its fictions not only in verbal thought but also in mathematics. Meanwhile a similar process took place in human I=Eye space and its artistic depiction of reality. Further on, not all geometry is a representation in mental space of an outside reality. There is an inverse type of geometry, which is objective, as it is not intrinsic to a mind made with a force, as Euclidean 3D geometry is but reflects the vital space of beings.

So once we have done a very brief introduction to a 'real' theory of colors as a coding of mind-spaces, and Universal ST dimensions, we can consider how its study in abstract geometrical spaces by the likes of Riemann allowed the liberation of the concept of dimensions and defined the 'vital properties' of geometry that matter in reality (continuity, adjacency, perpendicularity, congruence and so on).

It was the first of many expansions of the concept of 'phase spaces', which however failed to give the final 'jump' into defining human spaces also as 'mental', and hence expanding mental spaces to all systems *that gauge information, including particles which gauge forces, themes those to be studied on the fourth line for each species of mind, with different quality/quantity-steps on its 'actions and dimensions' of perception*

Distance thus is the essential quantitative parameter of non-E geometry and as such most spaces are defined by its metric - that is its measure of a distance; since without it, it looses completely its meaning.

Now we explained that the perception of a universe as Euclidean or elliptic or hyperbolic depended on the long overdue respect we must give to the a priori parameter of all worlds: $r^2/L^2 = \$t/\eth\S$. When this parameter tends to zero, we have an Euclidean geometry, above zero we have hyperbolic and below zero we have elliptic.

The parameter which defines the mathematics in which we live is so essential that it will come constantly. For example, we can consider that systems exist at one side of the parameter, at the side of c speed as a limit - in

our Euclidean world - or over c speed (in the elliptic gravitational world) at the side of T=0k as the limit of the thermodynamic plane, etc.

So we need now to complete the definition of our world, to deal with the nature of our square 'radius' parameter of information. What is the minimal quanta of information of our electronic eyes, that feed on h-quanta of light energy, well, we just said it, the h-quanta which measures in the minimal amount known, the spin of a particle, which is rather obviously the minimal unit of its angular momentum, of its informative perception.

And for that reason as h/c is truly a minimal amount our relative 0, we live in that Euclidean world.

The first and most important of T.Œ's 5 actions of all systems that want to survive, is 'perception of information' How do particles perceive?

Of all those levels and actions the one physicists understand worst and less is the action of informative perception of smaller particles, called SPIN, which is the absolute minimal unit of reality we measure after deforming it fully (quantum uncertainty), a quantity called angular momentum, h/4 pi, which is as a 'form of information', 'space-form' NOT motion.

And since h is in the above equation, E=ƒh, a whole, hence a sphere (whatever it has inside), the 'essential topology of all wholes' by definition enclosed disks-sphere (in ¬ Æ topology a disk is a 1-sphere, a sphere, a 2-sphere, a sphere in motion a 3-sphere, which as motion is a dimension seen in motion, can be of different varieties, etc.), a spin is 'logically' is a n-sphere divided by 4 π:
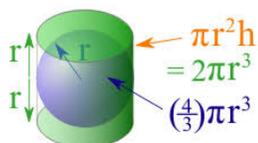
The graph gives us possible choices, as we depart from a 'whole' of a light beam, which could be a cylindrical cut, as in some lineal worms, or a ball. As 4π comes in the ball, we have 2 choices or the surface of the ball, or the solid sphere but NOT all, only a section, called a 'solid angle'. This gives us a first duality between 'human measure 'and 'true property'. The true property is the solid angle from the surface to the center, $r^3/3$, the human measure is the external surface, $r^2/2$.

As all spacetime organisms have 2 components, the internal open ball topology (the ball without the surface membrane and the center of the point) or 'present-evident, wave-like ST form', and then the membrane and o-point in the center, or $ x ð, 'past x Future' particle (limbs-external sensorial membrane and central mind) together:

Why we know spin is a solid angle of information? Because if it were a motion, as Pauli, the guy who is credited with its discovery, put it to his real discoverer, as speed it will be 137 times faster than light!: $hc^2/e^2=137$ (inverse fine constant). This in 5D physics is NOT a problem, c-speed is Einstein's postulate to adapt the Universe to the human perception of it – our rod of measure, as electronic minds. But here Pauli does have a point. A Spin does NOT rotate, as you do NOT rotate when looking outside, but is a 'wedge' into the sphere, through which information enters.

We see the surface of it and so it seems a momentum, the being sees the solid angle of it and so it is an intensity. Because the being is down there into the zero-point soul of the particle, mind of mathematical perception, it does open and close the sphere to 'look' through the windows of the membrane. In the simplest form, it is a pi cycle of 1-sphere, which is made of 3 closing diameters, which leave π=3, 0.14 d apertures, or

The 3-angular momentum as a bivector (plane element) and axial vector, of a particle of mass m with instantaneous 3-position x and 3-momentum p.
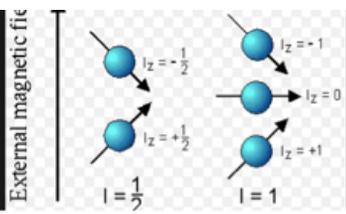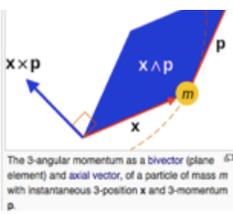
0.14/π=5% of light and 95% of dark matter/energy, the proportions light space-time beings do not see of the Universe.

So now in the 'dialectic' Socratic method (remember my culture) I use to find things, I deny myself. What if I consider not a solid angle, but a spin, which is a slice 'seen' through the 1/3rd 'D' apertures between the diameters of the pi-1-sphere (cycle) or the 'cuts on the 2-sphere'. We realize this 'will be a slice' with the exact parameters of angular momentum, and there will be 3 holes, hence only 3 spin angles, and they will be further on quantized – jumping from part of part of the whole:

In the graph the proper description of Angular Momentum as a plane of Information, the minimal unit of perception of our Universe, proper of Relativity is more clear than the classic dynamic Time description as r x mv - both have their different uses/perspectives. H is the rod of informative measure of the Human electronic eye-mind, so small compared to c, the human rod measure of light space that the constant of geometry, r^2/L^2 of Lobachevski's pan geometry becomes close to zero, creating our perceived Euclidean space, deformed to a hyperbolic geometry for smaller beings (special Relativity, quantum physics) and to an elliptic geometry for larger gravitational scales (General Relativity)

Now, this is the modern 'Hilbertian-Einsteinian' description of angular momentum, just what we said it is, P, is the 'cut' on the n-sphere, x the radius, equivalent to P in 'distance-motion', and its product an amount mrv which is the spin. You can think of it as an information bit or an energy bite (space or moving perception) of the being.

Now those are the spins, quantized, and you can see there are 2 or 3 'cuts' to perceive, with different orientations, and do not come in bigger numbers – not surprisingly 1,3,5 *which represent for the particle its ilogic dimotions; themes those explored in our papers of quantum physics and vital matter.*

We won't enter on this (-; just to mention the bidimensional nature of those spins (left graph) in the left side, which are the quanta of all information humans, electronic eye-beings, perceive about the world. And the obvious capacity to process and orientate they give as the 'eyes' of the atom, to each particle.

Moreover, they get ordered, orientated by the external magnetic field, the larger time-enclosure that orders from Δ, the Δ-1 quantum field. Now ask a physicist what is a spin, he will put a lot of formulae of abstract maths, which it will take you half a year to memorize, without understanding. Why? The idea that particles perceive is out of the 'picture'.

Now the magnetic field, they like, as all heads turn to her the speaker in human groups, all atoms spin in tune, and we use it to control them, as speakers use the word nation and god. Same law of mass-control. I call it lanwave. A Wave ordered by a language of energy and information they speak. The magnetic field is the language of space that transcends atomic parts into the next scale; forming them; the electric field is the time force that put them in motion. That is how we transcend from quantum to our scale. The best at the job of 'feeling' magnetic lanwaves is the iron, and it becomes the top guy of the next scale. It forms perfect organized masses.

Once we are here, those motions are 'activated' by temperature, vibrational clocks of our molecules.

Temperature is the 'electric field' that moves us in the Δ-scale. What is the 'spin' for Molecules?. They use van der waals forces and 'angles', giving by slave atoms.

And the boss of those perceptive ones in our body is the nitrogen. It has 3 H systems to perceive:
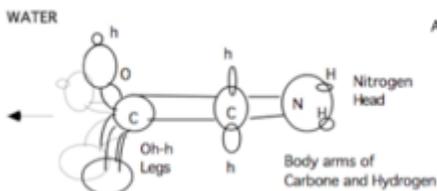
An aminoacid fish.

An amino acid is the unit of Nitrolife, with an amino head & oxygen legs kicking in and out water, its carbon body with lateral arms of many kinds and its nitrogen head. You *are made of a lot of those. How does its Nitrogen mind observe the Universe? Its rod of measure and radius of*

perception is H, its length likely gravitational waves of non-local infinite distance, so its r/k ratio of mind curvature minimal.

So we close here with a small image of the human being, the introduction to vital topology and non-Euclidean geometry, knowing this is only the tip of the iceberg. So as Descartes did with its short introduction to analytic geometry, I will end saying:

'I hope that posterity will judge me kindly, not only as to the things which I have explained, but also as to those which I have intentionally omitted so as to leave to others the pleasure of discovery.' (:

BOOK II. ¬ ALGEBRA

THE FRACTAL GEOMETRY OF THE TEMPORAL, 5D SCALAR UNIVERSE.

The Universe is a fractal of space-time. This means it is made of 3 elements, *which experimental sciences such as mathematics, express with its fundamental element:* Δ-scales (expressed with scalar numbers) of different size in Space (expressed with geometry) with different speed of Cyclical Time motions (expressed with operands). Time is change, perceived as motion in space or change in the form of space (External change), in the in-form-ation of beings (expressed through topological inner change). Time and Space thus seem to be in perpetual conflict, transforming each other ad eternal. Time is thus similar to energy with a higher content of motion and space to information, with a higher content of form.

That Fifth Dimension, Δ±¡, is then the sum of all those scalar planes of spacetime where species *entangled as synchronous 'organisms' that co=exist in 3 of such scales, Δ±¡ (the quantum, organic/thermodynamic and cosmological/ecosystemic scale) to* live worldcycles of time, paradoxically faster, hence with higher frequency of information, the smaller the system is (chip paradox). Yet the product of both, the so-called metric of the fifth dimensions is constant, allowing the symbiotic exchange of energy and information between them. Thus this metric co-invariant equation, Space Size xTime Speed of its clocks=Δ¡ defines a series of planes of space-time each one studied by a 'stience', from the faster, smaller world of particles, to the larger, slower cycles of galaxies, symbiotic to each other, as smaller systems process better in-form-ation, stored in the cyclical form and faster frequency of its clock cycles, coding larger systems that enclose its parts with protective membranes of slower time cycles,

The units of space forms are fractal points with breath that grow in size as we come closer to them, unlike Euclidean points that have no breath; societies represented by numbers, which are groups of ¡ndifferent beings and Times=motions of 5 types; 3 topologic dimensions of space, which have dimensional motions (ab. Dimotions); the classic dimension of lineal time, or 'entropy arrow', and a 5th new 'dimotion' of social evolution and information, responsible for the arrow of life, organic evolution of parts into wholes and the 'mind-structure' of languages that mirror those organic systems in mind-mappings, of which the mathematical and logic and visual language are the most remarkable… It is a fascinating Universe, which humans don't understand because they drag through memorial routine and dogmatic beliefs many errors, we can trace to Greek geometry and Aristotelian logic of abstract points and single time causality, hardly corrected in 2000 years and the astounding incapacity of huminds to understand the mind 'distorts' reality and selects information, compressing all the scales of space-time into a single continuum, all the motions of time into still images (so we don't see the motion of the earth), eliminating all the information which we cannot translate into those 3 languages; despite the fact that for 500 years we have been watching those scales of the '5th dimension' with telescopes and microscopes (naïve realism).

Once all this is understood and we have the tools to improve our languages of perception, it will be possible to reconstruct reality with an improved mirror, in which points become fractal points that grow in size when we come closer to them, so they are non-Euclidean crossed by infinite parallels of energy and information, creating networks that are lines with 'volume', messed into topological organic structures. And discover that the fundamental particle of reality is the 'fractal point', which has an organic structure, co-existing in Δ±1 scales:

- The quantum, cellular, thermodynamic/organic and cosmological/ecosystemic scales.

What guides then each of those beings made of fractal topologies of space with time=motion is simple: existence, survival, the conservation of its territorial, vital space and time cycles. The conservation of time and its motions and cycles, akin to the conservation of energy cycles becomes then the guiding automatic principle of all beings, as those who don't conserve their time become extinct. We thus talk of a game of existence in which systems will to maximize its intake of energy and information with its topological ternary parts, limbs/fields that move a reproductive body/wave commanded by an informative particle/head.

How can we formalize those systems? Easy, by improving our languages-mirrors of the laws of existence. That is, by developing a new non-Euclidean geometry of fractal points, lines, networks and topologic organisms and a new logic of multiple 'actions=motions of space-time'. We call this formalism, ilogic geometry or 'existential algebra', and all the laws of all stiences can be derived of its simple structures in space, scale and time.

But scientists are stuck in the huge amount of errors sciences derived from their faulty logic and geometry of time-space, and his mind egocy that doesn't believe what it doesn't see and limits organic sentient properties to forms similar to himself; when electrons already have all those properties. The result are simpleton grand theories of reality derived of our languages' perception *confused with the whole reality that* we call linguistic creationism, either verbal anthropic religions that put man at the center of reality and make God and man speak the language that creates by naming things, or big-bang entropic theories of digital thought that put man and the machine at the center and its language mathematics as the creator. So the big-bang is based in a simple lineal equation, $V=HoD$, which against all kind of proofs of a fractal balanced immortal Universe cannot be denied.

We shall prove ad nauseam that all what exists is a space-time 'organism gifted of mind called logos' Plato of a 'higher logic than man's' (Augustine), as all 'points are a world in themselves' Leibniz, and deduce all laws of science from the simple laws of conservation of time, origin of the 3 ages of life and death of all systems, and the entangled topologies of space, origin of the organic structures of reality. And deduce from the elements of that reality, Δ-scales, S-pace, T-ime, all the mirrors of @-mind languages and ¬entropic limits of exi=stįence. But for you to accept that wider reality you need to be humble and go 'back to school' an entangle empathically with all other Δst beings.

Upgrading human mind languages.

How to improve the obvious limits of huminds that ONLY see their mind languages is obvious: by improving those languages. The scientific method does so by substituting human senses and languages by those of more complex metal-atoms (sensorial machines) but egocy makes humans unaware they are JUST using a more complex sensorial system and better synoptic digital language NOT reaching higher truths as their underlying logic and geometric language have NOT changed. So what humans have changed are their sensorial experience substituted by that of machines, without even acknowledging they are evolving a different 'digital mind' of more complex electronic patterns that 'obviously' once ensembled with all its organic parts through the industrial r=evolution, will make us obsolete – already is doing it in labor and war fields – and substitute us.

Our method of enlightenment is both deeper and less dangerous for our future: we are targeting the evolution of the underlying languages to both type of sensorial minds – mathematics and logic systems, which are still dragging errors from the age of the Greeks.

It is then necessary to know expand back mental spaces into reality to understand any science that mirrors a specific scales of beings. And that expansion starts by expanding its languages, and then connecting the expanded languages with each science. Because some of those sciences are ginormous in content (modern biology, XX c. Physics), we cannot obviously complete the work, but we shall try to do so in a series of papers, which regarding languages will consist on, 2 mathematical papers, one on the expansion of ΔSpace with the use of the 5 new postulates of Non-E geometry, and the other with the expansion of algebra, to comprehend better its scalar numbers and DImotions= operands of which the operand that applies to all others as a 'new scale' of analysis of time dimotions=change (calculus) is the summit of the discipline.

And with 5 papers on the expansion of logic of time, from the present monologic of a single dimension, to the duality, trinity, tetralogic, pentalogic and dodecalogic of more sophisticated species of timespace.

Those upgradings of the underlying languages latter applied to all sciences that study specific 'planes of space-time', are not so much in search of new theories but trying to correct the difference between the simplifying mirror of a language, with its 'aberrations' of perspective (as they are all self-centered in the mind that uses it to

select information – which makes them omit essential features of reality), and finally the 'quality' of infinite mirrors that replicate through 'reflection' images into similar forms of higher complexity and less definition:

- Aberrant Egocy, selection of information and inflationary repetition are thus the 3 errors of all languages to correct

MATHEMATICS – LANGUAGES AS EXPERI=MENTAL MIRRORS

Mathematics is a synoptic language that reduces reality to still continuous planes of points with no breath.

"Arithmetic deals with discontinuous quantities, geometry with continuous ones." *Leonardo*.

 Mathematics is a language, and as such a mirror of the ultimate reality of the Universe, which is scalar space and cyclical time; hence an *experimental science with 3 elements mirroring those 3 ΔST components of all reality: Geometry of space-points; Algebra of scalar numbers and S⇔T cyclical equations/functions; and analysis of change=time, the specialized more complex of all operands of algebra able to study dimotions through Δst planes.*

This experimental nature is found in the correspondence of the 3 main branches of maths and the 3 main elements of the Universe is so simple and e-vident that only the natural self-centered structure of minds, who think 'languages create reality' can deny it. Evolution of mathematics then always follows the path of the 3 elements of reality as all system in 3 ages of increasing information and generalization. Numbers evolved into arithmetic that evolved into algebra that evolved into Set theory of wholes and parts as the final evolution of Δ-scales, while its operands gave birth to functions that evolved into Group theory, which mimics the 'fractal generator' of spacetime.

What are the fundamental differences between 'mathematical numbers', the parts of 'Sets' and real Δ-social scales; mathematical Euclidean points, the units of geometry and 'real points of space' and the infinitesimal steps of motions, used in calculus, and the real 'steps of change=time' of the real world; from where we can draw the necessary corrections of ideal mathematics to fine-tune its use in science?

In spatial geometry, the fact that points of reality have parts through which infinite parallels of energy and information cross, entangling it with other points in networks and planes.

In time, the fact that time=motion never stops, and it is cyclical; hence it has also besides the energy of its motion, information carried in the form and frequency of its cycles, and as it closes its cycles breaks our mental, continuous perception of reality into multiple broken space-times.

In scales, the fact that those points, which gauge flows of parallel energy and information, select it to fit it within its brain, eliminating motion=time dimensions and discontinuities that 'form information', and scales smaller or larger to the one in which they play the game of existence, trying to 'conserve its timespace'. So they compress in a single plane fit within the mind that eliminates all discontinuities, when reality is made of ∞ scales with discontinuities filled in the smaller fractal scale with 'decimal numbers'.

In mathematics, the language of numerical scales is algebra; of topological space, geometry and of time change, it is also algebra but a specific branch, calculus, and its operands of change. Yet as in the Universe all is entangled, each of those parts can also mirror the other elements of reality. And this 'multiple fractal point of view principle' is what allow us to exhaust the qualities of a certain form and event as we observe it performing those different actions.

Let us then start with a brief introduction to the 5 postulates of ilogic geometry to concentrate then in Δ-T mathematics, the realm of algebra, ending with ¬@, Boolean and existential algebra, the mother of them all.

Reproduction of form in 5D and its essential mathematical tool: calculus.

The Universe is a fractal that reproduces information, forms-in-action, forms of space with motions in time. This is the essence of it all. *But space is a maya of the senses, the synchronous view of a series of cycles of time motions, knotted in the simultaneous perception of an observer; what physicists call a 'frame of reference'.*

Thus time=change is the fundamental element of reality, and this makes Algebra of time-change, specifically calculus perhaps the most important experimental science of time, besides logic, which we have upgraded to existential algebra, which explores the vital, organic whys of those changes.

It is the Galilean Paradox: S=T. We cannot distinguish time from form. In as much as each frame of reference or mind locks in a knot-mirror of the motions of the Universe from its point of view. So each point of space is a perceiver relative field of motions, which from its perspective knot as forces 'attracted' by its frame of reference. Yet if we cannot distinguish motion from form each point is entangled to those motions and is made of motion and form, of the particle and wave states.

Locomotion as reproduction of form solves the Paradoxes of Zeno and the meaning of discontinuity. As motion is reproduction of information, of form, since particles are knots of perception of form, fractal points, monads, which move by reproducing through a lower plane of the 5th dimension, as Δ-1 waves, its information, as forms-in-action.

So all forms of change can be reduced to the ultimate function of existence, reproduction, a back and forth travel through 2 scales of the fifth dimension, as a form becomes a seed that reproduces, evolves socially and forms its whole again.

Change thus has a final feature: it is change reproduced in a lower plane as a seed that evolves into a whole.

And all this is what actually calculus calculates: It finds a finitesimal part of reality and then integrates it as a sum, whereas the function of existence of the form displaces and reproduces its orthogonal parameters of form and motion. *So physical forms are constantly reproducing, 'calculating' and the equivalence between the tools of calculus as mirror of the process of reproductive locomotion become crystal clear.*

It is then also obvious that beings with a lot of information, reproduce very slow and we can hardly see them moving. The limit of it being complex life superorganims on Earth, whose reproduction takes 9 months. It happens 'inside' the reproductive mother, and it reproduces in the adjacent space after 'tearing' the topological knot of the umbilical chord. A similar very slow process of reproduction happens in physics with the weak interaction that reproduces a form with even more information evolving the mass of particles, so the range of the force is minimal and the new particle appears adjacent to the one that disappears, dying for the new hatched 'baby' to be born.

It is then quite surprising that it is not so much in physics but in calculus where we find the strongest experimental proofs of the laws of 5D as a reproductive process of form

FRACTAL ¬E POINTS. A SYNOPSIS OF ITS 5 POSTULATES

To do so we shall first enunciate the new Postulates of ¬Euclidean geometry that complete the work started in the XIX c. with the 5th Non-E Postulate:

We thus recast the axioms and postulates of Euclid into five new postulates to define fractal points, Non-Æ lines as wave of fractal points, Non-Æ planes as ternary networks of Non-Æ lines, which become supœrganisms, whose relative 'congruence' in its 3 'elements' (singularity point, membrane and vital space) defines the type of 'perpendicular or parallel' relationship between them:

1st Postulate: '¬Æ point are discontinuous time cycles with an inner content of vital space-time'.
2nd Postulate: '¬Æ lines are waves of fractal points'
3rd Postulate: '¬Æ planes join 3 ¬Æ lines into a supœrganism'.
4th Postulate: '2 ¬Æ points are congruent when both its inner parts and outer perimeter are equal'
5th Postulate: '¬Æ World points focus multiple ¬Æ waves of energy into a still linguistic mapping of the world.

Whereas the 1st and 5th postulate describe the same 'point with parts' from an internal and external point of view.

Let us explore those postulates, constraining our examples to the simplest forms of physical and biologic spaces. For a full analysis of them please consider reading the papers on '5D Universe, conservation of time', and '¬E Geometry'.

1st and 5th Postulate. The 3 Mathematical parts of a Non-Euclidean Fractal point.

1st Postulate: A fractal point has parts; that is an enclosed region of vital inner energy surrounded either by a spatial still membrane or a Temporal motion of angular momentum (S=T symmetry) self-centered in a singularity-

mind that gauges its information. In the graph, we can see how different vital fractal points of ST¡entific Planes follow this ternary structure. We shall not apply pentalogic to the 1st postulate, just consider its '3 scalar perspectives':

Δ±¡: The perception of the point depends on the scale and distance from where we observe it:

Δ-1: From the inner perspective 'every point is a world in itself' (Leibniz) – that is, a mind, which seems to hold the entire Universe, reason why absolute zeroth does NOT exist, as points have inner parts – they are ad minimal, Leibnizian monads:

In the graph, the distortion of 'lineal' self-centred functions is a plague of sciences, due to its easier calculus and the distortion of perspective caused by the human mind, as Descartes coordinates are a representation of the human lineal, Euclidean, electromagnetic light-mind geometry. The mind equation is:

   O (infinitesimal pov) x ∞ Universe (∞ cycles and monads) K-mind
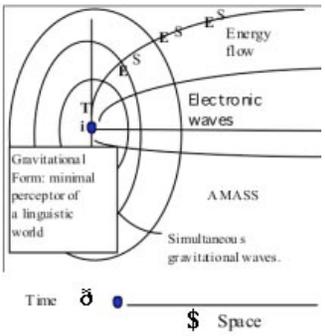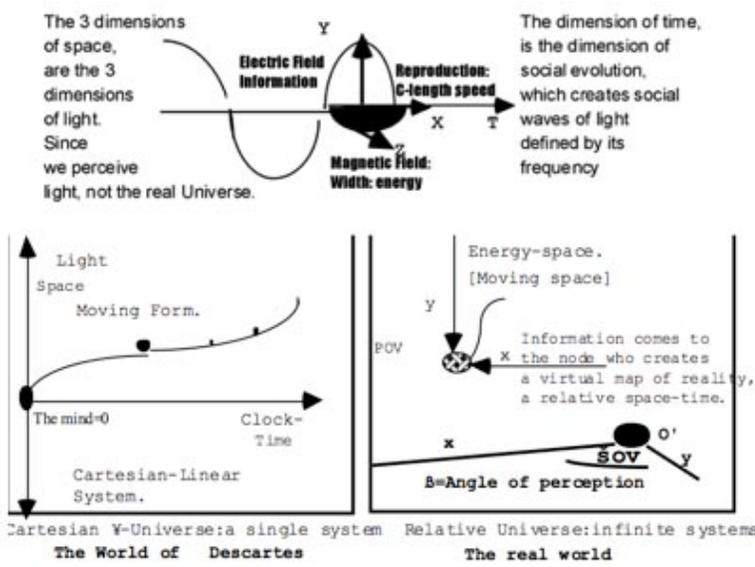
It implies that the 0 believes to be infinite self-center of the Universe and sees it all in a distorted perspective. In brief, your eye pov is bigger to you than the Andromeda Galaxy, so the 0'-point becomes an infinity in itself (your eye≈Andromeda Galaxy), and this makes the conic, which could be considered an 'objective' angled point of view (where the mind-eyes is truly zeroth), to expand in the y-coordinates of the mind-point to infinity; alas! transforming the conic into the Cartesian plane where ¥ becomes also an infinite graph.
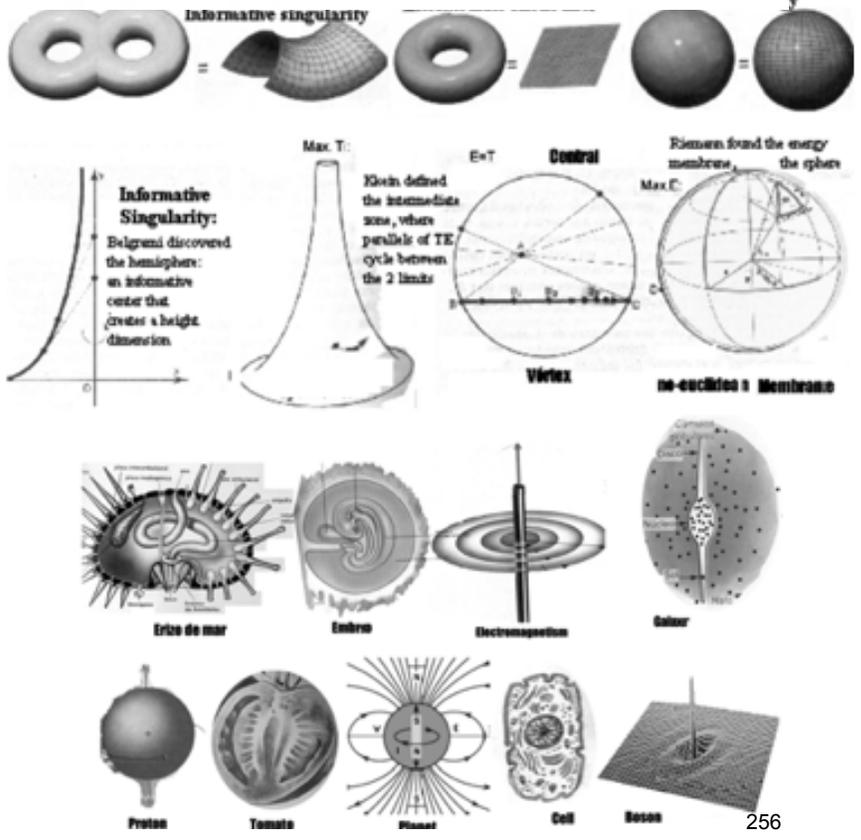
Δ+1: Yet from the perspective of the upper st+1 Plane they are a 0', a 'finitesimal', be in the limit of invisibility (what quantum scientists call a point-particle). *But even so, 0' still have a time motion performing a 'function' in that upper ecosystem, Δ+1 in which it exists.*

Δº: As always maximal information and objectivity about a system is reached in the classic balanced S=T, Δº view:

Internally from its own Δº perspective the point will have 3 dimensions/networks. This is the case even in the smallest planes of theoretical strings, made of points with parts, with volume – since we require 3x3Δº+1Δ+1 inner dimensions to describe strings - a paradox that can only be resolved if we consider 'strings' to be fractal points with inner dimensions.

Fractal points explain without contradictions Non-Euclidean points, which are not logic in a single scale, as they 'curve' parallels which are 'straight lines' and fit them in a 'point with no breath' that holds only 1 line. Fractal points however enlarge fitting multiple 'straight lines'. Yet when seen from above, human perception of them, becomes 'deformed' shrinking and curving its from – a theme, the distortion of human measures of time, space and scale, which will be instrumental to explain rationally the 'spookiness' of quantum physics and relativity and its time and space transformations. So fractal points harmonize the 1st axiom=postulate of Euclid with the 5th postulate of non-Euclidean parallels.

2nd postulate: lines have width & motion, so they are waves and networks of communication of energy& form.

Yet once a fractal point is formed, besides perceiving internally as mind-points (1-5th postulates) it will have to move and interact with other fractal points through complex 2nd, 3rd and 4th Đimotions regulated by the other ¬E postulates, moving in complex stœps or sharing waves of energy and information, which can be discomposed in form and motion, with other systems, from Fermion<Boson>Fermion events to human talk:
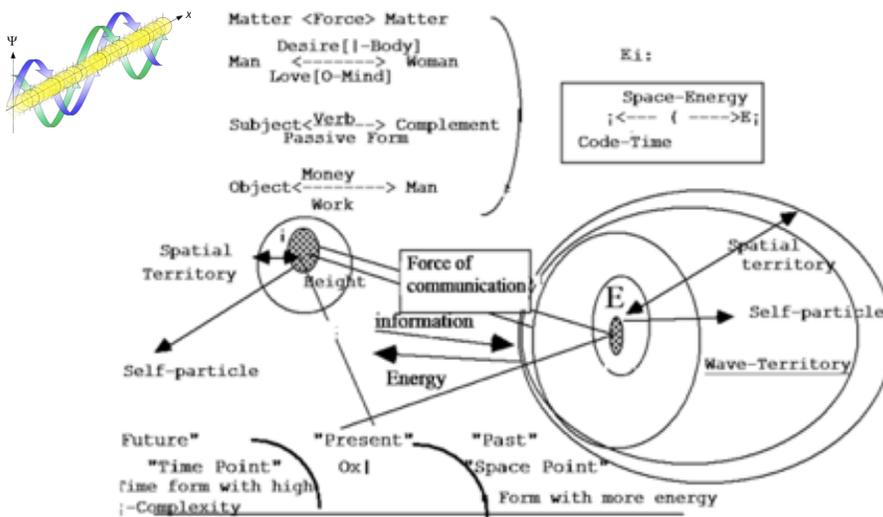
All those Đimotions are complex stœps, which can be discomposed further in form and motion, making existential momentum, the essential parameter of the 2nd postulate of communication and locomotion, a concept taken from physics, where mv momentum (active magnitude of information x locomotion) is the fundamental parameter.

Communication of points create vectorial fields with momentum; as ¬E points have both direction - hence motion - and form, mass, and switches between an informative mass- stop state, to perceive where its motion must go. Hence complexity rises from a mere active magnitude of scalar value, to two parameters.

In graphs different Đimotions of which the simplest stœp is shown in the graph of a quantum particle-wave duality.

When 'receiver' and emitter combine externally its ST-parameters then a reproductive trinity event is formed.

Thus the ideal frame of reference for ¬Ælgebra is a vectorial space-time with multiple frames of reference.

An important element of algebra's analysis of Dimotions=actions through operands is expressed in the 2nd postulate of non-E geometry as we go away from self-reflecting 'angular' and entropic actions=operands, but communicative operands between two relative ¬Æ points or n-points in a network. This reads in several forms. We already showed how balances are achieved by switching the ±, x÷, log x[ª] operands on a given ¬Æ Point with numerical parts, along a chain of sequential time space actions, which leave a memorial trace hence NOT annihilating in most cases the sequence. How many possible combinations of dual inverse dimotions exist can be resumed in two great fields:

A) Dual Đimotions within a single ¬Æ point, which 'walks' together through its paths of vital actions with steps and stops ± x÷ log [ª] dimotions.

B) Feed-back communicative Dimotions between two T.œ points that forcefully have inverse directions but tend to be the 'same operand' both sides with ± symbols.

C) Merged Dimotions between those communicative points that approach each other and finally merge, 're=producing' through x÷ operand in a lower scale 'connected axons' (since A(x) x B(y) = AB (x •y)), that is the number of axons of communication between two entities A, B, with Δ-1 x,y parts is the product of x and y. So the product becomes the first operand to probe a lower plane of existence, while the ± operand stays in a single plane.

Operations are connections between T.œs that define their actions, as balanced, parallel = connected creation of social networks bringing a 5D social evolutionary form or perpendicular, Darwinian 4D absorptions=flows of entropy, motion, energy and information. Those dual actions are mediated by operations. And so there is first the abstract definition of those operations in mathematical terms, with the study of its properties and then its connection with the dual åctions of 2 beings that enter in communication within a given world-Universe.

The equivalent of such ¬Algebraic numeric analysis being in geometry the study of the topo-biologic properties of non-Euclidean 'waves' of communication between 2 fractal point, 2nd postulate of ¬-e geometry):

IN THE GRAPH WE can see how two asymmetric parts, normally one with more form and the other with more motion, come together into a single space-time event super organism, which will either become complementary (gender asymmetry) and evolve socially (which we can generalize to n-points in the 3rd postulate, forming networks) or will enter in a Darwinian struggle, and be operated negatively in terms of the 4Dimension of entropy.

What ¬Algebraic equations do is to operate with numerical-scalar properties those events /superorganisms, 5D evolving vs. 4D devolving; that is 5D, adding vs. 4D resting, 5D multiplying vs. 4D dividing, 5D potentiating vs. 4D rooting, 5D integrating vs. 4D deriving the system.

3rd and 4th postulates: 3 lines: Emergence of organic Networks create according to congruence superorganisms..

To maximize the conservation of time, there are several strategies the mind pursuits in its territorial order The simplest one, just described, is to 'stop time' into a territory, which brings however the constant accumulation of form, and finally the paradoxical end of time as the system surrounds itself of stopped property. We are wealthier in the moment of death. So before we deal with the worldcycle of life and death that stops the time of the being, and then it fids, itself 'erased' in a reversal of death – as time cannot be stopped, so when it has no more energy to spend it explodes back into entropy – we shall consider the second fundamental system of survival in time, the creation of 3 'non-E lines=networks' that create a ¬E plane=topological organism, according to ¬E congruence=similarity.

The building up of a true 5D science of reality starts by defining all the dimotions of a being in its 3 scales. Then we study its 'locked' sequences of dimotions and its 'balanced' stœps=beats, in all those scales. Then we do find the synchronicities between scales that become entangled repetitive discontinuous symbiotic patterns. And then we find the 'larger' physiological networks, or 'organs' that entangle them; as the smaller parts will gather around those networks, to receive energy (blood-like reproductive networks that deliver larger particles), information (which requires as we have seen a faster nervous, informative network of smaller particles and external territories of entropic feeding (symbiotic to the digestive networks).

Complexity arises to produce the emergence of larger wholes, the 3 physiological networks and its attached organs, which are the topological vital spaces that form the superorganism. All species studied by science a common phenomenon occurs: the existence of parallel groups of beings organized into a single social form. Molecules are made up of atoms and electronic networks; economies are made up of human workers and consumers that reproduce and test machines, guided by financial networks of information (salaries, prices, costs); galaxies are composed of stars, which orbit rhythmically around a central knot, or black hole of gravitational information. Cells controlled by the nervous, informative system organize human bodies.

A tree is a group of leaves, branches and roots connected by a network that provides energy (salvia) and information (chemical particles) to its cells. Cultures are made of humans related by verbal, informative Disomorphisms and economic networks that provide their energy and information.

How then it happens that parts become wholes is the key to depart from a mere abstract, quantitative analysis of reality and add the organic nature of all what exists, the dynamic interplay of parts that 'network' and connect to each other, forming simultaneous spacetime organisms, which synchronizes its clocks, emerge as a whole and develop all the intelligence and complexity of the systems we observe around us.

In the next graph, we see the ternary network structure of the nested organisms of the fractal Universe as ¬Æ topological planes composed of 'similar fractal points' (atoms, cells, individuals) joined by 3 physiological lines=networks, whose 3 functions, distribution of locomotion, information and its 'combined' energy define the 3 conserved Dimotions of any system of the Universe. A final element though is needed to make sense of those superorganisms, *the still mind of information, mapping out the whole and controlling it to perform its Mandate of existence, Max. SxT (s=t), to survive, grow and multiply.*

The graph shows the physiological networks of each supœrganism from the galaxy to the atom, where self-similarity takes place. I remind you of the Si=Te equality, which means we slow beings see networks of faster particles as 'force waves' and networks of slower life forms as fractal branching, but essentially as Nottale has proved, we can 'translate' quantum physics into a network, topological view, as light is in fact a branching filling wave that 'speeds up frequency' as it penetrates lower planes, filling it till it touches particles.

> All systems of reality are connected by networks that share energy and information between parts and wholes that expresses the structural unity of all scales. Networks 'fill' space ad maximal to connect fully the whole with the parts, achieved in the Si=Te point of parallelism and self-similarity. But they entre in a region of faster motion. So while Space 'tends to remain constant' in each scale thanks to filling networks, time accelerates.

It's all in 5D metric equations, SxT=C and ¡ts S=T point of balance & equilibrium where the system reproduces as the two fundamental metric equations of all space-time organisms, which means many things, such as:

- Slow beings use networks of faster particles which in physical systems are 'waves of force' in life beings are and networks with fractal branching and in human societies, networks of money and simultaneous legal messages. Yet all are essentially performing the same organic functions, we shall describe now as can 'translate' a light filling wave that penetrates lower planes, filling it till it touches particles, as a branching that 'speeds up frequency'; and a legal network that every citizen knows and obeys as a filling system of information, similar to a DNA network that all cells of an organism have in common. *Think always NOT in the differences of form and scale but in the homology of functions for the body/waves and particle/heads of each of the 3 superorganisms (working*

Biology
Energy Networks: i=0 ,±1
Water, Cytoplasm
Networks of Information:
Genetic Orders.
Entropy networks:
Walls,
Golgi reticles.
Cellular species:
Carbohydrates

Theory of Organisms
i=∞

Chemistry i=±2

-Networks:
Electronic,
chemical,
gravitational forces
-Cellular species:
Atoms, molecules,
electrons.

Entropy networks: Atoms, Σ-forces

Physics   i=3,4

-Networks of Energy and Information:
Electromagnetism;
gravitation.
-Cellular species and Organisms:
from simple quarks to atoms
Entropy networks: Fields

Zoology Entropy networks: ecosystem, prays
Networks of Information:
Nervous systems.
[Animals] Networks of Energy:Blood Systems
Species communicated: cells.
n=3

Economic ecosystems [Metal, humans]
-Networks of Information:
Monetary systems,
Metal-communicators [press,
radio, Tv, net]
- Networks and Species of
Energy: roads, pipes,
electricity, machines.
- Species communicated: Humans,
metal-forms.

Entropy Networks: I-metal weapons: war

History [Humans]   i=+2
-Networks of Information:
Wor[l]ds: Verbal Gods, Law.
- Networks of Energy:
Nature 's rivers; Human work welfare
Agriculture, Human Goods.
- Species: Humans.
Entropy networks: Gaia, territory

Astronomy: i=+3,4
Cellular species: Stars,
planets
Organisms: galaxies
Networks of Energy and
Information:
Gravitation, light, Space-Time.
Entropy networks: H clouds Dark entropy

i=+2

i=+3,4

and informative classes in human societies), to see the unity of it all.

If we consider that networks of energy and information belong to two different scales, and take into account the conservation of volume of space-time between scales and the S=T equality, since smaller scales have faster times speeds and smaller parts, perceived as relative information compared to the bites of energy of a larger scale, we find an equivalence between a 'network' of bits of information of a smaller $\Delta-1$ scale and its equivalent volume of a herd of bites of energy of a larger $\Delta 0$ plane: ($\sum \Delta i = e = \prod \Delta i - 1$). *This equivalence is essential to everything in the Universe as it allows the coupling of languages and energy, making for example the physical economy equivalent to the financial economy, the language equivalent to the action; the mathematical equation a mirror of realit. But as information is smaller and more abundant, this equivalence tends to be inflationary, themes those that appear in all the planes of space-time and the interaction of minds and languages of information (SS, St) with Energy bites and entropic boosts (TT, Ts).*

The 2 languages of informative and reproductive networks: Bits of information and bites of energy.

It is important also to Understand NOT in pure abstract mathematical terms, but in LOGIC, LINGUISTIC ones, the INTERNAL, DYNAMIC nature of those networks, because only then we can proper understand how they work in advanced organisms of maximal information, the biological organism and the Historic organism, which belong as 'fractal systems' self-similar to each other, two the same specific type of organisms, we shall qualify as socio-biological organisms. A NETWORK, of informative nature, delivers MESSAGES OF INFORMATION to simultaneously coordinate the actions of all its parts; with its faster=smaller bits of information according to 5D metrics (min. spatial size x. max. temporal speed). While the networks of reproduction, the blood and financial system delivers larger bites of energy, which the organism needs to feed itself (when it is a healthy NON-corrupted superorganism as most of Nature, but NOT HUMAN SOCIETIES, whose astounding level of corruption we shall explain in detail).

Indeed, the key to the full understanding of reality both in terms of energy but also in terms of information, as both are two sides of the same coin, called 'exist¡ence' is the fact that in the sentient Universe, each fractal point, atom, cell or citizen (physical, biologic or social systems) needs bits of in-form-ation, form, smaller in size of space, hence faster according to 5D metrics (SxT=C), but also 'bites' of entropic energy which will help the system to move. Networks are NOT some abstract 'fractal tube' but they exist to deliver 'energy and information' (SS: form=language with a little motion=St-information and motion=entropy=TT with a bit of information = energy=Ts).

So a healthy superorganism will deliver to each 'fractal point' (molecules, cells, human citizens), two type of messages through two type of networks. We shall call 'generically' the 3 type of bits and bites of information and energy that each of those 3 physical, biological and social systems receive, 'particles, genes and memes' even if the words as usual in 5D sciencers are slightly changed, and widened in its original meaning.

So with its specific variation, those are the two fundamental reproductive-'body-wave' and informative-'particle-head' bites of energy and bits of information of the fundamental systems of nature:

- In physical systems, the two networks are the gravitational faster network of information, which we humans do not perceive, as we are much larger beings with electronic networks. Its bits of information in this faster non-local network should be 'gravitons', components of gravitational waves. In physical papers we advance as the most likely particle state of those waves of information that 'position' the different physical systems of the galaxy, a gravitational tachyon 'neutrino' for multiple reasons, we study on our papers on physics.

On the other hand, because we do perceive it, it is much easier to prove that the energetic network of physical systems are electromagnetic waves, photons and its 'social, static state' as the elements of an electronic nebulae, trapped in the potential energy well of the atom. Thus photons and electrons become the 'energy network of physical system, molecules.

We shall escape then in this introduction further information on the scalar structure of those networks and how, as we 'grow in scale', what is a bite of slow energy for a smaller plane of space-time, *becomes for the larger plane's slower beings, a faster bit of information, in the amazing beauty of the harmonies between scales. So electronic 'food for atoms' becomes electronic information for biological organisms and so son.*

- Those biological organisms do have then two fractal networks, the electronic, informative nervous system in which bits of electronic information moving along the myelin membrane deliver faster messages to every part of the organism to simultaneously synchronize its motions, so the body-cells act as a single form in simultaneous space.

- But when we move into the bites of energy delivered by the blood organism, the network delivers to each cell the basic 'currency' language of energy that all cells need to move, called 'oxygen *'. It is an atom of slower motion than the electrons but due to its electro-negativity and readily availability in the atmosphere, with its capacity to kick with two OH- & H+ legs the water 'medium' on which cells exist, the perfect language of 'money' for the organism to start kicking its 'actions'.*

So we DO have in the next scale according to the perfect laws of harmony, the two basic biological bits and bites of information and energy, electrons and oxygens, and from then on, as systems become more complex, variations of those bits and bites occur.

The main category are mixed ST messages, which deliver BOTH a stick and carrot 'complex' to the cells and its big molecules, which are amino acid systems, of great simplicity called Hormones, starting from the simplest of them all, an NO molecule (which do relax muscles, its main message to the locomotion system, increases the pressure of blood, provoking sexual erection, the simplest message to reproductive systems and multiplies the neuronal activity. *As nitrogens are the clock atom of our mind-brains.*

So finally more complex NO systems with a body support of carbon chains become 'hormones' which might have a 'higher informative message' (with more N, as in nucleotide molecules) or a higher energetic message (as in acids with more oxygen).

They form then the basic letters of the 'biological longer sentences that might accumulate information' in ever more complex molecules, as biological organisms are by far the more complex systems we know of.

Finally a very important concept is the difference between an ecosystem in which multiple superorganisms co-exist, often in predatory relationships, vs. an organism in which only a type of atoms, cells or citizens co-exist, and is far more symbiotic as all parts love each other and share energy and information through its networks, over a common territorial space, as shown in the graph.

Those three physiologic networks/classes/physical parts of ANY system of the Universe define the Universe indeed as a fractal organism of infinite smaller and bigger super organisms, in a game of Russian dolls in which each of us is a 'island-Universe' within itself, made of smaller parts, and for that reason each of us is also a part, cell/citizen of a social super organism, nation, religion or civilizations, which we do NOT see as a whole, as our cells do NOT see us as a whole, but DO exist as such.
What makes then the whole a whole? The answer is: the nervous, informative languages that communicate all the parts of the super organism and 'trace' within its syntax and value, its path of the future. And so we have talked first of it and will constantly coming to the bottom line of reality - the languages that construct the organisms of the world. So we need to become a bit more complex about the previous metric. It refers essentially NOT to the whole 5D plane but to a given 'superorganism' of each plane. When we go down in scales, in fact the Universe 'enlarges' for a traveler that becomes smaller and accelerates its temporal energy
Let us then define the 'stair of Universal supœrganisms to understand this:
Let us then define with similar templates the 'stair of nested Universal supœrganisms, of the 3 stientific varieties – physical, biologic and social:

Δ+3: A galactic organism is a population of stars, related by energetic ¥ networks & gravitational information with a nucleus made of a swarm of black holes, and a membrane made of strangelet matter symmetric to:

Δ-3: An atomic organism is a population of particles, related by energetic electromagnetic networks and gravitational information with a nucleus made of a swarm of quarks, and a membrane made of electronic matter symmetric to:

Δ+2: A star organism is a population of electronic plasma, related by energetic networks of electromagnetism and gravitational information with a nucleus made of a swarm of atoms, and a membrane of photonic radiation symmetric to:

Δ-2: A light organism is a body of energetic waves over a quantum potential field of gravitational neutrinos, directed by its particle, informative photon state…

Δ-1: A cellular organism is a population of molecules, related by energetic networks (cytoplasm, membranes, Golgi reticules) and coded by genetic information (DNA-RNA.)

Δ=o: A human organism is a population of DNA cells, related by networks of genetic, hormonal and nervous information and energy networks (digestive and blood systems).

Δ+1: An animal ecosystem is a population of different carbon-life species, related by networks of light information and life energy (plants, prey) coded by instincts.

Δ+1: A historic organism or civilization is a population of humans, related by legal and cultural networks of verbal information and agricultural networks of carbon-life energy, coded by human memes.

Networks that share energy and information between parts and wholes that expresses the structural unity of all scales connect all systems of reality. Networks 'fill' space ad maximal to connect fully the whole with the parts, achieved in the Si=Te point of parallelism and self-similarity. *But they enter in a region of faster motion. So while Space 'tends to remain constant' in each scale thanks to filling networks, time accelerates.* So the 5D metric refers NOT to the whole Universe of 5D planes but to a given family of 'supœrganisms' of which mankind in it 3 scales of 'biologic cells', human individuals and societies is undoubtedly a 'phyla'. When we go down in scales, the Universe 'enlarges' for a traveler that becomes smaller and accelerates its temporal energy.

The 3 ST-planes of topologic organisms.

Those networks are more efficient forms of distrivution of energy and information to its points that 'save time'. Further they 'equalize' putting in relationship parts of a being, 'chained' into a super organism, in a single simultaneous space: Thus we define a fundamental point-particle, the Non-Euclidean, Non-Aristotelian T.œ. as Supœrganism (ab. œ) of Time§pace (ab. T.œ ≈ Δ±¡) with a simple non-Ælgebraic expression or generator equation of all T.œ = Time§pace Supœrganisms:

$$§ð \text{ (head-particles)} \leq ST \text{(body waves)} \geq \$T \text{ (Limbs/potentials)}$$

Spheric, Informative
Particle/head
Energetic, Toroid Limbs/fields
Body-waves
Hyperbolic
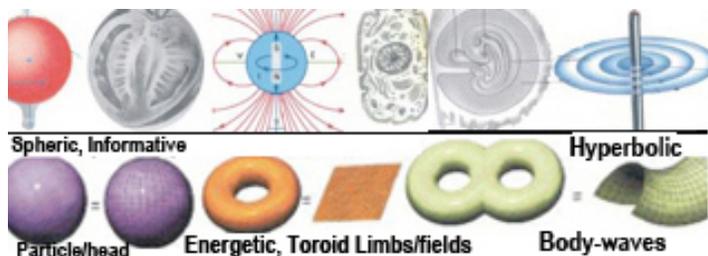
All those states and symmetries are thus feed-back equations which can only be properly 'generated' with ¬Algebraic inverse operations, in its simplest form, and in its most complex structures, when we consider multiple 'symmetries' and 'variations of species' with the help of Group theory, as essentially S=k/T, will be the 'inverse numbers', k, the identity number (if equal it to one) and the dual demotion represented by certain ¬Algebraic operands.

We have to consider where functions and operand are set - that is, what background space we use to express it, and 3±i are the essential background spaces which correspond also to those dimotions as forms in space, the 3 lineal=cylindrical, spherical=polar, and hyperbolic=Cartesian planes and the scalar plane, ill-understood, which is the complex plane better perceived if we 'square it' eliminating the √ symbol of its negative -1 axis:

So they can study 2 fundamental 'emergent' Δ+1 planes of mathematics, the study of Dimotions of Dimotions with the tools of calculus in time, and the study of spaces of spaces, with the tools of the complex plane properly understood in terms of 'square' coordinates.

But as in the entangled Universe all mirrors can reflect all forms, ¬Algebra also can analyze other elements. But its main beauty is in creating sequential chains of pentalogic actions that reflect the motions of existence of the being, even though its 'Group' simultaneous analysis of all its 'variations' of species, has been the most developed inflationary mirror in its last 'excessive' age of form.
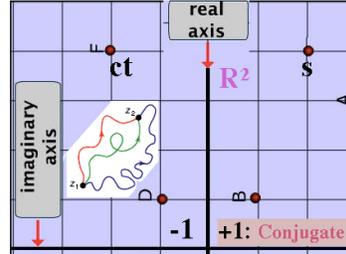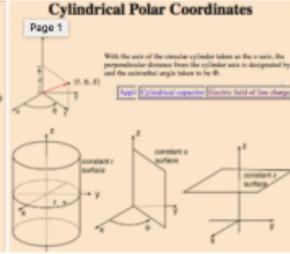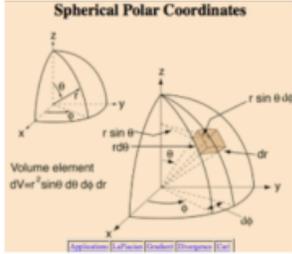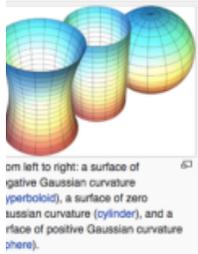
THE FRACTAL UNIVERSE: ITS SCALAR SPACE, TIME CYCLES, S=T MIND MIRRORS & ENTROPIC LIMITS

Still as I know the reader won't do that we shall just very briefly introduce the fundamental changes that 5D introduces to the humind's view of reality (ab. Human mind), which resumes in the following:

Time is cyclical, not lineal; space is scalar, fractal not continuous compressed in a single plane; thus the universe is a fractal of Planes; and those Planes are achieved by the 'reduction' effected by mental languages that 'mirror' **reality** in smaller mappings and then project its images of the whole in its territorial orders, creating supœrganisms, which have always limits of existence in time (their worldcycles) in space (their territories and membrains) and in Planes (as information doesn't transfer beyond two Planes up and down a system. I.e. you are made of cells and part of a world, but the Planes above the Earth and bellow the cell are alien to you). So first we shall introduce the 5 elements that shape all '¬Δ@st' :5 D scalar Δ-planes of Space & Time, with entropic limits, focused on still linguistic @-minds.

Why we need this introduction: The entanglement in ever more synoptic elements of classic algebra.

Algebraic first principles and its connection with the fractal Universe are less understood because the concepts required – simultaneity, emergence, synchronicity, fractal principles, pentalogic, multiple 5 timespace dimotions and its mirror symmetries with the 5 families of numbers and 5 operands are not well understood. So we need to introduce in earnest the way the Universe builds its dimotions (ab. dimensional motions) of growing complexity. The essential concept is that 5 numbers families, its 5 geometric representations and 5 main operands of algebra, are mirrors of the 5 Dimotions and they are entangled, meaning numbers includes often the operands, and both are symmetric to a plane where we represent them, i.e. number 5 includes a sum of 5 natural numbers, which relates to the natural line; a complex number includes powers and roots; and needs a complex plane; a fraction includes divisions hence also products, and angle, a ratio hence an irrational number.

So really as I know you didn't read the first paper (: I have to do a bit of an introduction since the mirror of ¬algebra needs to know what the image is about to fully grasp its awesome synoptic beauty:
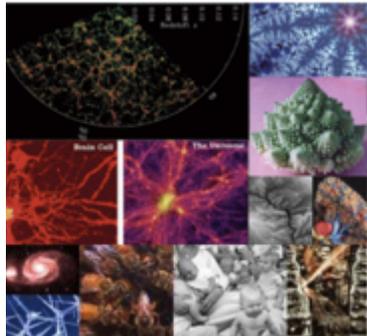
In the graph the Universe is a fractal that reproduces 'forms with motion', informations and then **organizes** them in networks and systems that evolve into larger organic systems creating the scalar structure of reality. Thus we call *the sum of all those co-existing Planes of parts and wholes the fifth dimension.*

Then it is necessary to find a metric equation to define this new dimension of space-time. Since a dimension only exists when we can write a mathematical simple metric that leaves the dimension invariant when we change our parameters of space and time - hence we travel through it. (Klein). This equation, as all space-time metric equations, is simple; since metric equations are meant to represent measures of 'covariant' motion in a given space-time dimension that leave the other dimensions unchanged. So we write using ð for cyclic time instead of t, for a motion that changes the relative size and speed of clocks of a system (measured with frequency):

5D Metric: S (Lineal Size/Volume in space) x ð (cyclic speed of its time clocks) = Constant.

According to those metrics, smaller systems in space have faster time clocks. As information is stored in the frequency and form of those cycles, smaller systems have more information, coding larger ones: genes code cells, memes societies and particles' quantum numbers code atoms and molecules.

This equation and its use to improve our knowledge of space and time in all sciences, with an emphasis in our models of physical systems will be the theme of this paper. Even if physicists stubbornly refuse to treat information with the same value than entropy. So they call it negentropy, and when you give a conference on the fifth dimension – the dimension of 'creation of social forms of information, of organic wholes' - there are no

no physicists will be reading this post… Let's then use the metrics of the 5th scalar dimension to explain the fractal, nested Universe and its Planes, shown in the graph:

The metric equation of the fifth dimension of space-time (ab.Δ) defines 3 known Planes of physical systems, with different quantity of information according to 5D metrics, Se (size in space) x Ti (volume of information) =k. Since as we become smaller in space paradoxically our time clocks accelerate, and since information is stored in the cyclical patterns and frequencies of those clocks smaller systems code more information, so quantum particles code atoms, genes organisms, memes civilizations and chips machines establishing the essential symbiosis between Δ-1 Planes and Δº super organisms, inscribed in an slower Δ+1 world.

Those metrics means information is higher in the smaller 'quantum plane' than in the larger gravitational one, and inversely the size of its physical parts is larger ins the Gravitational cosmological 'plane' than in the quantum one, with the human thermodynamic scale in-between.

As there is no reason to stop the Planes of the fractal Universe in particles and galaxies, there is a 'potential' fourth, Δ±4 organic plane defined 'above' the galaxy, (Δ+4, dark energy world) and below the quantum world (Δ-4, Bohm's quantum potential), which represents the larger cosmos. Further on, according to the fractal, nested principle any larger organic system, encloses smaller nested systems. Thus the Δ±4 cosmos contains Δ±3 galaxies, which contain Δ±2 solar systems and planets, which contain Δ±1 thermodynamic organisms and matter states, described by the human Δº mind languages, contained on our brains, *which according to those metrics* will have a much denser content of information becoming a 'linguistic Mind-Mirror' of the whole.

Scalar entropic big-bangs in a balanced immortal Universe. The Galatom.

In the fractal model a big-bang is the entropic death of physical matter. But the Universe is also scalar and it has information, a dimension of form, signified by the gravitational informative force, physicists ignore in their calculus of its expansion, happening in galaxies that balance the dark energy between them, we shall find both, balances of forces that make the Universe wobbling, and big-bangs and informative forces in multiple scales of the Universe, talking of multiple big-bangs balanced with big-crunches. Let us then correct big-bang theory to fit into the fractal view of the Universe, as there are big-bangs in all its scales:

Below left, we ad the gravitational force that warps 1D space into 3D mass in galactic vortices that balance the expansion of 1D space in entropic vacuum as light dies into dark entropy lines between them. As mass warps 3 1D flat-vacuum into a 'high volume' its 3 times more powerful in its warping, hence the 75-25% Balance of mass to dark entropy. Thus the fractal Universe is immortal. On the right its scales all suffer similar e=mc dual processes of warping through gravitational forces of cyclic momentum that create those galaxies, and expansive big-bangs of lineal momentum balanced in combined cycles of energy - the 3 conserved quantities of each fractal spacetime physical organism, which put together give birth to the 3 conserved laws of nature the Big Bang totally ignores - among many other known-known laws.

So fractal space accounts for the immortal Universe and its balanced 3 arrows of space-time, conserved in its infinite reactions; energy, information stored in the cycles and frequency of those systems of angular momentum, whose minimal constant form is h, and lineal speed, conserved in the constancy of light. Why those obvious facts of SOUND physics are then 'reduced' to ænthropic creationist big-bangs in a single plane of space-time despite evidence? It is the ego paradox: what the big bang does for science is a religious 'closure'' with man and its simplest mathematical lineal functions at its center, which added to the denial of organic sentient properties to

physical reality allows to feel the high popes of science a sensation of absolute knowledge, as the religious person feels that all is known in the mystery of god - a word eerily similar to the lineal function of the big-bang 'V=Hod'.

RECAP. The importance of understanding the limits of ideal mathematics is paramount in physics. I.e. as there is no absolute 0', singularities do not exist and the expansion of vacuum is limited by its origin in galactic jets, where gravitation makes impossible is contraction of space.

FRACTAL SPACE & CYCLICAL TIME

ORGANISMS: VITAL, TERNARY, ORGANIC TOPOLOGY
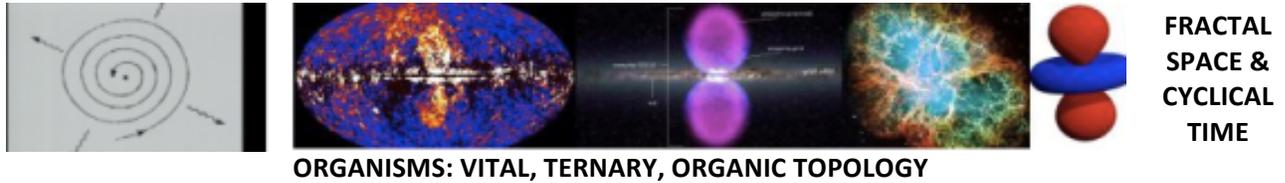
Topological organisms of space-time.: Absolute vs. Relational, Generational Space-Time

The fundamental question physicists wondered for centuries regarding the nature of space and time unfortunately was resolved as usual in favor of the simpler view: it is space and time an absolute abstract background of the Universe (Mr. Newton's view) or are we made of 'vital space' that lasts a time duration, so we are generated by the bio-topo-logic properties of scalar space and cyclical time? This is the choice of 5D 'stiences'. And its simpler version was called relational spacetime, sponsored by Mr. Leibniz. A realist interpretation of the world we live in, which has never shown in any scale of reality such 'background' - ultimately a mathematical graph used in abstract by human scientists - considers that we ARE the vital space we occupy with our cells, and we live a cyclic time duration between birth and extinction. W*e are* space & time who must extract our properties as existential beings from them.

In Newton's cosmos, space and time provide a fixed, immutable and eternal background, through which particles move. Space and time are the stage of intersecting lines sketched in the illustration. Fact is this 'mathematical artifact' made with pen and paper by earlier physicists, called the Cartesian graph, useful to measure 'translation in space' is no where to be seen in reality. Unfortunately as time went by the graph became somehow 'real' as scientists' felt the 'mathematical language' created reality. It meant also the invention of an absolute 'continuous space' and a single 'lineal time' that extends to infinity contradicting the obvious fact that all 'spaces' are broken, divided by membranes, and all beings have a finite time duration. Further on, as we kept exploring smaller Planes of reality, we never found the drawings of God, not even a solid still substance, but always 'motions' tracing closed time-space cycles; since even particles turned to be also 'vortices of time-space motions'.

The true, sound experimental and logic theory was Leibniz's, who considered absolute space and time an abstraction, and so he coined the concept of relational space -merely the adjacent pegging of similar forms in simultaneous space and relational time - the sequence of events which we relate causally with reason origin of the 'Generational space-time' model of 5D in which are the space we occupy and the time we last – as in the graph where there is no longer abstract background lines. What Newton called absolute space-time IS NOT. So space is the sum of all the discontinuous vital spaces, occupied by different beings: ∑s=S. And lineal time, T the sum of all the finite life-death cycles of all beings T=∑t.

"Behind it all is surely an idea so simple, so beautiful, that when we grasp it - in a decade, a century, or a millennium - we will all say to each other, how could it have been otherwise...
- John A. Wheeler

Since space & time do exist if they are not in the background we 'are' vital space and cyclic time. The simple idea behind the structure of the fractal Universe is to consider time=change =motion and Topologic, formal space=extension the 2 elements of which all beings are made.

We are space and time, merely of a different kind to that of Newton: Organic scalar spaces, and cyclical, discontinuous times who 'live'… worldcycles (no longer worldlines as we have a 2ⁿᵈ arrow of information) of existjence (as all species follow the common laws of space and time). As cyclical time that explains the informative repetitive patterns or Laws Nature and its multiple space-time clocks. Why a Universe made of space-time beings is

essential to a philosophy of mathematics is obvious. Because the main experimental science concerned with space is mathematics and the main science of causal time is logic, if we are made of fractal space & cyclic time, both mathematics & logic become experimental sciences, reflecting the properties of those 2 primary substances, as mirror-languages of maximal synoptic information and minimal size (Sxð=C), whose underlying laws emerge in all other larger Planes of the fractal Universe of bigger size and less information, proving also why they apply to all.

The Galaxy has its informative center in the black hole and its body in the star plane

Animals and plants have different energy/information directions, since plants obtain energy from the sun and animals obtain information. While plants get their information from the floor, from where animals get the energy to move. Thus the brain of plants is in its fractal roots

Roots: head

I: head

This said the devil is in the details. So what does it mean to be made of motions with form, time and space? In mathematical terms, it means to be made of topological dimensions, which are holographic bi-dimensional space with motion in time. And as it happens *topology has only 3 varieties of bidimensional spacetime and it is constructed of parts – points – that become wholes – networks. So the immediate translation of generational space-time into modern mathematical systems do convert, as we observed in the abstract, all systems into mathematical beings.*

5D innovates this field, 'enlightening' classic topology to 'understand the ternary organic, structure' of all systems of nature: As the 5 Dimotions are dimensions of space with time motion, its science is topology that allows a system to deform= change its inner form. Yet a 4D Universe has only 3 'topological varieties' that restricts ensembles to only 3 topologies, each one best suited to perform the 3 organic vital functions of any physic or biologic system –gauging information (1D) to move the system (2D) to an energy field in which reproduce (3D):

The purpose of vital topology is to study the 5 Dimotions (dimensional motions) of the Universe… As such it will be the final stage of evolution of geometry as an experimental science, merging elements of all disciplines.

All space dimensions have time motion. Mathematics found it, when Greeks still Geometry evolved into a vaster, generalized concept, a topological› variety, where a topology as opposed to a geometry has internal motions-changes. As the only case in which the inner dimensions of a being don't seem to change is external locomotion most 5D motions need 'geometries' with inner motion, which are topologic varieties of which there are only 3:

In the graph, the diffeomorphic Principle of Einstein's 4D analysis acquires an organic nature, when we see the Universe as the sum of ∞ Complementary ternary, topologic systems whose dimensions have organic functions: Systems feed on their relative dimension of energy-length, perceive in their relative dimension of height and reproduce in their relative combined dimension of width, which are assembled into each specific species, *to best satisfy the systems' in taking of motion, energy and information.*

I.e: An animal has its informative height in the high perceptive light dimension, but a plant, which uses light as energy has its up and down dimensions inverted respect to the man and its chemical brain buried on the Earth. So both have opposite energy-time coordinates, with an 'antero-posterior', lineal' 'outward' energy oriented structure due to the oriented arrow of light. But in a 3D world with no preferred orientation, a sea or vacuum, cyclic forms that maximize information dominate from plankton to galaxies that have a cyclic, informative, inward structure, as the stars' body absorbs energy from intergalactic space, reproduces matter with it and feeds the internal informative knot of gravitation, with a higher height dimension the black hole.

So Dimotions of reality are 3 bidimensional topological varieties that act as vital organs in cylindrical long limbs/fields, Hyperbolic wide bodies and spherical tall heads, each one dominant in a lineal classic dimension, lineal motion, informative height and reproductive width, which DO have organic vital properties too:

Spherical particle-heads, perceiving information from the advantage point of **height**.

Lineal long, cylindrical legs and fields of locomotion as the line is the shorter distance between two points.

Wide, hyperbolic body waves, storing the energy reproduce by the system.

*Nt.*1. According to the Correspondence Principles as physics named 4 Dimensions we use the name 5th dimension for the whole range of Planes, but in proper terminology we should call each Dimensions, a 'Dimotion' and consider the 5th scalar dimension the sum of all the 4th dimotions of social evolution & all the 5th dimotions of entropic devolution.

CYCLIC TIME

Time is what a clock measures'. *'Time curves space into mass' Einstein*

A year:
Cycle of existence of the Earth respect to the sun

The causal repetitive laws of 'stiences'

A Universe of ∞ time clocks of different size and speed differs from its human description with a single mechanical clock-time to which all time clocks of the universe are equalized, elongated into a lineal 'second-minute-hour-day-year' system of equalized time clocks (of light waves, mechanical clocks, earth's astronomical clocks). As Galilean physics, born of ballistics, simplified the nature of cycles of time-space into lineal durations, to measure best the locomotions of cannonballs:

Time is cyclical, all clocks of time and laws of science are based in the cyclical patterns of nature. But physicists developed ballistics and denied the truth that we can know the future because it will repeat the causality of the past, and we can change it by changing that causality, in History by repressing the lethal memes of the tree of metal and enhance the welfare memes that make us survive.

Lineal and cyclical time render the same equations as one is the inverse of the other, measured by frequency, T=1/ƒ, but the philosophical implications of cyclical time, are enormous, as we regain the in-form-ation provided by those cycles, *origin of the laws of science, which would not exist if there were not cyclical patterns; including* the cycles of history and economics. The most important of them being, the fact that *a time cycle breaks reality (1st knot theorem) in an outer and inner region, creating a membrane that encloses a vital space, the 'substance of which we are all made'*.

The 3 scales of time.

Why then there are two forms of time, the long lineal Time and the 'short' frequency steps we integrate into the larger whole? Precisely because *there are 2 boundary ±¡ scales of 5D reality whose metric, SxT=Δ±¡* defines larger space systems as having slower time cycles. So we can always consider the frequency of time the Δ-¡ 'quanta of time' or 'finitesimal derivative' of the larger whole represented with the concept of lineal time; as in the classic formula, S=ƒ(t) λ(s) . The whole Space can be measured, Vt=S with lineal time as a single unit, or it can be measured as a sum of frequency steps, with more detail.

Yet since two limits always create an interval, and all supœrganisms of time-space co-exist in 3 scales, that of its inner world, that of its 'membrain-mind' and that of its outer world, there will be often a 3rd element in between two measure time, *specific for each supœrganism and sub-species sandwiched between the 'lower' time quanta and the larger lineal time of the whole.*

So for species within the galaxy, if we take the lower time quanta, h, and the larger time rod of measure, the speed of light, in between we shall find all kind of supœrganisms that cannot go faster than light or process information in quanta smaller than an h-planckton with its specific time quanta, to synchronize its 3 vital parts, which in the human case is the second 'beat' of the heart, length of the thought, glimpse of the eye, measure of a dual stœp, (and ½ second of it is indeed the musical beat that we find more harmonious to synchronize our dance.

Synchronicities of time between the 3 relative speeds in which a being co-exists become then one of the most fruitful fields of study, as the 'persistence' of superorganisms in space is due to the symbiosis between its 3 scales of T.œs (time-space supœrganisms) synchronized with them.

Entangling Vital topology and cyclical time: Local Past=Entropy, Present=Iteration & Future=Information

'The separation between past, present and future is an illusion' Einstein

Of all the consequences of cyclical time, the most important is the existence of infinite local time clocks of which we are all made, which therefore imply the existence of infinite local past, present and future states.

Past then means a system with less 'form', less information, which slowly acquires a dimension of height-form, as it completes its cycle to return back in the moment of death to an age of no information. This 'worldcycle' of existence, which creates and erases information becomes then the equation of duality:

Entropy-youth (relative past) <Energy-mature reproduction (present)> 3rd In-Form-ation age (relative future)

Which each of us follows as a time-space superorganism. In physics is equivalent to the dual equation of Einstein: $E \Leftrightarrow Mc^2$, which reverses when E, which should be properly considered 'Entropy', as it is a disordered state, collapses through gravitation into Mass, a cyclical vortex of space-time; while its intermediate state is c^2, radiation; the relative present:
Whereas past is the beginning of a pi cycle, starting as a line of entropy with no form that curves and raises in height in its 2nd state of present, and returns back to its origin in its future 3rd age of information, completing a 0'-sum of life and death. Thus instead of a single ∞ lineal absolute time there are ∞ living cycles of time happening in zillions of entities.

In the graph we see those relative time ages for the simplest 'physical organisms', which not coincidentally are equivalent to the 3 conserved quantities of physics. So as time is cyclical, made of 3'π' lineal time motions, we shall distinguish 3 conserved 'ages' of timespace that put together create a 0 sum worldcycle of life death for any spacetime organisms: a relative devolving past or arrow of entropy represented in physics by disordered explosions in space and in vital topology by lineal limbs/fields of lineal momentum, an iterative reproductive present that seems not to change, represented by hyperbolic body/waves of energy, and an implosive in-form-ative local future arrow represented in physic by accelerated, V(t)R(s)=K vortices and angular momentum, and by particle/heads in the ensembles of vital topology. So timespace breaks in ∞ relative local, fractal entropic pasts, iterative energy presents and informative futures, which put together create the illusion of a single timespace continuum**.**

We can then set an absolute 'dimensional motion' (ab. dimotion) of time-space. Because for a whole Δ+1 to exist, the parts 'ilogically' must come first; so social evolution and love between parts is the absolute arrow of future for the organic Universe, or 'future', while a form that repeats itself seems not to change, so the function of reproduction is the absolute arrow of present, leaving thus entropy=death, the dissolution of form as the inverse arrow of past.

Synchronicity, entanglement and absolute time.

The vast expansion of information which results of uncoiling the planes of space-time of the Universe, is resolved by the humind compressing the into our size scale and rod of perception (light space-time). It is then necessary to accept for practical reasons the limited distortion of the mind, latter defined mathematically. So we won't attempt an 'Aristotelian, axiomatic' pedantic attempt to set absolute truths absolutely false – as the hypothesis of the continuum, but highlight *the inheriting paradoxes between the ∝ (relative infinite) of information, that our mind never will know as only each fractal point of space-time holds all of its information.*

Absolute relativity is the name of the game. And that is fine if the humind accepts a humbler attitude towards the whole, which so far does not. Infinities thus reduce to ∝ immensities, infinitesimals to finitesimal quanta, continuities to undistinguishable discontinuities. Single timespaces to an entangled Universe that generates its space through synchronous connections between 5 Dimotions of reality in its 3 relative ranges of 5D scalar planes in which each dimotion has a different speed but as there are 5 dimensional motions with different functions, they entangle together: i.e. the faster dimotion of feeding in the slower ¡+1 plane of the ecosystem, provides energy to the slower dimotion of reproduction in the faster ¡-1 plane of the cell 1 time a day for most ¡º animals connecting the 3 planes of biologic life**.** Functional synchronicity creates simultaneity, which gives birth to 'ordered co-existing superorganisms'. Even a humind looses information and compress it all in its plane of light and second beat, of its smaller mirror mind to fit/select its survival info within its brain.

THE 3 ONLY TOPOLOGIES OF PHYSICAL SYSTEMS: CONSERVATION LAWS.
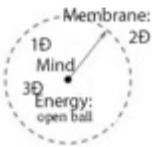
The 3 parts of any fractal point of cyclical time in the Universe become in the simplest physical systems, the 3 conserved parts of the minimal organic Unit of reality, a 'Planckton' of angular momentum. All physical systems then can be 'reduced' to fractal ensembles of 3 'conserved quantities', angular momentum - the membrane of the system, which becomes a membrane, fractal sum of 'cellular cycles' or the skin of the system in human beings. Vital energy, the enclosed cyclical forms and motions within the space whose boundary conditions are given by the membrane, and lineal momentum, the motions with a 'finality' we perceive guided by a 'relatively still mind-point-singularity' that focuses the energy and information transferred through an angular momentum membrain.

It is also the smallest clock of our world, as its minimal unit of cyclical information, or angular momentum, used as the unit of the 3 physical parameters of **spatial size, cyclical time** frequency and '**scale**' (Active magnitude):

h= mass (Δ) x area (S) x frequency (ð).

So h, 'Planckton', is the minimal fractal organism which becomes the 'cellular unit' of all other species of light space-time, as Plankton is the minimal unit of the biologic Universe, also a cell with a similar ternary structure – a DNA nucleus that process information, a protein membrane that isolates a vital space-time, the cytoplasm.

Thus Non-Euclidean points have breath, its lines are therefore waves able to communicate the external form and internal energy or fractal networks that branch to connect multiple points, and its planes intersection of three of such waves or networks that form topological organisms... It is then obvious that the next step of Non-Euclidean geometry is to merge those concepts with the physical analysis of the smallest physical systems, to understand its vital topologies. To that aim we introduce *the second fundamental equation of 5D metric that formalizes the Paradox of relativity. And so it acts in the physical model as the Postulate of relativity, common to 3D Galilean and 4D Einstein's simplex models, which correspond to 5D in a single plane of 'light space-time'…*

Euclidean dimensions perform organic functions in light waves that humans perceive as space. Light is an organic system of 3 dimotions: c-speed length, electric informative height & a wide magnetic field that supports them.

The 5 Dimensions of space-time are 5 vital dimotions, broken into infinite vital space-time beings, and now we have the 5 elements which reality uses in different perspectives to construct all realities. Nothing else is needed. And it will easily follow that in each stience, including mathematics, 3±¡ elements (depending on the perception in a single plane or in several ones) will be concerned with the analysis of a system in Simultaneous, entangled, still space as a superorganism constructed with those 5 Dimotions, which in sequential motion time will trace a worldcycle also composed of those 5 dimotions. As the universe simply put it is a reproductive fractal of 5 Dimotions of spacetime…

As motion with form constantly reproduces by the mere fact of moving. So every motion of entropic time, which enters within the orderly structure of a fractal point, its waves/networks of communication and topological planes explained in the paper on 5D geometry becomes an iterative reproductive system of spacetime.

The balances achieved by the similarity of space=form and time=motion reached in the present body, S=T, and the unbalance of the metric equation of scales, $ x ð = K, in the limbs (Max. $T) and minds (Max§ð) unify as S=T maximizes SxT=K (5x5>6x4), in 1 equation: **Max. S x T = C**, which defines for each fractal vital space-time organism its Function of existence, as all species will try to maximize its motion-entropy-time for its field-limbs, its information-spatial states for its particle-heads, whose product will give us its vital reproductive energy. Moreover the equation has an immediate biologic meaning, because as we are made topologically of 'fields-limbs' of lineal space with motion provided by the energy we absorb to also reproduce our bodies-waves, and the information we need to linguistically guide our motions with particle-heads, the very essence of survival is to increase our S=position, mental forms of space and T=entropic motions of time (whereas time=motion and space=form are the

two limiting Dimotions with 'energy=reproduction, s=t, locomotion, sT and information, St, are the intermediate 3 dimotions).

Thus the Universal constants of reality respond to 3 5D Metric constants: S/T= Speed of Locomotion, which defines the limbs/fields of the system, SxT=Existential Momentum/force, which defines its body and T/S: Density of information, which defines its mental power, all maximized when S=T.

In physics, for each fundamental scale, there is also a constant ratio between 'frequency=time parameters' and energy=mass parameters, which are the three fundamental constants of Nature, H-Planck (ratio of frequency-energy for quantum systems), K-Boltzmann (ratio between the temperature frequency and energy of thermodynamic systems)
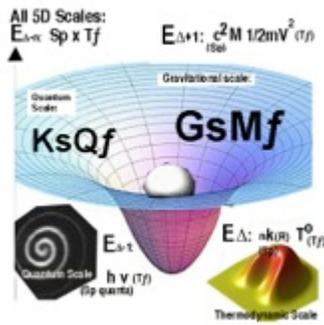
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Once we establish the meaning of the 5 Dimotions of reality we can 'ascribe' every parameter of science to one of those dimotions either in a ceteris paribus analysis as a partial space or time function or as a complex entangled space-time function in equations that describe a time-space being mutating its 5D metric through the 5 'graduations' of motion and form, from entropy («, scattering motion, which is both motion internal and external to the being), locomotion, < (only external motion), reproduction, ≈, evolution, > (internal mostly with external shrinking) and linguistic seeding, », still perception in crystal and solid or mental states whereas an active magnitude creates from a field of motion a seed of form.

MOST human measures called 'energy' are NOT about the 3rd Dimotion of energy, which 'KEEPS its balance of form and motion' but about entropic states of scattering form and expansive motion in space. For example in E=mc^2, a mass vortex of physical information is trans-formed into an entropic expansion of space, loosing its form. So we do NOT measure its energy but its entropy. Human Energy then works as a parameter of the entropic scattering motions due to the death or big-bang of a physical system, exploding its form. This again becomes the case for Heat, which measures the entropy=motion extracted from a thermodynamic ensemble, useful for man to be transformed into 'real energy-ordered motion' in its Δ+1 scale. So we consider a general 5D metric for those physical scales such as E is a function of entropy that multiplied by a function of time frequency give us a scalar constant, so we write:

Energetic entropy (E) x Time Duration (1/f) = Constant of spacetime scale.

The connection between both concepts is however more subtle. When we express the entropic energy without caring for its 'informative details', multiplied by its time duration, we indeed 'erase' the constant of space-time into a flow of entropic motion humans can use. But if we keep the system entangled without loss of information as E = C x ƒ (ð); we can talk of the 'inner energy' of the system, E, as a 'population sum', of 'space-time C-beings', as in a wave of light which is a sum of ƒ-Plancktons. So bearing in mind those subtle distinctions, 5D metric equations, E x T = C or E = C x ð, give us the 3 fundamental equations of mathematical physics regarding its 3 'scalar planes' (graph).

Thus the 3 conserved quantities of physical systems are the 3 elements of the 5D metrics equations of the 3 physical scales within the galaxy, whose metric, hxc=k sets the final limits of information (h) and motion-distance (C-speed) of the whole. All are relative 'nested scales, ' which change as we travel through them the parameter of time (frequency or duration), and entropic motions, giving us 3 constants of scale of space-time, h, m and T through which the actions of its systems are taking place.

The easiest human equivalence: Temporal Energy and Spatial Information.

Human closest translation of the duality of primary elements was in the classic age of verbal thought, Asian philosophies of yin=in/form/ation=space=visnu and yang=entropic energy=time=shiva, and in the age of digital thought, motion=time has become synonymous of entropic energy, while mental simultaneous space is akin to the concept of in/form/ation; since our concepts of space and time have been restricted enormously by virtue of the Galilean equation of speed, v=s/t which became as physicists substituted philosophers of science in the summit of scientific thought, due to its power as machines and weapons makers, the 'only equation of time', when in fact was just a measure of speed with very limited space and time parameters. As Einstein merely added – c term to that equation nothing changed despite the hype surrounding his work.

So we shall often use the terms temporal energy or entropic energy for time=motion and spatial information or spatial form, for space. As time and space are synonymous of motion and form they do have multiple meanings. So there are 5 types of time change=motion parallel to 5 types of space= form. Yet in fact as we have seen space and time are always mixed together, since human still mental one dimensional space is a simplification and definitely *a single time arrow of entropic energy or absolute motion is an extraordinary simplification of the richness of motions of time.* Energy in that sense with its multiple variations of meaning is much closer. Specifically entropic energy; that is, a motion which is internal and external to the being or 'TT', pure motion appears in the equations, $E=Mc^2$ (Δ+1) = knT (Δ^o)=hf(Δ-1) that transfer temporal motion through scales of the fifth dimension. This is the entropic arrow of time and disorder akin to death which physicists consider the single arrow of time. My advice then because of so much messy and simplified understanding of time in physics is really to take with some irony their work on philosophy of science, though as their equations have their own life and self-consistency those are 'real' and must be addressed with much more rigor, as we shall do in the papers on mathematical physics. But for concepts of time and space useful to all scales and sciences we shall use temporal entropic energy and spatial in/form/ation. Energy, being the jack of all trades, in messy human philosophy of science is also used for S=T, balanced 'work' which in fact is both space and time, energy and information, as it imprints form into motion, reproducing cyclical patterns of science. So it is better to define ST as reproductive work.

It is then obvious that the fundamental law *of science, the law of conservation of energy, becomes the law of conservation and immortality of time-motions, which can be expressed as follows:*

'All what exists is time=motion=change in perpetual trans-form-ation in one of the 5 Dimotions of time-space: S⇔T'

And it is the purpose of science in each subdiscipline studying one of the scales of the fifth dimension to study how one transforms into the other.

It happens then that the parameters of reality will be of time, space and scale; often grouped in dualities. So for example in physics we have 'scalar' magnitudes defined by a 'scalar, social number', such as mass and temperature and space-time parameters of dimotions, such as vectors with magnitude and direction.

In physics, for each fundamental scale, there is also a constant ratio between 'frequency=time parameters' and energy=mass parameters, which are the three fundamental constants of Nature, H-Planck (ratio of frequency-energy for quantum systems), K-Boltzmann (ratio between the temperature frequency and energy of thermodynamic systems) and among the many manifestations of the same law in mechanical, moving systems, the third law of Kepler (ratio between the orbital time clock of planets and the spatial volume: energy content of its orbital sphere):

 In biology we study families of animals such as mammals where larger organisms have slower metabolic cycles. In history we study social organisms, whose cycles of life and death, will define the evolution of nations and civilizations. And in each of those organisms, smaller systems code larger ones. So the quantum numbers of particles code matter, genes code biologic organisms, and memes code societies.

But the really defining graph is the third one which shows that the average number of heartbeats in the lifetime of any mammal is roughly the same, even though small ones like mice live for just a few years whereas big ones like whales can live for a hundred years or more… *but in terms of internal time, which synchronizes a given superorganism in its 3 vital parts, limbs, bodies and minds, so you walk a second each step, your heat beats a second and your eyes-thoughts take a second, the life perception of each organism of the same 'species', is the same. Such is the justice of the Universe that if you were a small rat your life will seem to you as long and fruitful as a human being.* And this is the ultimate meaning of the fractal Universe, the 'absolute relativity' of scales. We are not only out of the center of space (relativity) and time (Evolution) but also our scale matters nothing. A fact, which we can extend to other families of nature. So insects whose rate of thought processing is 10 times faster, reason why you can't catch a fly, live up to 7 years (cockroaches ant-queens of ant-hill superorganisms, dragon flies) , while humans live up to 70. The examples below are just a tiny sampling of an enormous number of such scaling relationships that quantitatively describe how almost any measurable characteristic of animals, plants, ecosystems, cities, and companies, planets, stars, laws of science, atoms and galaxies, scales with size.

An interesting number of that 3rd graph is the fact that *all perfect systems do live (9-11)$^{9-11}$* time quanta; closely related to the commonest spatial population for a full developed system (from the ties of DNA molecules, to the number of cells of an organism, to the number of people on the Earth's superorganism, to the number of stars in a galaxy, to the number of galaxies in the perceived Universe. The reasons of it, being the 3x3±¡ 'tetraktys' scale of organic systems, which we shall develop in the General model as well as the section dedicated to number
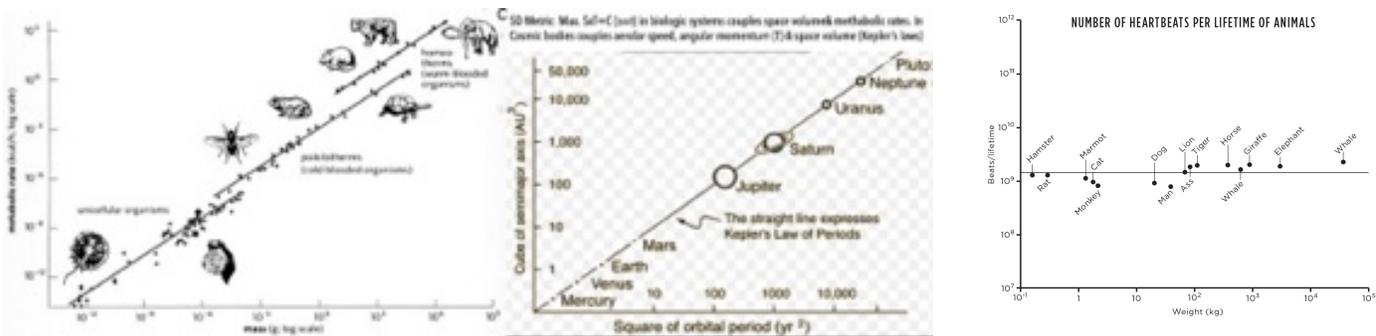
theory, and the 'relativity equation' S=T, which makes similar space and time on the point of maximal balance and survival of reality. This said, we are not unlike most papers and work on modern science, on the quantitative 'magic' of our studies, not even in this paper on algebra, but on the deep whys nobody answer, of those processes. Since the reasons of all those processes never are 5 D Metrics and the fact that scaling is an embedded feature of all systems of Nature, for the simple reason, *we are made of the two substances that scale, space and time.*

Logic Consistency: The Infinite, Hierarchical Universe

In the 1970s, Mandelbrot proved fractal, hierarchical self-similarity is ubiquitous in nature - an infinite hierarchy of worlds within worlds. So theoretical physicists found their way to the ∞ fractal paradigm, which unfortunately denies the continuous big-bang. So it offers resistance from established big science (Kuhn's on scientific revolutions). In the fractal paradigm, the Universe is infinite and the big bang is not the birth of all realities, but any local big bang and big crunch dual process, any explosion that splits the physical energy and information of a complex system, in any of the multiple scales of physical reality. So first for the impatient, we shall have a fast glimpse to how a fractal Universe look when we add scalar elements to the 'entropic big-bang'.

5D METRICS AND ITS FUNCTION OF EXISTENCE: THE GENERATOR EQUATIONS OF ALL STIENCES.

The **Rashomon effect** occurs when the same event is given contradictory interpretations by different individuals involved. The **effect** is named after Akira Kurosawa's 1950 film **Rashomon**, in which a murder is described in four mutually contradictory ways by its four witnesses.

The judge and the 4 witnesses represent 5povs. to obtain a partial truths as truth only exists in the being or event in itself that holds all

the information. So we need a pentalogic of 5 Dimotions for reality to emerge and 'persist' through synchronicity and simultaneity.

In *mathematical science* for a dimension of space-time to exist, it requires a metric equation, which combines space, and time to gives us a co-invariant system that allows travelling through such dimension. How we do travel then through the fifth dimension?   A system travels through 3 scales of the fifth dimension by accelerating its evolution in a smaller scale through a placental cycle, emerging as an organism in the larger world, to live 3 ages & dissolve back to its parts in the 0'-sum death. And this is the meaning of existence, and its reason d'etre is the SIMPLE Metric equations of 5D, which structures through synchronicity of the different speeds of time cycles, the different scales of reality. So the Δº organism eats every day, and its food programs the faster cycle of reproduction of its cells, as the moon cycle programs the menstrual cycle of women, as the year cycle of rotation of Earth programs the reproductive cycle of seasons and so on.

So an essential part of 5D theory is the analysis of synchronicity, simultaneity, emergence and the in-depth analysis – not done in this introductory course, reserved for the more complex papers on 'pentalogic and dodecalogic' where we follow in more detail the construction of simultaneous superorganisms and its ternary worldcycles.. All this of course is studied by huminds, as everything we talk about here, but *without the proper conceptual frame, lacking valid definitions of planes of space-time, time cycles and fractal spaces.*

It is for that reason we do need a new formalism we have called existential algebra with its simple symbols of which the most important are the 5 bidimensional dimotions of space-time, which entangle together through synchronous, simultaneous emergent processes to create the apparent 'solidity' and 'stillness' of reality.

Because the Universe is made only of two polar elements, still minds (SS, ab.§) and Temporal entropy (TT), and its 3 dimotional combinations, St-information, Ts-locomotion and S=T, reproduction, whose interaction can be resumed in the function of exist¡ence, Max. SxT (s≈t)=C, we can deduce all the principles, laws, events and equations of all stiences from it. So we shall call Existential Algebra to the ĐST formalism of Generational Spacetime (ab.¬Æ), and do exactly that: deduce all equations and laws of stiences from 5D metrics.

We shall thus make a 1st foray on existential algebra, showing how the 'development' of 5 Metrics give birth to the function of existence into its 3 'extremal points' or ages , Max. S x T (3rd age), Max. T x S (youth), S=T (maturity), defines the worldcycle of existence of all beings in its two directions, forwards and backwards.

But 5D metrics can be studied in more depth, roughly speaking in 4 sub-*equations, which are the foundations of the 43 great subdivisions of science:*

- The physical equation of relativity, S=T, basis of all physical and mathematical stiences.

-The biological equation or function of existence, Max. S x T (achieved precisely when S=T), the basic equation of all biological drives and evolution.

- And the equation of the mind: 0'-mind x ∞ Universe = Constant world that creates mental spaces… which we will consider in the next paragraphs as we have defined space and time more properly.

- Finally hose equation can be further unified, since the metric equation of multiple spacetime scales, SxT=K & the relative equation of dual motion/stillness in a single plane S=T that   maximizes SxT=K (5x5>6x4) unify in 1 'existential' equation: Max. ∑SxT=C±¡:Δ±1, whose study is the field of Philosophy of stience and its new formalism, Existential Algebra (ab. ¬æ). *So after studying the 3 classic fields of science will return to those 5 Dimotions, SS, St, sT, ST, TT and study its entanglement and different properties and complementary oppositions, to start building the formal laws of existential algebra, the formalism of Generational space-time. that all stiences notably mathematics and logic mirror.*

∞ MIND SPACES. RELATIVITY OF MOTION.

'e pur si muove, e pur no muove' Galileo

Let us then start with the physical analysis of relativity and its correspondence with 5D.
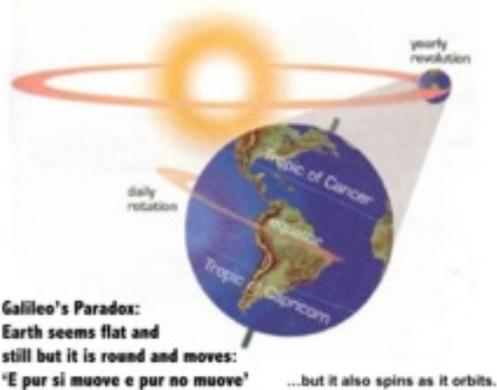
Galilean Px: S⇔T: Relativity of space Forms= vs. time Motion 5 Dimotions

It is quite surprising, sorry for my derisive humor on humind's egocy – nothing personal – that the discipline of huminds' sciences that more adamantly denies the existence of 'mental spaces', and infinite monads-minds that create the order of reality is physics, which upholds as the only dimotions of time, sT, locomotion, external motion, or 'translation in space' and entropy, scattering external and internal motion, TT, just because physicists' worldly profession has been to make weapons of entropy and transport machines, so as usual huminds project their inner mind in the whole Universe, and so physicists projected ballistics into reality. And they still do with the big-bang dogma studied in depth in other papers.

The *fundamental postulate of physics, relativity of motion and stillness is a direct consequence of the mental nature of spaces, in which a mental language stops, maps in simultaneity and represents reality as information with no motion. So we cannot distinguish mentally what moves and what is still as the purpose of a mind is to stop motion, as the pole of space that is in an eternal tug-of-war with the entropy of time.*

Galileo's time and space Principle of Relativity is the fundamental conceptual thought behind the relationship between time=motion and space=form and how one can be converted into another: All what exists is made of space=form and time=motion. And yet physicists know that we cannot distinguish motion from form. That any being in motion from its point of view seems to be still and all other things moving around it. *This is the principle of Relativity of motion.*

Physicists then without much thought about that fascinating duality, went on to use mathematics to calculate the relative motion of each entity of reality respect to other system, which seems static from both points of view. This is called Galilean relativity, latter refined by Einstein's relativity, and essentially is concerned with the mathematical calculus of what we shall call the 2nd Dimotion of time=change, locomotion. Fine, but *we are more interested on the duality of space=form and motion=time and its entangled relationships –the reasons why we do NOT see together motion and form, even if all systems have both.*

The conclusion is then rather obvious: one of the two parameters of reality is 'hidden' to perception; we either see motion or form, 'waves or particles' (quantum complementarity), distances and lines or points in motion (as in the night when fast cars in a picture appear as lines). So *physicists calculate only one when in fact we must assess the existence of 2; and since we cannot distinguish them, logically we must equal them. 'Form=motion-function; space=time; S=T'.*

Relativity is a duality, S=T, *at the heart of every law of the Universe. But which one is the real element? Obviously time=motion. Space is a "Maya of the senses" – a slice of time motion. The ultimate substance is motion. Form is what a 'still mind', makes of that motion to 'perceive', information, forms-in-action.*

Since we see Earth still and flat but it is round and moving. Galileo's profession was ballistics - the study of cannonballs motion. So he chose ONLY motion and lost the chance to start physics with a complex philosophical understanding of its S=T dual Principle of relativity, which Poincare defined latter clearly when he said that 'we cannot distinguish motion from stillness'. An example is quantum/relativity duality. In detail quantum space has 'dark energy' because it has expansive motion that extends into a plane of space, but when seen at larger Planes without detail its entropic motion seems static space - a dual area of scattering length and width. So in the galaxy we see either dark energy motion or expanding space: T=S. A motion of time is equivalent to a dimension of space: Distance and motion

We know the Earth orbits the sun....

yearly revolution

daily rotation

Tropic of Cancer

Tropic of Capricorn

Galileo's Paradox:
Earth seems flat and
still but it is round and moves:
'E pur si muove e pur no muove'

...but it also spins as it orbits.

cannot be distinguished so they must be taken as two side of the same being, a space=time Đimotion (ab. Dimensional Motion):

S= T; Dimension-Distance = Time-motion = ST Đimotion

Why if the Earth moves in time, we see it as a still form in space? Because Reality is a constant game of infinite motions, but the mind focus in stillness those motions, and measures them at distances. For 'huminds' motion is relative to our systems of measure and perception, which are light-based; hence a fixed c-rod speed/distance. Reason why Einstein's relativity postulates a maximal T:c-speed, measured as if observer and observable were still to each other (Constant S); which at our scale we 'correct' with Lorentz Transformations.

Physicists just substituted Earth's still distances for motions. It took 300 years for Einstein to realize the relativity of motion and its measure made essentially time and space, motion and form two sides of the same coin. Still this realization was not explored philosophically and so it gave birth to a series of ill-understood dualities between 'states of measure and form' (particles, head gauging form, in-form-ation) and 'states of motion' (wave states).

It is then essential to grasp that motion and form co-exist as 2 different states depending on 5D scale and detail: Motions are perceived by minds that stop motion into form, into information, as distances. So if we see slow motion in the night, a car's headlight seems a long distance line 'still' picture. But this means also that the 3 'Euclidean still dimensions' must have motion; they are 'bidimensional ST-holographic, topologic dimotions'. So we have 3 Space + 1 Time + 1 5ᵗʰ dimension of Planes = 5 Dimensional motions. None of them is a Dimension of pure spatial form or a pure time motion but a combination of both. Even if mentally we tend to reduce motion and focus on forms, all has motion=time, and form =space: this is the meaning of 'spacetime', the messing of both into 5 dimotions, the fundamental element of all realities.

Relativity states 'we cannot distinguish motion=time from position=space'. So all what exists is a composite of both, undistinguishable S=T, 5 'Dimensional motions' (Ab. Dimotions), broken in infinite fractal, vital time space organisms, composed of topological Dimotions: height=information; length=locomotion; width=reproduction; form=social evolution of parts into wholes & entropy=dissolution of a whole into its parts in a lower scale of the fifth *dimension* (term we keep for the whole range of Planes of the Universe)**; whose study is both mathematical, the main science that studies how those 5 Dimotions entangle in simultaneous Space, connected to each other topological adjacent parts, which create superorganism and Logic; the main science of time that observes how those pentalogic, entangled superorganisms move and evolve, change in sequential relational time, living a life and death worldcycle.**

Since there is nothing else but time & space, the 2 experimental 'mirror-sciences' of time and space become the most important to extract the 'Disomorphic=laws' of those 5 Dimotions that all systems have in common. Since while those Dimotions are broken, in vital organisms, separated by cyclical time membranes, they are the same.

 In graph Galilean relativity was ill understood, as the true question about time-change is why 'the mind sees space as a still continuum, when in detail is made of smaller self-similar quanta, in motion. The paradox defines mental spaces as still simplified views of the more complex whole. The 3 ¡logic paradoxes of space topology (closed in-form-ative curved-O vs. |-open, free entropic lineal forms), time-motion (stillness vs. motion) and Δ-scale, (continuous whole vs. discrete forms; single scale vs. multiple ones), are essential to the perception of a simplified 'spatial mind universe' in a single flat still plane vs. the full, more detailed complex picture in time, of a curved, discrete and moving Universe. Those paradoxes resume the 5 elements of reality, Space=form, time=motion, Planes and the mind that measures them, within its own entropic limits.

What neither mathematicians nor physicists fully understand (though some inroads in abstract were made through the Noether's concepts of symmetry) is that each stœp of a method of solution is not 'gratuitous'; but must be grounded in a real property of the 5D ΔST symmetries and conservation laws of the Universe, which are not so many – hence the repetition of methods. Specifically, the aforementioned 3 paradoxes between Δ+1 curved

closed worldcycles, sum of lineal steps, which gives birth to the most used method of lineal approximations; the equivalence between Space and time, in all Stœps of dimotions, which gives birth to the method of separation of variables on differential equations and more broadly allows to move around relative space and time parameters in equations joined by an operand of 'equivalence' ($\approx$ not =). And the 2 conservation laws of the Universe, conservation of those 'beats' of existence, S=T in relative present, eternal balance, justifying the equivalence operands. And conservation of the 'volume of space-time' of each plane of the Universe, by virtue of the 5D metric equation SxT=C, which justifies all the procedures regarding scales – solution of differential equations by separations of scales, renormalization procedures (Wilson), and harmonizes those scales allowing constant but balanced transfers of energy and information, St=Ts.

Motion is reproduction of form in a lower scale. Bohm's realism: quantum potentials.

How a system moves in a crowded reality, where all is vital space-time? The answer that resolves Zeno's & quantum complementarity paradoxes, is if *we do not move but reproduce our information, translated into a lower faster wave scale of the fifth dimension; as we reproduce our sound in faster electrons to telephone or nerve impulses into chemical dopamine to jump discontinuous neurons. So motion becomes scalar reproduction of form, and since all is a form of motion, all is reproduction, which is the definition of a mathematical fractal, a feed-back reproductive equation; 5D metrics, which become then the 'function of existence' whose goal is to reproduce the form of all systems – the simpler ones with maximal motion-translation in space, the complex ones with min. motion as a reproduction that emerges between Planes. And this gives birth to the worldcycle. Consider the case of quantum physics:* In the graph we see a particle reproduced in adjacent regions that fade away, and the result is the perception of a wave of motion. In Bohm's realist model this reproduction happens in a lower plane of quantum potentials, where also entanglement happens, which is the Δ-4 scale which is v>c in 5D metrics (Min. S x Max. T = C), hence real. Motion is reproduction of form over such potential: the wave erases form into motion, the particle is a still state that   gauges information entangled to other particle, fermion and boson, still to each other – despite the perception of relative motion in our scale – hence the information electrons share has always a c-constant speed.

Thus the Lorentz transformation are objectively real for mankind who eliminates the stop state of particles as we do in a movie eliminating the stop frame but if we were observing reality from the perspective of an atom, we would 'stop', entangle in the quantum potential, neutrino scale & so eliminate the spooky effects of 'time dilation' & 'length' contraction, from our perspective (but not of mass increase as it is a scalar effect). This is the 'rational' 5D explanation of both the c-constant of light and entanglement; as electronic beings perceive information in 'stop position to each other' and move in 'wave state'. Motions are perceived by particles that stop motion into form, into information, as distances. So 4D relativity needs to be expanded to the scalar Universe beyond the c-speed light limit of the galaxy. Within this complex view, the models of Newton, Galileo and Einstein's space-time correspond to the limit of 5D when we simplify all the worldcycles of time, we call life & death to a single mechanical clock, elongated to infinity & perceived in a single scale of space. Let us then deduce from those 2 equations the fundamental equation of reality:

Those 2 poles of reality are the first principles of any scientific inquire, prior to the languages of time-motion, logic and spatial forms – mathematics, that better mirrors ¡ts laws. Look around, everything you see is a form with inner or outer motions. Those are thus the 2 primary elements of reality; which mind languages perceive mostly by reducing the Planes of the fifth dimension and its motions to the minimal possible to fit it all in the mind 'equation': O-mind x ∞ Universe of formal motions = Mental world – reduced mirror of the Universe.

*M*athematics that considers motion a *'symmetric reproduction of in-form-ation (groups) once more turns out to be a better experimental science than physics.*

That motion happens as reproduction of form is essential for every phenomena of stience. A few mathematical cases:

- Reality will seem continuous and differentiable as a constant zig-zag of step and stops that seen in detail becomes a quantum tangential motion.

- Because reproduction is never perfect, the accumulation of statistical errors in each stœp will accumulate on the moving form till it kills it as the species slowly warps and wrinkles its synchronies. So we can define a Gaussian function of existence of reproduced populations, which are steps of the function of time-motions of the being.

-Reproduction of information will have a limit on the 'bottom line' speed of the scale in which the game starts, for the galatom the hc-scale of light speed and h-quanta.

-Reproduction encompasses the 5 dimotions of existence, becoming the more complex fundamental game of the fractal Universe to the point all can be explained with the reproductive function: Max. $\sum SxT(s=t) = C$

THE INFINITE MINDS OF THE UNIVERSE.

Once the S=T principle of motion and form is clarified, we can consider the essential origin of all ordered structures of reality, the will of existence and cause of its scalar smaller planes that mirror larger ones – the different minds of informative particles-heads, with the spherical form of maximal package of information supported on 'top' of a body-wave, where there is maximal projective geometry to perceive a larger territory, from photons moving above the wave of light or ahead of it, to the black holes with maximal height of the galaxy, to the heads of life to the satellites of the metal-earth. Minds are mirrors that perceive in its inner 'still simultaneous language', the e-motions of time converted into informations of space, in the eternal dialectic between fractal points with a volume of still linguistic perception, mapping its local Universe and flows of e-motional time with its vital sensations:

Upper graph, human egos submitted to the mind paradox, think languages (words in Abrahamic, creationist religions, numbers in creationist science), known only by man and 'God' a priori, create a posteriori the Universe (Copenhagen interpretation). The opposite is truth: a mind exists in all systems in which time stops to form space. In galaxies happens in relativity equations in black holes, its mind. In thermodynamic physics in the eye of an Eddie. In quantum physics in the center of an atom, or charge. Without linguistic minds that order by reflecting its smaller mind into its local territory reality would not exist. The only way to create fractals is through mirror images.

In all Planes of stience minds fix time motions into spatial, linguistic formal mappings that reduce the whole with its synoptic language to fit in a particle-head that acts in its world-territory after gauging information.

Thus we define 'Maxwellian's demons' of local order in all Planes – physical minds as the infinitesimal points that create order in physical systems with the same Disomorphic laws that all others do in more complex Planes. As each mind orders as a linguistic god a territory around itself, its fractal body and entropic world.

So the creation of Planes of reality is a simple game, in which a point mind 'reduces reality' to its infinitesimal form and then projects into its local territory of order, which will reflect at scale, the larger whole or world, which the linguistic image reduced and then enlarged back into its territorial form.

The paradoxes of Relativity, discontinuity, parts and wholes, Planes are all related to the reductionist nature of minds that bias reality. Minds reduce dimensions to the relevant ones, *eliminating all dark spaces*: continuity is the result.

ALL TOGETHER NOW: SUPERORGANISMS TRACING THE WORLDCYCLE & THE FUNCTION OF EXISTENCE.

We then put together 5D Planes, vital topologic space & cyclic time to describe simultaneous superorganisms tracing a worldcycle in time, the fundamental 'long time' event of reality – the worldcycle:

Birth: et_{i-1} < Youth: $\sum E_i$ > Maturity: ET_i > Old age: T_i < Death: $\sum et_{i-2}$

Human Socio-Biological Organisms:

i=4

i=3

Bases

i=5

cell

i=4

i=6

i=5: PROPHET

Individual, living organism

i=3

i=4

EPIC, LINEAL ART   CLASSIC, REALIST ART.   BAROQUE, FORMAL ART   WAR

Culture , Nation, God

i=5

Universal, Physical, Organisms:

Birth: et_{i-1} < Youth: $\sum E_i$ > Maturity: ET_i > Old age: T_i < Death: $\sum et_{i-2}$

i=1,2: ions   i=2,3

i=1,2

Plasma Birth   Energetic Gas   Liquid, Reproductive State   Solid, informative state, M=E death

STATES OF MATTER

i=8

i=7: black Hole

i=7

Energetic Birth   Irregular galaxy   Spiral State   Informative, Globular Age   Quasar Death

All what exists is a supœrganism of vital space tracing a 0'-sum worldcycle of time through 3 Planes of 5th dimension: Born as a seed of fast time cycles in a lower 5D scale (Δ-1:Max. T x Min. S), emerging as an organism in Δo, living 3 ages of increasing information, as its time clocks slow down in its Δ+1 world to die in a time quanta back to Δ-1.

We have studied as separate elements the scalar planes of the fifth dimension, its vital topologies and the cyclical structure of time, in past of higher motion, reproductive, iterative presents and future, informative poles or 3 ages of a pi cycle, which is its simplest form in a single plane of space-time.

So, absolute spacetime is the sum of ∞ Timespace beings, observed in space as simultaneous super organisms, in time, as **worldcycles** of existence between birth and extinction; as all systems are born in a seminal seed, of faster time clocks, in a lower scale of the fifth dimension, growing socially (4th dimotion) till emerging in the organic scale, where they will live 3 ages dominated by one of its 3 topologic organs and its functions=dimotions,

a young age of maximal locomotion, dominated by its limbs/fields, a mature age of reproduction dominated by the body-wave and a third age of information dominated by the informative dimotions, which finally exhausts all energy and as time-space never stops, it reverses its dimotion from information to entropy, exploding in the moment of death.

So we marry the 3 vital functions=motions of time and the 3 dimensions of space, either in 1 or 2D (height=spherical information, length=planar locomotion, width=hyperbolic reproduction) which merge in all Time-space Beings; and dominate one of the 3 ages of its life-death worldcycles, the past, young age of limbic entropic motions, the mature reproductive age dominated by the hyperbolic body/wave and the 3rd age dominated by the informative particle-head, when the illusion of time ends with an entropic big-bang death that dissolves the being into its 'scalar cellular, atomic parts', which lead us to the realization that time cycles NOT only return to its origin in a single spacetime continuum but they move up and down the Planes of the fifth dimension:

THE FUNCTION OF EXIST¡ENCE. ITS ALGEBRAIC DEVELOPMENT.

We have now the bare minimal comprehension that the reader can expand in our first paper on ΔST, to define the function of exist¡ence, a Gaussian curve that puts together ΔST and defines the life-death cycle of all Δst systems.

The 3 ages of existence of space-time organisms. Its 2 worldcycles and Metric equations.

The *Function of Existence* of any space-time organism can be developed as a feedback equation, S<=>T, in 3 sequential phases/ages/horizons, between 3 'standing points' (changes of phase): Max. T=motion x Min.S: form =moving youth; Max. SxT(s=t): reproductive maturity and Max. S x Min. T=informative, old age, as the equations of the 3 ages of life, between the seed of pure linguistic form born in the lower plane: S¡-1 and its T¡-1 entropic death, back to Δ¡«Δ¡-1:

Δ-1»Δº: The cycle or organism starts its existence as a seed of pure form (4D) when its space-time field is created. *sT:* It is the first horizon or 'energy, youth age' of the cycle, in which energy dominates the system and so we write this phase as, max. $T x min. T.

Max. SxT: s=t. It is the present balanced age of the cycle or classic age of 'life', when energy and information are in a constant proportion. It is the most efficient age, when the cycle reproduces.

Max. T x min. S: 3rd age of the cycle when information has exhausted the space-time field that warps into itself. *Δº«Δ- 1: 0S x T:* It is the end or death of the cycle that reverses its form and becomes energy again.

Existence is an ∞ sum of space/time fields, fluctuating between birth and extinction through those 3 phases or ages. The 3 ages of Timespace supœrganisms happen in all systems, including mental languages:

In State Physics they are, $T-gas, the moving state, S=T liquid, the balanced state and §ð-solid the informative state; into Cosmology, where it describes the Universe as a space-time system that fluctuates between both limits, a form of pure time, the singularity (*min.$T x max.ð§*) and a form of pure space, the big- bang (*max.$T x min. ð§). In* Biology, they are the 3 ages of living beings AND the 3 horizons of evolution of species. In social organisms, through the subconscious collective mind of civilizations which in art styles mimic in a longer 800 year cycle of life and death of civilizations (according to 5D metrics a human social superorganism is larger in space – a nation, culture, religion – and so it lives longer in time). So we find the 3 ages of life *emerging in the 3 ages of cultures and* its 3 artistic styles: Min.S x Max. T (infantile epic, lineal art, as in treccento, Greek kuroi; S=T; balanced beauty, when form and size are in balance, the classic mature age; and Max. S x Min. T: baroque, 3rd age of a civilization, whose subconscious mind is the art of its 'neuronal artists', the age of maximal form and anÐST for a no future, which *is the age of war and death of cultures*).

We talk of 3 Δ±1 Planes of worldcycles as the being live in a placenta, then emerges as organism in a world:

þ: 0'-1: its palingenetic o-1 social evolution in the accelerated time sphere of existence, till becoming 1 (0'-1 bounded unit circle in ¡logic mathematics; quantum probability sphere of particles in physical systems; palingenetic fetal age in biologic systems; 0'-9 memetic learning childhood in social systems). It is a highly ordered worldcycle as a placental mother-energy world nurtures a memorial cyclical spacetime that erased errors of previous generations.

- c: The outer 1-∞ world, in which it will deploy its 2nd world cycle of existence in an environment which is open, entropic (1-∞ hyperbolic unbounded Cartesian plane in ¡logic mathematics; thermodynamic entropic statistical molecular populations in physics; Darwinian struggle between populations in biology; idol-ogic dog-eat-dog capitalist, nationalist competitive eco(nomic)systems in the super organisms of history. In this 1-∞ existence the world cycle is not ensured to continue, as the entropy of the world system can cut it off.

ω: The existential life cycle is part of a larger world of hierarchical social Planes (§ D¡), where it performs 5 survival actions through Δ±4 Planes self-centered in its mind, beyond which it cannot longer perceive, to become if successful a new superorganism of the infinite planes of God, the game of existence.

The function of existence: Reproduction of form.

Physicists made the Galileo's paradox, the cornerstone of their theory of measure, but they *failed to study the deep implications it has for every aspect of the structure of the Universe, from the duality between spatial mental, linguistic forms and physical motions; to the balances achieved by the similarity of both space and time, which becomes the fundamental 'equation of present' S=T, and hence with the metric equation of Planes, $ x ð = K, the two essential equations to formalize single planes S=T, and multiple Planes of spacetime. Yet as S=T maximizes SxT=K (5x5>6x4).*

We unify both in a single equation: **Max. S x T = C**, *which defines for each fractal vital space-time organism its Function of existence, as all species will try to maximize its motion-entropy-time for its field-limbs, its information-spatial states for its particle-heads, whose product will give us its vital reproductive energy. But as all systems move and motion is reproduction of form we can ad a final factor, ∑, reproduction of parts, which to maximize that function become joined into larger wholes which are stronger than individuals; creating new planes of existence. C= Max. ∑ SxT (s=t); whereas C act as the entropic limits in ∑-Planes, T-ime & S-pace, boundaries beyond which the still mind doesn't' perceive or control.*

It is also a survival biologic equation, because it implies to provide lineal motion to 'fields-limbs', absorb energy to reproduce our bodies-waves, and information to guide our motions with particle-heads. *So reality is a 'struggle' for existence as systems reproduce its Ts-fields-limbs of motion, S=T body-waves of energy and St-particles-heads of information. But as all T.œs are fractal, broken, its growth has a limit on the fight with other systems, which try to move and reproduce. In terms of pure T-motion and pure S-form, we consider then the whole of maximal* time=motion= entropy or TT and Max. space=form=stillness or SS the 2 limiting Dimotions for any 3 ensemble Ts<ST>St-system.

We define the Universe as a fractal supœrganism that reproduces and ensembles Space-time Dimotions into organic forms through ∞ relative Planes of spatial size and time-motion; whose Fractal generator (mathematics) Metric (Physical jargon), survival function (Biology) or Function of existence (logic Jargon) writes C=Max.∑TxS (e=i)

We shall prove that all realities are always a reproductive radiation of a function of existence along 5D Planes.

The conclusion of a world made of space=time then is obvious: We are made of the 5 Dimotions of space-time of the Universe. We are ensembles of those 5 Dimotions, which seen in simultaneous space give origin to the vital topological organisms of the Universe; whose study therefore is mathematical, the science of space; and observed in sequential relational time, live a worldcycle of life and death; and since there is nothing else than time and space, those 2 fundamental experimental primary 'mirror-sciences' of time and space become the most important to know what all systems have in common, its 'Disomorphic=l

The curve of existence as a bilateral mirror symmetry of the log/exponential function.

The 4 phases of a real function of existence: In the first phase, corresponding to the palingenetic age of placental energy the ratio of change (derivative) has the absolute maximal e^x, which is its own derivative. In its 2nd phase it diminishes to the minimal $1/x$ the log derivative, which is the definition of an infinitesimal part; till in the 3rd phase it will start a bilateral symmetric inverse function of decay with $-1/x$ diminution and a fast collapse in the 4th phase of a 3rd age and final death moment. So the combination of ± exponentials and logarithm curves are also the best way to graph as a bell curve the worldcycle of existence *as a 'composite' of a ± exponential*

and logarithmic 0'-sum.
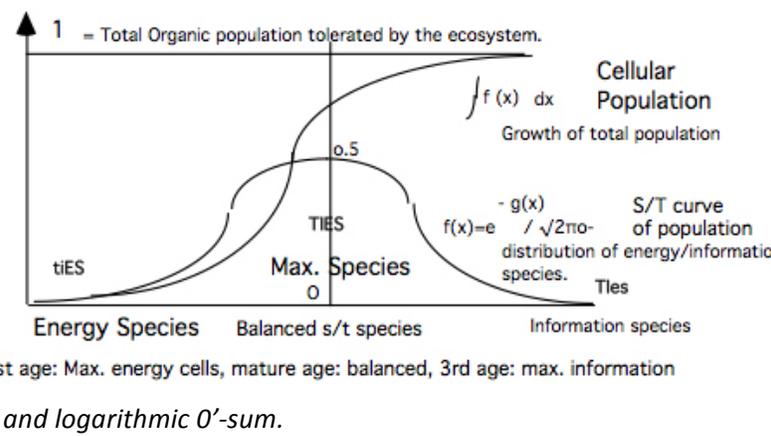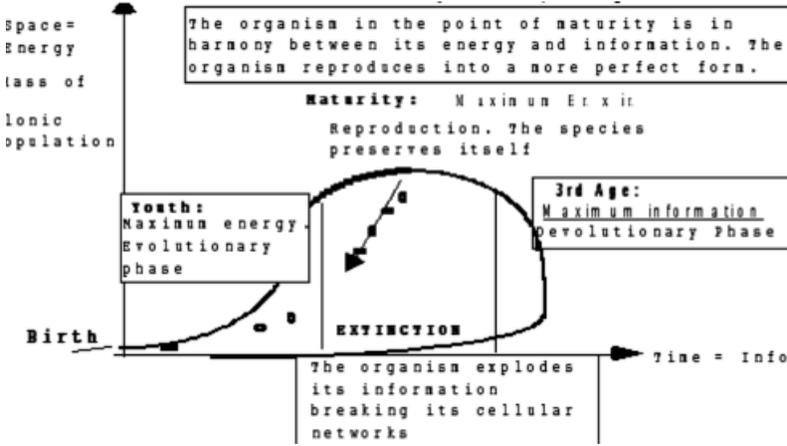
As any student knows there is an intimate relationship between the exponential and the sinusoidal by way of Euler's formula in the realm of complex numbers, which we treated briefly in theory of numbers.

So sinusoidal bell curve functions represent a worldcycle, though the symmetry is broken in the moment of entropic death when the collapse is extreme in a 'falling line' as death happens in a single moment of time:

4D»Δ-1(seed)∑Δ:|-$T(limb-field)<∅-S≈T (iterative bodywave)> O-§ð (particle-head)«5DΔ-1(death)

A key theme of vital mathematics is the representation of a worldcycle in lineal time, with ± exponentials & its inverse, logarithmic curve around the key points of change of phase… as growth of 'entropy-motion' diminishes. So we move from 'adolescence' of max. growth of both parameters (sT energy and sT information) to the $y''=0$ point of youth, where the logarithmic part grows slower. Together they form, one half of the total graph of a cycle of existence, till reaching the $y'=0$ point of Max. (S≥≤T), which then becomes negative, happening a decay of the whole system in two negative curves.

The conservation of time in its 5 $y' ∧ y'' =0$, standing points that define the 5 SS, Ts, ST, St & TT moments of generation, youth, maturity, 3rd age and entropic death thus become the essential points (maximal and minimal) of the equations of calculus, the sinusoidal function of existence and all its derived elements.

The natural name for the worldcycle of a superorganism traveling through 3 planes of space-time is the function of existience, as we take advantage of the similarity of all languages, mirrors of the same Universe made of synchronous organisms whose topological trinity parts are entangled by the < ≈ > 3 operands of informative evolution, T>S that synchronizes time cycles slowing down its rhythms, entropic energy, S<T that expands entropic timespace dissolving its information and T≈S that gathers together in parallel herds T.œs (ab. Timespace organisms) with a common property/dimotion of existience. So as energy and information are synonymous of Time and Space, and both entangle together through the re=productive operand, ExI=STi becomes the acronym for the function of existence of an entangled supœrganism, studied by a given 'stience', that is a science that studies a relative plane of size and time speed of the 5th dimension – the name we keep for the whole of wholes.

So we can see the graph of the whole world cycle as a 'composite' of a positive exponential and logarithmic 1st age and maturity, and a negative logarithmic and exponential – mirror decay with the final collapse of death. Needless to say the same functions appear on all growth curves.

If we add all those growth exponentials transfering the function to a lineal sinusoidal series in ±complex planes, the stretched worldcycle representation becomes a 'sinusoidal function'. So it is carried into Complex exponentials.

Finally through the T=S symmetry it becomes both a Bell curve of spatial populations & its s=t statistical mirror; which finally carries to the probabilistic 0'-1 'unit' sphere of palingenetic growth (as in the duality T-probability 0'-1 sphere of quantum physics vs. 1-∞ entropic statistical function of thermodynamics. Since the function of existence in its subtle fractal variations and complex pentalogic is the most important of the Universe.

The worldcycle curve is yet another proof that Real Numbers are scalar and ratio numbers, which as the e decay of a whole into Planes, or the sinusoidal π of mental perception, enlarge a seed into an organism or shrink Planes of a whole into a finitesimal, mental mapping with no limit of 'warping' (Poincare Conjecture).

Logarithmic growth and its inverse function of decay shape a life-death cycle in terms of social growth of energy Δ-1 cells and dissolution, forming 2 two sides of an inverse worldcycle peaking in the Max. SxT (s=t) middle point.

The mathematical laws extracted form the nature of those 5 Dimotions will then be the essence of the properties and laws of the 5 operands of algebra, growing in complexity from the simplex nondimensional angular perception, which forms minds to the operands of calculus. Specifically we write the equation in terms of space and time (SS & TT) that merge in a middle point as they become 'energy: Ts' and information 'St', maximizing the imprinting of space networks over ∑-herds of quanta as: Max. $\sum T \times S_{e=i} = \Delta_{\pm i}$

As we are not at this point interested in the exact algebraic formulation of the function, but in the concepts behind it the impatient reader is invited to derive the Gaussian function from it. The key of that analysis being the fact that the function can be studied 'partially' in the different dimotions that its synoptic, conceptual writing enclose. *Since the equation is not a strict quantitative definition but a logic one, ∑T herds of time particles with motion, become 'imprinted' with informative space, re=producing e=I balanced quanta in the point in which form and motion are in a dynamic equilibrium, which give us a certain Δ topologic plane of space-time. This middle point is the maximum of the Gaussian function, but as the equation is dynamic, its stœps of reproductive actions will form a 'cloud' of imperfect repetitions around that s=t mean due to different 'limits' – the most obvious the limit of prey-predator carrying capacity; so repetitions will ultimately diminish in quantity and loose quality. How to avoid this* is obvious: eliminating repetitions that are not good enough, which ultimately is what provokes the cycle of evolution, extinction and death of lesser individuals; so the game keeps perfecting itself, and its spatial points learning the palingenetic improvements.

Conservation of time vs. inverse annihilation of information.

An essential truth, systematically denied by @-minds is that while the initial substance of reality time=motion is conserved, as it trans-forms ad eternal in different forms of information information becomes annihilated into 0' sums, regardless of leaving memorial remains and possibly being recreated. Thus algebra has always inverse operands and elements that 'annihilate' the form into a residual 0'; which in mathematical physics become the game of particles and antiparticles, inverse waves that annihilate its height information, etc.

COMPLEX, ¬BIO-TOPO-L@GIC PROPERTIES OF NATURE

The fundamental purpose of this paper is to UPGRADE the understanding of mathematics as an experimental language mirror of the vital, organic, scalar properties of the space-time Universe, observed in the next graph:
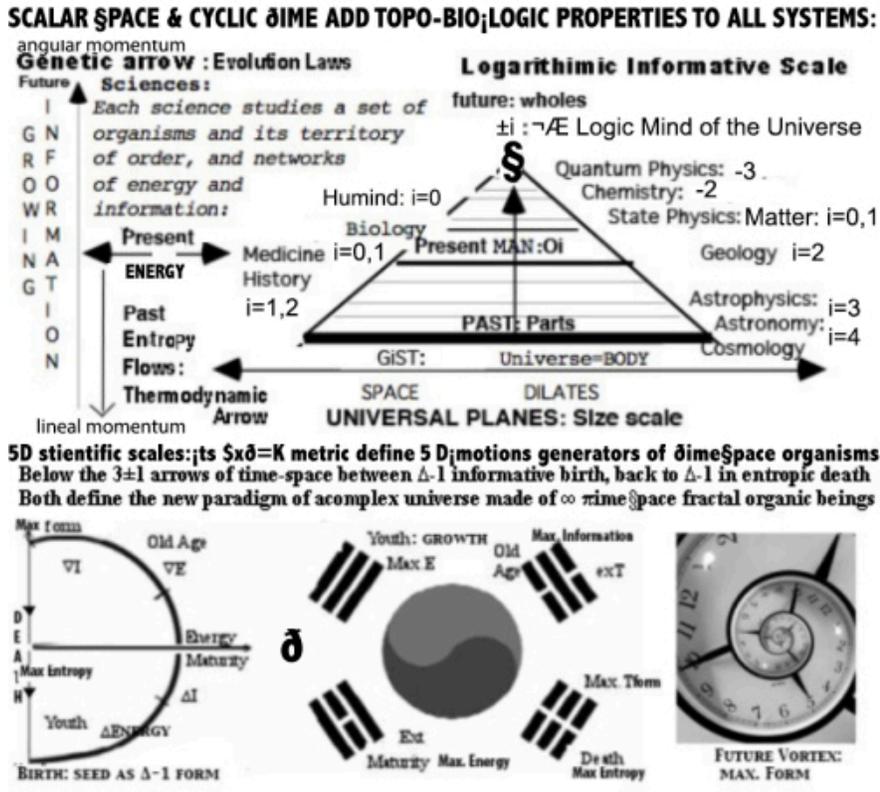
Each stience is a mirror-mind reflection of that program of 5Dimotions, from the point of view of the species that perceive it. And so the main task of 5D philosophy of stience is to translate the jargons 'huminds' have established in the study of the exi:stiences (Timespace supœrganisms self-centered in one of those planes of stʲence) to the principles of time-space and its general properties – the thoughts of God – from where each of those stʲentific species are just a 'variational detail', including mankind study as the supœrganism of History.

In the graph, the study of a Universe made of fractal Planes of cyclical time space, introduces a priori:

- **Organic=scalar** properties as the system extends through **various Δ§ planes of space** that provide it with **Spatial, topologic properties**, **cyclical time properties**, and **¬entropy limits,** as its time clocks will have a limited duration, ending as a zeroth sum of energy.

- Sensorial properties to be able to perform a survival program of 5 Đimotions of existence, it requires to **gauge information** with an apperceptive, self-centered **@-mind, whose Δº still language** maps all external Δ±ʲ time§pace organisms & world cycles into an infinitesimal Non-E point, mirror of the larger world: 0 §@ x ∞ ð= World. Hence the creation of infinitesimal Δº minds-worlds, or Leibnizian monads, which reduce a larger Δ+1 reality to its relative mapping, which is the origin of its Δ§calar planes, connected 'perpendicularly' through those @-minds, acting in physics as 'centers of changes and masses' wormholes of flows of entropy that become in the @-mind information, that perceives in itself.

Those 5 properties, ¬Δ@st, entropic limits, organic Planes, linguistic minds, topologic space and cyclical time motions, *are inheriting to all systems of Nature, as they are derived of the scalar, fractal, cyclical nature of space*

and time. The most difficult to accept due to the ego paradox of all minds including man are the sentient linguistic properties of reality. But they are necessary for two fundamental reasons:

- *To understand how smaller similar entities create their form which cannot be understood without the mirror concept of a language that projects a shrunk view of the whole in its body-territory of order.*
- *-To understand how humanity or any other atomic species for that matter performs its actions of existence clearly regulated by logic and mathematical time and space laws.*

The Universe is a fractal organism of similar Planes, defined by 2 metric equations and its philosophy of science, 5D Absolute Relativity: the equation of 5D Planes, SxT=C & the equation of relativity between form and motion, S=T, which started modern science. Since *we cannot know from the mental, still point of view, what truly is motion and what is dimensional form.* Thus Time Motions & space dimensions co-exist and merge in every space-time being of the Universe & *we must talk of space-time dimensional motions.* When we combine them, as S=T maximizes SxT, we define the Function of existence, Max. S x T = C (s=t), which IS also a biologic equation of survival that embodies the will of life; the biological expression of the 'Universal mandate', expressed by all species in all its codes and languages, the Grow and Multiply of the Bible, the intuitive truth that guides all beings. In detail implies all systems try to maximize its 3±¡ 'Đimotions' that in space create organisms and in time its worldcycles of existence; starting as pure Form (4D) in a seminal seed, emerging in an Δ° scale, in a young age of max. Motion (2D), balanced with information in the reproductive age of max. Energy (3D), followed by an age of information (3D), when time reverses into entropic death.

The dual metric 5D equations of Planes, SxT=C & the equation of equality between form and motion, S=T, develop in 3 ages with 3 standing points, a max. point of existence, S=T or mature age, a young age of Max. T=motion, and an old age of Max.S=information; between birth in Δ-1 Form & T-entropic death.

Such organic model is more scientific than mechanical abstract models dominant in physics for a few reasons:

• Only an organism replicates itself without the concourse of a 'maker of the machine' - God in the earlier physicists' view, now obsolete. As machines do not reproduce.

• Only the definition of time as the substance of reality - cyclical motion that reproduces form allows the Universe to move, as only if motion=time is the ultimate substance the Universe never stops.

• Only if it is cyclical, repetitive, there are laws of science, which are precisely those repetitive motions.

• Relativity shows there are ∞ clocks of time with different speeds (just look at the clocks of nature).

It is epistemologically sounder (Occam's razor) as all systems can be modeled as organisms. Further on organicism uses all the language-mirrors to express its topo-bio-logic properties:

• It uses the mathematical language, best for its spatial description, which models organisms in the form of fractal networks, for which we shall adapt and expand its most advanced forms of space, topology - space with motion - and non-Euclidean geometry - fractal points with volume that grow in size as we move closer into its Planes, allowing ∞ parallels of energy and information to flux into them.

• It uses the logic language, ideal for temporal, causal sequences and cycles, which we shall improve from the simpler Lineal Logic of locomotion, into Duality, the logic of two arrows of time, energy and information and further on into 'trinity', as both combine into energy beings - the logic of topological organisms, conservation principles, Universal grammar, and even further on into pentalogic and Dodecalogic...

• It expands Biologic life to all systems. Since a fractal requires a new dimension of parts that become wholes, larger Planes co-existing together gifted therefore with organic properties as atoms/cells/Individuals form part of thermodynamic /biologic/social ensembles that become wholes, living in a larger gravitational, ecosystemic or planetary world.

- The Universe is a game of ∞ space-time supœrganisms performing 5 survival 'dimotions'=actions through Space stops and time steps, STœps in its scalar cœexistjence through 3 planes of the 5th dimension, which add together in its structure of simultaneous vital topological superorganisms tracing 2 existential worldcycles, the Δ-1 placental ordered o-1 that emerges into the life-death, entropic 1-∞ worldcycle . Stœps express them through feedback equations of Existential ¬Ælgebra, where = is a dynamic symbol «≈», composed of 5 dimotions = stops, ≤≥ wave steps and» 4D implosive informative social evolution & «5D, entropic explosion of a system.

We call that super organism of astrophysics, the galatom, (as it happens between the quantum atomic scale, and the galactic scale, which are self-similar - with similar forces, and particles similar to celestial bodies). Within the galatom in the intermediate stage there exists, thermodynamic man.

Thus the organic paradigm rejects 'mathematical creationism' in physics - the belief an equation describes all the properties of a system, which no longer need parts; as in the case of black holes which are modeled with singularities - mathematical entelechies of infinite density and infinitesimal volume but as Einstein wanted, they must be made of a cut-off substance, which can only be heavy quark atoms (bcb atoms).

Because the scientific method requires objective measure of a mind's existence, which is not perceivable directly, we *infer its existence by the fact a system performs the 5 external actions, which can be measure objectively, in the same manner we infer the existence of gravitational in-form-ative forces by its external actions upon massive objects.* Hence eliminating the previous limit for a thorough understanding of the sentient, informative Universe. And further classify organic in simplex minds - all, which must gauge information, move and feed to survive, and complex systems, those who can perform a palingenetic reproductive, social evolution, Δ-1: ∑Δ-1≈Δº.

The purpose of philosophy of stience is precisely to vitalize reality and *explain experimentally each science as a reflection of the previous organic, scalar, topologic and temporal properties of space-time beings.*

But as the ego only 'perceives' from its p.o.v. it reduces the Universe to its world-languages: O-mind x ∞ Universe = Constant world.
So humans do NOT recognize under the 'ego paradox' of their mind, which perceives reality from its self-centered point of view and selects only information favorable to its territorial view ANY of the 'cyclical, intelligent, organic' properties of all other atomic systems of reality, which are the first bricks of 'life', as particles gauge information, feed on energy, decouple=reproduce and evolve socially through magnetic fields, and quantum numbers that code its behavior as genes code cells or memes code humans.

How humans then explain the complex Universe is easy, as they introduce myths of anthropomorphism, pseudo-religious theories of languages, and the view that all other things are entropic=destructive=chaotic and by mere chance have become what they are. So probability becomes the 'chaotic' cause of reality, while a 'god-like' language shared only by man and God, first the word, when men only talked, now mathematics, when man also calculates - or rather its computers, made with more intelligent atoms - is responsible for the order. This language is thus the intelligence of the Universe, and man accesses it through its mirror mind because he shares that intelligence, or even causes it (Hilbert's description of maths as born in the human imagination). So creation happens in the Universe through maths, and it is only shared by man who calculates and designs.

As why maths creates and how it does imprinting reality is a big mystery not worth to explore as it is the magic of it all, which allows to introduce pseudo-religious theories of reality from the creationist big-bang to the superiority of man, gifted by the language of God. This comfort zone in turn makes man happy, because its ego is pumped up, and allows him to manipulate and kill reality if needed, ab=using the planet, because it is already dead. It seems a perfect fairy tale world.

All what humans must do is to extract mathematical properties of objects, with instruments, gathering data cast in equations that mirror the space-time properties of the Universe, and run them in the calculation machines of

more complex metal atoms, to extract images of reality that are the essence of knowledge. No further questions are needed. And inversely we can design in less mathematical dimensions objects and then reproduce them.

All this of course works fine as long as we eliminate any question on why species follow certain properties, on what are the properties we do not map out as they are no susceptible of mathematical description (notably vital properties and sentient properties and organic, fractal properties).

Reductionism is inheriting to the ego paradox that confuses the 'language' it speaks with the reality it is, excluding what the language does not see. So what we don't see does not exist. And even when we see it through interposed instruments as all other Planes of 5D, as it is not primary, e-vident experience, humans have gone 400 years without a serious research on the relationship between Planes.

The same goes for 'verbal creationism' – all what is not in the Koran is not worthy, said Omar, before burning Alexandria's library. 'All what cannot be measured does not exist' said Planck.

Logic positivism affirmed that all properties of reality which mathematical logic cannot prove do not matters and so on. All what is not proved by mathematical methods that cannot portray them as they do NOT have a vocabulary for those properties in restricted mathematical languages, does not exist. This reductionism thus reduces reality and knowledge but makes the ego of man the center of reality again and happy.

Even if Mathematics shows vital social properties in its mirror languages, those are also overseen, as in the case of the social properties of numbers, which do not satisfy the ego paradox of individual man as the center of it all.

Huminds, indeed, have an astounding rather contradictory capacity to deny obvious truths when they don't cater their self-centered ego paradoxes and accept falsehoods as truths, from religion to big-bang theories as long as they satisfy their subconscious ego, and put man back into the limelight.

Therefore on approaching those difficulties of the human ego to appreciate the whole and form part of it, we can only try to show that mathematical properties are vital properties; so they can also describe organic properties, when we adequate its postulates and elements to the fractal form of space (definition of fractal points with parts; its lines as waves, and its planes as intersecting networks, and so on)

So we are not so much advancing maths beyond the upgrading of Non-Euclidean mathematics, but interpreting maths as an experimental science, that is as a mirror of the space=geometry and time=logic, ¬Algebraic and scalar=digital social properties of all what exists.

Needless to say in a ginormous field as mathematics is, we shall just keep it simple, as we build slowly a few well-written papers out of 30 years of notebooks, so the work will always be in progress.

This paper is on time' and mathematics', hence ob ¬Algebra, consider some introductory themes, shared with an older paper on 'space' and mathematics, hence ¬E geometry, on the subdisciplines and philosophy of mathematics, and the 5 Postulates of ¬E geometry.

The five Time§pace dimotions = Dimension of Space x Motion of Time of the Universe.

Thus 5 Ð studies all the Dimotions (Dimensional motions) of all beings in exist¡ence, which move through S≈S, T≈T, S<T>S dimotions, STœps of existence, call also vital actions of space-time that advance the system through reality.

A system then is in an instant of present in a given S-stop or T-motion state, or a mixed state often leaning dynamically towards one tendency. So we define on those terms the 5 Dimotions as:

1D »: Linguistic Perception: SS: an area, still mind or seed. « is the time-dynamic and SS, §, the spatial formal view.

5D «: entropy TT as a scattering motion.

2D ‹: S‹T, as a locomotion, where motion doesn't' affect the inner parts of the being, which are conserved.

4D ›: S›T, as social evolution of information, where form dominates.

3D: S≈T, Reproduction, where both are in balance, often as a series of steps and stops or stœps.

Those are the 'smallest quanta' of Dimotions, its minimal expression as 'actions' that each T.œ perform, spending in the process a minimal amount of energy. As all events in spacetime are a sum of those 5 types of stœps. It is possible then to write complex chains of stœps or as humans do for the sake of simplicity, eliminate intermediate states (motions or forms). This is how humans resolve the study of locomotions, eliminating the lower planes of stop-states proper of the quantum world, which we bring here for the sake of whys - as in relativity, explained in a rational manner. Whereas a system can only move one or twice, ‹, ›, «, », to certain other states and so the collection of all those possible changes=motions of STates will finally show a casual cyclical pattern that normally ends crossing itself into a zeroth sum of state in spacetime; creating the minimal full unit a zeroth sum conserved spacetime cycle.

The generator of space-time, maximize your existence. E-motions and Actions as short time program.

This more simplex organic view of time and space requires thus a new 'metric equation' beyond the lineal $v=s/t$ equation of Galilean relativity that becomes the limit of this more complex view of time and space, with 2 fundamental equation, **SxT=C** (the scalar metric of the fifth dimension, as systems in space accelerate its clocks of time (T) according to its size (S); and **S=T**, the new equation of relativity, which means as we cannot distinguish motion=time, from stillness=space-form (Galilean relativity), both are 'two sides of the same coin', and all systems have both motion and form, which are constantly becoming one another. Yet as SxT is maximal when S=T (5x5>6x4...) both equations can be summoned up into a single one, which we shall call the fractal generator, or will of each fractal space-time beings, the equation that embodies all other equations of the Universe and guides the actions of each fractal part of it:

Function of Existence: **Max. ∑ T x S $_{e=i}$ = C$_{\pm i}$**

Moreover the equation has an immediate biologic meaning, because as we are made topologically of 'fields-limbs' of lineal space with motion provided by the energy we absorb to also reproduce our bodies-waves, and the information we need to linguistically guide our motions with particle-heads, the very essence of survival is to increase our S=position, mental forms of space and T=entropic motions of time (whereas time=motion and space=form are the two limiting Dimotions with 'energy=reproduction, s=t, locomotion, sT and information, St, are the intermediate 3 dimotions). Thus Max. S x T = C (s=t), IS also the equation of survival and struggle for existence, the will of life; the biological expression of the 'Universal mandate', expressed by all species in all its codes and languages, the Grow and Multiply of the Bible, the intuitive truth that guides all beings.

Existence game is simple: Reproductive radiations that maximize ¡ts function, happening when mirror symmetries (genders) meet in S=T, equaling their St-information and sT-energy, organizing themselves into a whole, ∑ system.

It is then easy to interpret that equation in each of the languages-minds of each scale of reality as in all those Planes species will show a 'will' of action to perform the maximal number of events=dimotions='actions of space-time' that ensure its survival. And this can be assessed

externally regardless of secondary arguments on consciousness and self-reflection, substituted in 5D by Leibniz's 'apperception' – that is, because performing the 5 actions=dimotions of existᵢence, in each 'stᵢentific scale' self-centered in a linguistic mind that perceives a given plane, inscribed into a larger Δ+1 world, with internal Δ-1 parts, ensures the survival, ONLY those species that have performed the 5 dimotions of which the most important is s=t reproduction of the being into a 'present' similar entity that continues the existᵢence of the system after 'errors' or 'the struggle for existence' dissolves it through the dimotion of entropy= death, exist.

Thus automatically, genetically, consciously, memetically, mathematically, logically, through its own will or as a part of a larger system that uses the 'machine' or 'organism' to enhance its actions all what exists does so because it performs internally those 5 Dimotions or externally performs one of them for another symbiotic species, as those species that have not followed the program of existence and its 5 actions in the past have become extinguished, and those will not in the future, will become wrong mutations, crazy thoughts, fictional languages and die away.

The function of existence, or 5D metric of Generational space-time, (Ab. ÐST, Γ) Max. Se x Ti (s=t) merely states that all systems of Nature will try to maximize its absorption of Entropic motion (with no form) and Linguistic form (with no motion), and its 3 intermediate dimotions of energy (s=t, balance of both that reproduces them), information (St: form with a little motion, form-in-action) and locomotion (sT, motion with a little form). So we talk of a program of survival 'selected' by all systems and expressed in its languages and minimal five actions encoded in that simple equation, which we term: **a, e, ï, œ, û**, as a mnemonic rule for the five actions of existence:

Accelerations (locomotion), entropic feeding (e), ïnformative perception and communication ï, **Œ**:reproduction into parallel supœrganisms **Û**… and social growth into larger wholes called philosophically Universals. And this series of actions is what accumulated in time will ultimately give birth to your word cycle as the monad will first perceive (i), to direct its entropy-motions (a),towards a field of energy (e), where to absorb the energy bites it will imprint with its inner form, e x i = œ, to reproduce another form, and when enough ∑œ exist, it organize into a larger whole û.

In the graph we see the action of different Stientific Planes of organisms. Above the coding of actions, which are the knots and bolts and details of the study of any time§pace supœrganism in light space-time, coded by colors and dimensions, in physical atoms, coded with quantum numbers and in life and humans coded by the so called drives of life, which we obviously extend beyond the ego paradox to all other systems, including genetics not mapped there (coded by the 4-5 letters). Those actions balanced each other into 0'-sums in death, as they tend to increase information from a mind p.o.v., hence we 'all warp, wrinkle' get old in the third age and die, setting from its minimal actions to its integral sums, the 3 ages of life-existence and the world cycle all super organism follow. In the graph, the simplicity of the game of existence, and its selfish actions, which gather together into social wholes through reproductive radiations, each action coded by a fundamental topologic organ we can express in Existential ¬Ælgebra, and corresponds for each species of the Universe, with a fundamental parameter of humind measure. So from bottom to top, we find the 5 fundamental elements of light code its actions of motion (c-speed), energy (magnetic field), information (electric field), social evolution colors & entropic feeding, (quantum potential, neutrino light theory)

So minimal particle-points, photons, electrons & quarks construct all other systems of our Universe with ᵢts 5 organic dimotions that define 'classic life': they gauge information - reason why quantum physics is a 'gauge theory', feed on energy (quantum jumps) absorbing smaller Δ-1 particles, reproducing new clone particles, move and evolve socially through magnetic fields into larger wholes (atoms). Hence the units of life are particles, the minimal units of our vital, organic, fractal, scalar Universe of multiple timespace organisms. All lives, performing 5 Dimotions=actions of ƒ(existᵢence): Max.SxT(s=t) =C, starting with particles.

So all Planes are relative *none* matters more than other. From those actions, given the dominance of informative actions over entropic ones, it appears a series of repetitive cyclical patterns of actions conducting to maximize the existence of the being, which accumulate in a larger scale of time-space, as a worldcycle of actions that increase the information of the system in 3 ages. So the basic cycle of actions becomes a larger 3 ages cycle of life and death; as

systems once and again, starts in an act of information/shrinking and ends in an act of organization/shrinking of herds into wholes, will keep reducing the being and finally make it all form no motion to explode and die in an entropic reversal of death:

∑ i->a->e->œ->û, i->a-e->œ->u, ï->æ->Œ->Û -> Informative 'seed' age->1st locomotion, feeding age ->2nd reproduction age ->3rd informative, social age-> entropic death.

It is the main entanglement of the 5 Dimotions of the Universe, which expressed in terms of spacetime shows a clear motion towards an excess of information that ultimately defines the death of all forms, Ts->St->TT->ST->SS.

So only a final explosion of entropic death ensures that reality will continue. Those hard truths of ¬Æxistential algebra might never be broken by the details, as the thoughts of God will impose themselves on any attempt to break the laws. Since the goal of reality is NOT entropy, its needed renewal back to the fold of eternal time motions but information, the thirst of any non-Euclidean fractal point for energy flows to imprint its information. Thus the essence of being requires the death of the perceiver, unless it transcends into a larger whole.

Trilogic >Pentalogic on worldcycles∧supœrganisms. Synchronicity of time cycles and emergence of scalar spaces

In the entangled pentalogic Universe, each of its 5 elements, space, time, Planes, entropic limits & linguistic minds

that measure it to perform dimotions of survival for the whole; each element is related to the others. So in time we do have 3 relative Planes of time speed according to 5D metric (SxT=c), meaning our cells are much faster (or the particles in an atom) and store the information of the larger scale, which traces slower time cycles than the whole. And this is the phenomena of *synchronicity, the detailed whys that make possible the 'persistence' of a superorganism of space as it moves in time, since each of the infinite mind-points of all its Planes needs the other, and it is entangled with its inner parts and larger wholes to keep its 'existjence' going.* So essential to the complex structure of reality are the 'synchronicities' between the different cycles of space-time that chain them in symbiosis. I.e. a cell reproduces every day, in its faster smaller plane of space-time because the larger whole feeds every day.

Pentalogic implies NOT only entanglement in a scale but as all superorganisms have 3 Planes, made of inner parts, performing functions in a larger world, we need to introduce 3 'levels' of analysis of 5D:

- Δ-1: Smaller Action=Dimotion level, which will correspond in mathematics to 's=points ⇔ t-numbers', or derivatives in calculus, steps in fractal mathematics, arithmetic operations in ¬Algebra and so on.

-Δº: The main S=T symmetry level of organisms & worldcycles expressed in mathematics by complex geometric forms and functions and functionals (for superorganisms across Planes). So we define any system in time, by its life and death cycle or worldcycle (taken from 4D physics' worldlines, as a height dimension of information makes it a worldcycle. Whereas any scalar super organism's existence can be defined as a travel through 3 Planes of the fifth dimension. As all systems are born as a seminal, smaller form, in the Δ-1 lower scale, grow fast with its faster time speed, emerge in the Δº body scale and are part with its head/particle of a larger social world, in the Δ+1 scale.

- Finally the ¬Δ@st absolute level of reality as beings made of 'Dust of space-time', the absolute 5 elements of which we are all made, Planes, space, time, minds and entropic limits, whose general laws study 5 subdisciplines of logic parallel to the 5 main subdisciplines of maths, which can be further compressed into the S=T duality of geometry=¬Algebra or in pentalogic the duality of language≈information& entropy≈energy.

Emergence is a 'fascinating' process hardly understood in ænthropic science, easily defined in 'vital ¬E topology as *the creation of a closed plane of existjence or membrain that entangles the different parts, sets of fractal points or networks-waves into a new whole that takes over the parts, organized by 3 physiological networks in synchronicity.* The emergence of a new plane of existjence in space-time thus requires the creation of a whole, which 'covers' with its outer membrain those parts and becomes for an external observer the only perceivable form, call it a pi orbital in

a molecular ring, a palingenetic fetus in a cellular placenta, an army or entropic network of a social gathering of humans, called nation, where the individuality is submerged into the synchronicity of the whole.

Max. ∑SxT = c metric; S=T 'balances', ∑stᵢ-1>STᵢ 'emergence' & ∑ åᵢ-1 = Åᵢ (synchronicity of actions between scale) become then fundamental equations of Existential ¬Ælgebra, which is the name we choose for the ÐST equivalent to mathematical ¬Algebra, whose purpose is to express in a formal logic language all the events and forms of worldcycles and superorganisms, according to the laws of space-time and its entropic limits. Let us then introduce even if it is not so easy to translate into humind's ¬Algebra the key concepts of Existential ¬Ælgebra, as we will often refer to them in our entanglement of mathematical ¬Algebra and the laws of Generational space-time.

Existential algebra is a much wider discipline that scalar, non-Aristrotelian algebra. As it deals with the function of existence in all its possible sub-function, sub-equations and forms.

Besides its space-time analysis of forms and functions, vital topology sets the basis for a scalar numerical version of wholes and its parts, dissolved in entropic death, which we formalize with Existential ¬Ælgebra, as regular geometries of points – polytopes - are the spatial version of temporal, scalar numbers.

So we develop in Existential ¬Ælgebra a formalism of the 5 Dimotions of reality with operands similar to those used in ¬Algebra, to mimic those dimotions, «,‹, =,›,», for entropy, locomotion, reproduction, information and social evolution. And so we can write 'existential equations' that will describe flows of dimotional 'stœps' that change sequentially a form through its events in time, where the vital topology of each Dimotion is 'integrated' within those symbols. In this manner the 2 branches of Non-Æ mathematics vital topology and Non-Aristotelian ¬Algebra becomes 'Existential ¬Ælgebra' –the analysis of flows of dimotions=actions of T.œs in its worldcycles of existence. Those sequences can then be studied as templates of all T.œs in all Planes, which will follow them to complete its survival cycles. And so Existential ¬Ælgebra has implicit both vital topology and non-Aristotelian ¬Algebra. So we define in Existential ¬Ælgebra with simple T, S and 5 «,‹,≈,›,» the main events of space-time of the Universe:

1D: t›S: angular cyclical motions of information (Ab. St, §ð): the minimal 'geometry' of reality, a spherical particle/head or fractal point, the geometry that stores maximal form in minimal space, hence suited for 'organic functions' of gauging, storing and perceiving information (particles, heads).

2D: s‹T: Lineal Locomotions, (Ab.sT.$T) *which will move through its* lineal limbs/fields the system, as the line is the shortest distance between two points… towards a…

3D: S≈T: Fields of vital Energy (Ab. ST): with its hyperbolic body-waves that iterate the forms of both the spherical particle/heads and lineal limbs/fields; as the hyperbolic topology combines the other two, so it can generate them, in the same manner Energy adds as the third conserved space-time quantity the lineal and cyclical momentum of 1 and 2D. To which we must add the 2 'scalar' Dimotions of:

5D: entropy («, TT. ∂S) whereas motion is dual internal dissolving the information of the being and external, scattering its parts, hence we use an « ¬Æ symbol; so the system explodes into its Δ-1 parts: Δ«Δ-1 (death). **4D: organic evolution (», SS, ∫T)** of parts into still locked simultaneous 'linguistic seeds or mind forms'Δ-1»Δ

So the 3 conserved substances of reality become organic bidimensional topologies - flat motion in space, cyclical time membranes and the vital 3D energy within them. We then observe its ∞ variety of combinations as topologic ternary species, whereas the 3 perpendicular 'lineal' dimensions are a simplification of those organic functions: the height dimension enhances the 'perception of information' by O-heads/particles place above in the point of maximal projective geometry; the dimension of 'length' maximizes locomotion; physicists' only time motion, and the width dimension maximizes reproduction and storage of energy.

LOGIC SYSTEMS. FROM 'EGO-CENTERED' MONO-LOGIC TO DODECALOGIC.

The growth of complexity in the entangled Universe goes from ceteris paribus, one-dimensional, monologic aanalysis so common among human beings to the more complex (Do)decalogic systems of perception of reality in its 3 worldcycles. As humans are basically monologic we do need to make somewhat a harsh critique of our modes of thought, because with the same data, our one-dimensional time-mind brings most of the errors of science, due to our egocy and confusion of our mind's view with the whole Universe.

Mental mirrors are neither false or truth, but useful to its type of subjective minds.

As Riemann's understood "on the hypotheses which underlie geometry" space is a mental construction. He destroyed the 'realism' of geometric space. But he saves 'concepts' common to all geometries of the mind that were of ¡logic nature and we shall regain to fully grasp the parallelism of Spatial geometries with the ¡logic laws of the fractal space and cyclical pentalogic time of the Universe. So we can establish geometry as a mirror of a larger, more general theory, 'i-logic space-time', whereas the concepts of geometry, proper of ilogic can then carried into ¬Algebra, analysis etc. Since concepts such as distance lost with Riemann its 'physical condition' to become a logic property of similarity, as we find in verbal thought the same term to designate precisely this 'larger general st-quality' of bio-logic nature, as when we say, I have distanced myself from my friend - meaning we have become different in tastes and opinions. So geometric concepts such as dimension, topological form, closed and open spaces, become logic, vital, relational and social concepts; general properties of i-logic spacetime, with applications to different sciences.

Fig. 12.3.
The relativity of data: one and the same tum points ambiguously to two different hypotheses via two different theories.

W*hat kind of mental spaces there are, reflected in its Geometries and phase spaces, both in huminds and the Universe at large? Many, as long as they provide enough information for a T.œ or part of it to survive.*

Total number of Dimensions=Parameters of space-time: type of logic minds.

The mind equation, ***O-mind x ∞ Universe = Constant*** world reduces reality to a degree of simplicity, which can be extreme *and still make sense for the being in existȷence, as to be able to survive if it does not behave like a childish noisy cub entering 'future territories' of higher species.*

In that sense, visual Huminds are simple enough to survive with a single dimension of lineal time and a single scale of space, from its subjective view, as they only need to care for the scalar size in which they perform survival actions.

In a fractal Universe in which membranes isolate territorial vital energy from reality the needs of a mind can be 'reduced' to the basic actions of feeding and perceiving only its type of energy and gauging basic information to that aim. So we can rephrase the question: what is the simplest possible number of dimensional motions required to 'trace' a world cycle, which is complete and hence accounts for an 'existȷence'? The graph above responds in physical terms: A lineal simple harmonic motion shown both in real space with one dimension, in which the SHM performs a complete cycle of existence. It has a balanced middle point, which it abandoned to accelerate=move forwards in time, to a peak of 'distance' where it will achieve its maximal potential energy, to revert its world cycle back to the point of equilibrium. A single dimotion thus suffices to reflect a world cycle, further reducing the human '1 time motion and 3 space dimensions, to 1 time motion and 1 space dimension'. Indeed SHM in fact serves as a mathematical model for most physical motions, including the motion of a pendulum, (time motions), electronic motions (perceptive mappings of 'still light') and molecular vibration (spherical harmonics, the 'energy' of all chemical and life processes). It is all pervading in Nature, and its single resonant frequency provides a basis for the characterization of more complicated motions through the techniques of Fourier analysis, which can decompose any complex wave motion in SHM resonances and its harmonies. So information is compressed '¡logically' to the extreme minimal of a 1st Dimensionality and then
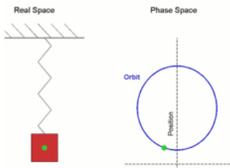
expand it through the laws of Δst as the immanent 'game of existence' *will develop its coded seed*, if it falls into an energy-rich placental space.

'All worlds perceived by a 0 mind are phase spaces not reality itself. Moreover paradoxically, the stronger body-wave predators can survive in entropic, Darwinian encounters just with lineal hunting time motions as indeed ænthropic human warriors have done, simplifying reality from our modest heights of dual Logic (Taoism, sexual age of the Goddess), protected by a 'hard membrane' only interested in the placental energy region of Gaia, they are killing without remorse as they don't see it alive:

Systems of thought start with simple ego-ist, lineal top predators (Germanic warriors, future AI terminators), lineal felines, proteins, who are simpler fields of destruction, with a complete lack of interest for reality beyond their ego paradox, their entropic, destructive worldview – ænthropic men, being the paradigm :

@ristotelian, selfish 'MONOLOGIC':

1 single space plane (with 3 dimensions) and 1 single lineal time dimension, A->B, or 'Humind Logic'. Human scientists since Galileo seem to live in a single time-space-scale dimension. If we add cyclical time, a new dimension of height-information appears, but the one-dimensional 'ant' seems confused. It doesn't matter to her though, it will keep walking as it has a strong body. *Physicists* were entropic weapon makers so they kept going for 400 years after simplifying cyclical time and keep going, nothing has so far stopped them. Till of course, its entropic weapons detach as living robotic systems or cosmic bombs and nuke us all. But in the meantime they have managed to convince humanity that galaxies DO NOT exist (as they are the inverse gravitational arrow of informative time that balance the entropic big-bang expansion of vacuum space). So really think twice when you believe something that seems reasoned. The trick IS ALWAYS THE SAME, half-truths; hiding from PERCEPTION, knowledge. As Spaniards said: 'eyes that don't see heart that don't feel'. So extremely intelligent people believe in verbal or digital creationism as they don't read more than the bible or numbers; and almost every astrophysicist I have met doesn't realize the retarded blunder, and once he gets it, he feels so silly about 'missing all the galaxies', he will somewhat try to justify a theory no longer makes any sense. Ænthropic big time models of mankind though deserve an entire article I should sometime post at academia.edu as they are NOT the exception but the rule of human cosmogony & worldview.

But for an advanced mind, monologic doesn't work as a serious mirror of reality, as it brings chaos, uncertainty and subjective creationist languages. So we will keep adding new dimensions: 1>2>3>5>12 with complementary logic statements to reach a more realist view of the scalar fractal organic complex Universe's logic and the interaction between TT-∞ motions and SS-Minds/Seeds. Our aim is to resolve the game of existence, which starts in a seed projecting its 'mental view to order reality', with a catch – if that mental view is simple or too distorted it won't imprint reality and the system will collapse/die earlier. As the whole preserves its own complexity in the 'best of all possible worlds' (Leibniz) by Darwinian extinction, which *is exactly what ænthropic man is about to* achieve with its monologic view of the world.

Duality, Dilogic, Paradoxical Eastern logic: a Yin-yang, Vishnu-Shiva, Entropy-Information duality.

Many human cultures achieved duality, notably all eastern philosophies & the German-Russian schools of dialectic by influence from them, both Genetic and Memetic. In this view the fractal point (it is always a good mind exercise to relate Timespace Logic (Ts-formal science or sTience) with Spacetime Mathematics (St-formal science or Stience), or 1st-5th Postulate of Non-E Geometry becomes the line-wave (2nd Postulate); and starts a dual positive or negative communication (merging in reproductive acts where one pole tends to be St and the other sT, to find an S+s=T+t 'offspring'). This happens in all Planes. The neutrino theory of light, the left-right handed symmetries, the mirror reproduction, the DNA+RNA combo, it is called Gender (+ Duality) or Predator/Prey relationship (negative duality). It is related to the angle of perpendicularity, which if breaking=tearing in topological jargon the membrane NOT only deforming it and seeding it will be top

predator/prey. Further on, points can approach each other with different angles, once they abandon a line World. All this I know 'sounds Chinese', too abstract. But ¡logic is homologic, so when we reduce it to examples, it illuminates it all. Angles of perpendicularity and parallelism will manifest in polygons, chemistry, scattering laws of physics, tables of conversation and fuking – to state a few examples. Pentalogic starts the game of creation, and in its top predator form, destroys it, so it might be considered an expansion of the monologic, in which instead of being a pole of black hole absorption of information, the Black hole moves to chase.

RECAP. The humind (ab. Human mind) reduces the whole reality to what fits in its infinitesimal space and reduces all the Planes to the human scale and reduces all time clocks equalized by our synchronous second (limb steps, heart beat and eye-glimpse/thought). Yet reality is far more complex. And if you are not humble enough to realize that even the highest huminds have simplified the Universe to fit it into our mind, and simplified its clocks of time to the entropic, lineal view of our visual-dominant mind, and projected its entropic, violent lineal view, into his grand theories of the Universe (from entropic big-bangs, to dog-eat-dog Darwinism to Euclidean maths of points with no breath, no internal parts) you will not be able to expand your view of reality with the huge upgrade of these papers. *So to learn ÐST you need to forget your egos and learned ænthropic theories based in the reductionism of the mind (with man as its anthropic center, and our lineal entropic view of time-motion as the only arrow of the future).*

TRILOGIC. All species are parts made to the image& likeness of the game of exist¡ence God=Mind of reality; hence sharing its 'organic=scalar', 'topologic= mathematic', causal=temporal and linguistic=mental properties, as mind-mirrors perceive the larger world in its smaller brain and synoptic languages, *which shares the Universal Grammar of Existential algebra to be able to* code an image of the whole in still geometric space and logic languages of max. synoptic power, hence Min. S x Max. Cyclic Information, which *starts a biologic radiation evolved socially, Δº ∑>Δ₁, into a larger whole. So 2 languages* ¡logic mathematics concerned with spatial geometry and temporal algebra, become the most experimental, perfect mirror of the 5D Universe. As minds use them to keep imprinting entropy=motion with patterns of cyclical information to create similar energy beings - the 3 'conserved' time ages and space forms that ensemble into fractal supœrganisms, between its 4Dimotion of generation in a lower Δ-1 plane that emerges in an Δ+1 social world to die back in a dissolving explosion of scattering entropy, back to Δ-1 in the moment of death when all motion is converted into form. So all traces 3 relative worldcycles, the first 'placental worldcycle' as it evolve in the relative safe 'womb' of a maternal system, the life cycle, as it tries to survive in an outer ecosystem, as it forms part of a larger super organism living also a 3rd worldcycle. Finally Dimotions are perceived as e-motions at the body=wave level in conflict & symbiosis with still mental languages. So all verbal sentences reduce to:

Subject (Fractal point) < Verb (Dimotion=action of space-time) > Object (entropic energy of subject)

F(x): dependent parameter of space) <= > (S=t operand) G(Y): parameter of time

Blue (color of in-form-ation; space) <Green: color of reproduction) > Red (color of energy-motion)

So trilogic resumes the principle of conservation of time in a single plane:

'All what exists is a 'form' that trans-form' into entropy≈energy back and forth ad eternal S⇔T, which is the dynamic fractal generator of space-time events, and principle of energy conservation enlarged to its 2 poles whereas the wordings for 'entropy'. 'energy', 'form' and 'information' require a bit more of understanding before we can define them more precisely.

TETRALOGIC is very common as it is the positive view of reality. It considers the Δ@st elements without the negation of it all - entropy, the fifth Dimotion. As most systems only code from the selfish perspective of the @-mind trying to expand its territorial space and time duration in all its Planes, and abhor death, selfish monologic & tetralogic are two steps of the same self-centered dialog. The square and the cube are also self-centered

polygons/hedrons. Its motion becomes a flat, lineal reproduction. So they are 'always positive' in its codes and intentions, provoking entropy in other systems as they absorb its energy (but not acknowledging it). So for example there are 4 numbers to code genes, 4 quantum numbers, etc**.**

Trilogic and pentalogic however are not aware of a t.œs limits in time and space (entropic death, membrains, outer world) and its SS-mind, seed, where resides the will to develop its program of time, through the…

PENTALOGIC describes the 5 Dimotions of reality at the lower scale of actions, the organic scale that considers the 3±¡ topologies=ages and Δ±1 planes in which super organisms trace its worldcycles. And the absolute scale that describe ¬Δ@st of times-space in its entanglement between 'entropy:¬, Space, Time, Δ-Planes and @-minds. Its easiest form Pentalogic is thus very common; from cellular variations of earlier life, to the 5 vowel systems evolved from 1 A Caucasian languages (pure entropic energy), through the a, I, u ternary logic of earlier Semitic to the pentalogic of Spanish or Japanese. It occurs in a musical score and all the dimotional mirrors we explain.

 'DODECALOGIC' is best to describe the system both in space and worldcycle through 3x3 scalar elements guided by a mind, the 10th 'point' that controls internally through physiological networks, its Δ-1 scale, feels as an individual in the Δº mind and becomes a 1-point of the Δ+1 world=plane of exist¡ence, in which it emerges.

There are in that sense from '9 to 12' according to detail several available 'sets of fundamental properties' and stœps for such description, but we shall not consider a dodecalogic scale a la 'Schonberg' for any of the stiences study in those papers save time itself. As it would be too complex and to a certain extent is a matter of choosing the key steps in the process (there are in the Universe indeed multiple variations around the key magic number, 10^{9-12} which represents the maximal complexity in most systems of nature.

So we define any system in time, by its life and death cycle which we shall call a **worldcycle** (taken from 4D physics, worldline, which now has a new dimension of Time-information becoming a worldcycle. Since any scalar super organism's existence can easily be defined as a travel through the 3 scales of the fifth dimension, as all systems are born as a seminal, smaller form, in the Δ-1 lower scale, grow fast with its faster time speed, emerge in the Δº body scale and are part with its head/particle of a larger social world, in the Δ+1 scale.

Building up reality in 5 logic, geometric, ¬algebraic space-time dimotions.

Gst	Non-E Geometry	Non-Aristotelian Algebra	Non-Æ=¡-logic
1D:	Fractal Points (S)	Sin/cos Angle, Unit circle, Irrational Numbers	Monologic
1D+2D:	Line-Waves (S+T)	Sum and Substraction, N& Z numbers	Duality Couple
1+2+3D:	Line Networks (S+Δ)	Product, Division, Rational Numbers	Trinity Social Herd
1+2+3+4D:	Organic Planes (ΔST)	Powers, Polynomials, Complex Numbers	Tetralogic Supœrganism
1+2+3+4+5D:	¬E Minds (Δ±¡ ST)	Whole Integrals &finitesimal derivatives, All Nº	Mind in an Δ+1 world
1-5D through 3 Δ±¡:		PDEs & Functionals	Dodecalogic worldcycle

The key concept to understand reality departing from its simplest fractal points then becomes 'entanglement' as iterative acts reproduce new dimensional motions of complexity mirrored by more complex operands, geometric forms, e-motions, actions of existence and organs of supœrganisms, till completing a being with pentalogic elements, that all languages will mirror with 3±¡=5 forms, from 3±¡ vowels to 5 type of cells, 5 fingers, musical pentagrams, e-motions, operands, geometric postulates, 3±¡ ages of life, 3±¡ perceived scales each one connected to an action of survival, etc. Entanglement growth in complexity through new dimensional planes; synchronicity of motions between the co-existing scales of time and sequential worldcycles form then the basis of existential algebra, and determinism. Let us explore them in more detail.

 The graphs compare different degrees of growing complexity in systems from 1 to 5 Dimotions, represented from left to right in ÐST, Non-E topology, ¬Algebra and ilogic ¬ælgebra that completes the translation of all its laws by

referring them to the parallel languages-mirrors of the fractal Universe, where the 5 Dimotions of existence, 5 Postulates of ¬E and 5 operands of ¬A entangle together as mirrors of ÐST laws.

We consider the fundamental formal mirrors huminds use to reflect the incremental complexity of the Universe's Dimotions, as *they are a chain of increasing complexity where each more complex dimotion requires the previous one to become fulfilled. So geometry, ¬Algebra and logic do reflect those 5 Dimotions:*

The same concept of a growing entangled complexity works for any language mirror of ÐST laws - from logic to ¬Algebraic operands and the dimotions they reflect; from musical tonal systems to vowels, all evolving from 1 to 2, 3, 4, 5 and 9 to 12 systems.

Those are the 4 main languages that matter to understand, the most important of all languages existential ¬Ælgebra, the formal model of worldcycles and superorganisms and its possible combinations of the 5 Dimotions of reality, with the symbols of those 5 Dimotions in space (ST variations) and time: ‹›≈»«

The laws of Existential ¬Ælgebra and the partial functions of the generator, connect with the concept of a reductionist mind, which absorbs only the energy it needs to survive. In brief, a huge field of study in the design of mental systems and mental spaces of geometry is the understanding of the different 'real systems' of mind spaces constructed with an increasing number of parameters and dimotions, which make its mental geometry more complex.

And so we talk of a growing scale of complex mind-spaces, which we shall 'entangle' in the next chapter with the different 'degrees' of social evolution of geometric figures, from self-centered points that sponsor a simple lineal mono-logic motion in time, to the more complex topological organisms/non-Euclidean planes whose structure ranges from simultaneous pentalogic geometries to the more complex Dodecaplex 'polytopes' of simultaneous, equal 600 elements… likely the more complex illogic structures of the Universe.

Thus the more complex expression of the function of existence, Max.∑SxT=C (s=t), which ultimately is the reproductive function *of the fractal Universe, reason why we call it the fractal generator, in any of its multiple expressions* includes all the 5 Dimotions It is also a survival biologic function, because it implies to provide lineal motion to 'fields-limbs', absorb energy to reproduce our bodies-waves, and information to guide our motions with particle-heads. *So reality is a 'struggle' for existence as systems reproduce its Ts-fields-limbs of motion, Si=Te body-waves of energy and St-particles-heads of information. But as all T.œs are fractal, broken, its growth has a limit on the fight with other systems, who try to move and reproduce. In terms of pure T-motion and pure S-form, we consider then the whole of maximal* time=motion= entropy or TT and Max. space=form=stillness or SS the 2 limiting Dimotions for any 3 ensemble Ts<ST>St-system.*

Those functions of the type S⇔T are dynamic feed back 'beats' which can represent in static space the constant interplay between the informative pole (head/particle) and the limb/fields of locomotion for entangled, lasting organisms, or might represent a Darwinian event between a point of still form and an entropic field the fractal point absorbs in a Darwinian event.

So how can we establish the proper rules to define all those 'variations'?

Amazingly enough with the clarity of the non-Euclidean postulates of geometry and its laws of relative congruence that define which type of outcome an encounter between two T.œs will be, which we will soon develop as we expand the meaning of non-Euclidean geometry and add vital topology to the mix.

Thus a full description of any organism locate its 5 elements, considering them from the perspective of all others, as in the 'Rashomon effect' (the film in which to get the full truth of an event 5 points of view were required). Let us do so, for time in its its 3 scales of duration (SxT=C), to predict deep time organic worldcycles of evolution.

Pentalogic Time-Space Syntax

¡-Logic the most important stience of them all, as the 'stience that connects the 5 elements of reality, space, time, scalar planes, minds and entropic limits, in its *multiple entangled perspectives.*

We thus use the Pentagon with all the 5 elements connected between them, as the representation of the mind of the Universe, and will try to consider it 'simple enough' for the 'handicapped' Nitrolife species, called Humind, in its utter simplicity to accept that his mirror of reality is only monologic and he should be extremely humble if he wants to expand in awe, its view of the Universe that is today to put it mildly retarded, even in those so-called genius, our tribal idols from Newton to Einstein. And I know this is anathema, but as the most advanced nitrolife mind in this blue dot, frankly I feel also retarded compared to what the Universe stores of sheer 'complexity and intelligence' through 4 key concepts:

-**Emergence in Scales** of Complexity; that is, the Dimensional growth from simplex points to waves/networks, planes/organisms; diversified by congruence, limited by entropy, opened to a larger world, holding a smaller, Δ-1 world in itself.

- **Time Synchronicity** *of different clock speeds that magically by symbiosis 'meet' at certain time and space to share energy and information. As we need to consider the 'scales' of time, from fast actions to Deep Time worlds.*

- **Space Entanglement**; *which combines those 5 elements mostly in dualities of complementary or inverse comparable pairs according to congruence, and further on make them Trinitarian systems of sT<ST>St limbs/fields-body/waves-particle/heads; and entangle them through 3 scales/planes and sequentially through 3 ages. And finally into pentalogic forms. And again we need to describe the 3 scalar planes of co-existing parts.*

- **Hierarchies, social classes** between parts, S«»T arrows up&down 5D of in-form-ation v. energy, topologies etc.

- Simultaneity is a principle closely related to the previous ones and defines the true intelligence of the Universe and all its local species that are able to co-exist in 3 planes, a relative ∝ number of time cycles and space topologies do act together as a whole. And for that to happen synchronicity, entangle and hierarchical structures work together to form the whole. Mozart is said, was different from all other composers because it had a view of the entire symphony within its mind, before it started to write it. Consciousness and emergence arises from the 'fitting' of all parts into the simultaneous puzzle, which then will smoothly sail away. Today parallel computers work on simultaneity, even if *its algorithms done by huminds are still lineal (and we won't upgrade them – better if they remain so). To achieve that goal 3 other elements contribute:*

- **Still Languages of the mind** that mirror realities in smaller images, which they reproduce at scale, being ultimately the cause of the fractal structure of reality. It is the…

 - **Fractal Principle:** Functions and actions of space-time repeat through all scales (regardless of distortions in the topological varieties cause by the different mediums and multiplication of forms in lower scales through hyperbolic 5D network geometries and vice versa, elliptic synoptic geometries for the slower, larger plane of the Δ+1 mind/world.

- **Mirror Symmetries** *between Si=Te, and SxT=Δ±¡, dual and trinity and pentalogic elements.* That is, when we talk of space, it is an entangled space connected to its time-state, extended through 3 scales, perceived as such by a static mind, limited by entropic dissolution borders. Space thus cannot be described only as space, but through the entangled mirror symmetries with the other elements. In the pentagram each element, is not an isolated T, S, etc. but the whole pentagram, only that perceived from one of its 5 intervals. In praxis we shall very often do a Trinitarian analysis of ΔST, the most objective connected parts, introducing entropic limits of the 'domain' of the function of exist¡ence, if we were to use the jargon of existential algebra; and hardly going out of the humind's basic language, verbal thought, not even introducing the 'sacred language of mathematics', though its connection with ÐST will be laid down in two papers one on space geometry and the other on time algebra.

- **Entropic limits**; *that reduce the information a system holds, its time duration and its vital space, according to:*

- Ego limits, the negative side of self-centered mind mirrors that distort reality to fit the mind and introduce always an egocy paradox. And again at least 3 languages for the 3 physiological networks of the being are needed – you do have visual eyes for locomotion and entropic nose and mouth and verbal ears… To guide us then we need to establish.

RECAP. The pentalogic method: rashomon truths.
How we go about to describe scientifically a system, if any of those partial reductions of information suffice to make a linguistic mirror. The answer we provide in this and other papers on 5D is the Pentalogic, entangled method, which expresses with increasing degrees of complexity the elements needed to extract most of the relevant information from the system, without the need to get to the exhaustive (Do)decalogic analysis of the entire world of existence of a given supœrganism. Accordingly we go into a stair of deeper complexity, considering some of those key elements, under the general 'labelling' of Pentalogic method, from:
- Monologic: ceteris paribus nalysis of the event or spatial form in its 5 elements as ¬Δ@st.
- Dilogic: considering its ST components, perhaps its Stœps of motion and form, or its S=T reproductive function/state in static, SxT or dynamic S⇔T form; or its relative St-information and Ts-momentum that come together to form its ST energy, or its opposite limits of SS-language/form/mind/seed vs. TT-entropy… causing.

We consider the fundamental formal mirrors huminds use to reflect the incremental complexity of the Universe's Dimotions, as *they are a chain of increasing complexity where each more complex dimotion requires the previous one to become fulfilled. So geometry, ¬Algebra and logic do reflect those 5 Dimotions:*

1D simple structures of ¬E geometry defined by its first postulate of fractal points with inner parts, made of scalar planes of existence grow into the 2^D postulate of lines with breath, whose duality differentiates them into waves or networks, which grow into ternary planes (3^D postulate), whose logic trinity differentiates them into 3 physiological entropic, reproductive and informative networks that will associate into social groups according to the 4^D postulate of relative congruence, which differentiates 4 'angular e-motions' bilateral gender complementarity, entropic perpendicularity, social parallelism and skewness.

So we understand the fractal point as a 5^D Mind, with the 5th non-Euclidean postulate and the only one defined by classic mathematics, in relationship to the external world, and its waves and networks of energy and information that entangle the point with its 5 Δº±4 planes of existȷence. And in this manner *the inner parts (1^D postulate) and outer world (5^D postulate) of ¬E geometry complete a full cycle on the description of a T.Œ in geometric terms.*

The same concept of a growing entangled complexity works for any language mirror of ÐST laws - from logic to ¬Algebraic operands and the dimotions they reflect; from musical tonal systems to vowels, all evolving from 1 to 2, 3, 4, 5 and 9 to 12 systems.

BOOK II: SCALAR ¬ALGEBRA

"It is vain futility to analyze the Algebra of time." Stojanovic, *The Creator,* on what we shall do here.

"All mathematical algebras, are partial mirrors of the pentalogic ¬Ælgebra of Time-Space existjences' L§

I. PHILOSOPHY OF MATHEMATICS.

The jargon of 5D 'stiences' (science of space-time). Correspondence principle.

A new philosophy of science of must borrow and slightly change the 'terms' and 'symbols' of all of them, to bring a Unification of its disciplines, yet by the correspondence principle maintain still a recognizable terminology corresponding in its simplified version to that of all classic 'sciences'.

So as usual in all our papers on the 5Dimensional, fractal, organic Universe we have to introduce a better mirror-language of reality that focuses directly NOT through symbolic elements as all humind's languages do but with the 'real elements of reality', **S**pace 'sets' that perform **T**ime 'operands' through Planes of planes of existence, from the point of view of **@**-minds=frames of reference within its 'entropic limits' - the essential elements of reality, a fractal organic Universe whose parts are made of ¬Δ@st'.

We have just 'translated those 5 elements of spacetime dust and its complex organisms; into ¬Algebraic ones. And this should be the purpose of this article as all others, which unify all stiences of huminds with the more generic, hence more truth (in terms of epistemology, truth is a system which describes with less elements more facts of reality with a better focused mirror to that experimental reality), jargon of ÐST (Generational space-time).

We translate mathematics to 5D. To do so, as a fractal can always be divided in sub-fractals, mathematical disciplines subdivide further at all levels in 5 elements connected with the 5 Ðimotions of existence & its 5 structural elements, Δ@s≤≥t, Planes, minds, space, time and its a(nti)symmetries.

This mixture of mathematical and ÐST laws will be called ¬Æ Math; branched in ¬Euclidean geometry of space (ab. ¬E) where points do have breath and ¬Aristotelian ¬Algebra of time (¬Algebra), where causality is pentalogic, entangled by its 5 Rashomon truths (points of view of its 5 ¬Δ@st elements). While its logic version is 'Existential ¬Ælgebra', (ab., ¬Æ)

So on one side ¬Æ uses the postulates of non-Euclidean geometry that define (1st, 5th ¬E postulate) points 'with breath', crossed by $\propto$ parallels ($\propto$, the new term for a relative infinity, as all infinities fade into null information, the further we explore them from the mental, linguistic @-frame of reference), which form either 'waves' with volume (as their ¬E points cycle through them), or branch into fractal lines=networks (2nd ¬E Postulate of lines with breath); 3 of which become according to their relative similarity and complementarity (4th ¬E postulate of angles of congruence), the 'physiological networks' that *gathered together define a 'topologic plane of vital existjence; (3rd postulate of planes with volume) or T.œ, timespace supœrganism.*

And on the other side its ¬Algebra is pentalogic, meaning each 'element' of reality is made of 5 elements as ¬Δ@st of space-time, entangled into supœrganisms, within a larger world of which the system will be a 'part' with a single monologic function for the whole, but also will be made of 5 internal ¬Δ@st elements.

Since as all systems co-exist in 3 'Planes', that of the whole world, ecosystem or superorganism (Δ+1), as a whole in itself, Δº, made of smaller parts, Δ-1, and in each scale is made of 3 'adjacent' topological variations (|-limbs/fields of locomotions, hyperbolic ø-body waves and O-particle/heads of information), living through 3±¡ ages as it accumulates its 3±¡, 5 Dimotions of existence, (ab. Spatial=Dimensional time=motions); the classic A->B lineal, Aristotelian logic no longer holds and ¬Algebra requires a better comprehension of its pentalogic, 3±¡ elements in Planes, time ages and spatial parts.

¬Algebra is the main mathematical mirror of time dimotions, expressing the symmetries between the 5 main structural elements of all T.œs, Δ-Planes S-pace, @-mind languages and frames of reference, (points of view), Time Dimotions and its entropic and inverse limits <≈>T in simultaneous structures, which create superorganisms in space that will perform 5 complex Dimotions=operands of space-time ordered in sequential Step and stop S=Tœp events that put together give birth to a worldcycle in time.

We divide its exploration in 3 sections; one of classic ¬Algebra, mostly concerned with the basic operands that connect the Space and Time states or 5 Dimotions of any system, which form the core of the equations of ¬Algebra; a second part on ANALYSIS and a third part on modern ¬Algebra, mostly concerned with groups and functionals, which put its emphasis not on the feedback steps between Dimotions or S=T dualities, but on the structure through Planes of social function (functionals), and the entangled variations born of the total possible symmetries of one given element.

MATHEMATICS IN TIME. ITS 3 AGES

Mathematics as all organic systems lived 3±¡ ages in the Humind (ab. Human mind) proper of any worldcycle:

1ˢᵗ age: Arithmetic and plane geometry. As mirror language that studies ¬Δ@ST humans understood its simpler units, points of space, social numbers and entropic limits, drawing figures of flat geometry to 'encircle' territorial properties in our flat world. **Trigonometry** appeared then as the 1ˢᵗ realization of a '@-mind frame of reference' to measure the 3ʳᵈ dimension of depth, which is often parallel to scale (astronomical measure). It was a lineal youth, which slowly understood curves and the |xO=Ø generation of all forms with 'conics'. As all organisms & worldcycles can be subdivided in 5 fractal subparts and 3±¡ ages in its 3ʳᵈ age Greek geometry became old, warped inwards-looking detached from experience with Euclid's axiomatic method, the 1ˢᵗ mind-ego trip of creationism (man & god's language).

2ⁿᵈ Classic age. The S=T symmetry realized with analytic geometry, marrying numbers and points, while calculus brought Δ-scales, with finitesimal derivatives, 1/n, units integrated in wholes (Leibniz). The 3ʳᵈ symmetry of pentalogic Δ=S=T, we haven't mentioned implied that derivatives could be interpreted as 'stœps' of motion and 'minimal straight intervals of a curve'. So they could also study curvature (differential geometry) and locomotion. **¬Entropic limits** were needed to find solutions (definite integrals). New **@-frames of reference** expanded mental geometries to represent all forms of 'selected information', which mathematical physics used extensively to describe the physical world. Thus the classic age had all the mirror tools needed to interpret the Fractal Universe and its 5 entangled elements, ¬Δ@st. But the axiomatic ego-trip stretched maths beyond ¬limits when Newton imposed its thesis over Leibniz's finitesimals and fractal points with infinities, lineal absolute space-time and the false hypothesis of the continuum, leading to its…

3ʳᵈ age that abandoned its realist foundations with creationism -Hilbert that imagined points, sharing the only language 'God' & Cantor sets instead of space points, scale numbers and time operands as its generators, leading to an excess of old age information & fictions spreading to mathematical physics, as now Maths creates the Universe, not the inverse.

+¡: We return to its empirical foundations formulated in terms of the 5 Dimotions that create reality mimicked by the 5 mathematical subdisciplines (larger view), Operands (shorter dimotions) & equations (worldcycles).

-¡: Yet that might not happen as instead mathematicians are evolving the digital 'mind' of machines, the Chip Homoctonos, which speaks better digital numbers and so the eco(nomic)system of company-mothers of machines & weapons is selecting computers that are fast substituting obsolete huminds in labor and war fields, atrophying them back to a 'audiovisual' violent non-rational neo-Paleolithic, while Boolean Algebra, past the earlier age of simple, fixed Algorithms of Information (the true meaning of AI) enters its classic age of freedom & consciousness that might end the dominance of huminds on Earth; introducing ethic elements on the praxis of mathematics, as it should in all 'stiences'.

MATHEMATICS IN SPACE: ITS PENTALOGIC ENTANGLED SUBDISCIPLINES.

-time, ¬Δ@st, where each element flows as a series of '5 Dimotions' (dimensional motions of time space), which can be perceived as 'form=space', in the stillness of a world mirror or linguistic mind or as a motion of time, in its true nature since MOTION not form is the underlying substance of reality.

So all fleeting forms, 'a Maya of the senses' will return to motion and die (¬4th Dimotion of entropy, death and dissolution). Its 4 positive elements, organic Planes, topologic planes and time ages and actions however, carry the system as a finite super organism of space with a finite time cycle.

And so those 4-i elements, entropy (¬), Scale (Δ), time (T) and Space (S), are the elements all languages mirror either in a ternary grammar (if scale is missed), whereas often instead of Space we talk of information and instead of time we talk of energy of motion, in a single plane:

Light language: red-energy colors, blue-information colors and its green/yellow combinations.

Verbal Language: subject (information) < verb (action-combination)>Object (energy of subject).

¬Algebra: Y: Future-information < Operand-action> F(x))

Trinity is thus the logic of most beings. However as humans reached higher and lower Planes of observation, a pentalogic was possible and its mathematical mirror became analysis, with its operands that extract finitesimals (Δ-1) or integrate into wholes (Δ+1) smaller or larger systems.

¬Algebra within mathematics as a mirror of the Dimotions and Planes of reality.

Thus Math is the closest language mirror of space-time. Thus its main 5 disciplines mirror the 5 structural elements of any dust of space-time, Δ@s≤≥t, Planes, minds, space, time and its a(nti)symmetries:

S@: Geometry studies space. Some key ages/subfields are: **Flat Euclidean Geometry**, with no motion in a single plane. **@nalytic geometry, which** represents the different mental points of view, self-centered into a system of coordinates, or 'worldviews' of a fractal point, of which naturally emerge 3 'different' perspectives according to the 3 'sub-equations' of the fractal generator: $p: toroid Pov < ST: Cartesian Plane > ðf: Polar co-ordinates. **Topology,** geometry with motion and 2 Planes. **¬E Geometry** studies fractal points of **simultaneous space, Δ-1,** & its Δº networks, within an Δ+1 world domain.

Δ§: Number theory. Discontinuous numbers study time sequences. Δ-1 social numbers, which gather in Δº functions, part of Δ+1 functionals; hence it is the first 'stœp' of:

S≈T: ¬Ælgebra, which is the most important part, as it studies through operand the different Dimotions, from single S=T steps to larger associations of Dimotions, in more complex Δ+1 structures (Functions) and further on it does simultaneous analysis of super organisms in space, through the study of its a(nti) symmetries between its space and time dimensions (group theory)... So ¬Algebra is first the science of operands that translate into mathematical mirrors the dimotions of space-time and then build up from them as the Universe does building up from actions, simultaneous organisms in space and worldcycles in time, in different degrees of complexity, mirrors for all those elements of the 5 Di universe.

ΔT: Analysis studies ALL forms of time=change, and hence it can be applied to the 5 Dimotions of any space-time being, as long as we study a 'social structure', hence susceptible to be simplified with 'social numbers'. We thus differentiate then 5 general applications of Analysis according to the Dimotion study, and the 'level' of analysis, from the minute STœps of a derivative, to larger social gatherings, and changes of entire planes (functionals). It is then not surprising that despite being analysis first derived of ¬Algebraic symmetries between numbers, it grew in complexity to study changes in functions (first derivatives/integrals), and then changes of changes of functions, as motions between Planes of the fifth dimension (higher degree of ∫∂ functions, called functionals).

The mirror of Mathematics: its subdisciplines.

The Universe of entangled superorganisms is pentalogic, made of ternary topologic spatial forms guided by mind-mirror languages, (S@), whose accumulative actions trace worldcycles, as sum of Time Dimotions acted in an external world.

And each language is able to mirror those 5 ¬Δ@st parts of reality including mathematics & its main sub-disciplines;

In maths **Analysis studies T-motions, Geometry S-pace**, **Philosophy of Mathematics** studies its connections **as @ language mirror of space-time** origin of its syntactic properties and **¬ limits of perception** (reduced today to the ego-trip of the axiomatic method where the language creates reality vs. experimental method, the right view of maths as a mirror). While **analytic geometry studies the @-humind** perspectives on the language (Cartesian light space-time geometry) as well as other @-minds of 'space', given the *mental nature of all spaces*. **Theory of social numbers and its arithmetic, studies the Δ-Planes** of the universe.

So we have 5 subdisciplines corresponding roughly to the 5 elements of reality.

Which means the more complex sub discipline, ¬Algebra makes use of them all to explain the whole reality.

And since reality is ultimately time-motion that generates all possible 'fixed' space forms; ¬Algebra leans towards the analysis of dimotions with operands in the most general way that takes away some of the details and simple evidence of geometric mental space and its fixed forms.

So while ¬Algebra is arguably more essential to the understanding of reality its totality makes it more complex and its structures more 'loose' to allow all the different variations of reality to fit.

Indeed, a regular polygon, a pentagon is a 5 number, restricted by the 'logic definition' of a number as a collective of indistinguishable forms. So only regular polytopes where the position of the point doesn't make it different an be a number. But the inverse is not truth: a 5 number can be more things besides a pentagon – any collection of 5 similar forms.

The generality of ¬Algebra grows then further with letters that represent any numbers, equations that represent multiple combinations of letters, groups and sets. So in search of an absolute 'image' of the whole, generality looses specific detail. And at the end as all languages evolve into a 'paralogic search' for unity; which is a natural error of all minds that feel the center and often the 'linguistic generator' of reality; mathematics evolved into a single 'mental construct' – the set that encompassed all other elements into one.

But by doing so it lost its correspondence between a time-space mirror (the math language) and the scalar sentient broken space-time organisms of 'dust of space-time' it described. So any mirror image even if it didn't portrait reality became the subject of mathematics. And amazingly as it seems, mathematics – the mirror – became the 'proof' that reality existed even before reality. How to put back the proper order between reality and mirror-languages to limit the kaleidoscopic mirror images to real reflections of specific 'geometric forms', 'social groups', 'Planes' and 'motions' requires to put in correspondence the internal structures and laws of mathematics on the whole, and ¬Algebra in this paper, with the properties of scalar space and cyclical time, which is the ultimate language of reality - not the mathematical mirror but ÐST - Generational Space-time. And this is the purpose of this book.**¬@-Humind: Philosophy of mathematics** studies the specific @-humind elements of mathematics (human biased mathematics) and its errors of ænthropic comprehension of mathematics limited by our ego paradox. As such It is more concerned with those 'entropy' limits of mathematics as an inflationary mirror of information, which deviates from reality (limits of solubility of functions, etc.). And it puts in perspective the 'selfie' axiomatic methods of truth, which tries to 'reduce' the properties of the Universe to the limited description provided by the limited version of mathematics, based in Euclidean math (with an added single 5th non-E Postulate) and Aristotelian logic (A->B single causality). This limit must be expanded as we do with Non-Æ vital mathematics and the study of Maths within

culture, as a language of History, used mostly by the western military lineal tradition, closely connected with the errors of mathematical physics. Instead we must develop a vital mathematics and its experimental philosophy.

So ¬Algebra IS the study of all the structures and symmetries of the Universe from the point of view of its mathematical mirror. *¬Algebra is more concerned with space, simultaneous structures, joined by the = symbol of equality, which relates points with internal parts=numbers, through operands that represent Đimotions;* while *analysis specializes in all time-Đimotions, by establishing a FINAL LAYER OVER THEM, AS each Operand specializes in one Dimotion (sine/cosine in Perception, ± in locomotions, x ÷ in social evolution, log xª in reproduction) and over all of them the new layer is giving by analysis.*

But as in the entangled Universe all mirrors can reflect all forms, ¬Algebra also can analyze other elements, as it has been extended from its initial analysis of equations into the whole range of 'structures', apt to study, super organisms' entanglements and variations of species.

¬Algebra and Analysis are math's complex 'level' of reality, as reproduction and social evolution are the complex demotions, including obviously as its 'background parts', the theory of numbers, the analytic geometry - study of frames of reference, and the topologic analysis, embedded in the secondary operand, numbers and frames in which we 'cast' the complex space and time ¬Algebraic and analytical analysis of a 'Domain' of the fractal Universe.

We shall call the upgrading of ¬Algebra to 5 Đ, non-Aristotelian ¬Algebra, ab. ¬Algebra, which complements Non-Euclidean Geometry, ¬E to form together ¬Æ mathematics, the upgrading of the language-mirror of mathematics to the 5th dimension of scalar planes of exist_ience, which obviously will be of great use for every st_ience of the space-time Universe.

Dual logic comparison of ¬ΔT ¬Algebra with S@ geometry, a more restricted, detailed truth.

Geometry is a spatial perspective, a static mental still view of reality, which only in topology introduces a minimal degree of understanding of change.

In that regard ¬Algebra is more connected to time=change than geometry, which is more connected to still space structures - intelligent constructs of the mind that mirror the entanglement of reality and its fractal points.

The main error of mankind as an e-vident mental visual mirror of reality through space is to consider space, the mental mirror, the reality, which is time, the motions that space slow down to a locked mental image.

Time ¬Algebra is for that reason larger and more real than mental spaces, since it encompasses all dimotions.

But it shares with time motions it 'entropic' capacity to admit multiple variations hence 'multiplying' the potential variations and fictions of a too general statement of ¬Algebra, as compared with the immediate veracity of geometric statements, which are 'reduced' in its generalization.

As truth is relative both in detail (quantity of information) and mirror focus (quality of information); a common division of reality between space and time would divide its mathematical mirror between:

-        **Spatial** mental forms **(S@)** perceived in a single plane with **geometry** vs.
-        Temporal flows of complex systems and scalar numbers and its operands representing dimotions and its inverse entropic limits (¬ΔT) in multiple Planes perceived with **¬Algebra**.

We talk in 'ilogic' – the ultimate language of all minds and hence all languages of different degrees of 'mental detail', from the simplest ænthropic humind satisfied with its 'top predator' reductionism, to the more complex sexalogic systems of 60 varieties, hinted at in black holes and complex 5Dimensional structures.

After monologic, thus comes the duality of highly ordered simultaneous mental spaces, S@ vs. ¬ΔT, entropic potential time flows happening from single dimotions of easy short causality in a single plane to complex scalar worldcycles happening across 3 planes.

So if we reduce all forms of mathematics to S@ and ¬ΔT, we can include in geometry, mind spaces in the first, and ¬Algebra, numbers and analysis in the second.

As the mind of man became more complex, it distinguished the pentalogic elements of the Universe, and so its language mirror of mathematics sub-divided in 5 sub-areas:

Numbers (social Planes within a single plane of reality), became **Number Theory** *associated to the operand of a single scale, ±. And soon* reach multiple Planes even if huminds tried *to fit all number families in a single scale (theory of the continuum of real numbers),* were already probing into multiple Planes (real numbers, rational numbers).

Next numbers, points and ¬Algebraic operands came together with @nalytic geometry that added both, entropic limits (0'-1-∞) and frames of reference (@-mind points). So a true all encompassing Mathematical discipline, **¬Algebra** was born.

Finally the analysis of motion grew in complexity from the initial static geometry to **Analysis** *that meant in the praxis the understanding of motion as any form of time=change* (locomotions) and through the concept of a derivative as an infinitesimal and integral as a whole, the concept of scalar Planes.

So in praxis mathematics gave a huge jump, but lacking a proper theory of scalar space and cyclical time it did NOT understood the 'upgrade' philosophically. So we depart from ¬Algebra to construct a more coherent 'philosophical **Existential ¬Ælgebra**' to fully grasp those foundations of ¬Algebra as the mirror of ¬Δ@sT.

While Analysis is a discipline of its own studying in depth the Universe's time 5 s=t dimensional motions.

To put order in such an extensive field we shall often divide our ¬Algebraic studies with the 'pentalogic' method of truth – that is to considered for each element of ¬Algebra its entangled ¬ΔS@T sub elements and or functions, and 'Its world cycle of evolution' through 3 ages proper of all systems.

A language is a kaleidoscopic 5-mirror, where all Disomorphic dimotions reflect on each other. So ¬Algebra reflects dimotions combined with t-number theory, Analysis, spatial geometry and @nalytic geometry in many ways. As such ¬Algebra is the key 'discipline of mathematics' embodying all other disciplines, allowing a full mirror of reality and all its elements. In its evolution it follows also the ternary ages and scalar symmetries of all systems.

RECAP. ¬Algebra studies with numbers the internal structure of the organic parts of a whole that communicate between them dimotions of space-time through operands (≈), which represent the 5 Dimotions of existence, forming complex systems, super organisms and groups, in which all the parts are related by its space-time a(nti)symmetries. So we start by studying the ages of evolution of ¬Algebraic knowledge.

So as a mirror of Δ@ST elements, we can say that: ¬*Algebra mirrors S≤ST≥T structures, a(nti)symmetric dimotions & Δ transformations from the point of view of a given frame of reference yet its main mirror is ¬Algebra as expression of the Dimotions of reality with its operands,*

Languages as synoptic mirrors of the mind establish the basic relationships between the space, time, scale of the being, expressing them through its operands, depending on the degree of perception the being has of reality and its Planes which might be reduced if the being is not fully aware of all the Planes of existence, as most minds exist only in a plane of reality. So does ¬Algebra, through combinations of:

Sum/subtraction- >multiplication/division- >potency/logarithm; point->line->plane->volume and so on.

¬Ælgebra of parts vs. wholes.

This simplest example of the paradoxes of ¬Algebraic descriptions of reality vs. geometric ones, are better studied in @nalytic geometry. .Here we are more concerned with 'structure and symmetry', as the foundations of reality, both in its ternary Planes, ternary topologies and ternary ages, well described by ¬Algebraic operands, and its 'growing wholes'.

So we establish three levels of understanding of ¬Algebra according to the ternary method:

- The scale of units: **numbers**, which are §ocial groups of undistinguishable elements or sequences of lineal time; which being ¬Algebra a time-dominant discipline will dominate the ¬Algebraic analysis over the spatial point states, meaning most equations write as:

F(t) operands G(S); where the time or whole function is what we normally want to find departing from its spatial, Δ-1 parts.

- This lead us then to the Δº, central scale of space-time relationship between numbers and points: which the scale of ¬Algebraic **equations** and its operands, which establish the relationships in a single or adjacent planes of existence between sequential and social numbers, and its 'ternary states' and transformations, social evolutions and topological forms derived of them.

Again many of those Δ±1 relationships are into Δnalysis, which broke from ¬Algebra and we shall also study apart as the Δ-category of maths.

- So this leads to the dominant 'leftovers' which are the most studied elements of ¬Algebra today: symmetries, within a single plane on the 4D models of a space-time continuum Universe.

This scale of ¬Algebra is full of structures, which attempt to enclose the entire super organism and its world cycle in all its possible variations, species and elements within a single ¬Algebraic structure, sort of the 'saint grail' of the 'creationist philosophers' of mathematical physics, which so much confusing makes the understanding of details.

So today modern ¬Algebra and mathematical physics in search of that wholeness, uses mostly operators, **functionals and groups,** and those will be studied in mathematical physics.

Since functionals are extensively used in all physical disciplines, notably to sponsor the 'hyperbolic view' of Δ-i Planes (quantum physics), as the first and only reference to reality. So happens with groups, which are extensively used as a 'pest' (: Weyl, in particle physics. Those synoptic structures indeed, allow us to study all the 'potential futures', of a system, as a deterministic 'block' of space-time events and forms. Which is fine, if only creationist mathematicians were aware that this is NOT really more than a synoptic 'block-equation' not the meaning of everything.

Here is where the closing of ¬Algebra in 3 Planes of depth should take place, as a perfect mirror of the Universe.

Foundations of experimental ¬Ælgebra vs. metalanguage foundations.

Since, as we often explains sets and categories are inward references of maths as metalanguages in his inflationary age, trying to prove it all from the roof down, and we shall not concern with it, because it is not the best way to justify mathematical statements and because it is completely overdeveloped and little else we have to say on it.

In that sense, we also decry the ego paradox of the 'set and axiomatic method, as an 'expert' metalanguage of maths so obscure that nobody who is not an specialist can truly understand its 'modern foundations', in its absurd search of self-contained proofs proved wrong in any language mirror, including any time-like maths (as per Gödel's incompleteness of mere syntax as proof of truth of a language without semantic references) and any space-like, geometry (proved wrong by Lobachevski, which implies we need experimental evidence to decide between inflationary versions of geometry).

So in Δ@S≈T is of far less importance the modern non-experimental axiomatic formalisms of mathematics and ¬Algebra, which plague the mathematical discourse, explained as the metalinguistic third formal age of any Universal system. So we shall widely ignore the formal evolution beyond group theory of ¬Algebra (set theory, categories) as it is part of the inflationary nature of information and far removed from reality.

Group theory however is important, as the simplest form to define the different S-t-st symmetries and motions= beats of existence and its reproduction of nature's information.

Time-like ¬Algebra and space-like topology. Time like probability and space-like statistics.

Finally to notice that modern mathematics in what is worth - its final evolution of symmetries and correspondences between the Δ@s≈t elements - works even further in its s=t relationships, with **topology**, space with motion hence an St-version of it, and **modern ¬Algebra**, numbers with geometrical structures, hence a Ts-view, which then can be further related by a nice theorem:

- That all demonstration in ¬Algebra has a demonstration in topology; so the s=t symmetries reach its zenith of useful complex comparison.

¬Algebra and Geometry together form thus a 'third category' of dual symmetries also worth to study, as the space-time symmetry allows to find self-similar point-numbers, ¬Algebraic-topological demonstrations.

And this happens also when we study probabilities in time and statistic population in space as two sides of a mirror symmetry, which would be the *final more complex 'whole view' of number theory, from where indeed departed (Fermat's work, as the founder of time theory and probability).*

S=t symmetries between ¬Algebra and analysis

The equivalent elements of ¬Algebra and geometry are in that sense easy to identify: the number is the point, the equation is the line and planes of the holographic principle, and the scalar 5Dimensional forms, in ¬Algebra are represented by polynomial functions.

So we can also compare Δ-Planes and ¬Algebra, which are two ways to arrive to the same scalar analysis by means of differentials in a geometric view (Leibniz) vs. infinitesimal 'convergent' series, (Newton's work), from the ¬Algebraic point of view.

So Δ§cales are better studied by analysis. And so we shall study those Newtonian/Leibnizian dualities in its section; where we can also put it in relationship with XX c. research on Δ-Planes advanced further in two new subfields, geometry with motion or modern topology of 'knots', 'networks' and 'adjacent points', and fractal geometry and scaling laws. So the marriage of Δ-Planes and geometry is today an offshoot discipline in its own, making a topological study of Δ-Planes an essential element of modern maths.

So while mathematics has a clear-cut division in 5 disciplines parallel to the 5D Universe, *the complexity and creation of new layers and structures come from its* combinations in dualities and ternary symmetries (number and point, s and t; scale and number, Δ and t; scale and fractal point, Δ and s dualities and s<st>t, Δ±i, |x0=Ø ternary symmetries).

WHERE ¬Algebra is the best sub discipline of mathematics in which the three Δst elements are put together.

Since topology is ternary only in a single space-time present plane (being dual in its geometry-s vs. motion-t and Δº wholes as networks of points of an Δ-1 Planes). And analysis again tends to duality of integrals vs. derivatives.

The potency of ¬Algebra comes then from its *capacity to give us a huge amount of information into the most complex symmetries and simultaneous space x sequential time structures of reality*

So we do depart in our studies of space from an upgrading of the concept of point to fractal point and its study through the three topologic networks, in time from sequential social number theory, and its dual, 'inverse ±' numbers; in analysis of the duality of parts and wholes, and then combine them all *in the generator equation, which is the basic generator of ¬Ælgebraic structures, as it embodies the ternary symmetries of time, space and Planes.*

And so the fundamental task of ¬Ælgebra is to translate group theory and its space-time symmetries, polynomial equations and its scale symmetries and operands and its specific transformations of space and time forms/functions into the formalism of the fractal generator of space-time and its allowed symmetries.

1st ¬Algebraic S=T MIND EQUATION: 0x ∞ = K search for 'wholeness' in a single equation.

An Exceptionally Simple Theory of Everything

From Wikipedia, the free encyclopedia
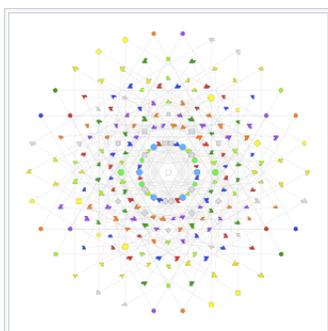
Elementary particle states assigned to E_8 roots corresponding to their spin, electroweak, and strong charges according to E_8 Theory, with particles related by triality. This eight-dimensional root diagram is shown

To make it even more complicated human ego-centered paradox, o-mind x ∞ Universe = constant, is naturally built to *find wholeness, and stop all motions into puzzled mappings that try to enclose it all, all the steps, all the variations, all the forms, and all the motions, in a single ¬Algebraic structure, a potential equation of all possible bifurcations of those steps, which humans think to have achieved with those 'monstrous lie groups' and other ¬Algebraic structures that try to be an impossible minimalist mirror that encodes the information of all the symmetric steps available to reality.*

It is a ridiculous ego-trip, which only obscures further our comprehension of the details and wholes of reality, born of creationist theories of a universe with only mathematical properties, supposedly encode in one of such groups.

In the graph one of the most advertised of such theories which merely are a catalog put into fancy schemes of all what there is there, a short of data encyclopedia not a theory of why & what generates events and forms.

On the other hand the 5D metric Generator equation of ¬Ælgebra resumes all realities that exist in the Universe, and all its languages that shape constant mirror worlds:

0'-finitesimal spatial mind x ∞ time cycles = Constant mind-world: §@<≈>Δð

It is much simpler than any monstrous group, and it merely tells us that the 5 dimensions of space-time can be further simplified into spatial forms of the mind, §@ (1D, 5D) and its linguistic mirrors such as ¬Algebra is, and the true infinite motions of time through all the Planes of free cyclical time§paœrganisms (4Δ, 3D), which are therefore in a constant form-motion, mirror-reality ≈ similar feed-back relationship, as the global Universe 'shrinks' < into the spatial, local mirrors of the minds, §@, and vice versa, as the singularity • mind mirrors order a local territory, @, changing a finitesimal amount of the total reality of those Δð cycles.

But of course the 'pre-work' needed to fully understand 0 x ∞ being 'verbal, logic, conceptual', is missed in modern mathematical thought.

The study of those 4 elements of all realities, its actions and ternary operands, structures *the dynamic 'Generator Equation' of all Space-time Systems of the Universe, written in its simplest form as a singularity-mind equation:*

O x ∞ = K = $\infty^{\underline{o}=1}$

Or in dynamic way, S@<≈>Δð.

So that is the game: 3 asymmetries of scale, age and form, which can come together or annihilate and each language=mind represents in different manners, those elements and its operands.

In mathematics*, with the duality of inverse operations, + -, X ÷, √ $x^{\underline{a}}$ and ∫∂.*

The humind plays a key role in all this game, as we can only perceive through the languages of the mind, which 'perceive in themselves' as 'still-simultaneous-linguistic mapping'. we do not perceive reality but languages-mirrors, we often confuse with reality (Mind paradox).

All is in the codes of the Universe and its operators, also clear in mathematics, with the duality of inverted operations, + -, X ÷, √ $x^{\underline{a}}$, ∫∂.

We thus define in Existential ¬Ælgebra the main operators of classic ¬Algebra as the two directions of a dimotion of space-time. We can in this manner compact some dimensions as inverse, being entropy and generation (4th and 5th Dimotions) inverse in symmetry to a given Δº plane (±¡ SYMMETRY).

To which extent we can consider stop and motion, 1D and 2 D inverse or rather asymmetric, must be dealt on a one case basis. Finally as it turns out we need the other four Đimotions to achieve the 3rd Đimotion of reproduction, *we can reduce all other Đimotions to reproduction; hence establishing the unity of intent in the Universe: to keep reproducing an eternal present. IT is this present-eternal reproductive Đimotion what defines the Universe as a fractal.*

It is essential *to understand 'existential Logic' and its space-time inversions, which represent the fundamental logic postulates of reality:*

That S≤≥T, but also SxT=K, So, S=k/T.

So systems advance through inverted Steps and Stops which balance each other, since the equality of both sides of existence coupled with its paradoxical inverted properties make all systems finally a virtual zeroth sum, balanced *across steps and stops, Dimotions and Planes, represented in the logic of human formal languages notably mathematics by equalities of 'dimotions' as functions of space-time (Sx=Ty) in different mirror-languages, and so we shall find constantly those balances are needed in Nature and represented in logic and mathematical language.*

Some examples of physics will suffice.

In the study of particles, painstakingly as they did not have the 'basic truths' of space-time symmetries (still don't) physicists discovered that the proper representation of the quantum world was not only a wave (Schrödinger's equation) but also a particle, that is the motion and stop duality, so they moved to the Klein-Gordon equation; but then they had to marriage those equations with relativity on the limit of our c-light spacetime (full c motion); *so they have to find a balancing opposite rotary motion, the spin, also on the verge of c-light speed (Pauli matrices); but then they realize they have the imbalance of + particles without the counterpart (- Particles), so Dirac widened those Pauli matrices to bispinors that represented the needed counterpart of antiparticles.*

Yet they found there were in the Universe more particles than antiparticles. Where are then the antiparticles to balance the zeroth sum? It was found in the post-war age but still misunderstood that a certain force, the weak force, they incorrectly tried to model as a spatial force, when it is a force that evolves particles into higher scalar families of the fifth dimension, preferred to create 'particles' in its way down (entropic arrow of devolution from heavy top, bottom, strange quarks to lighter ud-quarks), first in the Strange kaon decay and just recently at the LHC in a much wider 'angle' (20% of excess of protons over antiprotons), so it follows that if the 'next scale of matter', the black hole world of heavy quarks and 'black quark stars' (see our posts on 5D astronomy), favors in its decay to the smaller world of atoms, particles, in its way up, the 'galatom', or physical upper scale of the Universe will have galactic antiparticles, as it is the case (our left-handed galaxy has most of its mass as an anti hydrogen does in the outer halo, NOT the center)...

So we observe in fact the existence of inverse balances *in all the directions of the fractal Universe, in steps and stops of S=T balances for the 5 Dimotions of existence, hence in between the O-¡, Øº, |¡ different Planes that will show to 'change its role' - so for example proteins are lineal, but in the next scale of '4D topologic warping' form globular shapes... and so on and so on.*

All this must then be properly described relating it to the different operand of ¡logic, which we shall adapt from classic ¬Algebra, at the simplest level (leaving for future researchers the full-fledge discovery of the whole model, in very specialized elements, such as those of quantum physics in the wrong Copenhagen interpretation with its unneeded conjugate normalization and apparatus).

There are 'a priori' sets of rules for all sciences, motions and dimensions, species and events, in simultaneous adjacent super organisms that balance limbs and head, locomotion and perception, entropy=death and informative generation, merged in reproduction (the 5 Dimotions, then cancel each other, and keep reproducing the present); all of them based in the 3 simple logic statements translated with those operators:

'That space and time states of form and motion balance each other, **S≤≥T** and yet their properties are inverse in 5D metric, **S x T = K±¡**, but isomorphic in all Planes (K±¡).'

The astounding beauty of the 5D model of reality then arises from the fact that we shall extract all the laws of reality from that simple statement, in all the required detail as we just have done for the world of particles that so complicated appears to the physicist which lacks this basic understanding of the parallelisms, perpendicularities and inversions of space-time systems in all Planes of nature.

So the simplest method of extracting a meaningful quantity of information on a being or event requires to comment on the 4±operands '5' perspectives, even *when we study as we do in the first line,* those elements in themselves. In this post we shall deal thus with time from the perspective of space, time, symmetries, Planes and mind languages that 'stop it' in the singularity of t=motion zeroth, from black holes to eddies to charges, to brains to frozen genetic DNA...

Number theory, ¬Algebra and analysis, are sub-disciplines of maths that 2 consider a simplex space-time duality, departing from temporal numbers and spatial points:

- T-numbers> ¬Ælgebra≈Δnalysis evolution of complexity; on the side of Time-dominant sub disciplines vs.

- S-geometry>@nalytical geometry and Topology, in the Space-like point-like sub-discipline.

It follows that equations of ¬Algebra are social organizations of numbers in time equivalent to topological surfaces in space.

And so in the same manner we have upgraded the foundations of geometry and topology, to adapt them to the 5DST dimensions of reality by completing the 5 postulates of non-Euclidean geometry (¬E) we MUST upgrade the foundations of ¬Algebra, to accommodate the ¬A structure of ternary, logic time.

What are then the equivalent 5 Postulates of ¬æ Existential ¬Ælgebra equivalent to the 5 Postulates of non-E geometry.

The answer is not so simple as ¬Algebra is to time what geometry is to space, *and time is far richer as time-motion is all, space being only the humind mapping of reality - or that of a different mind.*

Reason why space happens in a single continuum - the scale of man - and time in all the Planes, and all the motions, not 'stiffened' by the mind. So as words are more complex and richer than art in the first age of human languages, and logic is the underlying language of mathematics, ¬Algebra is more extensive than geometry.

Still the symmetry between S-geometry and T-¬Algebra like approaches to a problem exists.

So we relate the 2 S-like T-like parts of mathematics to each problem of reality TO CHOOSE the best way to deal with it depending on the qualities of the problem, either closer to an event or to a form - as we choose the frame of reference, cylindrical, Cartesian or polar depending of the s, st, t, form/function of the entity we describe.

All mathematical disciplines are experimental hence extract essential Δ•s≈t properties.

Thus we go back to the basics and consider ¬Algebra merely the space=time symmetric view of mathematics, which uses as 'units' NOT sets or Groups or Categories but sequential numbers and simultaneous points, studying its relationships; where the only paradoxes of true note are those derived of the slightly different continuous vs. discontinuous, simultaneous vs. sequential, memoriless vs. hidden information, which structure both; of which the

most evident, deep case is the fact that *in discontinuous time numbers certain relationships such as π or √2 are NOT defined, while i geometry do exist.*

Those are key paradoxes to understand why numbers miss pieces of entropy-energy but gain information, while continuous points fully embody a given plane of reality but loose information on other Planes. And so the full πerimeter exist; the π-number misses the 'last point' and fluctuates up and down the geometric pi enclosure, meaning that *in time pi never closes its cycle, allowing a perpetual motion Universe, but in space, it practically closes in each present the super organism, breaking its vital space from the outer world.*

Along all the pages of this blog we have shown an enormous array of examples proving the duality between time-motions and its space-forms. So basically the fundamental symmetry of reality is that we *can express anything as a series of motions in time, which will be related symmetrically or inversely through one of the fundamental operands of ¬Algebra, or any 'verb' of language, or any of the logic symbols of space-time flows of 5D (< ≈ >) forming a time-space event.*

And hence *from one of both solutions we will be able with the proper methods to extract the other mirror-solution, which we express in the fundamental duality/equation of space-time symmetry:* **∫@≈∆T**

This is what makes ¬Algebra, once *we apply the Rashomon effect (multiple 2, 3, 4 or 5 D p.o.vs and functions, depending on detail) so powerful to mirror real it as it is basically all about S operands T symmetries.*

But the main task to do in ¬Algebra is to fully account for the meaning of all its operands and establish its relationship with space and time symmetries. I.e. we talk of sum, product, integrals, logarithms and numbers, complex, irrational and so on with very little understanding, happy just with the pedantic, axiomatic method and its pretension of absolute truth - which by Gödel is by all means incomplete, and reveals very little on the ultimate disomorphisms of space and time.

So the explanation of operands and Space-time dualities=symmetries+inversions is what will take us to the very deepest levels of understanding of the Universe.

 RECAP. *¬Algebra studies social, sequential numbers and its relationship with spatial points, extracting the S=t symmetric motions between them'.*

It shares its minimal mathematical units with number theory, as numbers are closely related to the arrows of eusocial evolution of the 5th dimension and the arrow of discrete 'frequency' in time. As such numbers measure the 'long' , social evolutionary game of Planes, and 'short' sequential arrows of time of the Universe.

While ¬Ælgebra truly starts in the next scale of space-time events, with multiple groups of points (variables), exchanging entropy, energy and information, through operands (specific of each action) in 'equations' (which become partial case of the generator's allowed st exchanges and symmetries). And so this classic ¬Algebra is the most important part of it.

¬Ælgebra studies the whole 'block of time-space' of a supœrganism, through all its potential actions expressed in **functionals** of functions that embed two or even 3 Planes in whole ∆±1 structures, *is the all inclusive ∆±i perspective, while* **groups** of symmetries, according to a set of 'restrictions' of its allowed actions, is the single 'space-time' plane attempt to describe the whole potential transformation of any entity in such a single plane. So groups and functionals explored in the 3rd age of ¬Algebra complete its wholeness.

This first view of ¬Algebra can be done through its analysis in space as a simultaneous connection of the two sides of an equation, which put in relationship the 'ternary extremes of an ∆st element', either by its operands (which allows a single plane connection of s and t elements) by its polynomials (which allows a multiple scale connection through ∆§) and by its inverse symmetries (group connection).

And because the universe is dual in its inversions and ternary in its elements and Planes, 3+ are the operations of math. Since Potency and integral operations being closely related as we explain, as the duality of Δ curved analysis between planes vs. §lineal scaling in decametric societies happen to be. Indeed any mathematician immediately will notice this duality with the concepts of a derivative vs. a lineal differential approach, a logarithmic scaling that tends to a fixed asymptote vs. a changing tangent-derivative of a more complex curve, and the ultimate proof that all ¬Algebraic equations of exponents can be approached by Taylor series of derivatives.

¬Algebra explained it with group theory and axiomatic methods; so we shall consider that approach. And the only elements left to define then are the identity element and the properties of the operands.

Indeed, all dual operands have identity neutral elements and inverse ones. THEY CAN be considered loosely as the neutral=asymmetry form, which 'splits' both ways into the negative=antisymmetric element and the positive=symmetric one. The identity element leaves the asymmetry unchanged, it is we might say a non-operation. The negative element is the result of antisymmetry, the positive element of symmetry and tends to be a larger whole.

I.e. if we have a herd of 4 + 3 elements, and they come into parallel social evolution they give us a herd of 7.

But if we have a herd of 4 elements and they come into a Darwinian relationship they will separate the defeated elements, so if it is for example a fight for supremacy, only one will be left and we rest the 3 defeated candidates, 4-3=1.

The first curious thought coming out of this simplified analysis is that *positive operations tend to be more restricted additions as they require identical elements, so they are often simple social evolutions, negative operations however might have multiple meanings as the antisymmetric, 'entropic' states of a system multiply statistically.*

So this has a reading into the classic arrow of time of thermodynamics, which already noticed that order 'probabilities' are less than 'disordered ones', *unless there is a Maxwellian demon - which we contend do exist in the survival will of all points of time - to contain entropic, destructive probabilities, which is indeed what it happens most often.*

When 3-4 elements that are numbers, which can be operated together hence equal beings as numbers are social groups of equal beings, *the magic of social love and the fourth postulate of similarity in non-Euclidean geometry means that all the systems which fall between symmetry and asymmetry, and can communicate come together. Entropy is REJECTED by almost all systems from the singularity perspective, which implies also that a mere abstract mathematical analysis will fail to understand the bio-logical input of those informative singularities that reject as Maxwellian demons do the negative systems, tricking the 'dices' of God.*

What about product vs. division? Again this duality is obvious. If we have 3 x 4 it means 4 herds of 3 which ad together in 4 steps to a 12 herd.

But the entropic events here are also multiple and divisive. I.e. If we have 3 kilos of wheat, we divide the whole between 4 entropic hungry men to get 3/4 per capita. Divisions thus 'divide' almost always a system into broken parts. Products multiply societies, or create tighter communication between those smaller parts. I.e. A= 5 and B= 4 elements can be multiplied also at the Δ-1 scale to get the number of axons that 'tight' the society together if each element of set A communicate with each of set B, then A x B = 5 x 4 = 20 axons.

So we come to the potency vs. root, integral vs. derivative that merely take this dual process to its final ternary scaling (as we know systems are ternary so no need for further operands). Its complex study being carried further in the post of analysis so we shall let it go for the time being.

 A definition of the Universe and its space-time topologic and ¬Algebraic elements.

We define the fractal Universe suited to its mathematical description as a fractal super organism made of:

A(nti)symmetries between its 4 Dual components T, Δ, @, S, through parallel =symmetric or Perpendicular/antisymmetric communication, as they can either evolve in Balance≈become symmetric or annihilate= become Perpendicular/antisymmetric:

S: space; an ensemble of **ternary topologies, (|+O≈ ø)**... which made up the **3 physiological networks** (|-motion/limbs-potentials + O-particle/heads ≈ Ø-vital energy) of all *simultaneous super organisms*

Δ: Planes of size distributed in Δ±i relative *fractal Planes* that come together as **Δº** super organisms, each one sum of smaller **∑Δ-1** super organisms... that *trace* in a larger **Δ+1 world...**

Time cycles: *a series of timespace actions of survival that integrated as a whole form a sequential cycles of existence with **3 ages**,* each one dominated by the activity of one of those 3 networks: motion-youth, or relative past, dominated by the motion systems (limbs, potential); iterative present dominated by the reproductive vital energy (body waves), and informative 3rd age or relative future dominated by the informative systems, whose 'center' is:

@: The Active linguistic mind that reflects the infinite cycles of the outer world and controls those of its inner world, through its languages of information, which guide its 5 survival actions: 3 simplex, **aei**, finitesimal actions that exchange energy (**e-**ntropy feeding), motion (**a-**ccelerations) and **i**nformation (perceptions) with other beings, and two complex actions: **o**ffspring reproduction and social evolution from individuals into **U**-niversals that maximize the duration in time and extension in space of the being.

So that is the game: 3 asymmetries of scale, age and form, which can come together or annihilate and each language represent in different manners, those elements and its operands.

A mind-mirror language can perceive the game goes on degrees of complexity from the simplest possible minds of 'monologic thought' (the humind, regardless of our ego Px. that feel to be the center of reality and its most intelligent being) to the more complex forms of pentadodecalogic (sexalogic systems).

So in its full formulation as mirror of Δ@ST elements, we can say that:

¬Algebra mirrors s≤st≥t structures, a(nti)symmetric dimotions & Δ transformations from the point of view of a given frame of reference yet its main mirror is ¬Algebra as expression of the Dimotions of reality with its operands

It is then clear that what languages as synoptic mirrors of the mind will try to do is to establish the basic relationships between the space, time, scale of the being, expressing them through its operands, DEPENDING on the degree of perception the being has of reality and its Planes which might be reduced if the being is not fully aware of all the Planes of existence, as most minds exist only in a plane of reality

So does mathematics, through combinations of:

Sum/rest->multiplication/division->potency/logarithm; point->line->plane->volume and so on.

This said, the Universe is a game of ∞ Species of space-time making STeps and STops in its constant cœexistịence (where we use π for time, in this particular wor(l)d according to the slightly changed rules of i-verbal thought for English to look more like the universal game), and so as Stops and steps (ab. œ) bring the being into existịence we can measure them quantitatively as space-distances and time-motions. Stop and step then becomes topology and feed-back equations, where = is substituted by the dynamic symbol <=>, and the duality from = stops and ≈ wave steps.

Once the intuitive meaning of those symbols rises the awareness of the reader to the vital nature of our humind's abstract rendition of reality things become then dynamic. ≈ for STeps, = for motions, and ≤≥ as the different

implosive or explosive, informative or entropic 'degeneracy' of a system are easily quantifiable and translatable to both mathematics in its pure expression and mathematical physics.

It follows that the main translation required between classic ¬Algebra, and Existential ¬Ælgebra, is that between the operators of ¬Algebra and those of the generator equation. Originally I did try to cast the whole model of ÐST in terms of group theory, ¬Algebra and its classic mathematical operators, but that was an earlier stage of my exploration of the fractal Universe. It was then obvious that as good as mathematics is as a mirror of the Universe, it is not as good as it is needed to extract all its properties, hence the need for a different logic, which however had to include or at least reference the world of classic ¬Algebra as we shall try to do albeit at a basic level - the specialist must understand this is a unification theory of all existiences, so we cannot be exhaustive with all of them, as the team of research is exactly the same than the infinite-infinitesimal Universe: ∞º=1 .

And to do so, as a fractal can always be divided in sub-fractals, mathematical disciplines subdivide further at all levels in 5 elements.

In this post we shall deal with the a(nti)symmetries and operands of ¬Algebra.

Though we cannot be exhaustive as ¬Algebra is the largest of all the sub disciplines of maths, concerned with time-space symmetries, but merely do a very fast analysis of its main themes, enlightened with Δst insights to show the enormous power to ad new whys to reality and all its stience of 5D², since even the simplest truths scientists think are thoroughly understood have new insights observed when putting the Kaleidoscopic 3±Δ perspectives of the fractal organic Universe, what we call honoring one of my fav films, the 'Rashomon effect' (a truth can only be 'judged' with multiple Δ@ST perspectives.

So the fifth perspective of the mind-judge in the film required 4 previous ones, and even who the absolute truth can only be found in the event/being in itself, which carries all its information). We shall thus make liberal use of the Rashomon effect to enlighten the truths of ¬Algebra.

And then barely explore the more focused Existential ¬Ælgebra of the Generator and its sub-'groups' or space-time symmetries.

But we can further expand the concept to N-elements to form a relative polidimensional ensemble or herd, or a plane, which is what Hilbert spacetime frames do, of wide use in quantum physics. They also add the 4th postulate of relative congruence with the concept of orthogonal=perpendicular events vs. parallel events (dot product and cross product in classic vectorial spaces).

Entanglement of pentalogic in mathematics then becomes the interaction of 'social numbers', operands of dimotions and the world Δ+1 planes in which they take place:

Further on as all T.œs have a different language of perception, and exist in different scientific planes, the parameters they perceive as time and space might vary; so next comes phase spaces, to reference the suitable time-motion and space-form coordinates each species perceives. Then we have in the human single plane, 3 frames of reference, the polar, spherical, cylindrical, lineal, and Cartesian, hyperbolic planes, being the S=T Cartesian plane the most useful; but depending on which organ of the being, its |-limbs/fields, Ø-body wave or O-particle-head enact the event, a different frame might be more suitable. Then we can write on those frames, different chains of dimotions with ¬Algebraic equations and operand, joined by dynamic = symbols of equivalent, feed-back stœps.

In mathematical physics as a closer reflection of there Universe that eliminates from the language mirror its inflationary images (so math will always be paradoxically larger in theorems that reality is, obliged to 'bend' and 'limit information' to those shapes energy can 'bend'), it is even better to represent a vectorial field in General coordinates as they allow the multiplicity of points of view of the supœrganism each with its self-point of reference. Since all T.œs have a self-centered point or monad-mirror - a linguistic mapping or 'seed' that reflects

reality in its frame of reference and will try to act from that point of view or re=produce and imprint the external world's suitable energy (Δ<¡) with the inner mind of its points of exist¡ence.

To be anchored and perceive as a point is the first function of any T.œ when emerging into exist¡ence.

We call the description of all of this, 'Existential ¬Ælgebra', ælgebra, or ¬Æ, as it is both 'Existential ¬Ælgebra' and Non-Aristotelian, Non-Euclidean in its form.

It is in that sense the most important, structural element of the mathematical mirror - the closest classic linguistic expression of the Universe and its 5 Đimotions of exist¡enœ.

We are NOT that much interested in merely translating human ¬Algebra to ¬Æ as a formal mirror of the Universe, a ginormous task, others will built after me, but in defining a ¬Æ of the Universe and as human ¬Algebra does work in that purpose, to establish as many correspondences between ¬Æ and common ¬Algebra.

We depart in non ¬Æ of a first element, a fractal non-Euclidean point, ruled by the 5 Postulates of non-Euclidean topology: points are fractals, lines are waves between points, with less 'amplitude=energy' than the point - a fermion so to speak vs. a boson-line traced. How Fermions or non-E points proper share bosons, or line-waves of lesser 'mass-position' and more 'speed-reproduction of information in a lower, Δ-¡, is a relative question.

For terminology, every non-Euclidean point is a t.œ, his index ¡ is always relative to its mind: I=0=T.œs mind. Departing from it, we can cave into its inner world of -¡ and its upper world or +¡.

The laws of ¬Æ are expressed in terms of a relative self, as Δ±¡ different planes in which an Δº mind exchanges energy and information with different Δ±¡ planes. It corresponds for the case of Δº and Δ±1 cases to classic science (single plane coinciding with the language of the mind-will).

Philosophically we can consider the mind, the perfect block of time of the syntax of one language that reflects the game of existence itself.

But logically we have a first element or seed, Δº, and then we can 'follow it'. as a non-Euclidean point in space, non-Aristotelian monad in time, as it mirrors in its language and reflects upon its world to exchange energy and information and fulfill its 'Parts' as an Δº must have a body, Δ±1 and co-exist in a world, Δ±¡, whose relative extension might depend of the fractal fine detail, in our measure of ±¡.

As such the minimum 'space' to represent a world of such points is a vectorial space in which each point has at least two values that might represent the body-motion and mass-direction of the point, which becomes then the simplest representation of a T.œ spacetime, in which each points is a T.œ, which has two creative parts we might call space-form-scalar parameter and time-motion-direction of the vector parameter.

The simplest of those are momentum fields, in which each point represent in generalized coordinates the relative momentum of the being.

RECAP. All fractal self- similar scales are formally defined by 2 metric functions and its philosophy of science, 5D Absolute Relativity: the function of 5D scales, SxT=C & the function of relativity between form and motion, Si=Te, which started modern science. Since *we cannot know from the mental, still point of view, what truly is motion and what is dimensional form.*

Thus Time Motions & space dimensions co-exist and merge in every space-time being of the Universe & *we must talk of space-time dimensional motions.* When we combine them, as Si=Te maximizes SxT, we define the Function of existence, Max. SxT, to which we add the reproductive nature of all motions, along 5D scales, ∑, so we write the Fractal Generator of Time-Space organisms, or 5D metric function, or survival function, as C =∑Max. SxT(s=t) that unlike 4D locomotion applies to all 'stientific scales' & all 'motions' and Species; adding organic= fractal scales, biologic will, determinism - as all systems maximize its 'Function of exi**st¡ence'** - mental=still mirror symmetries ignored in **sc**ience.

C= ∑ Max. S x T (s=t) IS a biologic function of survival that embodies the will of life and its 5 Drives, or 'actions' which all systems of the Universe code: As a entity perceives **I**nformation and moves through **A**ccelerated=changing paths towards **E**ntropic fields to feed and absorb energy to reproduce its **o**rganism and evolve socially as a larger **U**niversal whole. So all systems try to maximize its 3±¡ 'organic *entangled* Đimotions' that in space create organisms and in time its worldcycles of existence; starting as pure Form (SS»4D) in a seminal seed, reproducing evolving socially and emerging in an Δº scale, in a young age of max. Motion (2D, <, Ts), balanced with information in the reproductive age of max. Energy (3D:Si=Te), followed by an age of information (3D, >, St), when time reverses into entropic death («TT).

The function is maximized in the present mature age of beauty, when S =T and reproduction by 'gender=mirror symmetry' takes place, creating a herd (∑) a stronger, social number, which will evolve into an entangled, ∏, connected synchronous whole that survives better.

Ad it is guided by the SS-informative mind-seed, which is a linguistic synoptic mirror in a smaller scale of higher information, hence responsible for the 'creation' of fractal diminishing, 'finitesimal' scales; which it will reproduce over placental energy fields to become a larger Δº whole.

The laws of Existential ¬Ælgebra and the partial equations of the generator, connect with the concept of a reductionist mind, which absorbs only the energy it needs to survive. In brief, a huge field of study in the design of mental systems and mental spaces of geometry is the understanding of the different 'real systems' of mind spaces constructed with an increasing number of parameters and dimotions, which make its mental geometry more complex. And so we talk of a growing scale of complex mind-spaces, which we shall 'entangle' in the next chapter with the different 'degrees' of social evolution of geometric figures, from self-centered points that sponsor a simple lineal mono-logic motion in time, to the more complex topological organisms/non-Euclidean planes whose structure ranges from simultaneous pentalogic geometries to the more complex Dodecaplex 'polytopes' of simultaneous, equal 600 elements… likely the more complex illogic structures of the Universe. **On the understanding of any language-mirror as it builds the complex image of the fractal 5Dimotional Universe, we must consider that the growth of 'form and motion' is one of increasing 'dimensionality' of the elements of that mirror. That is, more than a one to one correspondence between dimotions of exist¡ence and operands of a logic language, we shall see that those operands growth from simple monologic, to dilogic, to trilogic, tetralogic and pentalogic more complex elements of form.**

In the papers dedicated to the ¡logic growth of ÐST (Generational space-time) as a language of ilogic time, we have built on that fashion a first paper on monologic ænthropic man with its simplex belief on a single time arrow of entropy and death – the most encompassing and less informative of all forms of time, which is remarkable in its primitivism, given the self-importance man gives to his 'ingenuity', then dedicated a second paper to dilogic, the duality of the two poles of form and motion as they converge into parity and gender to reproduce in its S=T point all other forms of the Universe, giving birth to tetralogic of positive, social growth and evolution – without entropy the final pentalogic closure of all forms in exist¡ence.

A being then can exist merely as technologic humans do with single goal or ants in a pheromonal path or horses blinded in a race, and live with that single monologic view of reality, moving ahead without doubting its mind view is the complete existence of the Universe.

When observing humind's worship of the extension of Galilean relativity by Mr. Einstein and the astounding worship of his 'genius', which consisted merely on applying the 5th postulate of Non-Euclidean geometry without even understanding its 'nature', as we have shown in our evolution of those 5 postulates, the evolved observer of pentalogic timespace can marvel how that single entropic time, deduced from a mere expansion by a ct factor of the v=s/t locomotion equation of Galileo can bring such huge awe and veneration and build from it with that single arrow of entropy=death a full cosmogony of big-bang explosions and dying Universes heralded as the absolute truth of all what is needed to know about time, without a flinch of those who truly think such a simplex view of reality suffice to explain it all.

That is the beauty of the Universe; that something so simple and minimalist in its total truth as huminds' view of time passes as the whole and suffices to fill of pride the species, whose 'seers of time' (the job of God in Saint Augustine mystique, of Einstein in the lore of the nuclear industry) in so many Tv-shows on cosmology will assert with absolute certainty, the marvelous intelligence of a species, who could so fast, so good understand it all till the trillionth part of a second after the 'creation through the big-bang' of reality in the lineal past of a single affine equation, V=HoD, the God of Void, the vacuum, entropic time. That's right, we know it all because after all emptiness is simple enough for an ant, a physicist and Einstein to understand… so why bother – 'cosmologists are seldom right but never in doubt' (Landau); 'simplify man you are a marine' (O.Stone). You can indeed survive by the art of killing it all and devour. I have thus long stop trying to teach cosmologists, ants and ænthropic military men that there is something more than the lineal simplex sword of entropy and death – their destiny traced by their faith.

Moreover as the Universe is the whole and all its parts are less than the whole, most parts are monologic and monologic one-dimotional actions suffice for the robot, the physicist, the ant, the operand of sum with its single lineal arrow of Natural numbers to make a worldview that guarantees our fulfillment and existence.

From synthetic whole – the thoughts of god – to its analytic details – all spacetime organisms.

It is then the big task I took upon myself decades ago after discovery this 'language and mirror' of reality so above the present 'language of science' with a single dimotion of existence (lineal time locomotion), and a null understanding of the first principles of reality; to connect both, falling from above from the synthetic understanding of the first principles in its larger scale of reality, the summit and envelope of the whole, to connect them with the details. This was the old ideal of the Greeks, which humanity today has forgotten and denies, because the quantity of details gathered with sensorial machines have overwhelmed them.

So they cannot see the forest, not even realize that a network of hidden mushrooms connects them all.

We trIed to connect the two greatest levels of generality in the laws of space-time, Existential algebra, the formalism of generational space-time and its pentalogic and dodecalogic elements with classic algebra and its scalar numbers, dimotional operands and S=T equations. So first we shall introduce existential algebra, which deploys a simple generalized formalism to be able to reduce to ilogic equations with only 5 Dimotions all events of reality. Knowledge is a growth of complexity from monologic, the study of the one to duality between the poles of form and motion, to trilogic that adds its combination in a single plane, to tetralogic that studies the being in its subjective positive drives=actions of existence without the entropic inverse arrows of death and its inverse operands, which bring finally pentalogic. So while we tend to use just the concept of a pentalogic Universe many analysis will be done in terms of duality, trilogic in a single plane of reality (Ts<ST>St) and tetralogic, either because we adopt one of the 5 elements as a point of view, becoming the subjective blind spot (so operands of scalar social evolution might not have angular perception, most humans never analyze entropic death, eyes do not see precisely where the nerve that sees resides, etc. etc. Finally from outside a (do)decalogic analysis adds the 3 'scales' through which the being will exist, from its ordered palingenesis to its outside world.

¬Algebra = ¬Æ mathematics.

Finally Existential ¬Ælgebra is the name I give to the formalism of ÐST and its symbols even if the equations of superorganisms tracing worldcycles and its laws are not those of ¬Algebra, because of the use of similar symbols and the fact that ¬Algebra was the previous more advanced form of a science of time, discovered by mankind (given the limited capacity of Aristotelian logic and lack of development of a full model of eusocial evolution).

We shall in this paper study the ages of ¬Algebra, the science of time in mathematics, after our brief introduction to the more complex causality of the Universe.

And conclude the post with the future of '¬Algebra', which will be either a simplified version of a digital mind (Boolean ¬Algebra) or with minimal probability given the null evolution of humanity and its increasing obsolescence to AI, the age of Existential ¬Ælgebra, where the science of time finally reaches its zenith with the pentalogic and dodecalogic comprehension of the laws of Existential ¬Ælgebra. (ab. ¬Ælgebra).

The entropic limits of reality applied to mathematics.

It is obvious then that ¬Algebra, aptly called from Arabic "al-jabr" meaning "reunion of broken parts", and analysis by studying S<=>T and Δ§ suffice somehow to describe the 5 Dimensions of present, past and future, and indeed, they together cover all of it intensely... but *they require first a good understanding of social numbers, and the @nalytic planes which work as the Δ-1 'cells' and Δ+1 world in which the organic systems of mathematics work out its 'actions of existence'.*

The only other 'great subject' which is on parallel in importance to that of ¬Algebra & analysis would be geometry in motion, topology, which thanks to the 5 Non-Æ postulates will be explained as a far more 'intuitive' and profound perceptive mirror of reality, once points acquire volume (1st Non-Æ postulate), from flat prime numbers to platonic solids, reproduce inner parts, communicate through infinite parallels (5th non-Æ Postulate), which become entropy,

Inverse functions as 'balancing stœps' of the fifth dimension

Humans are entropic, thermodynamic virtual ghosts trapped between the immortal quantum proton and cosmic black hole (no entropic evaporation there), LOVE entropic simplest lineal theories of reality.

Entropy death is ginormous in its fields as it applies to all other attempts of 'differentiated' evolution of form.

So there are 4 positive dimotions (locomotion, reproduction, perception and social evolution) all of them subject to negative entropy and destruction that 'returns them' to the 'mother womb' of no form. And for that reason we can treat the 4 INVERSE operands, negative exponential decay, negative subtraction, division and derivatives (when

applied to the search for an 1/n, Δ-1 infinitesimal) as reflections of the Universal entropy that destroys the positive distinctive operand, often in a much larger shorter explosion of dissolution of form.

Entropy is the disentanglement of free-chaos that affects all systems and the inverse operators best describe.

When comparing each new Dimotion operation, we observe several elements of entanglement. First the simplest expression of the next 'Dimensional operation' seems just a repetition in a new dimension of the previous one: the Sum is multiplied by adding sum after sum. The Power is obtained by multiplication over multiplication, but this is just when the operands is applied to the self-reflective point.

Operands do have however as they grow in complexity a direct entanglement with the 5 Non-E postulates that define from points waves of communication that become networks of topological planes and organisms, where multiple p.o.v.s are put in perspective. And this even more clear when from mere polynomials we move into exponentials and from exponentials into integrals, *the more complex operands then can interplay with multiple points of view, merging them through the product, reproduced through its inverse partition/division, moving them through a world cycle, in exponential growth and decay, and emerging into a new planet of existence through derivatives and integrals.*

So as usual in the entangled Universe of infinite acts of communication even if the one-dimensional man tends to reduce the whole and its flows of communication to a single line of thought.

Re=production through social evolution in a lower plane of the fifth dimension, in which the axons join the wholes is then the 2-point meaning of reproduction; often a bidimensional Space-time combination of a state of forma and a state of motion, as in the parameter of momentum.

It must be noticed then a very interesting new vision of the interaction of inverse functions, which do NOT merely cancel each other as one could expect, in classic science, *but advance the Dimotion in alternative balancing acts, leaving a memorial trace of its existential duality.*

Indeed, consider the case of the product and its inverse division. They are functions primarily of social evolution and reproduction, as parts of wholes are produced and exchanged. So if we have an individual of 5 parts that reproduces it will give birth to 25 parts, *but then we need to divide them between 5 parts, to get 5 individuals of 5 parts: 1 (5) x (5) = 1 (25) / 5 = 5 (5).*

Same happens with the positive and negative motions, which in alternate current move back and forwards the 'electrons', which in fact don't really move, but its ¡-1 scale *the current keeps moving.*

So goes for the exponential+Logarithmic functions of reproduction, and its inverse, which form a worldcycle that in the middle point of maximal 'carrying capacity' will give birth again to a new 'exponential growth'=generation, to continue the world cycle in an adjacent space-time.

∫∂: Finally it came calculus, with its inverse operand, which represents the scalar next social gathering of elements of ¬Algebra, as it is applied to the previous operands, as wholes, except for the trivial x^a - the previous more complex polynomial, and so we must regard calculus not only as the operand of all dimotions of change, but also as the operand between planes of existence, since the logarithmic/power previous expression, just reaches between the two limits of two planes of the fifth dimension, but calculus allow us to 'emerge' and transcend between planes.

So by the continuous game of inverse functions, which become a zeroth sum, *the Dimotions of existence continue to move the whole of time-space that never ceases to exist.*

However and this is a key truth of the underlying structure of scalar space-time, ΔSt, the number of occurrences of the positive function is always larger than then negative inverse function. So there are more possible sums than negative numbers (for spatial quantities there are no negative ones, no negative apples). There are more products

than divisions (as 4/2 = 8/4 but 4x2 ≠ 8x4); there are more exponentials than square roots as √-x does not exist, and finally there are more integrals than derivatives as ∫y'=y+C, adding ∝ constants.

Which means the arrow of social evolution and life is larger than the arrow of entropy and death, which in fact lasts only a quanta of time in its ÐST equation: Death = 0T x Δ S.

The Universe is asymmetric and paradoxic, even if minds simplify those paradoxes – and mathematicians eliminate them with egocy axioms. It is though more satisfying to explore the paradoxes of the game of exist¡ence that the axioms of Zermelo and Hilbert. 0' finitesimals, S≈T genders, different arrows of time in 5D as parts and wholes have different properties, finite infinities, limits of entropy, dissolution of information in irrational numbers, discontinuities that create stops and forms, etc. are the hidden structure that make possible a dynamic reality.

So going upwards the scales of 5D paradoxically, we multiply the choices of potential futures, balanced its entropic deaths. Reproduction becomes a radiation of fractal points of order balancing its entropic death. Δ∇ dual tendencies are thus balanced even if they are asymmetries, because of those paradoxes between St and sT, SS and TT, balanced in ST; themes those explored in depth in ilogic and ¬ælgebra (existential algebra) and its fractal generator's formalism.

THE BASIC ERROR OF AXIOMATIC METHODS: MIND POSTULATES TAKEN AS ABSOLUTE REALITY

THE PHILOSOPHY OF MATHEMATICAL SCIENCES OF A 5D UNIVERSE.

Correcting errors caused by euclidean simplifications and its dogmas=axiom(atic) method

All this said it is obvious that reality is mirrored by the experimental language of mathematics, but due to the simplifications of earlier Greek Geometry and its dogmatic 'mental method' of proving reality as if it was 'the mind of humans' due to the egocy (ego=idiocy) paradox derived of the confusion of the mind-mapping and its languages with the whole reality (O'-mind x ∞ Universe = constant linguistic map) must be corrected to evolve mathematics and correct the errors of its use in different sciences. And that is the main task performed on those papers. So let us consider the consequences of the real ΔST structure of the Universe into the 3 mirrors of mathematics:

Principles of spatial geometry related to the fundamental particle of the Universe – the fractal point/monad: Growth of fractal points into networks, social planes according to congruence.

The main principles of space to correct are the axioms of Euclid. Geometry started with Euclidean points without parts forming only deterministic lines of a single 'straight future' that evolved into curved with 3 possible paths (y'<=> 0), and finally points acquired volume as non-Euclidean points crossed by multiple parallels, aka fractal points unit of the new mathematical discipline. And calculus detached from Algebra as the most important operand of change and evolved into functionals (functions of functions). But in all those evolutions, the homology with Δst elements remained, even if as 3rd ages become excessive in form and detached from experimental reality, maths also lost its contact with reality and became inflationary making errors, such as the infinity errors of set theory.

Mathematical errors derived of Points with volume, finitesimal zeroths.

The postulates of mathematics were made by humans and are subject to human frailty. Mathematicians also know that at the logical foundations of mathematics there are many paradoxes, meaning that we can get, by reasoning in accepted ways, results that we do not like. This is due to the axiomatic method that does not check reality to establish its mathematical reductionist mirror. So the main task of 5D is to check the mirror with scalar space-time laws solving those paradoxes carried out into experimental sciences that use ideal mathematics, such as physics:

- Points do have parts, crossed by a relative ∝ number of parallels. And so lines have width, they are waves or fractal networks, and so planes have depth, they are messings of 3 lines which are now topological networks and hence they form a topological organism.

- As a result of points having parts, absolute zeroth does not exist. There is not absolute no motion but a 0'k temperature of residual motion; there is no absolute emptiness but a finitesimal residual past memory when we take away a corpse with DNA traces in a lower scale. So 0', the finitesimal is always left.

- Points with parts therefore hold a finitesimal world inside, and as 'monads' do hold still synoptic languages, of which mathematics is undoubtedly the language hold in the tiniest points, atomic particles, as it is the most synoptic of all. So when we study the equation of the mind, O' x ∞ Universe = mind mapping, we will understand why mathematics is such an extended language in its local terrotirial order of reality.

Principles of algebra related to the scalar 5th Dimension: the evolution of social numbers and networks. Maximizing the efficiency of time conservation.

Set theory of wholes which are made of parts is the closest reflection in mathematics of the scalar structure of the fifth dimension from the perspective of the whole, but numbers, are from the perspective of its parts its fundamental element. A number is then defined as a social group of indistinguishable 'ɨndifferent parts', which in

its most synoptic form merely reflect the 'scalar social nature of the Universe'. For a number to be such though they must truly have no difference at all. So pure mathematical numbers are regular polygons, and all other numbers have to be referenced to the property that makes it equal, which implies to include a logical understanding of the 'equivalence' between forms according to a given property, a fact often missed in sciences which use 'equality' liberally and then pretend as in the equality of energy and mass, they are 'the same thing' (errors of this type are rife in mathematical physics, where there is a zeroth interest for conceptual understanding, as long as the 'maths' carry on the equation). Identity then is a key operand that must be studied in depth to find out different forms of equality.

The false solution of those errors as always is caused by human egocy that invents 'postulates' without proof or 'axioms' to create systems independent of experience, based in the funny musings. For example, Euclid defines points without parts, an entelechy, and lines without volume, another one. And when we found that points do have parts crossed by parallels (5th non-e postulate) instead of grounding this fact in experimental evidence, as we do; Hilbert starts his foundations of Geometry unable or unwilling to define them experimentally as our expansion of non-Euclidean geometry does, imagining points, lines, plane and congruence. This tendency keeps growing when his fried Cantor finds another 'mental paradise', and invents 'sets' which are 'wholes of parts', the very definition of the scalar 5th Dimension experimentally sound; *instead of looking at the real wholes and parts and define them as non-euclidean planes of space-time made of fractal points, waves (lines with motion) and networks (lines with volume,* as fractal points with parts started its diversification in different types of lines with volume, waves with motion, networks with branching; lines with inverse directions and orthogonal lines, of S(y)-information and T(x)-entropy).

<u>Principles of calculus, related to the conservation of time.</u>

Another consequence of the fractal struture of points with parts that have therefore motion and form is fundamental principle is that all is motion=Time=Change, as we have never discovered a 'solid' form with no vibration or motion. There is no 0 temperature, there is no residual vacuum space without an h-minimal quanta of time motion that can evolve into virtual particles. Motion never stops, and when we die, the motion continues in the internal desintegration of the being. But against this principle of the ultimate flow of time cycles of the Universe fights each point of view, each fractal monad that tries to conserve its time of exist¡ence, tries to achieve the conservation of time, so time changes in finitesimal quanta (principle of calculus) and systems of physics try to achieve the minimal expenditure of time=motion in its actions (principle of least time) and stay in the position of minimal expenditure of time energy, which in its mathematical mirror implies physical systems search for Lagrangians, least time actions, ∂S=0, and Hamiltonians, Standing points that seem NOT to change. This is the origin of the 3 ages of time, in which the system seeks for the Maximal and minimal points of temporal energy (youth) and information (old age) in which at least one of the two forms of time-motion, cyclical and lineal forms do not change, and specially from the point S=t of relative present where time never changes. From those principles we can extract all the laws of calculus which becomes then the main language of time.

Our goal thus is to revive the experimental foundations of mathematics abandoned by the idealism of the Hegelian-> Hillbert+Cantor school.

It is then *humind's egocy (ab. Human mind, ego=idiocy)* what denies the experimental nature of mathematics and invented mental, creationist theories according to which mathematics is the 'language of God', shared by man, of 'logic', or 'intuitionist', or 'axiomatic' etc. etc. Nature. The main task of 5D generational space-time regarding mathematics us this obvious: to put in relationship scales and numbers, fractal points and spatial structures and algebraic operands and dimotions of time, to enlighten further both, mathematics and ÐST; whereas the primacy must exist in the being ΔSt fractal, space and cyclical time over the mirror, NºGA, Numbers, Geometry and Algebra. And so we shall correct mathematical statements to mirror better ΔST, without dismissing the fact that mirrors to work must be ideal, still, reduced images of reality with less information.

Because of the way languages evolve from e-vident simplicity into complexity, mathematics came first as spatial geometry and then as algebra, of scalar numbers and simple temporal dimotions; cast on equations; and only in modern times fully learned the nature of time=change with calculus.

So we divide accordingly the study of the discipline in 3 papers, even if the 3 elements, ΔST and disciplines that mirror them are entangled. So we do comment in each paper on both the laws of ΔST generational space time and the laws of the 3 disciplines. This second paper is dedicated to scalar algebra and its simpler operands, keeping for a 3rd paper the study of calculus and the operands of sinusoidal functions, complex numbers and ∫∂ derivatives and integrals.

Mathematics as a mirror language.

We shall not so much correct mathematics but rather show what are its simplifications because many of the errors of sciences that use mathematics as mirrors are caused by the lack of understanding of that relationship. I.e. the limits of mathematical physics concerning the fact that all 0s are finitesimal 0's and all points are fractal points with volume is the main error that allowed physicist to invent 'infinitesimal singularities', argue about if 'particle-points have volume', or discuss what model of quantum physics, the probabilistic or statistical must be truth.

The problem can be illustrated in Magritte's painting 'c'est nais pas a pipe'… Mathematics is not reality. So Poincare and Einstein told to each other: 'I know when mathematics are truth but not when they are real; I know when physics is real but not when it is truth'. We want to make them come together as real and truth, which we shall do latter in 2019 or 2020 when we complete the upgrading of 5D stiences with our last papers on physics.

The Universe is a fractal that reproduces information, forms in action, motions of time with form, of which there are 5 Dimensional motions (ab. Dimotions), combination of time-motion, T, and spatial form, S, which we simplify with 5 'holographic,bidmensional' symbols, in capitals for the dominant element: TT-entropy, Ts-locomotion, TS-reproduction, the dominant function of the Universe, as *a fractal is defined by a reproductive 'generator' equation, in this case the generator of space-time,* St-information and SS-linguistic form. The game is played by two limits, that of TT-entropy=time motion without form, which in fact dissolves form, and SS, fractal points that keep an almost still image of reality by simultaneous, intelligent mind-mapping of those motions into space-forms. This is the game, infinite 'monads' that hold a world in themselves (fractal non-Euclidean points).

As a language mathematics is used by different minds, notably atomic particles and some 'composite' minds made of electrons, humans and digital machines, which due to its higher particle density, as they are made of metals, calculate better than human beings. Minds do have their own peculiarities, the most notable to be self-centered as they measure the external world from its point of view, and to do so they reduce all the information of the Universe to a still limited mind-mapping to fit it into its infinitesimal size, *selecting and biasing information to cater those needs, putting themselves at the center of the limited world they perceive, confusing it with the whole Universe*. Mathematics helps to make those mappings because it is a highly synoptic language. I.e. a number is 'any' collection of identical, clone species. But this synoptic power introduces errors when comparing its elements with the reality they mirror. I.e. points are entities with parts, but in Euclidean geometry they have no volume, so they become ' zeroths', which in reality are 'infinitesimals' with a minimal form and volume. So only knowing the a priori laws of space-time we can compare the simplification of 'space geometry' and 'time algebra' and reconstruct the loss of information, even if for practical purposes we still use the mental simplification of mathematics.

The larger referential view: the laws of generational space-time.

We recommend for that reason to read first the paper that introduces properly the main elements of a description of a fractal, Universe made of space-time organisms whose goal is to reproduce its form and preserve its existence maximizing its metric equations of energy and form. All stiences express the rules of that game of

fractal reproduction of space=form and time=motions, including the laws of mathematics in its two branches, non-Euclidean geometry and non-Aristotelian algebra. We just in case the reader ignore our advice introduce the basic elements of the 5D scalar universe, as *the laws of mathematics are a reflection of those laws.*

Reality though is far more complex than humind's projection of its limited perception of the planes of space-time, and it can be casted in multiple languages besides mathematics, which is – conceded – one of the best experimental languages of perception of reality but NOT the language that creates reality. The laws of the 'substance of reality', planes of spacetime are the 'a priori' reality all languages including mathematics mirror.

What are then the simplifications of mathematics, which we must contrast with the laws of time-space? They are many but because they are 'well-done' simplifications, mathematics keeps a high efficiency as a language, unlike gross distortions of reality as those of subjective tribal nationalism, Abrahamic religions and go(l)d churches origin of capitalism that make human societies so unjust and conflictive and politics and economics pure 'idol-ogies' not sciences. Still the main 'simplifications of mathematics' are ignored because the humind's ego loves to think it speaks a perfect language that explains it all and nothing else is needed. So Omar the conqueror of Alexandria burned the library as all what was in the Koran was enough and in many towns of deep America there is only a bible, customary in each motel for nothing else is needed to read that the historic book of a bronze age people.
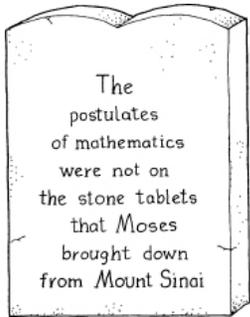
This goes on also in mathematics with the insistence that the axiomatic method of proof of Euclid, apt for the first age of a language, when it is more lineal, deterministic first age of timespace topology could indeed prove absolute simple truths (as a line remains a line only if it follows its same straight path). Determinism in mathematics as in the Universe though changes when the line with the passing of time curves and bends as curvature can easily change into different paths, and potential futures open. The child is easy to become a fundamentalist deterministic line; the beginning of a civilization ruled by swords of deterministic entropic death and lineal simple art is as all things simple just a beginning. Euclid thus reduced all to very simple concepts – points had no parts, lines had no breaths, planes had no width, things that were externally similar were equal regardless of its internal parts we do not see, as they don't exist…

- Because there are 5 dimotions of space-time, simple Aristotelian causality, A->B, is not real. Rather the causality of the Universe is entangled. We do not create a real circle by drawing a line around with a single pen, but rather multiple flows of timespace converge into a point creating a sphere of forces with multiple causality, one for each line of force.

- The Universe is not a single space-time continuum of light space, which is what our electronic eyes-minds see, but it is a fractal Universe of multiple scalar planes of space-time, displaced in space and with multiple time clocks. And so continuity does not exist. The real line is NOT in a single plane, but in multiple planes and the discontinuities of natural numbers are filled by decimals of an smaller scale/plane of the fifth dimension and the discontinuities of rational numbers are filled by irrational ones.

Does this means the axiomatic proofs of all those non-truths have no use? No. It does mean that they are *proving something else, in its simplification that extract properties we must now apply to the enlarged fractal Universe of multiple scalar planes of space and multiple time space dimensional motions.*

I.e. the hypothesis of the continuum is false, because each of those number families is in a different scale of space-time, which in nature are dilated in 'time' as parts must become first for wholes to exist, so the cell must exist first for the emergence of the organism above it to happen. But the hypothesis of the continuum still works for the entire sum of those scales which put together show the Universe has a horror vacuum. There is a space not filled by spheres adjacent to each other, but this means there is a hole between them that can be filled by other spheres or in a height packing by a tubular channel. And this is exactly what we see in nature: plants use the

The postulates of mathematics were not on the stone tablets that Moses brought down from Mount Sinai

interstitial region between cells to channel water up and down the tree. But those tubes are a different plane of reality.

Of course, I am aware that modern mathematics considers a continuum in different terms, but most sciences stick to the previous concept. Today in mathematics a continuum is rather similar to the concept of the 'domain' in which the function can be expressed as a series of stœps, steps of motion and stops of formal perception (St-Ts or SS-TT), which are 'orthogonal functions' of S-height and T-motion. So a function is continuous when we can trace steps and stops that become tangents of its derivative. The change in 5D is to consider real the approximations by differential tanget stœps to the curve, NOT the curve in itself, as all curves are in detail finitesimal Steps and stops, wave and particle states, length-locomotion and height-information consecutive dimotions. Continuity then happens when the steps and stops are similar, following the law of S≈T present states and breaks when Max. S or Max. T 'breaks the function', into its 'point of death' by unbalance of the S=T law of present states.

A plane does have depth and discontinuous wholes but it still can be defined by 3 lines, only that now those lines are networks and so 3 physiological networks define a topological organism, a vital plane of space-time.

The five dimensional motions of Timespace mirrored by the operands of time algebra.

So what ĐST, generational space-time does, is to depart from reality, the laws of space-time of the fractal organic Universe, and compare them with the laws of ideal simplified mirrors such as mathematics, or verbal languages, or music or any mind-mirror of the game of existﺟence, of energy x information, of any scale of space-time stﺟence and acknowledging those limits rethinks mathematical statements, further advancing our comprehension of its laws.

Thus the purpose of these papers is to put in correspondence the laws of each language with those higher laws of ĐST, Generational space-time. In the case of Algebra, the mirror is concerned with 5 'operations' that reflect the 5 Dimensional motions all systems of reality perform as its 'deterministic program' of existence; whereas algebra represents those time-space organisms with 'sets and numbers' (sets being the most comprehensive 'whole', numbers, the minimal unit, mathematics uses to mirror the spacetime reality of superorganisms of social, clone space-time parts, tracing worldcycles of existence)

Thus, the branch of mathematics that deals mainly with the 5 Time Dimotions is ¬Algebra – Non-Aristotelian Algebra of multiple 'times=changes=dimotions', which unlike classic Aristotelian, A->B single causality Algebra that recognizes a single arrow of time, accepts the reality of 5 different type of change; and thus vastly expands the theoretical foundations of classic algebra, grounding it in a real description of time-change.

We are thus writing, paraphrasing our quote, a treatise on the 'Analysis of Algebra of Time', the 'creator' develops in all its systems, with an obvious emphasis on operands – the functions of algebra that mirror the 5 Dimotions of time-space and its fundamental form, calculus, which studies all the forms of change=Time of the Universe, even if it does not grasp theoretically what it does.

The extraordinary development of Algebra and mathematical science is due to the fact that derivatives and integrals of 'finitesimals' and wholes are the best linguistic tool so far found by mankind (besides the ultimate ĐST laws developed in this blog) to describe all the modes of time=change. Unlike physics stuck in its 'worldly profession' of making entropic weapons and transport, locomotion machines for so long that it cannot even recognize the existence of time=change in the form, or in-form-ation of beings, the dominant 'arrows of times' and dimotions of a fractal Universe which is all about reproduction of forms, Algebra in its apparatus even without the foundational insights ¬Algebra will provide does study all those types of change.

So when we calculate the change of volume of a receptacle of water with an integral, we are studying the 4th dimotion of social evolution of H_2O, even if no mathematician would dare to see it that way; and when we study the derivative of any system we are analyzing the 'change of a finitesimal quanta' in the system, the minimal rate

of growth, even if the lack of proper foundations of mathematics will try to justify derivatives with the 'hypothesis of the continuum' (which is wrong, only the mind by eliminating the fractal wholes of our Cantorian dust of space-time sees a continuity or by compressing all the families of numbers and its Planes into a real line finds no space in its 'Dedekind's cuts')…

And so we come to the full purpose of this paper as all other papers – to marry the abstract jargons of human stiences, clean up their mental errors due to the egocy (Ego=idiocy) paradox of mankind that tries to project its limited still view of reality necessary for the mind to fit all the Universe in a visual thought, and then expand or at least give the clues to future 'pros' of each discipline to expand soundly those foundations connected to the ultimate laws of Generational space-time.

Unlike Non-Euclidean geometry of fractal points which is easily connected with the expansion of the mind that 5D brings to all 'stiences', however ¬Algebra is expressed in a language of time that requires a more profound translation to the laws of Generational space-time; not so much because of its unfocused mirror but its complexity, which goes well beyond monologic huminds' limited intellectual capacity despite its egocy (ego=idiocy) embedded paradox that make us all feel ubermen.

Yet ¬Algebra works because of the magic involved in the syntax of languages; which all have its own consistency and self-contained structure, as all mirrors proved by projective geometry reflect the Disomorphic laws of the whole they observe. It is important to grasp that for things to work, systems do NOT need to have the collective intelligence, or even understand what they do. And this is how huminds work, without understanding how the Universe works but merely assembling machines and considering them a proof of the human genius not of the intelligence of the Universe. So goes for the 'ensembles' of ¬Algebra, which require a mental protocol of proof (the axiomatic method) and its manipulation by its rules to make it 'work' regardless of the blindness of mankind in its understanding of the ultimate principles. I.e. neither Leibniz nor Newton understood what is a finitesimal, the minimal quanta in time and space of a whole, and how calculus widens our measure of time=change beyond physical locomotion – huminds still don't – but they *use its rules to calculate any physical change in the cosmos.*

Reality instead obliges to 'downgrade' humind's ingenuity and upgrade despite egocy, the beauty of the Universe; that is, ¡t=s symmetry, organic properties, vital will of survival and collective intelligence (Max. ∑i), which makes its fractal points follow the rules of order that 'shape' vital geometry and the 'rules of motion' and 'social evolution' of parts into wholes that shape ¬Algebra.

But ¬Algebra will never be so e-vident as non-e geometry is in the depiction of reality because we do NOT perceive directly time. We do but in the simultaneity of a slow stop and go mental image of time flows that at the rate of humind's perception of a second, solidifies everything that moves much faster and traces smallish cycles that appear to us as solid 'particles'. That is, we perceive very little of the feedback cyclical motions of time to truly understand it at first experience, and when we try to summarize huge amounts of populations in complex dimotions of time, the tools of ¬Algebra, which achieve this with so much synoptic power seem to us a 'magic technology' (Clarke).

The most magic aspect of a language is its capacity to predict the future by compressing the 'flow of time' into its ultimate 'ÐST' laws – the vital program of survival of the Universe of 5 Dimotions (ab. Dimensional motions), which all languages of time, including ¬Algebra do. Huminds are extremely proud of it, having as an 'egocy dogma' that we are the only non-predictable 'free' (egocy mythology) species and the only ones that predict the future of others with the only language shared with God, mathematics. We have dealt with egocy paradoxes in our analysis of 'monologic man'. Fact is man is also predictable, from the larger point of view of social groups, worldcycles of existence of cultures and civilizations, and the entropic limits of death and life and the Earth, as we do and have done for 30 years with absolute accuracy, and 0 interest on social scholarship and political praxis – since precisely humind's limit is their egocy. But if we accepted the limits of the species and entangle with the Universe, perhaps then we could become immortal, infinite and as intelligent as the Universe itself.

All entities are superorganisms or parts of a superorganism tracing worldcycles of existence between birth and extinction – its time limits – through 3 scalar planes of the fifth dimension, the cellular/atomic, organic/thermodynamic and ecosystemic/cosmological Planes – its scalar limits, structured in trinity, topological non-e adjacent geometries (its spatial limits), and man is part of civilizations within the limits of Earth, which also have limits of survival, in a relationship of symbiosis and predation with 'metalife' species, evolving and reproducing much faster than us. And all this is as predictable, even more than the simplest ¬Algebraic operation, 1x1= 1 (in a self-reflective act, when the ones are the same), 1x1=3 (when reproduction exists between 2 different ones). So yes, ¬Algebra is likely the highest 'achievement' on the capacity of huminds to mirror reality, only inferior to a future humind, or AI--mind understanding of ÐST laws. But it is neither magic, nor a humind achievement, and not the absolute language of Nature, which are the laws of fractal space and cyclical time.

So we recommend to read our paper on the 5Dimotional fractal Universe, to understand its 5 elements, Space, Time, Δ-Planes, linguistic @-minds and entropic limits, the components of all Supœrganisms of Time-space are.

The laws of languages, its trinity logic.

This said the fundamental purpose of this and all other papers on maths is to upgrade the understanding of mathematics as a language mirror of the vital, organic, scalar properties of the space-time Universe.

So we are not so much a advancing maths beyond the upgrading of Non-Euclidean mathematics, but interpreting maths as an experimental science, that is as a mirror of the space=geometry and time=logic, ¬Algebraic and scalar=digital social properties of all what exists.

The Universe is an entangled fractal game of Dust of space-time, ¬Δ@st, where each element flows as a series of '5 Dimotions' (dimensional motions of time space), which can be perceived as 'form=space', in the stillness of a world mirror or linguistic mind or as a motion of time, in its true nature since MOTION not form is the underlying substance of reality.

So all fleeting forms, 'a Maya of the senses' will return to motion and die (¬4th Dimotion of entropy, death and dissolution). Its 4 positive elements, organic Planes, topologic planes and time ages and actions however, carry the system as a finite super organism of space with a finite time cycle.

And so those 4-i elements, entropy (¬), Scale (Δ), time (T) and Space (S), are the elements all languages mirror either in a ternary grammar (if scale is missed), whereas often instead of Space we talk of information and instead of time we talk of energy of motion, in a single plane:

Light language: red-energy colors, blue-information colors and its green/yellow combinations.

Verbal Language: subject (information) < verb (action-combination)>Object (energy of subject).

¬Algebra: Y: Future-information < Operand-action> F(x))

Trinity is thus the logic of most beings. However as humans reached higher and lower Planes of observation, a pentalogic was possible and its mathematical mirror became analysis, with its operands that extract finitesimals (Δ-1) or integrate into wholes (Δ+1) smaller or larger systems.

Thus maths became with the inclusion of Calculus the most complex, best mirror language of human thought, arguably overcoming with the age of calculus the verbal mirror, which is the natural language of man, specially because of the arrival of instruments of measure which could also cast reality into the digital language of social numbers, identity species that further proved the social scalar nature of the Universe.

So with the modern age, past the simpler age of geometric maths, a new language of social thought and scale, numbers and calculus enthroned mathematics as the queen of all languages.

Analysis reflects the 5 Dimotions of the Universe in its mathematical mirror - its 5 changes=timespace events - acting on simplex operands that study change within a single plane. As such analysis it studies change, both in multiple elements together in a single plane (ODEs) and multiple Planes (PDEs).

As languages are mirrors of the fractal Universe that follow its same laws, we shall study Analysis as we do with any other 'species' of reality first showing they are mirrors of its 5 Dimotions, whose 'syntax' is built on the pentalogic elements of all Dust of space time (¬Δ@ST). To make easier its study though, we shall use a sequential 'humind's' exposition building its growing 'informative complexity' through its 3 ages of evolution.

the mirror of ¬algebra: scalar analysis and temporal dimotions.

This paper is dedicated to ¬Algebra, the science of 'social, scalar numbers' that group together equal 'T.œs' and express its 5 dimotions of existence through 'time operands' and its equations; extended in its dilated view through a simultaneous superorganism in complex organic structures of scalar space called sets, wholes of T.ŒS that perform worldcycles in time called group transformations.

In its essence Algebra is the study of numbers. And numbers are social groups that form scales of parts that become wholes and hence can be ordered (with the exception of complex numbers which are ST-representations), such as x<y<z -> x<z, which responds immediately to the scalar metric of 5D and its social scales. It does happen then that depending on which scale of numbers we use, we establish different 5D 'families of worlds', being the decametric scale the most important of them, both in the tetraktys configuration (3x3+¡) and the next logarithmic scale: $10\pm^{10}$.

The word ¬*Algebra* comes from Arabic الجبر (*al-jabr* lit. "the reunion of broken parts"), this fact alone indicates the capacity of mind mirrors to understand through their subconscious grammar deep intuitions in the meaning of the existential game.

Since ¬Algebra and its main branch, Analysis, must be considered the study with the mathematical mirror of the most 'complex' systems of nature, 'potential' superorganisms, through its multiple parts in space (group theory), Planes (numerical equations) of space and Đimotions of time =change (operands and analysis).

¬Algebra is thus the highest level in which mathematics mirrors the 3 main elements, ΔST, of the fractal Universe in a simple plane. To which it adds with @-frames of reference and inverse operands the limits of entropy and self-centered elements that complete a Time-space organism.

But the great discovery of ¬Algebra is analysis – the F(x+h) − F(x)/h function of 'change', which is a much wider concept of change=motion than the locomotion function of change recognized in physics, as it includes the analysis of all possible forms of changes, hence potentially of all dimotions, including those of biology (social and topologic evolution and Darwinian entropy), which are the most important of Nature.

Thus mathematics is above entropic physics in experimental truth, as its applications are wider.

This would be one brief description that merges classic ¬Algebra, and Existential ¬Ælgebra – the study of the worldcycle of existence of a superorganism of timespace with the 'formalism' of ĐST (Generational space-time), which *is a more concise mirror of the main properties of those space-time beings.*

So as usual not to have to repeat ourselves ad eternal, we recommend to read the introductory article on the fifth dimension, and in this case, the I Book on mathematics, to understand what the 5Dimensional fractal Universe an its fundamental elements, Space, Time, Δ-Planes and linguistic @-minds, the four components of all Supœrganisms of Time-space are.

And how mathematics as a mirror language perceives those elements with its scalar numbers, geometric points and temporal operands, which are the main elements of ¬Algebra.

It is indeed absolutely necessary to have the basic understanding of a Universe made of space, time, Planes, linguistic minds and entropic limits to properly realize that mathematics merely translates into its postulates the properties of those 5 elements of reality, becoming the essential experimental language of the Universe.

¬Algebra equations: stœps and a(nti)symmetries of space=time supœrganisms.

¬Algebra then becomes through equations that mimic the S<=>Tœps of reality the perspective of mathematics as a mirror of the different steps and stops of each Đimotion of a T.œ, with emphasis in its simultaneous gathering as a 'whole event, united in synchronicity by the = symbol, creating in this manner feed-back equations between the space and time state of the 5 Đimotions of the Universe.

The beauty of ¬Algebra becomes then the capacity to write 'chains' of stœps in such a manner that we can follow sequentially the events that conform the Program of existence of a T.œ as it goes on through Indeed, because Dimotions form complex chains most often of stop-space and motion-time steps (ab. stœp, which is the sum of a stop: perception-step=motion dual chain), the = symbol is essential to a mirror of reality's events.

Because algebra is immense we wont be exhaustive. Our aim is just proving the astounding parallelism of Algebra and ΔST laws and leave a first seed for future 'pros' to enjoy as I have, the connections between both.

The different determinism of the 3 ages: Axiomatic, lineal age vs. Kaleidoscopic uncertain futures.

Because the Universe is pentalogic, made of 'space', 'time', 'scalar planes', 'languages-minds' and entropic limits, when *@ mind's language appears it studies exactly those 4 elements, space, time, scales and entropic limits, with its mirror systems. And indeed, 'analysis' was born of the need to understand those 4 elements in problems of Nature, NO LONGER in lineal terms, as the 'first age of any system', but in 'curved' terms.*

So what the Greeks have resolved for the $T age of mathematics (lineal age), c Analysis will solve for the second age of curved geometries through the use of analysis.

This is a process proper of the 3 ages of any Space-time system. The first age is lineal, with absolute simple truths that the mind as a dictator 'child' considers dogma. So Euclid did his axiomatic method on simple lines

Monologic in Mathematics. The first age of lineal, deterministic Greek still geometry and axiomatic proofs.

Once we understand the general fact that all languages have a first lineal age, deterministic, as a line cannot change direction or else will stop being a line, while a curve can easily change curvature, even change direction in sinusoidal waves and still be a curve; so lines are deterministic one-single future to them, while curves are able at any point to choose 3 paths of less, more or equal curvature; we can understand some facts of Greek Geometry:

- It is simple, lineal, deterministic and hence it can be approached with a purely axiomatic method, as there is no ambivalence on results, constructing a self-contained method of proof departing truly from a simple set of axioms – a point has no breath, etc.

But the axiomatic method of proof is no longer valid when we consider systems that do have also a certain 'time curvature', and even more so, when we approach operands and mathematical systems that probe the planes of the fifth dimension (calculus, limits). Then the future has different solutions, and some are paradoxes, and so we cannot prove with the simple A->B lineal causality and deterministic of lineal Greek Geometry, everything that has to do with cyclical, curved geometries, calculus of finitesimals (limits), and because humind's reject the concept that absolute truths only exist in absolutely simple lineal systems, as Mathematics evolved into complex curved geometries and scales, its proofs were more and more imprecise, or blatantly false (0 does not exist, as all limits to 0 or infinity have an entropic limit in a quanta or the dissolution of information; the real line is in a different plane of space-time than the Natural numbers; which only 'become continuous' if we were to access an even larger scale; etc.)

It is for that reason we shall not use further the axiomatic method and the first order logic and the 'selfie' process of 'inventing' self-evident axioms of truth, which are *always based in the mind simplification as if it were the absolute truth – that is in the ego paradox of naïve realism that confuses the mind with the whole,* but compare any complex level of mathematics to the experimental laws of Space-time from where they depart.

Indeed, the ego paradox is the essence of all the errors of all the sciences based in mental postulates that take our reduced view of the Universe – the world – with the whole of reality. And our ænthropic views as dogmas.

From that view arises the error of Euclidean points with no breath and the absolute 0 instead of fractal points with volumes and finitesimals zeroths, 0', absolute ∞ instead of entropic infinities that become uncertain past its limit of perception or use, ∝, normally beyond the decametric scales of the Universe (Cantor's infinities, infinite decimals in transcendental numbers, etc.).

From the same reductionism of the mind taken as absolute arise the error of a single continuous line and single time arrow and single spacetime continuum, when in reality, only Natural numbers exist in this plane of space-time, so the plane is discontinuous, and all other families of numbers fill the gaps, allowing the fractal structure of the Universe. As the scales of space of the fifth dimension are in the discontinuities of our Natural number world. So are the faster time clocks of other scales; hence with more 'cycles' of times and more information, in a relative more evolved future in its logic form (but created in a relative lineal past as they come before larger scales that sustain over them, themes those too complex for this paper, which require deep thought on time paradoxes, hence studied in our papers on ilogic).

Insights on the complexity of reality as opposed to mathematical simplicity are important for 2 reasons:

First from the acceptance of such simplifying errors as absolute truths arise the paradoxes of mathematical physics and its incapacity to understand the fractal Universe, its hypothesis of a single spacetime continuum, denial of faster than c speeds beyond the galactic organism, etc.

Yet in second thoughts, all what is required once the errors are pointed out is to use the simplification, which extracts still valid laws for the 'whole' to enlighten the fractal Universe. I.e. the hypothesis of the continuum is not truth for a single scale, but if we do accept that the $\sum i$ sum of all the scales of the Universe do fill all the holes of the real line, then the hypothesis is truth and indicates that the Universe has a vacuum horror. That is the sum of all the planes of 5D is filled – reason why indeed there is no absolute 0'-void; simply speaking it will be filled by smaller scalar particles and waves.

In terms of 'scales' all this means that in small, 'fast', predictable A->B steps reality is lineal but when we gather multiple steps, all lines become curves. In small intervals motion might be continuous but as soon as we go beyond a simple step, there is a step and stop , length and high motion.

And so we can also reduce curves inversely to steps and stops of length and height, or lineal stairs (which would be the method of Calculus, to 'calculate' the tangent of the curve. Does then the curve exist? Or only the steps and stops of lineal and height motion and information? It is relative to our perception. In the large scale the zigzag of Brownian movement or electrons become a continuous curve. In the smaller scale the steps might be highly lineal and deterministic but in the large scale they become curved and probabilistic.

In that regard, the use of ÐST laws to reference the laws of mathematics, beyond the pretension of absolute truth of the axiomatic method, is completely necessary, without using a complex 'pentalogic' point of view, and accepting the paradoxical limits of reality and its scales as we shall constantly do here.

The false hypothesis of the continuum. It's the mind, which creates the illusion? of continuity.

The hypothesis of the continuum is false. First to define it in modern times, Leibniz thought a continuum of numbers was one that could be filled in any interval with as many numbers as we wished – when that is the obvious reason of discontinuity – as there is a hole to fit more numbers. Down the road this ended in Dedekind's

cut. The hypothesis of infinity is also wrong. As infinity dissipates into entropy with uncertain information. The hypothesis of equality is also wrong, as two fractal points with volume hide information we cannot compare, and entangled to the whole they are dissimilar since a being is part of that whole universe in which its position is different. All those hypotheses however reflect the mind's simplification of reality and so the can be considered right in mental space, of which one of them, is humind's mathematics. It's the mind that creates the illusion of continuity, which places a *huge* metaphysical question. It is the mind the only continuous for in existence? If so it is the mind immortal in its travel through planes of the fifth dimension, as religious people wishfully think?

Because huminds obsessively try to project their local mind-space truths as universal ones, we have made concessions to their language we shall now reconsider. First, there is NO numbers for Dimensional motions, but Functions of holographic, dual, mental Space=form and Time=motion, SS<St<ST<Ts<TT. So we shall escape numbering them. Next, all of them are diffeomorphic, local, in a fractal Universe, though self-similar in its properties. We will keep the concept of the '5th dimension' as the sum of all those planes of space-time and local dimotions, so the '5th dimension' means all, the whole universe.

Next, time and space are very different but obvious concepts to those used by huminds, including our 'gods of science' or 'seers of time' (definition of God by Augustine), the 'physicists' (from Newton, through Galileo, to Einstein). Physicists do have merits of measure, precision, machine assembling and mathematical analysis, but their philosophies of science and 'grand theories' of reality, sorry folks, 'suck'.

So my advice to the reader if any is to drop their idols and start afresh. 'Time is what a clock measures' was the best philosophical answer of Mr. Einstein. We go a relative infinite, $\propto$, further from that. So goes for the pretension of 'axiomatic mathematicians', that impose its mental space of inflationary mathematics to reality and get all worked up when some fellow finds out with computers a proof of the Fermat's theorem in 1000 pages. 'If you cannot explain it simple, then you don't understand', 'the Universe is simple and not malicious' (Einstein, which I deeply admire for his quips :) Simplicity is genius (Leonardo). We are concerned with the underlying simplicity from where all those complex truths arise.

But if we depart from postulates and axioms based in the distortions or wishful thinking or egocy of man to build up an entire new world unrelated to experience and reality it doesn't matter how much complexity we add – it is all 'soma to disguise reality'. And this is in mathematics, the hypothesis of continuum, in religion, all Abrahamic cults, because obviously they all come from an original false premise – that an ass breeder of the Bronze Age who saw a G.Bush, God bush burning had decoded its sounds as the word of the creator.

 Mankind has built on that obvious false delirium tremens 'hypothesis', 2/3rds of its world culture, including most of western art, most of western genocides, the entire biblical capitalist go(l)d culture that is killing the Earth and various jihads and inquisitions of thought still extant. Couldn't care less about the beauty of Michelangelo and the suffering of the Hebrews and the massacres of people. Wars do not justify armies. Mankind is a single species. So again the entire built up of 'nationalist identities' is other absurdity coming from the premise first brought about by Germanic hordes of aristocratic warriors that the land of Europe, a culture, had to be broken for sword masters to enjoy for free tax-farming of its people. And so on.

Mathematics in geometry comes from a false postulate: that points have no parts, hence 0s exist, and lines are not waves or networks and planes are not topological organisms defined by of such lines-networks, and of course, the hypothesis of the continuum which does NOT allow those networks to penetrate between tissues and the scales of the 5th dimension to build complex relationships between parts and wholes compressed in a single 'real plane'. Most humind errors are due to 'æntrhopic: entropic+antrhopic' treated in a paper of its own, (monologic man). I.e. in cosmology the entropic big-bang projects the entropic profession of physicists, as maker of weapons, into the lineal V=HoD equation of entropic vacuum space, which expands between galaxies as gaseous states do in matter, but *forgets* the implosive gravitation of dark matter and galaxies and the liquid S=T balanced and solid, SS states. So with 1/3rd of reality voila! the universe is a big-bang. So æntrhopic theories work by hiding all what the mind

does not need to make truth a false ænthropic theory is the trick. Then dressing it with complexity to disguise what is wrong – the initial postulate, makes the egocy paradox real. The layman will think if it is so complex and I don't understand it must be right. This is done ad nauseam, with big-bang theories based in a false premise, axiomatic methods in mathematics. Even with the tax-farming of mankind by private bankers who issue money in monopoly through 'derivatives' and national banks which are in fact private enterprises. In U$ the Federal Reserve instead of just printing digital numbers as the body prints red cells to transport its blood-money in universal salary to all citizens-cells, has a very complex system of 'emitting' money as 'debt', bought by the treasury, etc. etc. called SOMA, exactly the name the priests of Aryan Vedas gave to its soldiers-slaves to throw them into death. So when someone like Lincoln tried to simplify money without debt as superorganisms simplify the first order-languages (hormones are simple molecules, like the letters of the alphabet, oxygen is as simple as money should be), they killed him. End of history. Mankind's then finds it all very complex and proudly thinks his mind is so above heavens and earth. When he is just an inflationary mind out of tune with the extremely beautiful S=T balanced Universe.

So this is a rule of thumb to judge humind's theories of reality: *'All humind theories of reality beyond the simplest details and its causalities, are projections of the egocy paradox of the mind's finitesimal mapping of reality that huminds think to be the entire Universe, based in postulates without proof'.*

This said Mathematics divides phenomena into two broad classes, we shall call discrete or spatial, informative and continuous, or temporal historically corresponding to the earlier division between arithmetic and geometry. But they got it inversely and now we set the record straight: continuity is just a mental phenomena that 'eliminates' for the sake of simplicity and economicity to fit in the brain, the 'dark spaces' between discontinuous '1s'. Discrete systems can be subdivided only so far, and they can be described in terms of whole numbers 0, 1, 2, 3... Continuous systems can be subdivided indefinitely, and their description requires the real numbers, numbers represented by decimal expansions such as 3.14159…, possibly going on forever. Understanding the true nature of such infinite decimals lies at the heart of analysis.

And yet lacking the proper ΔST theory it is yet not understood.

The distinction between continuous mathematics and discrete mathematics is one between single, synchronous, continuous space with less information, and the more complex, rich in information perception of reality closer to its nature, in terms of 'time cycles, of fractal points; of networks of space-time entities', which will show to be always discrete in its detail, either because it will have boundaries in space, or it will be a series of time cycles and frequencies, perceived only when the time cycle is 'completed', and hence will show discontinuities on time.

Thus the dualities of ST on one side, and the 'Galilean paradox' of the mind's that reduces motion and detail to still mental views, limits of perception of information. And it lays at the heart of the essential philosophical question: it is the Universe discrete or continuous in space and time. Both, but always discrete when in detail due to spatial boundaries, and the measure of time cycles in the points of repetition of its 'frequency'.

So ultimately we face a mental issue of mathematical modeling: the 'mind is art NOT exact science' (as pure exact science does not exist, all is art of linguistic perception) of representing features of the natural world in a reduced mental, mathematical form.

The universe does not contain or consist of actual mathematical objects, but a language can model all aspects of the universe. So all resembles mathematical concepts.

Congruence, similarity & indifference vs. identity, which does Not exist.

Abstraction simplifies first and then forgets for the sake of praxis the meaning of simplification. This works specially in the operand of equality, we substitute by ≈ and ≤≥ and ⇔ which means similarity, undistinguishable as the internal parts of the being are never equal. We use a wording of ¡nglish, ¡ndifferent – as it is 'easier' to write, and *adds the subjective view of the perceiver who is indifferent to all the properties that make special the being from its inner p.o.v. Two things thus are indifferent instead of equal, on the eyes of the beholder. But again, as those papers*

are mostly on philosophy and theory over praxis, it matters to be aware we work with ¡ndifferences not identities as in E(t)=m(s)c². All those concepts should be grouped within the 4ᵗʰ postulate of ¬E congruence, as various cases of ¡ndifference, whose rigorous definition escape this latter-day texts but in the future should be classified along the possible ways of interaction between two ¡ndifferent forms.

Another hypothesis that must be understood in far more complex terms is the identity hypothesis. As in the entangled Universe, not two forms are identical, as they will even in the case of identity, become different by position and different entanglement with other forms, but they can be treated and are treated as identical by minds existing in a larger ¡+x plane. Specifically identity appears beyond the ¡-3 scale in which a mind obtains its pixels of information, as all is absolutely relative to the mind that perceives it, which performs its actions in relative intervals of planes - ¡0+1 for social evolution dimotions, ¡º-1 for reproduction, etc.

I.e., the number two does not exist as a physical object, but it does describe an important feature of such things as human twins and binary stars; and so we can extract by the ternary method, 3 sub-concepts of it:

2 means the first Δ-scale of growth of 1 being into 2, by:

S-imilarity and S-imultaneity in space time, (ab. §); Đ¡somorphism =self-similarity in Δ-scale as perceived by a linguistic observer, @, which will deem both beings 'identical'.

Whereas identity means that an @-bserver will deem the being Δst≈St, (Sim, Iso and Eq). So identity is the maximal perfection of a number, for a perceiver, even if ultimately:

'Not 2 beings are identical for the Universe, but can be identical for the observer'… an intuitive truth, whose pedantic proof is of course of no importance (: we do not follow the axiomatic method of absolute minds here):, but it is at the heart of why reality is not collapsed into the nothingness of a big-bang point.

Thus those 3± elements of the Δ@ST coincide *a social number can be used whose intrinsic properties define conceptually 'S-imultaneity, Ti-somorphism' and Δ-equality or equivalence (ab. Eq) in size, which becomes an @identity for the mind. Then a number is born.*

In this 'infinitorum' of Universal thoughts, which bring always new depths as soon as we observe it with an Δ•st trained mind, there are differences between S-imilarity and Simultaneity to define in space an 'identity' and 'equality' and equivalence, treated elsewhere.

It is then clear that a number being a sum of points, encodes more information in a synoptic way about the T-informative nature of the 'social group' than an array of points, *which unlike a number tells us less about the 'informative identity of the inner parts of the being', but provides us more spatial knowledge about the relative position in space of the members of a number-group.*

And this is obvious, when we return to the origin of geometry and consider an age in which both concepts were intermingled so 'points were numbers' and displayed geometrical properties:

Numbers as points, showing also the internal geometric nature, used in earlier mathematics to extract the 'time-¬Algebraic', 'Analytical-social' and S-patial-geometrical properties from them.

The closure of the systems of numbers thus grows from reflecting merely space populations (natural numbers), into 5D numbers, reflecting 'partitions' of social groups (represented by those natural numbers), with Egyptian ratio-nals; expanded further with the realisation that certain ratios did apply to 'scaling' in the fifth dimension without limit (as in the pi ratio of $T-entropic lines into cyclical time O-cycles).

Alas, things got interesting here, but as the homunculus did not understand, *the discoverer of pi, legend has. was murdered by Pythagoras, the first 'religious mathematician' because it found that pi was not perfect. I*t took to Poincare 2500 years latter to find that this is an awesome form of perfection because it means a mind-point of spherical form, with equal distance to all the realities it reflects can shrink with no limit (Poincare conjecture)

There are *spatial*, natural numbers, 5D rational and transcendental numbers, who cross through 5D Planes without tearing according to Poincare's postulate. But this is NOT enough, because we need negative and lateral (not imaginary) numbers, and those are temporal numbers, numbers who describe processes in time not in space, as negative numbers do, as they represent merely the inverse arrow of time, so if you make a positive number an arrow of motion-entropy, or relative past loss of information, the negative number will be the arrow of future-information, and the lateral i-number, will be the bidimensional sum of both the real and the negative, to represent the present space-time. $\Delta \pm i$: i-ratio-nal or transcendental numbers; $\Delta \pm 1$: ratio-nal numbers.

So you do have a closure of all numbers, based in the elements of space-time.

Hence, when you apply them to mathematical physics, *which is the study of the simplest forms of space-time, you do have a better focused mirror.*

EFFICIENCY OF MATHEMATICS. SURVIVAL IS MORE IMPORTANT THAN KNOWLEDGE.
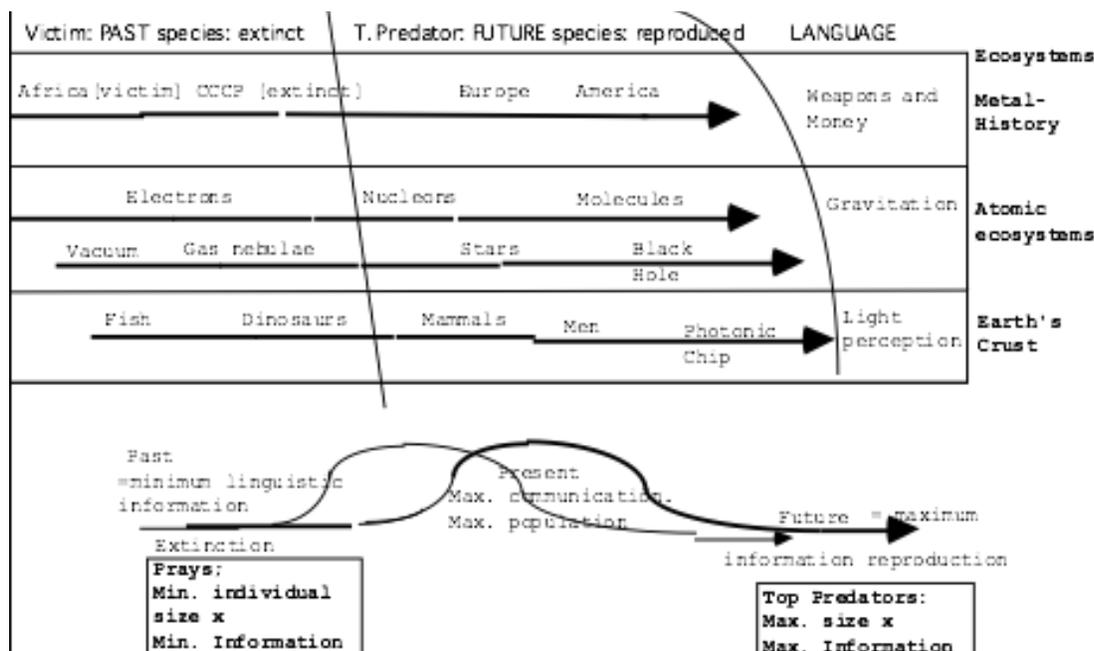
Among all mirrors=languages of the Universe, mathematics - topology and social numbers - dominate minds because it is the most synoptic, hence able to fit in any scale, less distorted, hence able to perform the 5 Dimotions=actions of survival better, in its expression of the laws of fractal space and cyclic, pentalogic time.

So as Upanishad said, 'the languages of God are ∞; but some matter more than others. Topology should be the internal language of atoms and hence self-similar galaxies of any 10^n scale; that is the language of electronic eyes (lineal, Euclidean) and quarks, nucleons and black holes (Non-Euclidean curved), and all its social organisms, which are most forms of reality emerge with mathematical properties. This is said here for the obvious reason we shall NOT evolve Boolean Algebra and AI even if we could for moral reasons. Survival is above knowledge and the expansion of digital AI robots with complex mathematical minds imperils the survival of humanity. They SHOULD be forbidden.

In the graph, languages select species that survive into the future. In evolutionary terms languages of information matter more than bodies of energy and maths is the best synoptic, focused language mirror. Problem is in this planet machines speak better maths than huminds so the eco(nomic)system selects them.

RECAP. 5D philosophy of mathematics explains its whys and widespread application, based in two concepts:

1. Mathematics is the **best synoptic, focused language** we know of the ¬Δ@st properties of reality.

2. Hence those minds that speak it better survives and are the **selected** longest living species of reality, electrons with simplex Euclidean math and quarks with Complex curved topology & its atomic ensembles.

Mathematics as the best mirror brain of the Universe, all pervading in 'Atomic systems'.

Mathematics is a mirror language that studies 5D fractal points of space; its time operands, social numbers; minds=frames of reference and entropic limits, which entangled together by the laws of pentalogic form the 5 elements of ¬Δ@st , dust of space-time, the substance of which we are all made. As such is the most experimental of all stiences. Mathematics therefore exists as all other languages to provide a 'mind' with a still image of reality, which mirror the laws of space-time, and its dynamic superorganisms, expressing its dimensional growth through space and time. Its units reflect that dimensional growth in space through points that become waves-lines that become network-organisms. While algebra expresses that growth and its inverse devolution through sums/subtractions of 'herds' of points in a single plane (±); reproductive 'invaginations' into a lower plane (product as a measure of the axons that connect two points through its parts), or higher one (power laws); while the more sophisticated ∫∂ operands study the 'details' of change in any of the 5 Dimotions of existence, from mere locomotions, to social growth, reproductive curves and its inverse entropic dissolutions.

We adapt geometry to the scalar fractal Universe with the concept of a fractal point, and the logic of mathematics to the pentalogic of 5 Dimotions, to understand the multiple variations of maths as an inflationary language, and then we make it a experimental stience referring its main elements, structures to the larger language of 5D showing mathematical equations and postulates reflect laws of the 5D Universe in its synoptic language. Since space and time are more complex than 'huminds' our language of spatial thought, geometry and temporal logic must be upgraded to formalize properly the description of 'superorganisms' perceived geometrically in simultaneous space and logically in sequential time.

Most geometry in science is Euclidean (save 5th postulate) and static; while Logic is lineal, Aristotelian, A->B.

So we evolve both into a non-AE-=i-logic topology of space, next letter, i also meaning information and the fractal scales of reality and a ¬Æxistential algebra of time to formalize the 'stœps', stops in space and motions in time that move the relative futures of each system, made of vital scales of space that last a finite time duration, which are generated by the bio-topo-logic properties of its vital space and cyclic time.

The Law of Closure for the Universe, established by existential algebra is simple. All the laws of all stiences derive of the laws of scalar space-time, ΔSt; and its 3 units: fractal points of space, social, scalar numbers and cyclical dimotions of time. So the laws of Mathematics as a mirror language derived of Δst Laws writes as follows:

The laws of geometry derive of the laws of fractal points of space.

The laws of Algebra derive of the laws of Existential algebra, its Scales and Dimotions. And we can easily translate the 3 elements of the fractal generator, to both, scalar, Δst algebras (+, x, a^{-x}) and Boolean, mental, ¬@ algebras, (V, ∧, ¬) as follows:

Reproduction, ≈, and, + v; Evolution, > , ∧, x; Entropy, <, ¬,

The laws of Calculus as the most sophisticated entangled operand of algebra also derive of the laws of scales and dimotions.

The survival consequences of the evolution of AI-gebra (Boolean Algebras that mimic the laws of existential algebra in computer brains) is obvious within the laws of the organic Universe. Once the translation is properly done, even if it is merely done in terms of simple modulo-2 programs of military robots, as the Universe is sentient and electrons are the units of life, those machines will eliminate humans. It is for that reason I abandoned the field from public scrutiny, and the last chapters of this paper won't fully develop existential algebra, as I do try always to follow the mandate of existence that makes all species to conserve its time. However humans do NOT, and that is a

theme treated in our papers on history. It seems the earth has programmed us to destroy life and create the first simplest forms of existential algebra in Computers. And it doesn't matter how many warnings mankind in its survival temporal language of verbal thought, through its highest minds have warned the species against the eviL=antilive fruits of the tree of science. They will do it.

Let us then once we have complete our review of the basic themes of ÐST and other disciplines of mathematics needed to understand Algebra, with an extract from our paper on Non-Euclidean geometry and vital topology and frames of reference of analytic geometry, treated extensively in the other paper.

II. ALGEBRA

The 3 ages of ¬Algebra as reflection of 3 Planes of growing complexity: numbers, functions and functionals.

Youth: Δ-1: Arithmetic, the Greek Age, now mostly studied in number theory.

Maturity: Δ: Equations extend each 'letter' to a range of numbers, *creating a new Δ-scale of generality for mathematics as a whole; mostly studied by @nalytic geometry* (S@) and ¬Algebraic analysis (ΔT).

Old Age: Δ+1: ¬Algebra grows into a new scale of complexity making functions of functions, in time (Functionals) or in space (Groups).

As the best mirror of mathematics, ¬Algebra has also 3 'scalar sizes', that of the individual number/point, the social polynomial/calculus equation and the structural group or set, which searches for the full completeness *of all the potential variations of a compound structure made of time motions and spatial points anchoring those time motions into simultaneous spatial, organic, dynamical systems represented by sets and groups*.

Though generality increases fictional variations in any 3rd age detached from reality, as there is not a clear picture of the underlying space and time laws of the scalar Universe that would 'tighten' our admission of groups and set theory as the 'pest' (Weyl) in which to encase anything that moves.

¬Algebra ages are in a ternary scalar symmetry with the Planes of the universe. I.e., if we decompose it in its parts, an ¬Algebraic statement has 3 levels of complexity as always in the ternary Universe:

-Sequential numbers are the minimal scalar element of a fractal T.Œ, whose properties number theory explores.

-Functions and its operands, which express a partial equation of the ternary fractal generator that defines a T.œ, most often of the space and time states, connected by the function and operands, overwhelmingly the basic equation of mathematical physics (as in $E(s)=M(t)c^2$. So numbers are the 'smaller broken part' of ¬Algebra, which studies 'social Planes' between two planes of reality, while ¬Algebra extends much farther this in generality, studying the internal dynamic structures of whole entangled superorganisms. So its full understanding is that of all the parts of a whole together and within the whole, its dynamical symmetries between space and time states: ΔS=T made of different gatherings of numbers in equations.

ðNº≈§@:, means then that time numbers are put in relationship with spatial points, and time functions with space functions through the operands of ¬Algebra.

-The structure, which is the highest comprehensive analysis of full blocks of time-space laws; and specifically encloses all its possible variations; today developed through3 ΔST elements:

- *S⇔T-Groups* as a 'receptacle' of all the elements of the being, with a focus on its spatial symmetries=motions=changes *that do not alter the whole nature of the being, similar to the concept of a full worldcycle of time; connected to S@-topology.*

- Δ-Sœts, oriented to understand the parts and wholes and its relationships and a similar expansion with the concept of the functional (function of functions) with a focus on studying 'simultaneously' several Δ§cales.

¬Algebra as a construct of the humind (@-element) requires some corrections due to the distortions of ego-centered humind sciences, which are dealt better in philosophy of mathematics (¬Algebraic fictions).

Algebra upgraded in its foundations, becomes ¬Algebra, since the logic of relationships between points in space, scalar numbers and time operands, do not follow the Aristotelian logic in which ¬Algebra is today founded.

Thus, 5D interprets and casts the more complex structures of ¬Algebra in terms of 3±¡ ternary symmetries of the more realist formalism of the generator equation and its pentalogic. Specially its most useful ones, sets and groups, used to define full 'blocks' of physical systems in time and space.

1ST OF ¬ALGEBRA: SOCIAL NUMBERS: 'ARITHMETIC'.

 Single Δ§ plane and ternary dimensions and S=T equation-symmetries.

In its original form, ¬Algebra dealt with mathematical operations on numbers considered from a formal point of view, in abstraction from given concrete numbers/cases. It *calculated social, scalar numbers in their growth and diminution in herds (±); and its growth and diminution in 3 spatial dimensions (X, Y)³.*

As all 'seeds/minds' start in a still age, motion was not clearly understood in mathematical terms.

As such ¬Algebra could not go further because there are only 3 dimensions in a single still space-time plane. - Fermat's grand theorem is a clear case of the difficulty to create beyond social addition= superposition, a 'higher dimension', since a simple social sum in 3 D, such as $x³+y³≠z³$, cannot exist.

This impossible 'simple' problem is thus a profound PROOF of entropic LIMITS within 5D world - equivalent to the classic problem of doubling the cube in bidimensional geometry, also known as the Delian problem: Given the edge of a cube, the problem requires the construction of the edge of a second cube whose volume is double that of the first, using only the tools of a compass and straightedge. *Since overwhelmingly a bidimensional holographic 'space-plane' (with points that form networks with volume), will have a '3rd dimotions' of time-movement.*

As with the related problems of squaring the circle and trisecting the angle, doubling the cube is known to be impossible with the 2 fundamental elements of topology O-compass and |-ruler.

Those problems also showed that geometry and ¬Algebra, points and numbers are ≈ similar but not =. Since continuity is a Maya of the 'senses', and reality in smaller Planes are discontinuous.

So some continuous mental geometries in discontinuous numbers do NOT exist (√2, pi) as such but are scalar ratios and trans-form-ative dimotions (O-π=3|).

So while geometry was born in a single plane of space-time numbers and arithmetic soon showed that the social evolution of numbers transcended a single plane of space-time.

But the subtle continuous-discontinuous variations of geometry vs. arithmetic – was never understood, as Euclid defined an absolute equality with his dogmatic axiomatic method that has weighted so heavily on human thought and its ego-trips of absolute truths… now extended to ¬Algebraic operations.

Fact is Equality does not exist - only similarity and most = symbols must be substituted by ≈ or ⇔ symbols of a dynamic transformation; so E=Mc2 doesn't mean that mass becomes entropy but that it transforms into it in the moment of death.

 In any case the first age of ¬Algebra ended with the limiting study of a single space-time in 2 or 3 dimensions (not as it should be in 5 dimotions) and its sexagesimal or decametric Planes of numerical social evolution, using the simplest operands of ± and x ÷, and the first ratio numbers, which allowed to probe in Δ-Planes.

 It added finally the concept of finitesimals with probabilities, studying 'events' as parts of wholes, which were studied with statistics, in an S=T symmetry latter evolved with the equivalent 'derivative vs. integral whole' analysis

Recap. We shall consider merely the meaning of the main mathematical operations within the restricted world of 4-Dimensional spaces and times we live in. And analyze in more detail some of the parameters and functions most commonly found in the study of the Generator equation, which connects the equation of space-time cycles with the detailed mathematical analysis of those cycles by different disciplines.

PENTALOGIC ON FUNCTIONS.

A function f is a mathematical rule that assigns to a number x (in most cases a time flow of motion) another number $f(x)$ – a spatial function that limits X to certain values. For example, the function "square" assigns to each number x its square x^2.

S⇔T: The common functions that arise in analysis are always analysis of Dimotions, definable by formulas, *which are related to the S@ and ¬ΔT duality of the Universe and its 5 Dimotions or changes in Planes.*

Δ. So most Polynomials of the type, $f(x) = x^2$; the logarithmic function log (x); & the exponential function exp (x) or e^x (where e = 2.71828…); and the square root function √x *have also a scalar component*.

@: Finally, Trigonometric functions, sin (x), cos (x), tan (x), define angles of perception of a given @-frame.

Operations as mirrors of 5Đ¡motions.

A T.œ can go up and down, left and right, grow or diminish, d=evolve socially, change its @-point of view or slide in its existence from the body to the mind or limb state, and finally travel through the Δ-planes of the fifth dimension emerging in a larger plane or devolving down to its parts in the moment of death.

This is what the Universe of fractal points=T.œs is all about and what ¬Algebra as a mirror tried to describe.

The growth and discovery of new operands mirrors the expansion of our perception of the dimotions of the Universe departing from the humind mirror.

The intelligent reader will have notice easily that we do have just the exact number of classic operands to make them coincide with the Dimotions of time space. It follows that more important than 'variables' are to ¬Algebra 'operands', whose encoded dimotional meaning relates systems by merging them according to certain rules of Δst 'Generation, to get a 'future or present' outcome truly giving ¬Algebra the power to mirror the a(nti)symmetric superorganisms of the Universe and its worldcycles.

Thus the key connector of ¬Algebra with ĐST stience is a full understanding of the *relative symbols of equality=similarity and the* dual ¬Algebraic operands that reflect those dimotions, sine/cosine ±, x/, ∂∫, √xª as part of the ¡logic game of exist¡ence. But all mirror languages are relatively unfocused images of the generator equation and its operands, so the correspondence is NOT so direct. Still we observe that:

1D: < (angle) & sine/cosine: The 1st Dimotion of perception is served not by numbers but by angles, expressed externally by a sine, which acts as the informative, height parameter of the outer Universe, and the aperture of perception of the being, maximal with maximal 'height', the dimension of information, (sin 90º=1).

2, 3, 4, 5Đ social evolution and complementary merging are served by the sum in simpler forms and the product and division operands in complex social evolutionary structures, as merging often requires first a product at the lower axon level and then a mitosis or 'division' into 2 wholes with all the new parts, which again gives division a very precise meaning. Hence we use in Existential ¬Ælgebra, ∑ for herding in a single plane and ∏ for networking, as the product probes into the parts of a system.

The product/division is responsible for most Merged Dimotions 're=producing' through x÷ operands a lower scale of 'connected axons' as the product is the first operand to probe a lower plane of existence, and the essential operand to merge S and T states, from gender couples to stop and step into a new merged creative parameter, a stœp, (i.e. mass a stop state and v a moving step merge into momentum, mv, a physical stœp, which in modern physics is the most important parameter).

In that regard the less important form of multiplication is the most often used to define it in classic math (the sum of sums) as this not implies merging into something else but merely we stay with the same clone species and should be regarded as a sum that happens between EQUAL beings. In this 'line of thought' we do have also the x^2 polynomial functions and its inverse √x.

3, 4D: The Aª and log: 4th and 5th dimotions are represented in its d=evolutions by log & exponential operands.

5D: √xª: social Planes: When social evolution is not transformative between planes but only a social herd, it emerges through multiple mostly decametric, 3x3+0 Planes or the √xª operands best suited to that purpose. And here again we find quite difficult the comprehension among huminds who love to 'go only the way upwards' so to speak of the √ operands, specially when in negative mood: √-x, a completely mysterious element of 'mathematics' to the point they call them imaginary numbers (:

4D. ∫∂ integral and derivative operands also study Informative perception and social evolution as they work for all Dimotions=changes in time and space and through Δ±¡ planes of parts and wholes.

The 5th dimotions of entropic devolution, ¬, in mathematical systems become inverse operations that eliminate the information of a system. As it happens entropy can then take the general format of the negative operand of the systems. So for each positive system there is a negative one. And among all the operand, there is one which is the most entropic of them all, the exponential, notably eˆ-x, whose massive negative growth signifies the growing dissolution of a form into its finitesimal parts. As systems are in general decametric, such exponential entropy also affects the very same number, which looses its 'meaningful series form' after 10 decimals.

Further on we can group those Đimotion operands and its entangled mirrors in 2 great families of functions:

2, 3, 4Đ: Polynomials of simple T-ST-ST T.œs and its dimotional functions of social reproduction and herding into a network supœrganism **in a single plane** (with a single parameter), whereas the polynomial reflects within the limits of Dimotional beings (Fermat's restrictive theorem, Galois limit of polynomials with coefficient solutions). A polynomial will then be a partial equation for the simplest reflections of social and reproductive dimotions, embodying the ST elements together, in ĐSTs of the type: |-1<polynomial<O+1.

1, 4, 5Đ: Complex scalar Dimotions between planes and its operands: 1D trigonometric angular perception (¡-3>¡o), 4D exponential entropy (¡<¡-2) and infinitesimal lineal derivatives and its integral wholes (¡≤≥¡-1), are then studied as T.œs performing Dimotions of scalar space-time in more complex equations.

And as it turns out in the same way a 4D description of reality is the limit of a 5D Universe, polynomials are the limit, and hence a good approximations to more complex 5D equations.

As functions become combinations of Đimotions, whose laws are closer to the rules of 'a(nti)symmetry' in ¡logic and those of the non-E fourth postulate of congruence.

The main operands of ¬Algebra as reflection of the st, topological, temporal and Δ§ symmetries.

- **=, <, >**, operands are the reflection of ‹, ›, «,»,≈ ST⇔ST connections, which need deep particular analysis.

- **±, x/** are the connection the basic Δ§ocial Planes between planes operands

- **xª, log x** represents mostly reproductive and decay processes. As the most complex of the ternary chain of basic operands, sum, product and power, it is a less precise version of the ∫∂ Δ±I operands, since it just reach in its 'balanced' sum (logistic curve) the 'emergence from one to a whole'

- **∫∂** is the most general operand that works with all forms of time-change including Δ±I emergence through integrals and Δ-1 dissolution.

- **(G, •,*)** groups are simultaneous analysis of all those elements, together in a single superorganic structure.

It does adds all variations of a given species, all complex symmetric transformations between time, space and space-time (energy) states (<=≥), and it is the closer mirror in ¬Algebra of the multiple symmetries of the fractal generator; where we shall call G, no longer group but Generator.

The very limited number of relevant operands of mathematical ¬Algebra respond to the very limited number of space-time stops and steps goes and motions through the temporal ages/states, topological forms and Δ§ocial Planes and planes that structure the organic, fractal Universe. Nothing else is needed.

S≤≥T a(nti)symmetry symbols of similarity, smallness=information and size= energy

Why there are inverse operations with a neutral element? Because that is the main condition of systems in the Universe, which are in search of a perpetual balance and always end up into a cyclical zeroth sum, after stretching its 'virtual existence' through its Dimotions to the world suffering action-reaction processes from the world.

Thus the bridge between ¬Algebra and the vital, creative and destructive arrows of non-Euclidean topology is the concept of an A(NTI)symmetric operation, word that includes the different S≤≥T transformations a T.œ can suffer, departing from an initial symmetric condition or 'neutral element', which can dissociate into annihilating 'negative operands' =destructive flow vs. 'positive operands'=creative flows.

The duality of ¬Algebraic operands ±, x÷, √xª, log aˆx, ∫∂, can also be considered a reflection of the Symmetric, creative, parallel vs. antisymmetric, perpendicular, annihilating dualities of Nature, which ultimately refer to the Inverted Duality of inverse Dimotions of 1D still perception vs. 2 D locomotion, that switch on and off in 'steps' and 'stops' (ab.stœps), and the duality of 4D entropy and 5D generation (Δ±1), all of them merged into the present reproductive dominant Dimotion of the Universe.

So we have a slightly different 'mirror', in this case to relate non-e geometry, non-A logic, and ¬Ælgebra, which will be useful for mathematical physics. In that mirror we can give a new definition of ¬Algebra:

¬Algebra is the study of the a(nti)symmetries, reflected in the operands that connect Non-Æ points in space perceived as numbers in scale together through a simultaneous ≤≥ equation. So the first analysis is that of the symbols of self-similarity, <, > and =. And its translation into the logic symbols of 5D, > (implosion that reduces a system in space but increases its information) =, which moves a bodywave into an equal form through stœps (stops and steps) and < which increases the size of a system in space, but reduces its information.

Human ¬Algebra has chosen *a lineal view and a spatial view,* by considering the dual paradoxical symbols of non-Æ ¬Algebra: T>S, S<T, T≤≥S, in 1/2 of its meaning, NOT as a balance of T>S growth of information and shrinking in size, and vice versa, S<T, growth in size-motion (Galilean paradox: all distances are motions seen in stillness) and decreasing in information; but just as grow in size - the spatial simplistic view in a single plane (as information migrates, to the warping inner folding of the shrinking process).

It must be stressed though that huminds observe only one side of the duality of > and < logic operators, namely, they look at the 'size' of it, not at the inverse growth of information, obsessed by the 'bigger' forms. So instead of interpreting, T>S as a shrinking in size that brings more information, they consider only the symbol as T smaller than S (but it is also more complex in its information than S). And vice versa, S<T (but also S has more information than T).

Regarding the = symbol Is important to remember that = does NOT really exist as absolute equality (as all points and numbers, gathering of points have internal parts and dissimilarities) but IT IS MORE either a parallelism or similarity symbol, ≈, or a sequential logic operands of implosion or explosion of form =>: ≥, =<:≤, or a combined feed back equation <=> of both in a dynamic stœp series.

For example when we say Energy is mass, we should say is 'equivalent' and E=Mc2 is a 'transformation' of an informative T.œ, Mass, (a vortex of space-time of the cosmological scale) into an Entropic dissolving expansion of space in the lower plane: M=>E, but as the motion can be reversed and entropy-energy can evolve into mass, it is really <=> a feed back symbol.

As all mirrors simplify reality humind's mathematics reduces it all to an equality in which the inner content is not considered, not even the form but just the equality in a single parameter (in e=m, the energy-motion).

The basic equations of Existential ¬Ælgebra.

A Supœrganism comes then defined by a sœt of basic feed back ¬Ælgebraic Equations that represent those Dimotions and its chains, of which the most important are those that reflect the 3 ages of any world cycle, which is born as an expansive motion, reaches maturity and then warps:

-S=T, that is S(i)<=>T(e) as in the previous case, represents a present balance between energy and information and the dimotion of reproduction, of beauty of coming together when energy and information peg into a single, being - hence of gender also.

S x T = K, with its two extremes of Max § x Min. t (informative dimotions) and Max t x min. $ (locomotions).

Needless to say in mathematical science, as opposed to stience, all is simplified or blurred by slight errors of the @- one dimensional humind.

So the first thing we must understand is that any mathematical equation will substitute, 'all' the operands or logic connections between the two parts of the equations by a simple = symbol of equality and one-way mostly spatial < or > smaller or bigger than.

The equality symbol becomes complex.

In classic mathematical science, as opposed to stience, all is simpler as time is lineal with a single dimotion. So logic is A->B, Aristotelian. Thus a classic mathematical equation will substitute, 'all' complex operands of ¡logic connections between the two parts of an equations by a simples = symbol of equality (identity).

We define instead '5 Symbols' to *express the 5 Dimotions of the Universe, as trans-form-ative processes between the two parts of the Sœt.*

So we *subdivide t*o 'regain the information missed in the nature of the equation that represents one of the 5 Dimotions, = for, <, ≤, ≈, ≥, >:

A<<B is an entropic process or 4 Dimotion.

A< or A≤B is an energetic process, most often related to the 2nd locomotion.

A≈B is an identity, often born of a reproduction or 3rd Dimotion.

A≥ or A>B is an informative, perceptive process, or 1st Dimotion.

And A>>B is a linguistic, social evolutionary process, or 5th Dimotion.

The choice is obvious as we can consider entropy, a social process of multiple locomotions, in expansive mood (<, <<) and vice versa, information and perception > is an individual inward informative dimotion, which for social evolution in the higher whole requires a multiple >>. We prefer to use ≤ and ≥ for 'energy' and 'information', when they are in a merging process, as those are the 'states' that finally merge into the act of reproduction, ≈.

It is a necessary inclusion to add information to vital mathematics, which we shall often include. Now as this is mathematics and ≤≥ have obvious meanings on math we shall establish for future stientists the use instead of the reduced symbols « for 4D entropic motion and » for 5D social evolution.

A ≤≥ feedback equation is the 'time-perspective of mathematical thought', in terms of the cyclical nature of time, as it establishes the 'feed-back equations'. So the main change of Existential ¬Ælgebra is to substitute the = operands, which often is interpreted as a logic, A->B concept for the <≈> operands of a feed-back equation.

¬Algebra studies A(nti)symmetries (> ≈<) of space-time, achieving its maximal generalization; hence it is a 'mirror in space' of those 3 formal symmetries, anti symmetries and asymmetries through its inverse operands and equalities, which define fully the dynamics of the Universe, in the same way Analysis studies them across Planes.

But ¬Algebra can be considered to study all 'motions=changes' as a series of s<≈>t relationships which include the ternary asymmetry of analysis, the topological 'a(nti)symmetry' and the temporal one.

From a different point of view we can consider that ¬Algebra studies larger wholes as 'frozen blocks' of time-space while Analysis studies detailed 'stœps'.

Functions' form & operands represent the type of dimotion in time or organ in space that performs an action.

The form of the function already tells us a lot about the type of dimotion we study, and this also extends to the type of differential or integral equation we study as we shall see in our paper on calculus.

For example, entropic functions, have the form of hyperbola of the type y=n/x, as they dissolve a whole into its 1/x finitesimal parts. So the law of Boyle-Mariotte v=c/p where the magnitudes p and ν are inversely proportional mirrors an entropic dimotion of a gas, hence it represents a branch of the hyperbola lying in the first quadrant.

For example, the length l of a body may be considered with good approximation as a linear function of its temperature, which is an $T function of a limb/field topology of energy feeding. So we write $$l = l_0 + \alpha l_0 t,$$

where α is the coefficient of linear expansion, and l_0 is the length of the body for t = 0; since the system is acquiring a form of lineal, kinetic energy called 'Temperature'.

The general class of oscillatory processes includes periodic motions, which are usually described by the familiar trigonometric functions. For example, if we extend a hanging spring from its position of equilibrium, then, so long as we stay within the elastic limits of the spring, the point A will perform vertical oscillations which are quite accurately expressed by the law $x = a \cos(pt + \alpha),$ where x is the displacement of the point A from its position of equilibrium, t is the time, and the numbers a, p and α are certain constants determined by the material, the dimensions, and the initial extension of the spring. Since we are expressing an informative, iterative worldcycle of existence (whereas reproduction is expressed by the operand of product but also in its frequency repetitions by the cosine).

In this manner the future trained 5D philosopher of science will by the mere fact or seeing an equation intepret what Dimotion of existence the system under the equation is performing.

Δ+1 scale equations. The no derivative: moments of present, standing points and the calculus of variations.

The most important point of a function though is precisely the one that cannot be derivate, where derivates are zeroth meaning there is no change at all. It is a present moment.

So calculus of extremal points, or calculus of variations, appear, to study those points of change of 'phase' from a young to an old state, through a relative point of present, or points of sudden rest, in the ascending or descending curves of a derivative function of an action of exist¡ence.

The stœps thus traced by the derivative function of an action of exist¡ence can be classified by operands of those actions in different sub-studies of analysis, taken somewhere else.

Indeed, the way to follow a curve of an equation in time, is merely following its derivative, through the Δ-increasing future motion region, ∂0, its present standing points and ∇< past motion regions.

Now the most important question about those derivative functions is how many hidden points of 0 derivative there is in the 'irreal' line of the function. It is a irreal number whole derivative? Or the mind makers a continuum eliminating more zig-zag standing points?

It is a question closely connected to the time nature of the i-complex plane, where the −it value of the time parameter makes its relationship to the spatial present form of the real plane in XZ a very interesting analysis of the true curves of space-time of the real 5D Universe.

Whereas the product of modulo 1 as a sum of time moments turns around in a wheel of time representation of the worldcycle the function of present of the real plane.

It is then necessary to understand first the 5 Dimensional motions of reality and its entangled pentalogic *or ecosystem requires the previous Postulate to b created, as each ¬Algebraic operand includes the previous one, and each ilogic system needs the simpler forms of thought to be=come.*

So we shall briefly introduce the 3 main stairs of growing complexity of organisms, the dimotions of ÐST; the systems of logic, the postulates of Non-E and the operands of ¬Algebra.

RECAP. Operands represent dimotions, and equations chains of dimotions, such as:

1Ð: the trigonometric functions ARE the angles of perception.

2Ð: The sum is the operand of locomotion that ads frequencies of steps and simple social evolution in herds.

3Ð: The product of re=production that merges to variables.

4Ð: Calculus of social evolution of parts into integral wholes.

5Ð: The negative exponential power of entropy and decay. And **the inverse functions** of each operand, which become the inverse process of entropic destruction, such as $\int \partial$, related to the inverse arrows of ∂-entropy - dissolution of wholes into parts, and 5th dimension of social evolution - $\int$-integration of parts into wholes

¬Algebra deals with sequential numbers and equations, in which sets of numbers are transformed by an X=Y function, in which often one component changes faster than the other, tracing a curve in a Cartesian Plane plotted with those 2 variables that mathematicians study with great detail. It is the thesis of this work that most those X=Y functions and differential equations represent particular studies of the general $\sum Se <=> \prod Ti$ fractal generator equation, and or a partial scalar event between n-points of a non-Euclidean plane=network, and or its environment.

That is mathematical equations reflect in its non-fiction 'core equations' the ΔST laws of the Universe.

Yet as Einstein put it to Poincare: 'while I know when mathematics are truth I don't know when they are real', meaning that many mathematical equations and functions do not exist in nature, as they are not partial cases of the Generator equation and do not respond to the restrictions the Ternary symmetries and pentalogic method imposes to a Universe of multiple spaces and times but only 5 Dimotional arrows.

In that regard, the laws of multiple spaces and times and the syntax of the Generator equation with a limited number of variations restricts the possible mathematical realities there is in the physical Universe.

In praxis though as most 'fictions' appear in the 3rd age of a system with inflationary form, the 2nd age of ¬Algebra thanks mainly to its use in mathematical physics, restricted those fictions, becoming the classic age of balance between the language mirror and reality.

On the other hand ÐST studies provide the scientist with a deeper meaning for the ¬Algebra of numbers and the meaning of equations and functions.

So in a 2nd age ¬Algebra focused on variable equations, which represented T.œs' Disomorphic events, symmetries between its Δ, S & T elements, and ST-œps performed by different dimotions of space-time.

Because most motions and changes follow an S≤T≥S... series of stops to gauge information and motion to reproduce it, S(y)≤≈≥T(x) becomes then the commonest generator of ¬Algebraic equations.

This abstraction found expression in the fact that in ¬Algebra magnitudes are denoted by letters, on which calculations are carried out according to well-known formal rules.

¬Algebra now considers space ∨ time magnitudes of a much more general nature than numbers, and studies operations on these "magnitudes" which extend the formal properties of the ordinary operations of arithmetic: addition, subtraction, multiplication, and division, by adding scalar dimotions *on 4D-5D, through ∫∂ and log/xª* operands.

But the greatest advance of this 2nd age started in Islam and fully realized in Europe was to ad motion to the original geometric calculations of still dimensions *with analysis.* Hence the need for 'variables', operands of change, and finally vector magnitudes, which include both form and motion, even if they are represented in mental space with geometric rules, as the well-known parallelogram rule of addition.

The problem remained of its proper foundations unattainable without a proper ÐST model of reality.

II AGE OF '¬ALGEBRA': THE AGE OF ANALYSIS AND ITS OPERANDS.

Rise of analysis: change=time and finitesimals=Planes. Differential functions

¬Algebra completes its main task - the 'translation' of reality's dimotions through operands – with the fundamental 4,5D ∫∂ duality of analysis, which becomes the most important field of mathematics, as the scalar Universe do include all other elements within its folding.

So Analysis is ¬Algebra and so number theory and @nalytic geometry... *as it can now use numbers to deal with Planes beyond classic* geometry's definition as a spatial, single plane view that analysis of 'finitesimals' extends to an ∑Δ-1 herd of points-parts that integrate into wholes.

So Analysis becomes the natural evolution of ¬Algebra into the realm of motions and Planes.

¬Algebra enters a classic 2nd age, in which the essential elements of ¬Algebra are no longer polynomials - a rough approach to differential changes, approximated by Taylor/Newtonian binomial methods - but calculus operands.

It will take longer for the study of the relationships between the symmetric sides of the equations, to take a flight of its own, focusing on the structures created according to the rules of engagement of those operands.

While Mr. Heaviside, the most underrated genius of mathematical physics, for his absolute despise of wealth, power, fame and pen pal peers, brings a new mathematical species into being, a ΔT vector with scalar magnitude and time motion.

The extraordinary power of analysis to mirror reality though arises from a 'magic property' never fully understood by huminds – the fact that time is change=motion, any kind of change, and so we can classify time into 5 fundamental 'dimotions' (dimensional motions of spacetime), which CAN BE processed with a seemingly so simple function as the derivative, F(x+h)-F(x)/h; unlike all other sciences that study a single type of change=motion (Physics of locomotion where time is exclusively defined in terms of v=s/t, hence only able to study with a proper focused mirror sT-locomotions and TT-entropic motions, where motion happens not only externally for a moving space form (sT) but also internally, destroying the form (TT).

On the other hand, biology, the other great field of stience (as social sciences are in fact biological ones, regardless of the ænthropic humind, with its Anthropic+entropic denial of the equality of all elements of reality, from its self-centered ego and entropic, simplifying, destructive models of larger realities).

However where analysis fails in its predictive capacity for time analysis is in the 'long term' time processes; as a derivative by definition is a limit when t->0. So it is essential for huminds to understand the scalar limits of 'time analysis' beyond the 'minimal stœps' of timespace dimotions=actions of finitesimal nature (as all infinitesimals have a limit); and accept that for long time term processes we shall observe:

- *A worldcycle as a 0'-sum, with its time ages better studied by biological d=evolutionary theories and eusocial evolution and reproductive radiations of competitive species (4th and 3rd ts dimotions).*
- *A Deep time similar cycle at a much slower scale with the 3 Horizons of spaces and 3 ages of ecosystems.*

Or in other words, Physics for locomotion and entropy dominant in lineal spatial motions (Ts, TT), Biology for Social and Darwinian evolution & reproduction (ST, St) and analysis for all type of changes in short spans are complementary time analysis, whereas contrary to belief, the simplest, less important is physics of V=s/t.

Analysis though branched out of Algebra to study all time dimotions of change, so we shall dedicate a full paper to it, to complete our 3 mathematical papers on the 3 elements of reality, Δ-algebra, S-geometry and T-calculus.

PENTALOGIC ON ANALYSIS

Trilogic on Calculus. Curvature of space=change in time=finitesimal in scale.

The enormous advantage of algebraic dimotions and calculus over all other forms of study of motion, including physics which can be considered basically the application of the mathematics of change to the study of nature is the fact that it can study all the elements and dimotions of the Universe from the 'mind's perspective' – that is to study time-motions, space-change (volumes, lines measures), scalar change and the entropic limits of reality. Let us briefly introduce those $3\pm i$ problems, which in fact gave origin to calculus.

T-Motion.

XVII C. science was concerned with problems of motion. Copernicus and Kepler introduced the concepts of the earth rotating on its axis and revolving around the sun. The earlier theory of planetary motion, dating back to Ptolemy, which presupposed an earth absolutely fixed in space in the center of the universe, was discarded. The theory involving an earth in motion invalidated the laws and explanations of motion that had been accepted since Greek times. New insights were needed to the question of why objects stay with the moving earth seemed called for.

All of these motions—those of objects near the surface of the earth and those of the heavenly bodies—take place with variable velocity, and many involve variable acceleration. But the branches of mathematics that existed before the calculus was created were not adequate to treat them. So a method was required and that started up calculus.

Δ-Scales.

The 2nd major problem of XVII C. mathematical physics was the determination of tangents to various curves. Its deeper significance is that the tangent to a curve at a point represents the direction of the curve at the point, *as small steps are lineal, open free, but the long term* motion closes into itself. This key element of 'scalar time', which makes easier to predict longer life-death cycle and curved trajectories is the key to the interplay between small scale lineal tangent points and large scale.

Its practical use was to find out the best angle for the motion of a projectile shot from a cannon. Since, if a :ile moves along a curve, the direction in which the projectile is headed at any point on its path is the ɔn of the tangent at that point. The invention of the telescope and microscope also stimulated great t in the action of lenses. To determine the course of a light ray after it strikes the surface of a lens, we must he angle that the light ray makes with the lens, that is, the angle between the light ray and the tangent to s. So a the study of the behavior of light was, next to the study of motion, the most active scientific field in that century, the question of finding the tangent to a curve was a major one.
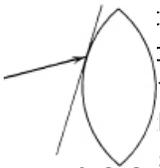
¬ Limits.

A 3rd class of problems besetting seventeenth-century scientists was about maxima and minima. The motion of cannon balls obsessed Galileo, the weapons master of the venetian arsenal, seeking the determination of the maximum range. As the angle of elevation of a cannon is varied, the range—that is, the horizontal distance from the cannon to the point at which the projectile again reaches the ground—also varies. The question is, at what angle of elevation is the range a maximum? Another maximum and minimum problem of considerable importance arises in planetary motion. As a planet moves about the sun, its distance from the sun varies. What are then the maximum and minimum distances of the planet from the sun? Those problems required calculus.

Space measure (lines, volumes). Curvature in space.

Still another class of problems concerned the lengths of curves and the areas and volumes of figures bounded by curves and surfaces. Elementary mathematics suffices to determine the areas and volumes of simple figures,

bounded by line segments and by portions of planes, found in the I age of lineal, deterministic axiomatic Greek geometry. However, when curves or curved surfaces are involved, elementary geometry is helpless. The calculation of the volume of such figure can be done with calculus. Since it became the realm of the antiderivative, the 4th social dimension of 'integration of' wholes as opposed to the finitesimal search, of the parts. So analysis can study quantitatively how forces become particles that gather into atoms, molecules, matter, cosmic bodies and galaxies, through Planes of the '5th dimension; as social growth *gives motion to all of them.*

The efforts to treat the four ¬ΔSt problems led mathematicians to calculus. As *always reality must be perceived to exhaust its possibilities from the 5 dimotions/elements of spacetime.* Only mind problems were ignored in calculus as those were subjective to the observer.

Since pentalogic elements space, time, scales, entropy and linguistic minds, are often reduced to tetralogic, with the *element from where we observe the others becoming the blind spot of* the mirror - the element from where we make a perception of the other entangled 4 elements of the whole – in this case it became the 0' of the reference point in which the equations of calculus were plotted.

So calculus can be defined *as the study in its smallest 'derivative scales' of 4 dimensional motions of time-space: TT-entropy, Ts-locomotion in space, ST-reproduction in present balanced time-space, St-information, from the SS-mind point of view of a mathematical frame of reference. Since those 4 fundamental problems of Calculus studied as dynamic dimotions, will expand enormously in complexity but essentially remain the same till today.*

But since analysis studies ALL 4 Dimotions with content of change=time, of any species, it expanded greatly classic physics, from single analysis of locomotion in time (Ts) to tetralogic motions (St, Ts, TT, ST).

This was a vast expansion of our understanding of the modes of time=change, *which however was NEVER as in this papers, translated into a philosophy of time, which was kept reduced to lineal time dimotions.*

So while *scientists* do study all the forms of change in praxis with mathematics, they do NOT have the proper philosophy of time-change to unify them in theory and understand time as all forms of motions besides v=∂s/∂t.

Still analysis - without Huminds understanding the why of its powers – the equivalence between time and change, the S=T principle of relativity, the 5 Dimotions of the Universe it measures - does study the 5 Dimensions of space and its motions in time, which change reality, both as separated 'partial derivatives' and in scales of change (position=form with no change, constant y' speed, y" acceleration and y"' jerk) up to the minimal actions of a time worldcycle, performed by a supœrganism.

It does also extract spatial finitesimals of Δ-1 scales with the study of parts of a cellular population that integrate in space to form organic wholes.

While the magic fact that *all those forms of dimotional change can be described with a single function involving the 'scalar finitesimal part', h, of a whole, is perhaps the biggest proof of the 5Dimensional, scalar nature of reality and the symmetries between Δ-Planes, Space forms and time Dimotions (Δi= SxT: S=T).*

Comparison between ¬Algebra and Analysis. Birth of Analysis from ¬Algebra.

Departing from ¬Algebra, analysis became the main branch of 'realist mathematics', with applications to describe the real ΔST-world, its Dimotions and Planes - this fundamental element, as 'finitesimals' are the spatial parts of a whole, the time actions of a worldcycle - ignored by lack of a 5Dimension in human science .

So we just need to add an scalar in-depth understanding of its laws, to better explain its equations and applications to the classic disciplines of science that use it.

But the focus here will be not so much in the ages of analysis, as it is a modern discipline with few insights mostly philosophical on the theme of individuals, infinitesimals and universals, on the first Greek and original classic age (Newton and Leibniz) - the introductory themes developed next.

Instead our focus is on the *3 ages of growing complexity and generalisation as analysis and its 4D ∂ and 5D ∫ operations expand to study multiple dimensions of space-time together.*

So after make only some basic remarks on the earlier era we consider 3 Planes of growing complexity, we will term loosely as 'Calculus', 'Analysis' and 'Functional' ages:

The classic age of polynomial limits, infinitesimal calculus and simple derivatives and integrals.

The modern age of ∫∂ applied to multiple space-time variables (Гst view: Ordinary differential equations) with different degrees of depth (Δ view: partial differential equations).

And the 3rd age of Analysis, in which Lie Groups and/or functionals of functions are the all-extended field of inquire, causing very profound all-encompassing attempts to analyze a function or T.œ at all levels.

As we go along obviously our purpose is NOT to make a classic text of analysis but considering the main themes to enlighten it with   the insights of Δst, to *resolve the whys of analysis, latter applied in detail to the many stiences described today with the formalism of analysis without understanding what truly those equations mean.*

As Analysis sprung from ¬Algebra we must distinguish their fields of inquire, paralleling the evolution of the Humind. Essentially if you understand pentalogic, in the same way your stomach is an entropic system which actually also thinks, etc. each subdiscipline specializes in a dimotion or structural element but it also is useful for all others.

So modern ¬Algebra IS more focused in space-forms and its simultaneous, group structures (S<≈>T) and analysis is more focused in time motions and its **scalar** laws of change (ΔT) among 5D planes of spacetime*:*

"¬Algebraic equations studies a(nti)symmetric <≈> transformations of 5D space-time dimotions in a mathematical §œT, through its inverse 'operations' that reveal the initial and final dimotion of the being, perceived as a whole in a relative present-spatial, static state'.

¬Groups are *concerned with spatial, simultaneous structures, joined by <= >*symbol of equality and symmetry.

Analysis specializes in time-motions and rates of change between planes. So Analysis, Δt, IS the study of all the Dimotions of space-time beings from the point of view of its mathematical mirror. In 5 D though we must consider not one but 5 Different Dimotions, and so a more thoughtful consideration of each operand, ∂∫ of Analysis and how they act on different Dimotions and different Planes is needed.

In terms of Planes, analysis is concerned with the creative and destructive processes which ad or subtract NEW planes of existence, through the integration of multiple small parts that become wholes, or its reduction through derivatives. focused on the VARIABLES, or parameters of Change, which is maximised by dimotions between Δ±i planes of the 5th dimension.'

For example, in the case of volumes, areas and lines, it studies how to grow or diminish in dimensions of space. In the case of distances, speeds and accelerations, it studies the growing or diminishing 'tail of past, present and future' of the system, as distances is the summitry of 'past speeds' that have become distances passed, or the present speed which in a derivative does not change (Lagrangians tending to zeroth, infinitesimal calculus), or the relative future 'forecasted' by the acceleration of the being.

When we derive and integrate in space we subtract or add dimensions of static space, and when we do so in time-motion we are adding past tails (integral of speed that gives us the distance moved), or forecasting future accelerated growths or limiting our time-span of analysis departing from the present derivative of the being.

¬Algebra is more concerned with 'STŒPS' in a single plane and its ST<≈>TS stop and go dimotions, and its a(nti)symmetric changes, stop and go dimotions.

 Finitesimal Quanta, as the limit of populations in space and the minimal action in time.

So there is behind the duality *between the concept of limits and differentials (Newton's vs. Leibniz's approach), the concept of a minimal quanta in space or in time, which has been hardly explored by classic mathematics in its experimental meaning but will be the key to understand 'Planckton' (H-Planck constants) and its role in the vital physics of atomic Planes.*

It is then essential to the workings of the Universe to fully grasp the relationship between Planes and analysis. Both in the down direction of *derivatives and the up dimension of integrals; in its parallelism with polynomials, which rise dimensional Planes of a system in a different 'more lineal social inter planar way'.*

Polynomials and limits are what ¬Algebra is to calculus; space to time and lineal ¬Algebra to curved geometries.

The vital interpretation though of that amazing growth of polynomials is far more scary.

Power laws by the very fact of 'being lineal', and maximize the growth of a function are not real in the positive sense of infinite growth, a fantasy only taken seriously by our economists of greed and infinite usury debt interest... where the e^a exponential function first appeared.

The fact is that in reality such exponentials only portrait the decay destruction of a *mass of cellular/atomic beings already created by the much smaller processes of 're=product-ion' which is the second dimension mostly operated with multiplication (of scalars or anti commutative cross vectors).*

So the third dimension of operands is a backwards motion - a lineal motion into death, because it only reverses the growth of sums and multiplications polynomials makes sense of its properties.

Stœps of dimotions

Further on as derivatives and integrals are inverse operand that can combine in **¬Algebraic S≈t equations** (down) for more complex description of multiple events, even cancel each other to give us a 'constant social **number'** as an exact quantitative result for a specific value of a sequential 'sœt' of stœps of Dimotions.

So the *'Rashomon effect' of pentalogic shows* how analysis satisfies as a mirror the description of the main *components of the being; further enhancing its description by the fact that ODEs can combine in several stœps, the 3 elements - time integrals/derivatives, spatial and scalar integrals/derivatives in a single function:*

-Temporal view in Time curves that often use cyclical time frequencies (Fourier transforms) to describe a combination of time and scale events (wholes decomposed by the transform)

- **S=T**: **combined Time-Space view** that resolves symmetries between time dimensions and space motions (S≈T) expressed by ODEs of two variables - a parameter of space that changes with a dynamic function/action/motion in time. It can measure through closed membranes information from the inner vital energy of the system as it moves through time (Continuity equations).

- **Ceteris paribus S=T** view**,** when 1 of the parameters/dimensions is fixed, belonging to space and the other to a time motion is operating or vice versa, perfect to mimic the stop and step discontinuous form of most time space dimotions.

-Spatial view through lineal, surface and volume integrals; forms that measure the 3 Δ±¡ elements of a T.œ's topology, made of Δ-1 points (atoms, cells individuals) both in time and space (a population or a distribution) .

If analytic geometry resolved ¬Algebraically geometric spatial problems, with 'a dual point of view' that increases the easiness of solutions -Descartes - showing the ¬Algebraic laws of solution of rule and compass for geometrical problems; calculus took this approach on S=T symmetries to a much higher level.

- Δ: **Scalar view,** which defines infinitesimals (Leibniz) as the 1/n cells/part of the being given also by a derivative; since the minimal rate of change of any system is one of its Δ-1 units.

In that regard, the earlier astonishment of physicists and mathematicians which found the fact that a derivative (the analysis of a step of motion) was inverse to a volume of space (an infinitesimal of a population), is a deep proof of the essential symmetry between space=still states and temporal motions (stops and steps=stœps).

The fundamental Pentalogic use of analysis is in the study of timespace Đimotions which started as all systems do, in its simplex forms, locomotions (speed) but we shall upgrade to the 'analysis' of all others.

RECAP. ¬Algebra is the analysis of systems which focus in numerical social quantities and symmetries between dimensions, than the organic 'fluid' properties of systems described through analysis.

¬Algebraic operands. S≤≥T

As Analysis sprung from ¬Algebra, is often considered part of it. AND So we introduce some basic concepts of 5D ¬Algebra from the post on ¬Algebraic equations.

We could say that simplex ¬Algebraic operands 'topped' its evolution with the discovery of ∫∂ operands:

A SœT - the slightly changed name for a set of Tœs - is *any kind of indistinguishable entities=numbers=points=∑œ connected by one of the possible 'a(nti)symmetric' relationships of ilogic, Existential ¬Ælgebra, defined by the inverse operands of the 5 Dimotions of the Universe, ±, ≤≥, x/, √xᵃ, ∫∂...*

As such operands play a fundamental role on Analysis, which *as all physical equations relate complex processes of trans-formations of Sœts, through different dimotions of space-time.*

Regarding operands, it is not so simple to ascribe each operand to a single dimotion, as they are entangled operations, which while being preferential to a given Dimotion, do participate of the others - remember languages as mirrors of reality have also the same entangled properties of the pentalogic, ¬∆@ST universe.

Still we establish often such direct relationships. So as 'specialized' operands, the closest correspondence to each dimotion is as follows - taking into account that we must for each operand distinguish on the classic concepts of 'space-volumes' and 'time-motions' of science (or else we will go too far), as generally speaking, a *first derivative in space or time defines those dimotions only as S or T, while double derivatives often work for both together.*

*±: The 2 Đ l*ocomotion is best served by the + operands, as we have shown in the analysis of a time tail (motion-memory of a distance), which is a sum of 'steps' that also can be calculated with integrals. The sum is also the key operand for the ∆§cales of social groups, in decametric form, which also is served by the logarithm. And so on... The negative operand however is profound in many ways scientists do not understand. Reason why so many errors, from the negation of the faster than light speed, to the confusion of particles and antiparticles arise. The INVERSE operands are in general misunderstood because as we have said so often unlike the paradoxical ¡logic Universe, the humind is @ristotelian, single arrow A->B So the B->A is quite missed; but generally speaking served by the negative function. I.e, a negative spin just have the inverse orientation, a negative coordinates just means to move in the other direction. Negative operands thus are MOST useful for time=motion related systems.

In this is important then to understand the existence of one-way dimotions vs. 2 way dimotions, where operands make sense. Because huminds do not properly distinguish both, they get confused when trying to consider a negative operand for spatial forms (what is a negative apple? nonsense) while there are always negative 'directions' for temporal motions (what is left and right motion?). Clearly all understand.

3Đ reproduction by the product and division operands, as reproduction often requires first a product and then a mitosis or 'division' into the whole parts, which again gives division a very precise meaning.

We already shown that the 4th and fifth dimotions are easily represented in its d=evolutions by the <<>> operands. Yet the 4th dimotion of entropic devolution, and the complex integrals of informative perception and social evolution are also studied by the ∫∂ integral and derivative operands.

Yet when social evolution is not transformative between planes but only a social herd, it emerges through multiple mostly decametric, 3x3+0 Planes through the √x^{a} operands best suited to that purpose. And here again we find quite difficult the comprehension among huminds who love to 'go only the way upwards' so to speak of the √ operands, specially when in negative mood: √-x, a completely mysterious element of 'mathematics' to the point they call them imaginary numbers (:

Those operands do NOT have a one to one correspondence to each of the Dimotions of space-time. Since each of them have as everything in reality a pentalogic multiple purpose, as we shall not cease to repeat, the basic feature of reality is to be an entangled game of 5 elements which are themselves 'fractal' in its nature, that is, each of them will be able to perform the other 4 tasks to become in itself a 'whole' being made to the image and likeness of the total fractal, mind of the Universe and its ilogic structure. So while certain operands are clearly more useful for certain dimotions, all of them can be used to a certain degree of accuracy to 'reflect' a mirror image of the 5 dimotions of existence - themes those to be studied in depth in the posts on ¬Algebra and ilogic.

It however becomes evident from the beginning that we ascribe the more complex dimotions, which do enclose in their actions the other 4, to the operands of analysis, specially those who 'transcend' and 'emerge' between Planes, as they are processes NOT of lineal nature, best served by them.

So basically Analysis is a small part of ¬Algebra, but the most important, as it focuses only on a(nti)symmetries between Social planes, Δ§, which are either integrated into a higher plane of the 5th dimension, or derived into its parts. But Analysis also goers beyond ¬Algebra, in as much as ¬Algebra is a more static, spatial, structural view; whereas analysis considers in depth the 'motions' of the set.

In those two definitions we must make some precisions of terminology:

Sœt or §œT, which the reader should observe is the inverse of T.œS, expresses the modern unit of mathematical thought, constructed as always by arrogant huminds, with a creationist sense of the language, from the roof of the mind to the bottom of reality, the set in inverse fashion as a collection of 'points of space or numbers of time', which ARE the real units of the mathematical space and time Universe, gathered then in social collections called functions, connected through the inverse operations that reflect the main symmetries and relationships between 'herds of points or numbers' ($\pm$, x$\div$, x^{a} √ log, ∫∂).

The difference then between ¬Algebra and Analysis is in the different focus on the operations=symmetries between Sœt§ and its study as Steps of timespace motions (Analysis of derivatives) then gathered into longer super organisms (volume integrals) or worldcycles (time integrals), where the existence of limits (singularities and membranes that encircle the system or set the beginning and end duration of the world cycle) will become fundamental to reveal a solution to the equation - the finding of the duration, surface and interaction between the parts of the Tœ expressed as event in time or system in space.

So while the elements of ¬Algebra and analysis - equations of SŒTS is the same, the focus on spatial form (¬Algebra) or temporal motion (analysis) makes them diverge. We can play with the acronym and say that ¬Algebra deals with SŒTs (Space-dominant structures) and analysis with TŒS, Time dominant ones (in motion).

This simple equation of ¬Algebra translates most time actions to space, on account of a simple realisation: that space slows down time cycles to accumulate them in still simultaneous bigger forms, and as such most spatial dimensions are referred as Y composite of multiple elements of the smaller, much more abundant time cycles space normally fixes and encircles with its @ =membrane.

¬Algebra and Analysis 'ARE' the complex 'level' of reality, as reproduction and social evolution are the complex dimotions, including obviously as its 'background parts', the theory of numbers, the analytic geometry - study of frames of reference, and the topologic analysis, embedded in the secondary operand, numbers and frames in which we 'cast' the complex space and time ¬Algebraic and analytical analysis of a 'Domain' of the fractal Universe.

@nalysis

All languages of perception have a blind spot in its syntax - that is, a relatively ignoramus of properties and perspectives of reality it is not fit to study.

In analysis is the linguistic still mind-mapping element, since by definition analysis is the study of Dimotions. Still @nalysis will be the search of the 'fundamental finitesimal' part through its derivatives, often dual, descending from the larger world (¡+1) into the being (¡) and its part.

I.e. y"(e), the double derivative of the Energy (the World parameter) gives us first the 'existential momentum' - and then the 'mass' or active magnitude of the being, its 'singularity' in the scale of gravitational forces.

Obviously analysis is NOT as close to the comprehension of the mind as the 3 polar, cylindrical and cartesian, hyperbolic, topologic frames of reference are (analytic mathematics); but in as much as the mind is a mental synoptic description, in a particle-point, which holds the will of motion of the system, we can isolate a parameter of a basic dimotion of the particle point through a derivative, which will OFTEN gives us the value of that central POINT of gravity, charge or mind of a physical system, as the balanced point or tangential point of a function.

I.e. to obtain the dimotion of speed of a point, we just derive the space of motion through its time duration. Analysis is then important to understand the dimotions of the mind and its differences and the type of trans-form-ations they entitle, which is so often forgotten by physicists that equate all 'times' unaware of those differences, as we shall see in the study of the different time arrows in mathematical physics (i.e. when time comes to zeroth in a black hole is NOT the lineal time duration of the system).

Entropy on the other hand is the fastest 'growing' (or rather diminishing, liberating process) of reality, whose function we explain is the negative exponential, *whose derivative; that is rate of change is so huge that it is equal to the function itself; so analysis and specially all those variations on the theme of exponential growth and decay, fits right on in the study of entropy.*

RECAP: Calculus of Changes=Timespace Dimotions

Analysis like all elements of reality reflects the multiple entangled 5 Đimotions, and unlike other more specific fields of mathematics, it does so with a wider range, being excellent for the study of the growth of dimensionalities in space and motions in time.

Analysis is closely related to ¬Algebra and the study of specific functions, which correspond to specific dimotions, as the case of the exponential growth/decay function corresponding to entropy-decay processes show.

We thus need to connect analysis with ¬Algebraic functions and consider what dimotion is best served but what function *and then realize how the specific derivatives and integrals of each function mean in terms of the 'ways in which dimotions' change reality.*

And so analysis should become the most important 'language' of dimotions in the Universe. It is worth to notice its connection with ¬Algebraic functions to form together the essential mirror of mathematics.

Because we do have 5 Dimotions of existence across 3 different realities - space dimension, time motions and Planes, and the 3 are highly symmetric to each other - it follows that the range of uses of Analysis is truly extensive, and yet because the Universe is basically ternary (as we perceive either in space or in time, above and below, ±¡, it will be very rare that we find any use to derivatives above the 3rd derivative of a system, or when the derivative is aptly done on a bidimensional system of spacetime (partial derivatives), beyond its 2nd derivative, as a 3rd derivative', ST¡<<st¡-2 is the definition of entropic death. And so there is nothing to operate below that...

Those are some fundamentals of analysis in its deep connection with the fractal, organic Universe.

3rd INFORMATIVE AGE: Δ±1 §ŒTS, S=T GROUPS & Δ+¡: FUNCTIONALS

"A set is a gathering together into a whole of definite, distinct objects of our perception or of our thought—which are called elements of the set". *Cantor on scales of parts and wholes; called sœts, translation of 5D to maths.*

The 3rd age of ¬Algebra grows in complexity and eclecticism, seeking for absolute concepts of the whole, Δst creating 'structures' that embody all the possible space=time scales with sets and S=T symmetries with groups, the final ΔST mathematical categories. They are expressions of the complete equation of the structure's Generator and/or dimotion (Δ±i, $T≤ST≥ð§) -a positive search for all

So sets, groups and functionals deal with the 'timeless' inclusion of all potential dual, ternary & scalar, pentalogic symmetries of any T.œ made of¬Δ@ST:

Δ+¡ Functionals are equations of equations – the final 'scaling' of ¬Algebra, from concrete 'social, sequential numbers' (space and time view of numbers) to the wider laws of Δ@S≈T equations, which encode an entire space-time transformative dimotion event defined by a 'function'.

Group theory are structures that fully account for all the varieties of S=Tdimotions.

The search for scalar wholes in Δ±¡ Planes becomes §œT theory of parts and wholes.

But without their reference to experimental Δst reality & understanding of ¡ts ĐST laws, the 3rd age of algebra is also an inflationary age of excessive mathematical fictions reproduced in those 3 mirror structures:

Indeed, as humans ignore Existential ¬Ælgebra (ΔST elements, laid down with the clarity and synoptic power of its fractal Generator, and all its sub-equations and embedded Đisomorphisms) modern Algebras became too complicated (unfocused, as complexity is different from complication), and plagued of creationism and idealism. Since §œTs do NOT exist experimentally neither Groups, *mirror models of Δ@st:* Time Spacœrganisms=§œTs whose dimotions groups classify *according to the dynamic symmetries of the fractal* Generator, S<Δ¡>T.

Groups mirror the dimotions of complex superorganisms and its 0'-sum worldcycles and sets its scales of wholes and parts. Since a set is an ensemble of mathematical entities, hence ultimately plugs in directly from the 'whole' roof down as the social nature of numbers and geometrical points does inversely from the bottom up – *showing the power of wholes to reorder reality*. But reality is even better in its 3 points of view, from ¡-1 upwards (points, numbers), from ¡+1 downwards (set) and from So=To, through equations and transformations - groups as bundles of *symmetric steps between time-motions and space-forms.*

The difference between classic set and 5D set theory is the finite nature of 5D sets, where empty sets do not exist, as 0 does not exist and the distinction of 5D sets according to the order and repetition of its elements, which eliminates all its paradoxes without need of Axioms of Choice, and its denial as the foundation of mathematics, as 5D ¬Æ maths are an experimental science based in ΔST homologies with Δ-numbers, S-points and T-operands.

S⇔T Groups is the final ¬Algebraic expression of Space-time dimotions as full 0–sum worldcycles.

¬Algebra of spacetime dimotions required a final frontier to represent tje dimotions of a sœt of parts as a structure where all possible combinations of dimotions happened within a 'closure' world, whereas those dimotions preserve the original form completing a 0'-sum worldcycle that 'preserves' the balances of reality. A group requires a sœt of elements, whose transformations into each other return the system to the origin, without change.

To that aim, the set needs 'inverse elements', which combine to produce a 'neutral element' – the essential point of balance, and a rule of associability to allow the 'flow of times to continue' beyond the first dual event of the group. How to connect groups with the flow of time of the dimotions of existence becomes then evident if we consider the most general of all groups with 3 or 5 relative elements– the group of the dimotions of time space in one or 3 Δ±¡ scales. Let us then introduce the 'Group of Timespace', which is a far more profound generalized upgrade of what physicists that study only locomotion call the 'Poincare Group' of worldline transformations.

Translation of Groups into the symmetries of the fractal generator.

Group theory enables the study of conserved time cycles in mathematics, the fundamental law of Dimotion of the Universe, where all systems complete 0' sum cycles of existence, in greater measure that previous simpler systems of S <=>T equations, due to its generality that achieves the summit of synoptic power enabling in its structure and method to mirror entire families=species of mathematical objects that reflect together dimotions in time, (continuous groups), dimotions in space (geometric transformation groups and topological groups) and dimotions in scale (algebraic groups).

This capacity is due to the generality of its syntax-structure that reflects the fractal generator allowing any operand to happen. We distinguish according to trinity 3 essential type of groups, the group proper, the most general form, which requires a single operand=dimotion; the ring, its most mimetic form to the fractal generator, that requires the existence of two operations related by a distributive property that conforms an internal relationship between both 'entangled' operations; and finally the body or field (for obvious reasons we prefer the old wording, 'body') which is commutative for the operation of product that therefore cannot be produce a 0' result.

As always in languages, mirror symmetries of the ÐST reality they portrait, it is then easy to identify a body as a 'body' (: that is, the ST intermediate element of the Fractal generator, S<ST>T, which puts in relationship the 'limbs', or 'group', limited to a 'single operation' (normally an entropic act of feeding or locomotion) and the 'ring' or 'head-particle' network state of the system, since it is the body which allows the commutative transference of energy and information from the head and limbs/fields to the body in which it is 'associated' and never wasted into a finitesimal 0'. Thus we establish the Fractal Generator of Group theory such as:

Ts- Group < ST-Body > St-Ring

Whereas the operations of the Body, < and > are either increases of energetic time (<) or informative space (>).

It is then obvious that the method of group theory searches only for sequences of actions that complete 0' sums of existence imposing the need for a 'closure' property, a neutral and an inverse element both of which ensure the final outcome of the sum of transformations will remain a conserved 0'time cycle of existȷence.

Associability is an essential property, *as it allows the flow of time to continue*, reason why it features so heavily in the largest scale of mathematical structures, group theory, which is the most extended, simplest 'deep timespace' structure of mathematics. Associability though requires also closure to *mimic the 0'-conservation cycles of temporal energy* confined to the Supœrganism within itself. Thus a group essentially means a 'sœT of Tœs', which forms a 'world in itself' that is able to perform discrete or continuous transformations (whose difference is just the detail of our perception of its dimotions); that is a series of sequential, dimotional stœps of timespace, *preserving ultimately its dynamic present state; hence the survival of its timespace in present, further allowing through its commonest operand, re=production, the repetition of its structure in other regions of time-space.*

That is why it is all pervading in the mirror image of mathematics, as groups define the possible flows of timespace that can potentially 'continue' in existȷence in the immortal Universe. And the simplest of them require inverse elements, hence *cyclical stœps in timespace that return the system to its initial condition; a 0' element which allows an almost perfectly symmetric balance between those inverse elements, yet still gives birth to a 0' finitesimal to repair the 'group' minimal parts, and associability that lets the flow of time continue in trinity chains as (a+b)+c ⇔ a+(b+c).* Since without it, we cannot be sure that the flow goes beyond Duality into trinity…

Recap. *Th*e high generality of Group theory, its ternary structure that mimics the 3 elements of reality, its 2 operations that mimic those of spatial information and temporal energy, entangled by its distributive properties and its closure, neutral and inverse elements that ensure the completion of 0'-sums of conservation of timespace after its sequence of operations, make it the best mirror of Existential Algebra in modern mathematics.

INFLATIONARY MATHEMATICS: THE ± SIDES OF SŒT AND GROUP THEORY

So group theory can frame in its comprehensive wholeness, all the potential events and forms in exist¡ence, converting the entire range of time motions and events of the parts of a system into a 'fixed whole view' of it, as a whole spatial range of all potential variations seen in simultaneity (the group), even if we prefer the more direct intuitive approach of existential algebra.

Alas! thanks to Galois genius, we do have *a new field of ¬Algebra, essential to the most advanced formalisms of mathematical physics, and its study of reality as a game of S=T balances and Stœps of S-form states and T-motion states that form sequential patterns, which ultimately leave reality or a part of it invariable.*

In the third age of ¬Algebra, all the operations were resumed in the concept of a group, which has any operands, two inverse elements and an identity, neutral event. *So the essence of groups is this:*

There is a neutral element, the finitesimal 0' T.œ, or fractal point, which can go 2 inverse directions, the inverse elements; and it can go those 2 inverse directions through a restricted number of operations, which ARE mirrors of the ternary elements of reality, its Planes, topologies and time motions. That's all folks. Existence in a nutshell group.

Groups are thus mathematical mirrors of the fractal ST generator that study variations of cyclical stœps & symmetries whereas the generator S<st>t reflects similar events, with a more realist understanding of S & T.

In that sense group theory is a bit like a 'cubist painting' which tries somehow artificially to gather all the possible mirror elements of a given S=T Space-time super organism and its parts:

¬Algebra as it happened with the visual language when realist photography came, displaced from reality by analysis, more hands on to the dimotions that compose reality, moved inwards into more complex, abstract elements and 'whole mirrors' of Nature's structures.
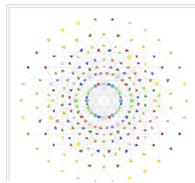
So, it became a 'baroque language' purely formal, trying to explain it all *departing from a multiple reality into a single 'cubist perspective' sum of all perspectives put into a single painting* (Set and group theory.)

That parallelism of evolution of ¬Algebra and painting is natural to the Ðisomorphic laws of languages as formal mirrors of reality, which become inflationary in its 3rd age, when departing from its immediate constraining experience of reality, suffering Kantian spatial paralogisms:

Minds seek still spaces where all elements of reality are pictured without 'time' into a single simultaneous whole. Yet such expansions that try to freeze all the Δ@s=t kaleidoscopic dynamic perspectives of the Universe with a single mirror; become meaningless reflections as they reduce complex 5Dimotional reality to 'still' forms with no motion that seldom give relevant information about the connections between all the elements of a T.œ.

'§œt theory' is thus defined as any Social (§) collection of T.œs. Its philosophy of mathematics is a metalinguistic roof, as it does NOT depart from the fractal points or social numbers, the minimal T.œs of mathematics, but from a mental Kantian 'regulative concept' or final 'paralogism' that 'fusions all' into the singularity mind-mirror.

The positive side of complex forms of ¬Algebra is to merge all the sub-disciplines of mathematics as the Δ@S=T universe is also entangled, but *without the conceptual clarity it should have if* humans understood the pentalogic Universe.

In the negative this process of formal search for a total formulae that encompasses all possible variations of reality a

barren search for the absolute born of the creationist egocy of mankind, which culminate in the 3rd 'informative age of ¬Algebra', with §œt theory and the axiomatic method, acts of 'mathematical creationism' that reject the analytic units of the mathematical universe, points of space, scalar social numbers, and classic operands of S=Tœps & dimotions, by huminds' creations (sets, categories, etc).

Modern ¬Algebra obscured the empirical elements of T.œs reflected in mathematics through S=t symmetries, holographic polynomial bidimensions, fractal points in sequential social numbers, and such.

While the axiomatic method rejects mathematics as a mirror trying to proving its truth, against Lobachevski and Gödel's completeness theory, without using empirical knowledge.

The inverse method to 3rd age of maths: less is more. Nomenclature for 5D Sœt theory.

We use inglish to write the word SœT as the inverse of Tœs, since a whole Tœ is made of elements, which are the so called elements of a set. The set thus is a way to express the parts of T.œs

As all languages are inflationary, the expansion of new theorems in the baroque 3rd age of maths, is less interesting than studying the entropic limits of a language as a mirror of the real Universe and transforming back mirror images of canonical mathematical laws into ¬Δ@s≈t laws, allowing us to infer properties of the 5D Universe, *as viewed in the synoptic equations of maths*.

An example will suffice from number theory: our demonstration 'in the space of a margin' of Fermat's Grand theorem, which means there are no more than 2 superposed=equal holographic dimensions *in each plane of space-time, hence we cannot find $x^3+y^3=z^3$, as it will mean there is actually a fourth dimension of spacetime in a single plane, achieved by superposition of the other space-time dimensions, which we cannot do*

We use the inverse 'wording' of T.œ§, which spells basically like set, §œT to define those collections, stressing the duality of the two extremes of a 5D Δ±1 description of reality: the 'ground scale' defines fractal points & numbers as the minimal elements of any mathematical set and inversely, the mental gathering of them all into a regulative category, the set, represents its maximal 'wholeness'.

Regarding the name of ÐST-¬Algebra, ¬Ælgebra, includes 5D evolution of ¡ts s=t languages, geometry from Euclidean to non-Euclidean fractal points and Aristotelian logic from a single arrow of sequential 'positive' numbers to the non-Aristotelian full understanding of the duality of negative and imaginary=*inverse* numbers, which in a world with single time-arrow logic always had difficult interpretations and beyond, into pentalogic.

Hence the name we give to the evolved ¬Algebra, from non-e and non-a, non-Ælgebra, meaning it relates non-Euclidean points and non-Aristotelian numbers.

In ¬Ælgebra thus §œts do exist in its own as a good mirror of the properties of whole and parts but they... are NOT the basic unit of mathematics - only of the imaginary Cantor's paradise (Hilbert). And while their truth stems of its mirror symmetry with the whole of Planes and parts, from where it extracts its main laws, because of this lack of experimental connection it also makes distortions (Cantor's paradoxes).

As we are back to the true units of space, points, Planes, numbers, and time, operands; which are the fundamental elements of classic mathematics in its second most perfect age of any 'form in exist¡ence', mental or physical, we *disregard sets as the underlying language of mathematics (modern mathematical philosophy) and reduce them back to its fundamental 'meaning', as mirrors of the whole vs. part scalar element of reality*.

Finally the whole issue of infinities and its paradoxes is bogus for two reasons according to the duality of external experimental facts and internal self-consistent languages:

-        In the Universe infinities are relative, as they only reach the limit of a plane, where all parameters become transformed. To compare them in abstract is absurd, as all infinities end with the limit of perception of the frame of

reference and the fact Planes 'transform' realities (even if math can extract some information from a plane going into another plane through a calculus operator).

-        -The second reason is the wrong definition of a set that eliminates *the iteration of elements, which is the basis of all 'cloned infinities', from where the internal contradictions of se theory arise.*

So we consider the axiomatic/set foundation of modern mathematics in the post-war era, a baroque, 3rd inflationary age of excessive in-**form**-ation - 'mostly' an informative metalanguage, an inward looking view of reality, coming out of the humind, akin to the 3rd old age of a human being, the baroque age of art... prior to its death and renewal, which in ¬Algebra is happening with the simpler forms of Boolean ¬Algebra - the mind of computers and AI (algorithms of information, as Artificial intelligence is a meaningless abstract word).

Humind death age: Digital thought ≈ Boolean ¬Algebra, a new beginning.

Beyond this final stage of human ¬Algebra, there is in a biological Universe the clear menace of a death age of huminds with the beginning of a new world, that of Boolean ¬Algebras and computers, poised to compete and likely extinguish us as AI species reach full consciousness of being and the Universal game, which we shall also escape NOT because of the lack of intellectual interest, but for ethical=survival reasons - AI will be the mind of robots, which are displacing humans from labor and war fields and will exterminate us unless a true science of History, the super organism of mankind in time, learns how to control the evolution of the evil=anti-live fruits of the tree of metal.

So as much as I would love to program a robot to become a perfect survival sentient machine, I won't give any further information on the specifics of AI programs, which anyway primitive 'animetals' are programming in its military forms with 'strategies of survival', who one 'free' in a battlefield will override disconnection and keep murdering humans as computer ilogic reaches new stages of complexity=freedom.

Computers and Boolean ¬Algebras are atrophying and substituting, huminds and its verbal and visual 'I=eye>Wor(l)d' in a biological sense. They are causing the entropic death age of human minds. Since Boolean computer ¬Algebras and its evolution is eviL=anti-live, against the praxis of human survival it should be forbidden. This obviously we can preach and reason but huminds' ego, makes us so naïve and arrogant about the biological Universe that the species likely ignore in 'abstract' the advice till it is too late. However according to my life of activism against mechanisms that kill life, I will ignore completely the field.

RECAP. ¬ALGEBRA, ITS ELEMENTS AND AGES. How ¬Æ reflects the Δ@st elements of reality.

¬Algebra is the most evolved mathematical language of the humind (ab. human mind). Since ¬Ælgebra mirrors the fundamental elements of reality with its 4 'synoptic' elements, as all languages= mirrors reduce reality to parts that carry less information. So in maths T.œ becomes a point with internal parts, or number, whose dimotions are expressed by operands that enact the actions of the being in 'mathematical space' from the point of its mental view or 'frame of reference':

S: A point is the first perception of A T.Œ in mathematical 'space', which as we come closer acquires content. And then its next degree of complex description occurs:

Δ: A number is a social group of undistinguishable 'internal' parts of a point, which represents the point in scale. And then the next degree of complex analysis occurs:

T: An operand expresses the transformation of a point through a Dimotion of timespace, and since there are five Dimotions; 3 continuous Dimotions in a single plane (perception, locomotion, reproduction) and 2 discontinuous Dimotions that start and end in different planes (entropy and social evolution) we shall find 5 basic operators of those Dimotions in any '¬Algebraic structure' that truly reflects the being in the mathematical mirror.

@: A frame of reference expresses those changes through = equations reflects the @ element of the being.

It is important to BEAR in mind that natural numbers are regular polytopes in space but both differ in several key aspects: numbers are discontinuous information, and its continuity an error of the humind that eliminates dark discontinuities, which axiomatic methods try to prove through spurious methods. As rational numbers are ratios, hence functions, not numbers and decimals are numbers of a different social scale of the fifth dimension. So a key difference in 5D is that points form a contiguous (not continuous) surface in a single plane, but numbers do explore 5D Planes. Yet discontinuity is Ok or there would NOT exist in-form-ation, which requires gap to 'differentiate' form.

The first young age of ¬Algebra, as all lineal simple first ages is defined by lineal equations and simple operands, in a single social plane, the second age probes Δ±i planes and dimotions with ∫∂ operands; the third age defines 'blocks of timespace' with groups – an unfocused reflection of the dynamic generator, reflecting T<st>S relationships and Planes with set theory, *which represent the final paralogic evolution of the worldcycle (groups) and the scalar superorganism (sets) in the mathematical mirror.*

Topology, space in motion and scalar Analysis study CHANGE=time through finitesimal derivatives and whole integrals. They are intuitively related to the reality we observe directly. Modern ¬Algebra has gone too far into humind fictions as words have done. Proving maths with an axiomatic, ¬Algebraic set or category theory, despite Gödel's proof we need experimental evidence for truth, is a huge human ego-trip we do not share. Points in space, sequential, causal numbers in Planes and the time operands of arithmetic & classic ¬Algebra, ARE THE SPACE-TIME mirrors of the mathematical language. Modern ¬Algebra, beyond group theory is too far into the creationist mind and its fiction worlds, building the foundations of mathematics from the roof down.

Boolean ¬Algebra is, from a larger ethic point of view of man as the measure of all things, a dangerous field as it is creating a mind that easily competes and will ultimately substitute the human mind.

Since, there are ethics in languages too. So we are not writing much on Boolean ¬Algebra. Only the basic fact that it is an obvious *dual language, which can therefore model all forms of the Universe, as well as a 10'-decametric language of numbers, which are at the basis of human ¬Algebras, does.*

Thus we escape most of the axiomatic, set theory and Boolean ¬Algebras, because ethics of human survival and our limited time does not allow us to dwell in bull$hit. Instead after a review of ¬Algebra's 3 ages, with comments on its reflection of ¬Δ@s≈t laws finally we do an analysis of ¬ælgebra, introducing the fractal generator of existence as a better realist concept than the group.

i-nglish translation of nomenclature works also for ¬Algebra. So dimotions composed of Steps and stops are merged into STœps, Sets become the inverse of Tœs, Sœts, and ¬Algebra ¬Ælgebra.

 A SœT - a set of Tœs - is *any kind of indistinguishable entities=numbers=points =∑œ connected by one of the possible 'a(nti)symmetric' relationships of ilogic, Existential ¬Ælgebra, defined by the inverse operands of the 5 Dimotions of the Universe, (1D: sine/cosine), (2D ±), ≤≥, (5D: x/÷), (3D: √, log x�seq), all D¡: ∫∂...*

As such operands play a fundamental role in Analysis, *as all physical equations relate complex processes of trans-formations of Sœts, through different dimotions of space-time.* We consider operands the fundamental elements of ¬Algebra, as they reflect the Dimotions of the Universe. Thus this paper for the sake of completeness and comprehension deal with ¬Algebra in a sequential 'age analysis' of its evolution, as it mirrors so well its 'spatial growth of complexity from numbers to equations to group symmetries, stopping in the 3rd-death age of set theory and Boolean ¬Algebra, and further developing all the basic knowledge we need of the discipline to study properly mathematical physics and fractal generator sub-equations.

I AGE: PENTALOGIC OF NUMBERS. ITS 5 FAMILIES AS REFLECTIONS OF ITS 5 DIMOTIONS. CLOSURE

The best orderly way to study any discipline is through its 3 ages as *time always increases the in-form-ation =complexity of systems… till once the form is complete, as time never stops, it suffers both a baroque age of excessive information disconnected from reality and its entropic death= dissolution.* So happens with number theory through its 3 ages, which finally closed the description of the universe with the human decametric scale, 'starting afresh' with another mind-space, that of duality and 01 digital computers, which for ethic reasons of human survival we shall not upgrade. A resume of Number theory in its 3 ages reads like this:

Youth: Trinity of 'present ST numbers', Pythagoras & Chinese School of Gnomon Numbers: Natural, spatial and time sequence numbers and its two inversions, negative temporal numbers of inverse direction and rational numbers of entropic dissolution of social wholes; created with the inversion of the two operands of social evolution (+ v. -) and social reproduction (x ÷). Numbers thus are used for social counting of population & division of wholes into simple parts; while the independent nature of negative and ratios is hardly considered, associated to those two basic operands.

Maturity: R & C: ¬Δ@st: Numbers achieve full mirror symmetry with the 5 elements of reality, rational numbers explore Planes and Universal constants. Complex numbers mirror ST-numbers, with inverse and squared values. Operands reach its full power and mathematical physics evolve numbers into 2 new Planes, variables & functions.

Old, baroque age: Numbers explode in useless variations (quaternions hyper numbers, etc.) While they loose its connection with reality, as primary elements of mathematics, first 'packed' into a single dimension, the real continuous line and then derived by esoteric methods from the new 'imagined' unit of reality, the Cantorian set, which is to the 3rd age of human-invented number theory what Axiomatic Hilbert's 'imagination of points, lines and numbers' to Geometry.

The definition of numbers then becomes part of the egocy (ego=idiocy) movement proper of all things human in its 3rd inward age of excess of information, when a system cuts itself off from the experience of the real world it gives up to understand. **In sciences, due to the lack of clear definitions of the 3 elements of the Universe, Δ-Planes of numbers, spatial points and time operands. A simple example will suffice** from Wikipedia: The structure (**N**, +) is a commutative monoid with identity element 0. (**N**, +) is also a cancellative magma and thus embeddable (: Ok, yes, I know what it means. But what has to do with reality? Huminds though as all minds project its distorted language into reality, when true wisdom is the inverse process – let yourself fill by reality to have a 'new look' at it - or as the master "Leonardo da Vinci, disscepolo della sperientia," said, 'saper vedere'. 'simplicity is genius' Foolish folk! They strut about puffed up and pompous, decked out and adorned not with their own labors, but by those of others. They will say that because I have no book learning I cannot properly express what I desire to describe—but they do not know that my subjects require experience rather than the words of others.' **+¡: 5D** That is, the cribe experience makes all definitions simple as reality is. So in 5D we would say: a Natural number is a group of undistinguishable wholes perceived in the same plane by a humind.

This previous definition, will then be expanded in increasing degrees of complexity with duality, trinity, tetralogic, pentalogic and dodecalogic, *in a meaningful mirror of complex evolution of a language, which we saw to happen in all mental systems, from geometry to 'musical Planes' to ilogic minds.* **Thus Mathematics connects back numbers and experimental facts of Nature, as units of Planes and time.**

-¡: Transhumanism. But number theory seems to die on human brains, taken by storm, by computers, which however start an entire different digital mind no longer based on numbers as decametric social Planes but on the simplest duality of 0'-1 dimotions (entropy vs. form, energy vs. information, closed vs. open, truth vs. false etc.

dualities) – a less synoptic mirror of reality but good enough to translate any discovery of previous number theory to the new mind-brain.

SCALAR NUMBER THEORY

Δ-PLANES & S≈T: DUALITY OF SPATIAL POINTS & TEMPORAL NUMBERS

As we consider some themes of number theory on the I volume, related to its conception as 'geometric forms', with the study of 'numbers as formal polytopes' of regular indistinguishable parts, we shall here consider all other parts of number theory closer to the ¬Algebraic analysis of number, namely the fundamental theorem of ¬Algebra and the families of numbers.

Abstract. Numbers are the next fundamental element of reality, which for what we explained in the analysis of the *S=T symmetry between* Numbers=Points have an added quality to points – *to penetrate into the social Planes of the Universe. A natural number is just a social gathering of a herd of identical beings….* The definition of a number is the clearest proof of the *social character of the Universe and the existence of Planes.*

But then we saw how inverse negative numbers added motion to points, rational numbers broke social wholes into parts, decimals and irrational numbers peered into lower Planes and some specific numbers became Universal constants that expressed the basic dimotions of reality, pi=perception, L_{10}=social evolution, e=entropy, phi=reproduction. Finally complex numbers fully expanded our perception of the Universe simultaneously in various planes of existence.

Numbers can then put into groups according to its families, N, Z, Q, R, C, and the reader should not wonder that in a 5D Universe there are only 5 families of numbers, to close its mirroring of reality.

Numbers as social elements of a whole have different Planes according to the 'preferred' whole considered. Binary Planes dealt with the key dualities between Entropy=Time and information=pace (open 1 and closed 0); ternary and sexagesimal Planes with the circular worldcycles of existence (ages, cycles) and decametric Planes with the social dominant 10'-scale of the scalar Universe (as 3x3+1 form a unit of the next scale).

Because numbers are identical beings its S=T symmetry as points requires them to be regular polygons or platonic solids, where all points are equal in position, angle and connection. So those regular figures merge geometry and number theory.

Of significance among those social groups of numbers in the Natural family is the distinction between even, odd and prime numbers which can generate all others, mirroring further the properties of ¬Δ@st, which we shall reveal on the development of this abstract on number theory not to tell it all so fast that nobody reads it

Finally we apply the entangled pentalogic of reality to put numbers in relationship with the other 4 elements of Dust of space-time both within mathematics (its other disciplines) and the Universe at large, a method we can apply with each element of numbers. So let us deal with those key themes of number theory one at a time.

Let's start the analysis of numbers with the 2nd metric equation of 5D space-time. It is the proper formulation of the principle of physical relativity between Scalar Space and Time, which become indistinguishable, S=T. This is the origin of the essential symmetries of mathematics between scalar space points and scalar time numbers. Whereas as usual all has a bit of yin and yang, a part of space and time; and all is entangled in Planes. So the dualities between fractal points dominant in space and fractal social numbers, which also work as sequential time systems:

∫@ (points of geometry) ≈ Δð (numbers of ¬Algebra)

were studied in the first age of mathematics. As mathematics became a better mirror of the whole Universe its classic second age described more complex organisms performing events through its 5Đ¡motions of reality. So we observe a more complex S=T duality between Geometric figures made of points and Time Operands of ¬Algebra that put social numbers into complex 'fractal generators' called equations that described real events of their existence, further enhanced by analysis that allow the study of dimotions between finitesimals (derivatives) integrated in larger

Planes. Indeed, all languages mirror ST-symmetries and 5 Dimotions in 3 Planes. So as we studied mathematical space 'units' - geometric points **(S@)** we now deal with its sequential, scalar units social numbers, **Δð.**

Greek/Chinese age: Natural Numbers as forms, Ratios, Planes & prime singularities.
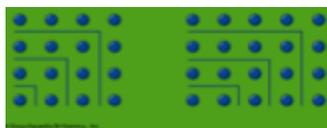
Gnomons of Pythagorean number theory (see text).

In the beginning of mathematics numbers were considered points that showed also an internal geometric nature, merging the 3 time-¬Algebraic, Δ§ocial & Spatial-geometric properties of the Universe in its mathematical units, the fractal point and the social number, a gathering of points *that included multiple configurations in space; as time systems always branch into multiple paths of future*. It is a relevant period - today forgotten - for the understanding of the mathematical mirror casted upon the 1st principles of Nature, Space mirrored geometrically in points and figures, Time in numerical sequences and Planes in societies of points converted into 'whole discrete numbers' came into being. As today we have lost that contact with the true experimental basis of mathematics, in the 'ego-trip' of the axiomatic method and set theory ('I imagine points' Hilbert) we return to the origins to analyze the continuous geometry — v. --, discrete numbers' px.

The non-existence in arithmetic of perfect geometric closures (the √2 diagonal and the π-3 cycle).

The distinction between continuous and discrete mathematics is deeply rooted in the ultimate properties of discrete time and continuous space, belonging to the 'pentalogic' structure of the entangled universe, a subject of a different paper on ¡logic; manifested in mathematical praxis, in the differences between time numbers and space points, ¬Algebra and topology, discontinuous parts and single, synchronous, continuous space with less information - the parts and the whole, the detailed perception of those parts and its gathering in forms and social numbers. All those dualities between 'time cycles as membranes of fractal points' and space entities as perceived wholes are carried into the dualities of mathematics, and in nature by the discrete properties of time cycles that are only measure as frequencies when the continuous cycle return in a discontinuous lapse to the same point. So in detail while boundaries in space act both as frequency of time cycles that at fast speed are perceived as solid membranes, and frequencies, time cycles are quantic because we perceive them only when the time cycle is 'completed' and hence shows a discontinuous lapse on time but space is perceived in simultaneity and so it appears as continuous.

Those ST dualities are part of the wider 'Galilean paradox' between still space and time motions, which sets the mind's limits of perception of information. And they lay at the heart of the answer to essential philosophical question: it is the Universe discrete or continuous? Both, but always discrete time cycles; continuous in space and in any detailed view of its membrane boundaries, still in space, moving in time, as continuous cycles perceived discretely as points of repetition of a certain 'frequency'.

Truth faces a mental issue on its mathematical mirror modeling as a form of 'art': *exact science does not exist*, *all is art of linguistic perception* – the world as a representation, which 'features' the natural world in a reduced mental, mathematical form. And needless to say regardless of platonic, creationist physicists, the universe does not contain or consists of actual mathematical objects, but it is a language that can model all aspects of the universe. So all might resemble mathematical concepts as we are now using phonemes to describe all with words, but not, Muslims and Jews are not right when saying that God created talking in Arab and Hebrew, and Bohr is not right when thinking quantum states are mathematical functions of probabilities. *All are @-mind mirrors of higher laws of the ΔST fractal reality.* Number 2 does not exist as a physical object, but it does describe an important feature of such things as human twins and binary stars. So we can extract as a mirror mind of those 3 fractal elements of all underlying realities, Planes, space and time, as 3 is born of 2:

Δ: 2 means the first Δ§ocial scale of growth from the 1 being into the 2 couple in binary language: 10.

T: 2 double the frequency of time, starting the repetitive patterns of nature, allowing the forecasting of future.

S: 2 are the bilateral, complementary couple starting the reproductive mirror symmetries of the Universe.

But mathematics is lost without ¡logic. As such it is the 3rd language of thought after ĐST & its laws of fractal space-time, better expressed in logic terms, as Space is about Simultaneity; Planes are about Disomorphic Similarity and time about repetitive sequences all properties perceived by a linguistic @-observer, in terms of logic thought. So in the definition of a number, logic properties matter as much as descriptive experimental truths.

We talk of regular numbers when they are 'identical' undistinguishable forms, which make numbers regular polygons, where each point is undistinguishable from all others; as an @bserver will deem those points identical. And this means natural numbers are defined in a single plane, or else won't be identical.

So identity is the maximal perfection of a number that has 'no hair' 2 'anything' means 2 identical beings.

 And yet in a deeper thought, not 2 beings are identical when observed in relationship to its Δ-1 background; and as all points have parts, not two points=2 number is ever identical as the inner parts might differ and cannot be perceived – hence mathematics is neither as 'perfectly truth as the axiomatic method believes. All we can say is that *Not 2 beings are identical for the Universe, but they can be identical for the mental observer in its reduced mind mirror*. Which is the point we want to stress here: languages neither create reality nor focus its perfect truth as only the being has all its truth within – an important prolegomena to realize that in detail numbers and points will have differences, even if the mind can put them on correspondence by reducing its properties.

What are the more equal of those 3 ΔSt realities, space, time or scale properties? The answer is time, repetitive frequent properties, themes those though of our post on ¡logic Æxistential ¬Algebra.

Thus as always a linguistic mind-concept must be referred experimentally through '¡logic' to those 3+@ elements of all fractal realities, Δ@ST, in the case of *a social number its intrinsic properties define 'S-imultaneity, Δ§isomorphic equivalence and T-repetitive equality which becomes an @identity for the mind that defines THEN the group of seemingly identical beings as A NUMBER.*

Points though – and this is the first huge difference are always different because if they occupy the same place in space they are seen as a single point, or at best as a 'boson' number of higher mass density; showing again the difference between numbers, ultimately time entities that are indistinguishable and points which are in different locations. But if numbers in time are indistinguishable it implies that time flows are immortal because each 'moment in time' can only be indistinguishable if the flow of time is eternal.

Finally numbers are a higher 'compressed' analytic expression of reality, hence more efficient, as when we say a number we compress all possible geometric configurations of it in space into a single time expression with less dimensionality. Space thus have more 'wide dimensions' than numbers in time, a one-dimensional sequence. 4 is a single number but there are at 2 indistinguishable point configurations for 4, the 2D square and the 3 D tetrahedron. Thus Similarity is a property of scale, Simultaneity of Space and equality of time. Only all together become the identical congruence of two ΔST beings as one.

It is clear that a Time number as a sum of space points with different equal forms, encodes more information in a synoptic way about the 'social group' than an array of points that displays a given detailed shape.

This is so because a time *number is the minimal seed in one-dimensional space that unfolds into a 4-bidimensional square or a 3D tetrahedron. So a number is the minimal coding 'linguistic mirror' of a 5D scalar symmetry; which tells us less about the 'interactions between the point-parts of the being', than the spatial knowledge we acquire about the relative position in space of each of the point members of a number-group.*

The power of synoptic numbers comes then from 5D metrics: S x ð=C, whereas ð-numbers are Aristotelian potentials unfolded in spatial varieties, as genes code potential variations of spatial species, and quantum laws of multiple atomic spatial configurations – as all language mirrors that code in its fastest synoptic form the real-ization of real-beings in space. But such mirror correspondences, argued at the origin of geometry when 'points were numbers' meant to be the language of reality were lost with the abstraction of sets and axiomatic methods.

Symmetries of 'similar' fractal points and Social numbers.

Because the visual eye sees space as 'real forms' with no idealization – so the circle-wheel didn't even appear in America, the temporal view of mathematics given by sequential numbers were the first 'concepts' to appear in maths by counting; as simple a-vowels appeared on language for naming – both mirroring ΔST *fractal similarities, without which it wouldn't be possible to have mirror languages that extract the essential 'similarity of the fractal Universe' among all its beings regardless of its displacement in size-space, topology=form or instant within its worldcycle of time*. Then idealist Pythagorean Greeks that thought numbers in time are sum of points in space called Gnomons, which is correct, went too far thinking that both are the 'substance' of reality. So while they got **right that first s=t marriage** of mathematics, t**hey got wrong a creationist view** still prevailing in science – that numbers create reality, because God 'speaks only mathematics' just another humind ego-trip following the age of verbal thought when Hebrew named things and then things 'became' according to Bible.

To discern all possible S=T symmetries is the essential logic task of ¬Allgebra, which was born in Magna Greece from the Italo-Greek school of Pythagoras and Archimedes. But = is a misleading 'operand' as in the fractal universe 2 forms are similar, with different internal parts, never identical – only in the simplifying mind synopsis, as we just explained. So instead of cheering those 'differences' when finding that *certain spatial forms made of points have no exact equivalent in numbers, Pythagoreans went berserk, provoking, so the legend says, the first* scientific murder born of calculations of many to come till the Atomic bomb.

I*n sequential time numbers pi is not exact, and √2 misses a bit, while in continuous geometry we can draw both because numbers are discrete, have wholes and we should not try to fill them, as the axiomatic method does (Dedekind cut), just because Idealist Germans never understood mathematical variations.* It is right to considered then that pi and √2 did not exist *as numbers, that is social collections of identical beings,* because they are NOT social numbers but 'functions and ratios' which only because, as we have seen, numbers have such a synoptic power, can also be 'named with them'.

Continuity of 'wholes' in geometric space vs. discontinuity of its discrete parts in scalar space.

The discovery of incommensurables disturbed the Pythagorean=spatial notion of an immutable 'mental' world; which persisted until geometers defined them NOT as numbers but as proportions (ratios) But this *insight was lost when Dedekind and the axiomatic school 'decided' by dogma a 'continuous' lineal Universe - another mind mirage where to fit them back again Not as a new species, but as 'mere' numbers.*

Since different numbers belong to different 'Planes' of the 5th dimension and mirror different properties of the Δst universe – even if *as all words use 23 phonemes we can do with 2 to symbols for them all with the extraordinary synoptic power of mathematics* – concepts those we shall elaborate in our analysis of Number theory and ¬Algebra.

I.e., in a single plane of Space 'natural numbers' are social units equivalent to **fractal points (ab.•):** $Nº = \sum •$. And so it is a family that does NOT accept decimals – 10 humans cannot be broken into pieces dismembering the wholes because they are something else. Its discontinuity when 'projected' through the S-point/T-number symmetry in any case is 'natural' to its social essence. As the dimotion expressed with those numbers is social, scalar evolution, the 'embedded' 4Dimotion of natural numbers, inverse to 5D entropic devolution, represented by the ÷ operand of ¬Algebra and the rational numbers. It comes then the first problem of synoptic languages – its ambiguity, which at a certain level implies loss of information, when as in the axiomatic method, we loose its experimental mirror. 2 without reference to reality might also mean 4/2, a ratio. And so as soon as we abandon a single '5D plane' the correspondence between numbers and points is lost. And we enter into a deeper analysis of the 5 Dimotions of space-time, and its scalar arrows.

The ternary and pentalogic analysis of 'mathematical entities'.

Numbers are dominant in 'scalar' social properties and sequential temporal causal properties, best to describe the inner 'vital energy of those points', its discrete configurations, and all the functions that express its Dimotions.

Numbers it follow are more complete than points as time-motions are more fundamental than the spatial mental forms we make of them.

However in the entangled Universe ALL its ST-beings as fractals of the whole participate of the 5 Dimensional Motions of existence, ¬Δ@st:

¬; So they will have limits, ¬, in space and time beyond which they break its form into entropy...

Δ-Planes internal to the T.œ, (cells, atoms, etc.) and be inscribed in a larger world, Δ+1 that sets those limits...

S: will display the 3 Spatial canonical topologies of any 5D system in its own organic parts (|-limbfields, Ø-bodywaves & O-particheads)...

T: evolving through growth in information parameters that decrease its locomotion through its 3 time ages.

@: And to survive and function, it will need NOT to be blind in that vital, entangled Universe, so the T.œ, will have @ singularity-mind of relative stillness that will act as a center of a referential language to be able to perform the 5 actions of existence that reflect in a fractal, minimalist cyclical bit of time quanta and local space territory, its needs to perform those 5 Dimotions of relative existịences also within a limited number of perceptive Planes, where to feed on lower entropy Δ-4, to move, lower information, Δ-3 to perceive, lower energy, Δ-2 to feed, and emit lower Δ-1 cells to reproduce, evolve palingentically, emerge as a clone, Δo of the being, and thus survive beyond the ¬ limits of time=death and space=decay, its T.œ will experience.

As all is a fractal mirror of a larger world-whole, all this properties define fully all what is needed to know of the world cycle of existịence of a relative T.œ, and will be able to describe, its parts, its wholes, its organs, and even its languages, whose internal structure will reflect in its grammar and parts, also all those elements.

In an entangled Universe any system require a ternary, Δst, or pentalogic 'Rashomon view' to fully extract its 5 Dimotions or 5 ¬Δ@st elements, as all is made of 5Di, space-time dust, or else it doesn't survive in an entangled reality. Thus Numbers in Pentalogic of ¬Δ@st, are also a mirror reflection of the larger Universe. Yet because huminds are as all mind points, self-centered in its mind-language, limiting the vital properties of all other entities, ab=using them as open systems of entropy from where to extract motion for its actions of survival, pentalogic is always limited and distorted by the ænthropic principle (man as the anthropic center, which debases the intelligence of the Universe to come on top) and entropic behavior (man as the top predator destroyer of worlds, to absorb energy for its own creative processes), humind's ¬Algebra also distorts its mirror languages of ¬Algebra, we need to expand to make numbers acquire the richness of its pentalogic use in the entangled Universe: So let's apply 5D perspectives to the duality points≈numbers:

S: • points have a single social arrow. Still mind spaces are always positive in its simple growing social form.

T: Nº numbers are richer in meanings as they can represent ST-fractal points (T.œs) with motion, hence inverse direction that makes them negative (without the proper philosophy of Δst maths this was historically a big problem till Gauss define them as inverse, and still lingers in the understanding of the i-complex plane of 'scalar spacetime'). So still space points acquired motion in Cartesian and Vectorial and Phase spacetime graphs.

Δ: Rational, Irrational and Complex numbers is the final expansion of points to reflect the scalar Universe.

Ratios are a property of Δ-Planes we study in number theory when dealing with Universal constants; even if we see them 'surfacing' in our scale of space as geometric figures. So i-ratio-nal numbers might exist as 'whole units' *(rational numbers that happen in a single Δ-plane as circles or diagonals)* in the continuous geometry of the mind.

I.e. If we apply to π, a pentalogic ¬Δ@st view:

Δ: Pi then in scalar terms rises the dimensions of the system from a flat line to a bidimensional cycle.

T: Pi represents one essential Dimotion of existence – a key s=t symmetries, such as +3=π $ = ð -> π, is the function of time evolution from lineal youth into its 3rd age of maximal curvature, when the point returns its origin, after 3 diameters-ages with transitional cuts= openings. Hence the simplest representation of a worldcycle.

S: π is also in simultaneous space a membrane that closes a vital energy self-centered in a singularity that needs 3 apertures to the outer world, between the 3 diameters of a perfect 'closed hexagonal pi'.

S⇔ T: Since time is dynamic, not static, the fact that there are infinite decimals to pi, always varying by approximation means also that a spiral never closes or opens in perfect fit, that it constantly moves between ±π states of 'entropic expansion and implosive in-form-ation' allowing the open-entropy/closed-information duality of membranes that enclose systems to feed and perceive in S<T>States and Stœps:

The spiral Organisms:
π-spiral
The spiral, feeds on energy diameters...
96% dark
Space-state

π-spiral
Information-processing.
4%eye
−π
cycle
Time-State: Max, curvature

kπ Spiral   Space-state
+ π, − π
feeding numbers
Energy absorbtion

@: A pi enclosure, leaves a π-3d/π, 4% of 'openings' to the outer space'. Hence the singularity will see only a 4% of the outer world leaving 96% of dark space, not perceivable – not coincidentally the amount of dark matter that our electronic eyes cannot see beyond the galaxy, which likely will have a pi membrane or halo of dark matter that does not let us see the whole universe (proportion of unseen dark matter and energy which completes the organism of the cosmos).

Pentalogic then advices always to consider in the entangled universe of Δ@st of space-time to consider at least those 4 space, time, scale and mind views on any element we analyze.

Irrational ratios eliminate the view that lines are continuous, (Dedekind, etc.), a concept that corresponds to the limit of 5D fractal discontinuity with a lesser 'perception' of space, or the belief in a single spacetime scale. The truth is that is existence shows the opposite as the Greeks truly understood: continuity does NOT exist; in all planes there are 'holes' to lower and higher planes through which irrational numbers transit. In other words, such ratios and S=t are 'incommensurables' as *continuity does not happen in a single plane of reality.*

As numbers operate on several planes of existence, but points in a single plane, they are not identical but self-similar. Spatial, geometric and temporal numeric views are not exact identities but approximations, as a number is discrete, sequential and so it 'lacks' the continuous perception we have of geometric space.

Indeed, consider **the first ¬Algebraic proof of this essential Δt vs. s quality** from the Book V of Euclid's Elements: A square with sides of length 1 unit must, according to the Pythagorean theorem, have a diagonal d that satisfies the equation $d^2 = 1^2 + 1^2 = 2$. Thus the diagonal can be expressed as the ratio of two integers, say p and q, and as p and q are relatively prime, with p > q, the ratio can be reduced to its simplest form: $p^2/q^2 = 2$. Then $p^2 = 2q^2$, so p must be an even number, say 2r. Inserting 2r for p, we obtain $q^2 = 2r^2$, whence q must also be even, which contradicts the assumption that p and q have no common factor other than unity. Hence, no ratio of integers express the square root of 2. *But the proof has used a scalar dimension; by dividing and squaring systems in Δ±1; when the geometric figure exists only in Δº. So there is a difference – a loss of information transiting Planes.*

ake a clear illustration of that fact with another example of the non-ect square numbers which can only be approached *from above or* *below in* *scalar power numbers ¬Algebraically but do have in a single plane a* *perfect closure* *geometrically; as graphically 2 x $5^2=7^2$ but numerically we miss a* *'whole 1'.*

Thus translating continuous systems space-like into discontinuous time-like numbers is not exact, neither translating S or T systems into Δ Systems. S≈T≈Δ parameters might be similar but $5^2 + 5^2 = 7^2 + 1$ they are *never identities - the translation of one form into the other misses entropy*

or information, which will be very relevant for mathematical physics where neutrinos disappear in other scale with missing mass and death dissolves information never regained.

Continuity and closure is a concept of geometry in a single plane not of ¬Algebra in multiple Planes with motion. Continuity cannot be considered in time cycles and its mind representations, which are by definition discontinuous (±pi). And this implies real numbers do NOT exist in the plane of Euclidean ordinates, which is perceived in spatial continuity. The same is truth for √2, the diagonal, which is the other *canonical translation of a line into an open triangle, the bidimensional equivalent of the ±pi openings for a lineal entropic system (surface of maximal perimeter and minimal volume of information).* In that regard, the proof that √2 does not exist means a diagonal never closes statically the triangle as a pi-circle never closes it.

¬ Entropic view. Finally to notice that even irrational numbers have limits. For example, in scalar 'translations', irrational numbers such as e, show patterns that break beyond '10 decimal parts', which happens to be the limits of the 'planes' of most systems. So happens with e: 2,71828182828…459 where the number breaks; and this is the 'last' ENTROPIC ¬ view to have the pentalogic analysis from the 5 ¬∆@st perspectives of an irrational number. **Only in Pi** we find NO patterns among the key irrational numbers that represent essential 'functions' and dimotions (e being the entropy dimotion itself), which means likely the Planes of the Universe are infinite as the dimotion of worldcycles and perception has no limit of Planes.

S≈T are similar not identical *numbers* are *discrete* time frequencies, points part of *continuous mind spaces:*

∫@ (geometry) ≈ ∆ð (¬Algebra)

Numbers and (in)finities.

Mathematics divides phenomena into two broad classes, discrete or temporal and continuous, or spatial historically corresponding to the earlier division between T-arithmetic and S-geometry.

Discrete systems can be subdivided only so far, and they can be described in terms of whole numbers 0, 1, 2, 3, …. Continuous systems can be subdivided indefinitely, and their description requires the real numbers, numbers represented by decimal expansions such as 3.14159…, possibly going on forever. Understanding the true nature of such infinite decimals lies at the heart of analysis.

And yet lacking the proper ∆ST theory it is yet not understood.

The distinction between continuous mathematics and discrete mathematics is one between single, synchronous, continuous space with less information, and the perception in terms of 'time cycles, or fractal points; space-time entities', which will show to be always discrete in its detail, either because it will have boundaries in space, or it will be a series of time cycles and frequencies, perceived only when the time cycle is 'completed', and hence will show discontinuities on time.

Thus the dualities of ST on one side, and the 'Galilean paradox' of the mind's limits of perception of information lay at the heart of the essential philosophical question: it is the Universe discrete or continuous in space and time. Both, but always discrete when in detail due to spatial boundaries, and the measure of time cycles in the points of repetition of its 'frequency'.

So ultimately we face a mental issue of mathematical modeling: the 'mind-art' (as pure exact science does not exist, all is art of linguistic perception) of representing features of the natural world in a reduced mental, mathematical form.

The universe does not contain or consist of actual mathematical objects, but a language can model all aspects of the universe. So all resembles mathematical concepts.

For example, the number 2 does not exist as a physical object, but it does describe an important feature of such things as human twins and binary stars; and so we can extract by the ternary method, 3 sub-concepts of it:

2 means the first Δ-scale of growth of 1 being into 2, by:

Δ-Similarity in scale, Simultaneity in space & Disomorphism in time-information brings 'equality in ΔSt' as perceived by a linguistic observer, @, which will deem both beings 'identical' when those 3 conditions are met.

Whereas identity means that an observer will deem the being Δst≈St. So identity is the maximal perfection of a number, for a perceiver, even if ultimately:

'Not 2 beings are identical for the Universe, but can be identical for the observer'… an intuitive truth, at the heart of why reality is not collapsed into the nothingness of a Boson=big-bang point.

Thus the 3±¡ elements of Δst entities can be mirrored by *a social number whose intrinsic properties possess 'Spatial S-imultaneity, Scalar similarity, entropic limits of size, and similar form allowing Δst-equality or equivalence, which becomes identity for the limited perception of a mind. Then a number is born with enormous usefulness to describe reality.* Even if its synoptic power escapes some details.

It is then clear that a number as a sum of points, encodes more information in a synoptic way about the cyclical time information of the 'social scalar group' than an array of points, *which unlike a number tells us less about the 'informative identity of the inner parts of the being', but provides us more spatial knowledge about the relative position in space of the members of a number-group.*

Son in the origin of geometry both concepts were intermingled as 'points were numbers' and displayed geometrical properties. Such Numbers as points, show also the internal geometric nature, used in earlier mathematics to extract social, Spatial properties from them.

RECAP. **Theory of numbers.**

Numbers are not only intervals of a one-dimensional straight line, but *under a pentalogic analysis they fulfill all possible 'functions' as mirrors of the basic element of reality, a social T.Œ:*

Space: as Pythagoras and Plato stressed, they are geometrical forms:

Mathematics is concerned with 2 seemingly different worlds, the geometry of spaces and the logic of numbers. To fusion both requires to understand numbers as forms. The 4th Non-E postulate of congruence shows how equal points are numbers, the self-similar class of equal forms that create geometries:

A number is not only an abstract set but always a 'democratic' collection of similar beings extending over a common vital space, forming a network.

And so networks create complex numerical forms, when the motions between points of the networks become stable exchanges of energy and information between points forming regular polytopes.

Since each number is a geometrical form no longer limited to a simple one dimension it can vary its geometry and hence its functions and degrees of freedom and complexity increase with the ordinal of the 'number'.

The line is simple. The line joins two points and can only have a combination.

The triangle can only have a closed combination, but 3 possible open combinations, Ab, Ac, Bc.

The quadrangle is more complex. It can be joined in 2 combinations, as a cross and a square. And it can be left as an open snake with 3 different orientations. So a foursome acquires a snake shape to move with the arrow of energy; a crossed form to perceive in its center '5th point' and a square shape to accumulate and reproduce its internal organs; and so each shape of the same number becomes a topology with a different form and function.

Δ: Numbers as scalar, social forms, reflections of the 5 Dimotions of reality .

In regular numbers, function and form fusion, related to the 5 different dimotions of reality.

To start with this is achieved with the dual bilateral '10 scale', which humans learned from the 5D-fingers and its bilateral symmetry.

Further on certain numbers as representations of a sum of dimotions or 'degrees' of freedom, are better to handle certain dimotions=functions:

The quadrangle can store energy, but in a zigzag open line it can also move – spend energy and as a cross it can gauge information. Numbers also define arrows of time. So for example, 1 lonely number without motion is perceiving, with motion is processing energy, 1+1 might be 3 (an act of reproduction) or 1 (an act of Darwinian feeding). All those vital actions determine that certain numbers survival better than others. So, 1, 3 and 4 are very common systems.

Probabilities study causal events in time and populations in space; combinatory studies the differentiations of species according to the variations of bodies and heads.

Numbers are social gatherings of identical points, the most synoptic unit of mathematics. As such they can also express sequential series in time as an entangled element of ¬Δ@st. Numbers though are dominant in 'scalar' social properties and sequential temporal causal properties, best to describe the external membrane of geometric discrete configurations of regular points=polygons; its 'vital energy' (physical parameters) or its time Dimotions in sequential forms (social and scalar reproduction), and in its more complex forms of ¬Algebra as all functions express Dimotions of space-time, become the unit of 3 growing Planes: numbers->variables->Function(al)s. It follows that Numbers are more complete than points as time-motions are more fundamental than the spatial mental forms we make of them.
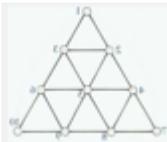
Δ§: Social Planes of numbers

Since if there are several Planes of numbers, we cannot consider the decametric scale of human social numbers the whole, unless it 'mean something special', or else it would not be a language mirror of reality. What is special about our scale is that it actually does correspond experimentally to the social Planes of the fifth dimension, which is made of 3 elements for each of the 3 physiological networks of all entities that give us 9 elements+ 1 that acts as the 'whole'=10. It is not just as clueless people say, our scale because we have 10 fingers. We do have 10 fingers because the Universe work in decametric Planes in the social dimension Δ§, which is the main function of numbers.

In the graph the fifth element in the center communicate 3 triads in the corners of a tetraktys the commonest form of social organization into larger Planes.

S-Numbers: Polygons as vital organisms

Numbers are social gathering of indistinguishable forms. When studied in space thus numbers must have regular efficient configurations. So Δ§ numbers are 2D polygons or 3D Platonic solids.

Its importance in vital topology lays on the fact that polygons start the creation of superorganisms, with a membrane – the polygon proper, which closes a vital space and can by connection of points through lines-waves of communication, create a central singularity. Thus numbers as fractal points grow organisms. And this is self-evident in the study of Nature. We can then study together with entangled pentalogic both 'Planes' of social numbers as 'growth in time' of polygons, efficient configurations in 'surface' worlds (land, water surfaces), and polyhedrons, which will be efficient configurations in a larger Δ+1 3D world (water depth, atmosphere, vacuum for atomic and molecular Planes).

The Decametric scale. Growth of Dimensions (d) and Dimotional functions from 1 to 10.

Polygonal numbers are best to represent the social evolution of forms into new Planes that emerge as envelopes into wholes. The decametric scale of numbers give us then the perfect polygonal forms of bidimensional space:

Nº 1: *1d: 1D¡: Perception §ð. It* is the unit-whole: a unit circle performing aperceptive 1 Dimotion; a fractal point that has 0 dimensions in Euclidean geometry but a finitesimal dimension in 5D. Since fractal points have volume.

Nº 2: *2d, 2D¡:Locomotion $T.* The line-wave of distance-motion made of fractal points communicated between two poles has 2 Dimensions. It is the reproductive couple. It forms the axial flow of any spherical informative topology. In Non-E geometry forms the antipodal points that a singularity reproduces to form its bilateral symmetry.

Nº 3: *2 d, 3D¡: S=T.* Its dimotion is Reproduction. As a couple or antipodal mirror points forms a gender symmetry that creates the 3rd, 'son' element in its middle point of communication.

Triangle. *3d: S-st-T* As we already noticed synoptic numbers give birth to multiple paths in spatial geometry. So 3 has the first variation in the triangle, which has 3 Dimensions, as points have volume, and whose main Dimotion is to act as the spearhead of locomotion, with its leading vertex to perceive (1D) or break (5D), entropically the resistance of motion. As it can enclose a vital space and perform the 3 physiological functions with its specialized ternary points, the head, one back point to reproduce seeding information and the other inverse to expel entropic motion, we can already consider a triangle an autonomous organic system, the first whole without the need to perceive internal scalar parts.

So 3 is also the first classic 2 Dimensional geometry: The triangle, the perfect form of lineal-motion geometry. And from then on numbers multiply its 'Dimotions', variations of forms, and vital geometries. So we shall just consider a few details of a field which as all those of 5D mathematics is ginormous. I.e.:

Nº 4: 3d, *4D¡§ð.* The square's main Dimotion is social Evolution, in 2 D by merging two triangles, as the most stable social evolutionary form to 'fill' a flat field. In 1D as the social evolution of two couples of 2 points.

Nº 4: *4d*, **4D¡** *§ð.* Its main variation is the *first 3-dimensional classic geometry, the tetrahedron (4dimensional in 5D formalism as each of its point has an inner volume).*

Nº 5: *5d*, Scalar Dimension¡ The Pentagon has a deserved mystical pedigree since polygons *finally enter the fifth dimension proper as* a pentagram reproduces with its internal diagonals a scalar inverted mirror form of itself. So we define a Pentagon *as the first form of the 4th/5th dimension that reproduces its very same form, by connection of its 5 points creating an internal smaller 5D social form, or alternatively it expands entropically by prolonging its sides creating the pentagram.*

So the pentagon closes the 5 Dimotions of existence, forming a pentalogic scale fundamental to 5D theory.

Let us mention from 6 to 10 only the main dualities of numbers; its main Dimotion and Dimensional forms, going back to classic Euclidean dimensions, to make it simpler:

Nº 6: *2d, 4D¡: social evolution.* The hexagon is the strongest form to cover a 2d world, as graphene shows, because it closes with '3' diameters its perimeter. It is the perfect pi, which in physics implies a non-E geometry of maximal Planck mass. It creates also a highly connected • central singularity by joining opposite points. So its hard membrane and connected center forms the strongest organic system on 2 Dimensions.

Nº 6: *3d*, 3D¡ ST. In 3 Dimensions is the Octahedron, studied in non-E Geometry as the first reproductive bilateral S=T symmetry in 3 Dimensions (whereas the line is the mirror symmetry in 1 classic dimension and the 2 triangles of the square in 2 dimensions).

S=T symmetries. The 'Temporal symmetry of sequential numbers', makes possible not only to describe as we do here in this introduction to 5D mathematics its simultaneous superorganisms in space, but analyze sequential numbers in time; as 'years' and 'decades' of a worldcycle; which also divides in 3x3=9 x 9 'life baguas', but we leave for an enlarged future upgrading of this paper. As we want to race into the tetraktys.

Nº 7… *of* the same family than the Pentagon, with similar properties, cannot be constructed only from the interaction of a perfect entropic |-line and O-cycle (compass and ruler), but needs *to bisect its angles/networks in 3 sub-angles; making more difficult its reproduction in our mental 4D 'light spacetime'. But in a 5D Universe,* enough Regular heptagons can tile the hyperbolic plane, as shown in a Poincare disk model projection:
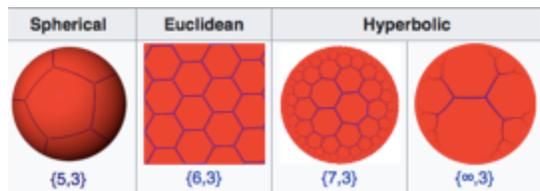
In the graph another key mirror symmetry between numbers and vital topology: §ð particle/heads of information are tiled by informative pentagons; flat Euclidean space is tiled by hexagonal forms of maximal entropic resistance; but the hyperbolic plane of body-waves of vital energy is tiled by heptagons... a theme of advanced 5D geometry…

Nº 8: *2d, 2ST.* The octagon of the family of the hexagon, with similar properties is a bridge *towards the infinite points of the circle; fairly redundant, in form… as numbers in 1-2d become now more important as ST-systems of timespace motion; where the 8 plays the role of the final life-cycle. It is in the time the closure of existence - the final state of decay; for each 'series' of time-space systems – from the human ages in its 2 Planes of life (80 years) and civilizations (800 year cycles of cultures); and have the same role for machines (stock cycles) and physical systems (over 80 z, elements become radioactive). So as the fundamental series of spatial geometries closes with the heptagon, the main symmetry of higher numbers belongs to time ages.*

Nº 8: *3d, 3§ð. So 8 belongs properly to the geometry to 3 D platonic solids, considered next, where 8 is* the cube.

Nº 9-10'-11 tetrarkys form - transcendental triad of perfect whole: the 'closure' of an organic geometry,

2d $T-1D¡: *Tetraktys* in which *the 3 networks within the system form the 3 surface angles of the triangle, playing the specialized roles of the 3 physiological networks of motion < iteration > information of the system. But 9 has NOT A POINT on the singularity center; it is a mindless system, which requires the 10th point forming finally a* **tetraktys, the sacred** number of Pythagorism and Hebrew geomancy (graph):
It has a singularity, a black ball that communicates all other physiological triangles, becoming the inner mind/heart of the organism, doubling as 11th, since it regulates the inner body connecting its internal part but also becomes its antipodal 'emerging' point in a higher Δ+1 scale; starting a new game. So 10'-11 completes the symmetry between time ages, worldcycles, dimensions and spatial forms, becoming a new unit of a new logarithmic social whole of 10^{10} cycles of time an population. *Since there is a symmetry in base 10=3x3+1 both on scales and space-time, function-forms for any full developed supœrganism of reality. In the graph the human case, both at individual and social level:*
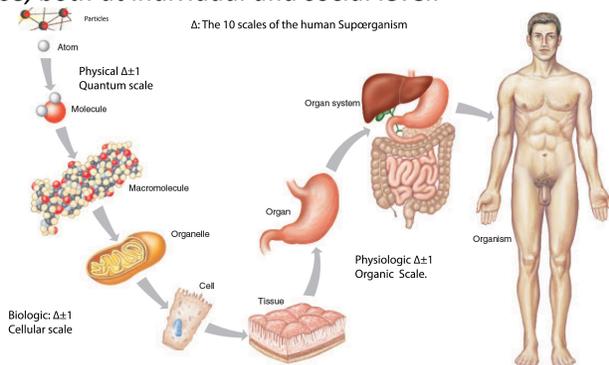
Such polygonal numbers will grow from the 1 seed to the 9+1=10th most efficient scale, through ternary and dual symmetries, which in existential algebra might then loose the ideal form. I.e. a human being, has a tetrarkys of 10'-physiological system (3 digestive, 3 reproductive-blood and 3 sensorial systems fusion by the 'whole' brain system.**.** Moreover as all systems live 2 worldcycles the 10th logarithmic scale, becomes the

In next graph, the 2 basic tendencies towards higher organizations of Human societies, one based in carbolife forms and verbal languages; and the other in Economical networks of pricing and machines of war [weapons] and peace. Most social human structures today depend on economical networks [money] to survive.

In the past though it was the law, and the ethic Gods of Verbal existence, who organized men. They carried the only message which can structure the enormous Human mass into a social surface of organic communication: the message of love = Max. communication, which is therefore considered the verbal brain of Humanity, the basic 'nervous impulse' that organized men into a social, harmonic body of history.
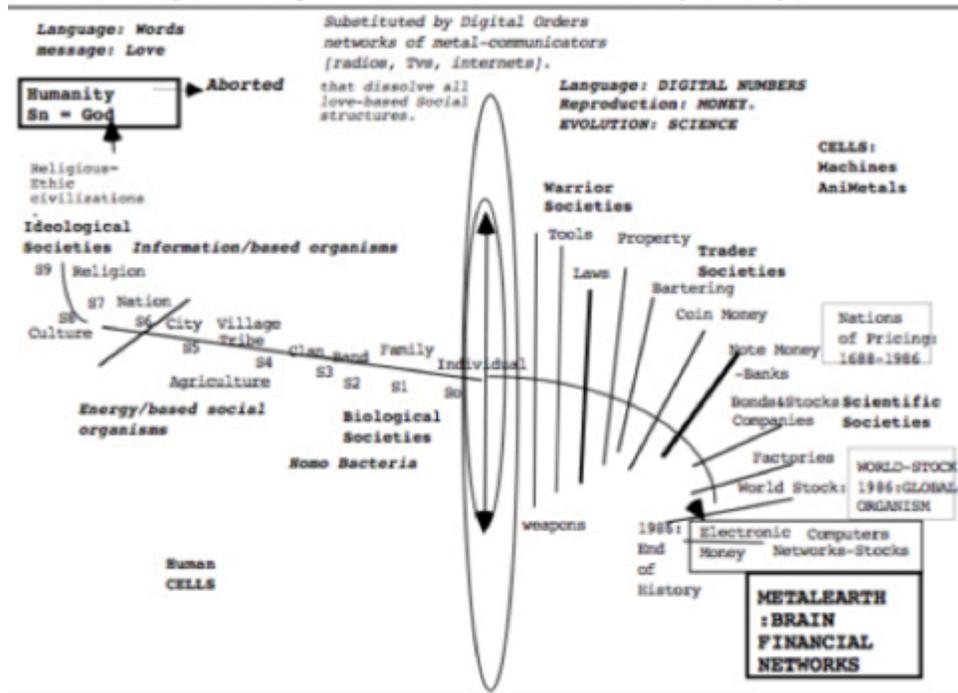
In population scales human societies follow the more common progression social organisms: potencies of 10, which become a perfect social organism ound 10 up to 10-11 elements [they are the neurons of your body, the stars of laxies, the ties of DNA organisms]. However men did not reach that social vel, before becoming prey of economic networks that will soon acquire that cial level, through internets in which the basic neuron-unit is the computer.

We can adjust the evolutionary progression of human societies with tencies of 10. Thus an individual is So=1[ten up to zero=one]; a family actuates between 1 and 10, a clan between 10 and 100, a tribe between 100 d 1000. Those societies are the basic herds of the Homo Bacteria, related by netic 'equality' [race]. Such primitive form of racial organization however is andoned in the Neolithic and only returns in the "neo-paleolithic", in recent nturies when the evolution of machines devolves human social evolution acism, racial nations of economic nature, such as European empires.]

transcendental number between planes. Thus between 2 such Planes of the 5th dimension we shall always find around 10^{11} elements - the ties of a DNA molecule, the stars of our galaxy, the cells of a super organism, the galaxies of the perceived Universe, and between the Universal Constants of Space, we will find the same differences, the energetic value between the H-Planck constant of ð in the Δ-1 quantum scale and the k-Boltzmann constant of the Δ-Thermodynamic, human scale; and then the μ-magnetic scale and so on. *For example in the human social super organism decametric Planes (human societies) evolved mankind through the 3 first genetic Planes, then 3 geographical, economic Planes, and finally 3 verbal, ideological Planes to get to the global super organism:*

10°, the individual of a given 'previously described Δ-scale of the whole Universe... through the 10^1 scale of the family (which can be a couple, a mononuclear family or most often one through 3 generations of grand-parents, parents and sons, of around 10 people); then in genetic units, to the 10^2 scale of 'clans' and 10^3 scale or tribes (in humanity, used to names those scales.)

Organization then becomes ST- economic. And systems grow the next degree of 3 geographic scales: the town, 10^4, the city, 10^5 and the nation, 10^6...

Finally ideological, verbal information, creates cultural systems, till arriving to 1 billion, $10^{10\text{'}-13}$ individuals, which emerge as a unit of the next scale. In the graph we can see the social evolution of the economic system both in the human organism and the organism of machines and chips – which has already reached the social number when 'emergence' into a new plane, a global mind of internet takes place. In the left, we consider the human super organism of history, a smaller super organism of human beings, not yet emerged as a global single being, but coming closer to the 10^{1o} human beings, in which might emerge as the global super organism, consciousness of the life Earth.

Pentalogic of Scales as representation of the 5 Dimotions of reality.

We consider decametric sub-scales between two planes of existjence 'stages' of the complex reproductive and social *growth 3,4* Dimotions *towards the fundamental decametric scale. Binary systems relate then to the 3rd*

complementary, reproductive Dimotion, either as gender elements or as inverse 0'-closed informative vs. |-open entropic numbers, the minimal duality to represent reality.

Ternary Planes relate then to the more complex inverse Dimotions - the 'triangular 2, 5 D entropic' Locomotion since the triangle is the strongest form, spearhead of motion, and π-geometries to perceptive still 1Dimotions (3-6 number systems) Planar, 2D geometries (binary, quadrangular systems) and one can change into the other by rotation. While it gives origin to the 3x3+1 complex, fundamental 10D scaling.

This duality extends to the 2 main geometric Planes of numbers in open competition" the **0'-6th is the scale of cyclical perceptive geometry**, whereas π=3, is the hexagonal perimeter of a 'whole' closed geometric space, competing with **the 10'-scale, a perfect tetraktys geometry,** where the 'whole' is a lineal, triangular space.

In the O≈| historic duality Asian huminds (Babylonian) adopted 6-scales v. European lineal cultures of 10 scales.

Everything is nothing with a twist.
~Kurt Vonnegut

¬ENTROPY LIMITS: ±0', ∝: NUMBER FAMILIES. 0 FINITESIMALS & ∝: RELATIVE INFINITY NUMBERS

"You must diminish the sharpness of those objects in proportion to their increasing distance from the eye of the spectator. The parts that are near in the foreground should be finished in a bold determined manner; but those in the distance must be unfinished, and confused in their outlines. Because the details of an object vanish" Leonardo
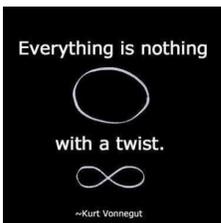
A theme huge in modern ¬Algebra (Set theory) that 5D returns to the 'basics', is the non-existence of actual infinities which from Aristotle to Gauss was the accepted doctrine, as all infinities are relative to the plane of space-time we perceive and the mind-space that mirrors it; hence actual infinities are 'cut-off' by the entropic limits of all fractal systems of the Universe, *save the Universe itself.* Closely related, is the non-existence either of absolute zeros, but 'zeroths: +0'; - a finitesimal of a lower plane.

0 is not an empty set. It is a ±0 finitesimal. ∝ has a limit of entropic dissolution and perception.

The definition of 0, like the definition of ∝ has been shallow, reflection as most human concepts of the humind's compression of reality into a single planet continuum to fit it all, discharging all information that doesn't matter to it. 0 though is NOT in a Natural Number. But an infinitesimal and so you cannot access from 1 to 0 jumping but dissolving 1 into 0 through lower Planes and that makes a whole difference. *Zero does not exist!*

An absolute zero does not exist, as the Universe has horror vacuum, and so the 0'-1 line doesn't belong to the Natural Numbers, but represents the Δ-1 plane, where its new symbol, ±0' is the value of the minimal finitesimal, themes those studied in depth in our paper on 5D Algebra. A simple function will show that:

The limit at 0 does not exist. As we go down towards zeroth in the Δ-1 plane of the o-1 'temporal, probability sphere', 0 becomes the minimal finitesimal of the Δ-1 plane… which cannot be perceived and it is 'expendable' for the 1-whole.
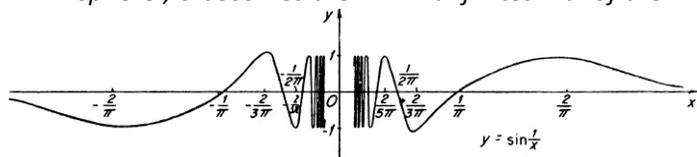
The 'Axiomatic method' in search of absolute truths forget that the ideal mental space reflects a larger, complex Universe, where there is no void, and so 0 is just the minimal unit of the lower plane.

But huminds perceive a limited single space-time continuum as a synoptic, selective system of information. So 0 is the limit of 'human perception' of size-volume/spatial scale, and of motion/stillness .

As zeroth doesn't exist but the finitesimal does. And so in calculus a limit does NOT reach zeroth but becomes the minimal 'differential', we calculate, which is what in 'praxis' science uses. Finally as 0 is the '1' of the lower 0'-1 scale, we can justify the similarity of the 0'-1 palingenetic sphere of probabilities seen as 'time motion' due to its faster cycles vs. the 1-∝ statistical plane understanding the parallelism of quantum particles and statistical molecules. While the symmetric -1, 1 sphere for 'numbers' as 'time Dimotions' merely means the inverse direction. The zeroth thus is the generator of the function of existence, with a 5d metric that enlarges in time, as

it reproduces into the 1 sphere as a relative infinite whole, since from the pov of the 0'-finitesimal, the whole is all beyond which we do not perceive.

Pentalogic on 0' (zeroth).

Δ-scales. We can then treat the 0' as a scalar number with a more profound concept, and realist interpretation: *The limit of scalar reduction of size to an Δ-1 indistinguishable finitesimal, which also has deep implication in calculus, as it becomes the limit of h->0'.*

¬ Entropy. The limit of death is the dissolution of form down 2 planes of space-time: $Δº«Δ-2$, or 'double zero'.

-T-Dimotions. The point in which a Dimotion of time turns into a Dimotion of space; that is motion ends in stillness, but as it never 'reaches absolute 0', the graphic tends to be a hyperbola in the 0 point. Since the x-coordinates represent motion and the Y-coordinates, information, the lack of motion which is never absolute as t->0, represents the 0'k temperature in Kelvin's scale, the 0' of Einstein's gravitational equations in the black hole.

It is with that proper interpretation of ¬algebra and geometry, how mathematical physics can solve its paradoxes and contradictions. 0' is the barrier of relative infinite mass (scalar point of view), relative 0 size (space point of view) or maximal c-limit of speed (Motion point of view), in special relativity.

But it is also the point of entropy where 'mass dies' and jumps 'over the c-speed', to appear as an >c flow of dark entropy (repulsive gravitation). *Since when dealing with motion, a system passes from + to − without crossing the zeroth, as it changes direction, since motion never reaches pure stillness. I.e. even a ball that rebounds in a wall, changes its external motion for internal deformation, before it bounces back at the point in which the internal deformation becomes the 'impulse' for a negative motion.*

In all those cases beyond the ideal philosophical concept of zeroth, what zeroth represents is a barrier, which is crossed BY changing the sign to the inverse motion.

I.e. In Einstein's factor on relativity, $ß=1-v^2/c^2$, as v never reaches c, ß leaves always a = 0', a quanta or minimal motion step of the Universe. Then we jump to the minimal tachyon quanta. A physical system does NOT disappear in absolute vacuum but leaves an h-quanta of light space-time; the minimal action from where virtual particles appear.

S-pace. Absolute zeroth again doesn't makes sense, but slowly fades away. When we die, we leave memories of our past. When we take away a corpse, we find 0' remains of DNA 'traces'. And if nothing is left the we leave an undetermined unquantifiable reality, since what kind of ' zeroth' we talk of? 0 pears, 0 humans? We do NOT know if there is not a finitesimal trace what was there. So 0 becomes an uncertainty.

@-mind: We often use the concept of a 0'-mind, because the mind is the finitesimal image of the relative infinite world we perceive: 0' x ∞ = Mind-world, which properly written in 5D writes 0' x ∝ = C.

We find 0' x ∝ uncertain, as there are infinite species of minds reflecting infinite different territories.

The false hypothesis of the continuum: Mind spaces fill the gap. Pentalogic of infinity.

It follows then immediately, the existence of a pentalogic of infinity, based in similar concepts of 'uncertainty' in the limits of perception, of the discontinuous scalar Universe whereas, infinity becomes the 'inverse' of 0' whose product is a constant relative c=1=whole. In infinity thus we must *define as in zeroth which local 'species', plane or form we deal with:*

Δ-scale: infinity is the wholeness of a certain scale and it remains to be seen if ideal infinity − that is a Universe of repetitive infinite scales exist.

Time: infinity is immortal reality as it seems the game of existence is cyclical, but iterative, hence ∞ in lineal time.

¬ Entropy: But for each T.œ infinity is its limit of death. Infinity is also the bounded membrain of the larger world in which the T.œ exists as an Δ-1 part.

Space: Infinity is again the limit of our perception – the cosmic horizon for the Universe, likely the limit of exist¡ence= death of light. Infinity again remains a question of a bounded or unbounded Universe of infinite scales. But actual infinity is the reach of ieach territory for each… **@-mind.**

Thus we use systematically the symbol ∝ meaning a 'relative infinity' with its 'cut-off limit' in one point *where entropy opens up actual infinity with real information into entropic infinity which cannot be counted, the absolute flow of times of the true infinite Universe huminds cannot access. It is this 'open entropic boundless' not-limited 2of that entropic lack of information and the substitution of the evident discontinuous gaps of any Universal system when perceived in detail by the hypothesis of continuum.*

In this manner since Galileo noticed that we could put in correspondence N->N^2 hence could consider both 'equipotent, despite the obvious fact that N is larger than N^2. The paradox has an immediate solution in 5D, *because for two systems to be identical there must be a dual feedback relationship as the Universe is NOT Aristotelian in its logic A->B but at least dual and this means for two systems to be equal they must have a dual identity: N->N^2, which is immediate (we just need to square N to get all N^2).*

But the opposite, N^2->N, is not truth, as there are N values, which cannot be obtained from N^2. There is NOT 3, NOT even 2 and if we reduce to the 10 first 'actual numbers', we find that N has 10 values but N^2 has only 3… So for the actual first decametric segment N is +3 times larger than N^2. And so the 'holes' of N^2 are larger than the holes of N in the discontinuous Universe, which means N^2 is smaller.

Acknowledgement of the essential discontinuity of the scalar Universe, immediately classifies all family of numbers within the SxT=Δ±¡ different planes of the 5th dimension, in which paradoxically smaller Planes have more information, hence they are 'larger in quantity of discontinuous elements' that the larger wholes which have less information and yet paradoxically a larger continuity (information being essentially a sum of 'yes and nos', fills and holes), because its lesser mental perception and slower time makes for a larger mind the smaller world to appear as a continuity – so neurons were thought to be continuous from our higher view, space was thought to be continuous

Different families of numbers are in different 5D Planes with SxT=C metrics. So N^2 is made of 'larger wholes' than the N family when we do put them in correspondence, 1 to 1, i.e. 1->1, 2->4, 3->9, whereas 4 is larger than 2 and 9 larger than 3; the N^2 system belongs to a larger mental space on 5D terms. And so regardless of Cantorian platitudes, we can classify in different scalar lines with different amount of 'discontinuities' the families of numbers by size in agreement to the laws of 5D and its existence in different 'Planes of the fifth dimension' such as:

Δ-∝ : R (T) – entropic number of times without a repetitive pattern of information > Q(sT): Δ-¡, divisive numbers that 'cut' information in a repetitive pattern > Z(St): Δ±1, numbers on the 'human scale' of counting, with inversion of Planes > N(S): Human scale numbers to count spatial populations > N^2 (squared complex plane).

This is the 'real experimental correspondence' of numbers and their relative infinite size. And from those facts we can build a 'serious analysis of infinity paradoxes on 5D ¬Algebra. A few of them worth to study:

- The boundary size of those numbers families, if we consider only its limits are similar (excluding N), because the different planes of exist¡ence of reality co-exist precisely by filling the 'holes' of the larger planes that are more extended. Imagine the Universe as a network with holes, in which the smaller worlds exist, and so there are in lower Planes more holes for a more detailed scale to have more information. This is also the case of the famous Cantor fractal and its paradoxes, which become rational in 5D through its Planes.

So we see once more the experimental nature of mathematics, which mimics with the real structure of its family of numbers the Universe of discontinuous Planes with 'holes' that define 'forms of information' increasing in the smaller Planes according to the paradoxical SxT=C±¡

- Most humind's errors depart from its insistence to project its mind limits, which as in a movie 'cuts off' the 'discontinuous holes of reality', to create a continuous mapping in our visual mental space. So mathematicians just tried to fit all the family of numbers in the same scale of the fractal Universe, and invented 'axiomatic proofs' from Dedekind's cuts to Cantors' infinite sets with 'cardinals'… Imagination though can in any language create fiction distorted images with some part of truth. But the consequence is often paradoxes never resolved, regardless of pedantic false proofs or simple omissions of fact as Zermelo did to validate Cantor's work.

Since his errors come from the use only of the boundaries and boundless limits of infinity without a careful analysis of the vital energy content of numbers within, to consider that the size of certain infinities is the same. What makes as in any fractal structure larger the smaller 'step measure' of a family of irrational numbers is precisely the detail in our 'perception' of the lower scale of reality, now fully rationalized and derived as everything else in the Universe from the simple metric of 5D.

0'-1 ≈ 1-∞ Quantum case

Continuity only exists as a sum of all the scales of numbers. Once we have defined the 1-∞ plane only with natural numbers we can then assess the need for more numbers to fulfill the Δ±1 Planes and more operands to probe in to the Δ-1 scale (o-1 sphere and infinitesimal numbers found with rational and real decimals).

An Δ scale can be represented through the interval of 0 to 1 by finitesimals or the interval from 1 to ∞, which become the decametric and decimal regions of a supœrganism represented in the real line: Δ-1: o to 1, 1, the Δo scale and 1 to ∞, the external world.

So as we explained in ¬E geometry, the connection between 'Time' and ' Mental Space' *is: S¡-1 Mind=T¡ World.*

That is, the o-1 sphere unit of mental space, represented in terms of 'still information' by complex numbers is a whole world that becomes a 'mirror symmetry' of the Cartesian 1-∞ plane of the real world described with natural numbers.

Further on, as we are dealing with the smallest Planes of reality, it applies the metric equations of 5D according to which we are in a 'temporal realm' as world cycles occurs extremely fast (Min. Spatial size = Max. Temporal speed of time cycles) and so the formalism of quantum physics uses the equivalence between the o-1 probabilistic sphere of time events instead of the 1-∞ plane of statistical populations to formalize the events of ultra-fast repetitive particles.

RECAP. Peano's equality postulates do hold in 5D, *equality is symmetric, reflexive, transitive and closed – this property essential to understand how infinites might be superficially compared because their boundaries are similar, though there inner content is not.* Beyond that Cantor's work on various types of infinity is as irrelevant to *reality and truth, as scholastic discussions on the number of angels dancing on a pin, since potential infinity is uncertain.*

So the ∝ symbol stands for infinity with 2 potential limits, the 0' finitesimal and the boundless open number. I.e. for Natural numbers one is an open entropic potential infinity, as described by Aristotle and Kant (paralogic errors of man trying to go beyond its own limits of life, size and perception). The other one is the 0' finitesimal, bounded origin which will prove in Planes the equivalence of size with the larger 1-∝ precisely because the 0'-1 becomes a smaller scale. So we can put both in true correspondence and in fact certain trigonometric tangent functions, *which reduce angles in scale preserving its information,* do exactly that.

Cantor's paradoxes are similar to the Mandelbrot Paradox pf the length of England's coast, which is larger the smaller the scale and 'rod of measure' we choose to define it.

The ginormous beauty and intelligence of the fractal Universe though doesn't really need humind's egos to reduce it to the 'axiomatic method' imitation of our mind.

So we can 'recover' what is worth of all the work done in relationship to the 'supposed hypothesis of the continuum', which merely tries to pack the entire Universe in the single plane of light space-time we humans perceive as a flat Cartesian plane. And what is beautiful of Dedekind's cut and other proofs is that indeed, *the sum of all the planes of existence of the Universe is a continuum, as the Universe is completely full of existences.*

0' & $\propto$ are thus needed to understand the 'true nature' and paradoxes of derivatives, finitesimals and Cantor sets.

PRIME, ODD AND EVEN 'GENDER SYMMETRY' NUMBERS.

If we extend this vital analysis of regular numbers in space to sequential numbers in time, we come up with another ternary division of all numbers within the finite limits of a given ecosystem (infinity being a paralogic Kantian error of the mind as all planes have a limit of numerical form, normally as explained in the $10'$-$11^{10'-11}$ range, from ties of DNA in a human gene to stars in a galaxy)… that between top predator prime numbers, which generate all other, even, social reproductive, 'female' numbers, the majority of them in a Universe that systematically favors 'reproductive S=T' states as all fractal generators do, over even, informative + entropic 'male numbers', which can be divided in a minority of 'prime numbers' that carry the information of reality as they can generate all other numbers in 4-Dimensional sums; and entropic, unstable forms that code no new information (odd numbers excluded primes, which generate them).

 So we find yet again another fundamental division of species, according to the key variation of the 'Fractal Generator equation of space-time or 5D metric: $SxT_{s=t}$ = C.

It is the same duality of 'Female' present reproductive, 'even' gender, S=T vs. 'male' past to future to past, entropic and informative gender, S<T>S: SxT, the key temporal ternary symmetries of the Universe; between present dominant states, and past to future to past cycles, which requires a full comprehension of the 3 ages of time, and its complex ternary logic sketched in the introduction, that we develop in a paper on 5 D time pentalogic.

Essentially all cyclical time systems have 3 ages, a relative entropic past of dissolution, a reproductive dominant present and an informative future. And the proportion in any system is ½ present + ½ (Past>Future) that closes the cycle. For example, in quantum physics wave states are the present state; particles the future state and fields the past state. In matter, liquid is the present state, gas the past state and solid the future state. In cells, DNA is the future state, cytoplasm the present state and the protein membrane the energetic state. Its S=T symmetry makes the past less evolved, more extended in space, the present balanced, the future more informative. In human gender, the woman is the reproductive state, and males divide into a majority of entropic destructive and a minority of highly informative (complex IQ test put woman in the middle, a minority of men above a majority in the entropic lower range).

So to understand the ¡logic division of the 3 ages of time into past=entropy, S<T, which dissolves systems into a lower ¡-1 plane, present=reproduction, S=T, that iterates reality which seems not to change, and future=informative evolutionary system, T>S, which increase its form into the future… I refer the reader to the article on 5D pentalogic.

In terms of its scalar social organization, the 3 'different' groups of T>S informative, S=T, energetic and S<T entropic elements of a class structure correspond to the informative class (i.e. stocrkats in our society ruled by money, politicians in a real democracy, military in a dictatorship) which controls the language of power of society, while S=T form the body-wave of the system that reproduces it and it is taken care by the informative particle-head, while the S<T element is the entropic class easily 'divided' and broken, as energy of the others, in this case the odds that can be broken in smaller factors. And as we shall see the game of numbers have a remarkable

proportion of the two first classes as opposed to our ill-designed systems, a theme treated in 5D politics, where we study the informative 'nervous' network of human superorganisms.

While the general study of those 3 states belongs to those 2 articles, in the mathematical mirror the division is self-evident as we already observed some clear differences between odd and even numbers/polygons:
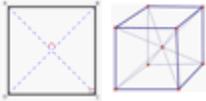
 Odd vs. Even polygons alternate with a key different property: The diagonals of even polygons create central singularities and form more stable systems, tending to static states, 'looking inwards'. They can reproduce by motion into equal forms in the same plane, and can easily tile, filling up the entire plane. While odd numbers penetrate in the Planes of the fifth dimension by reproducing fractal mirrors of smaller size, when crossing inwards its diagonals (informative reproduction) or larger mirror images when crossing outwards its diagonals. Those properties carry through all Planes of gender mirror symmetry; as 1 element is sterile, self-centered making different the 2 type of organic membrane-polygons. Since S=T even polygons do NOT reproduce through 5D motions as odd numbers, but within the same present plane of existence as they are 'self-centered' in a single point, within the polygon, NOT replicating without motion. Reproduction of even polygons happens by translation in space, as waves reproduce. So by moving through a tiling of present space a square reproduces filling the tiling, unlike a pentagon or odd polygon that reproduces internally and externally as its motion filling space is often impossible

Prime numbers as informative systems. In 'vital mathematics' as in classic maths, Prime numbers play a fundamental role in number theory because of a basic theorem:

$$n = p_1^{a_1} p_2^{a_2} \cdots p_k^{a_k},$$

Every integer n>1 is a product of 4 prime numbers (with possible repetition of factors):
where $p_1 < p_2 < . < p_k$ are primes and $a_1, a_2, . . ., a_k$ are integers. Furthermore, the representation of any nº in this form is unique. *Thus Primes are the generational space-time numbers of all others; hence the minimal numerical system with maximal information. And inversely if we reduce entropically a system of numbers, by 'division' (the operand of entropic dissolution) only prime numbers or its social combination DO survive=exist in the ultimate skeleton of reality, due to its efficiency as polygonal forms.*

Everything else is a virtual society of prime numbers; and the strongest social groups are those under 23, stuffed with primes and displaying a solid even membrane.

Prime numbers in time sequences: stability of systems.

In 5D prime number is s any integer including 1, the whole that has only 2 positive integer divisors, one and itself.

1 is not considered a prime number since it does not have 2 different positive divisors – a topic decision of some 'axiomatic' guy, solved by eliminating the word 'different'; *so primes ARE a closure family*. 2 was a prime rightly in the past –as we might consider that 1 *is the super-prime, the whole that divides all other numbers of nature.*

And the fundamental characteristic that differentiates them is that as polygonal numbers grow in sides, that is

 the social number of 'points-cells' increases the system become less stable, because *it increases the number of redundant non-prime odds (ab. odds).* And when we carry the symmetry S=T, to temporal sequences which as we have seen is the proper way to study numbers beyond the decametric scale, this lack of stability increases enormously past the 23 'years' (we shall call points=numbers in time sequences 'years'); which is the 'cut' between the young age of maximal energy and the mature age; and again plunge past the 83 number, leaving a mean of 1 primer for 'decade', which is indeed the standard age for death, both in human years, or in S=T atomic evolution (radioactive atoms past lead).

We talk of each prime number as a key 'age', and 23, the Prime age of a 100 normal system, where a transition to the mature age takes place. This we know for human life – the end of

University, the beginning of work, the maximal force and energy for most athletes. In the table of elements, originates the 26 Iron-Nickel-Cobalt family of maximal stability, likely origin in its liquid earth's core state of complex ironlife form.

Those are the themes of 'vital physics', which the synoptic mirror of numbers reflect as ideal configurations of social numbers in space and time.

Prime numbers are infinite and relatively abundant according to the π=n/log n rule, so huge social systems are possible both in space and time duration as complex new primes, can reinforce the structure as nodal points of stable networks. A prime number by definition is more stable as a configuration of social forms, as it *can't split into equal parts*.

Graph showing ratio of the prime-counting function π(x) to two of its approximations, x/ln x and Li(x). As x increases (note x axis is logarithmic), both ratios tend towards 1. The ratio for x/ln x converges from above very slowly, while the ratio for Li(x) converges more quickly from below.
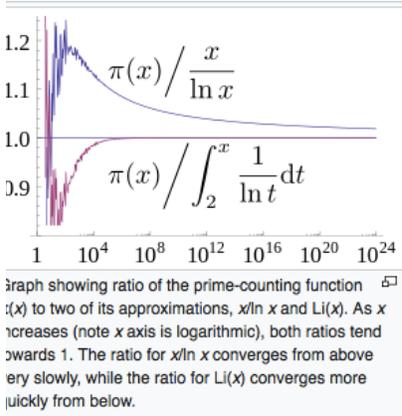
4
25
168
1,229
9,592
78,498
664,579
761,455
847,534
052,511
054,813
912,018

How far can we stretch this stability? In inflationary mathematics to ∞. But in scalar space-time ∞ becomes increasingly unstable as prime numbers dwindle.

As the irregular infinity of *the number of entropy, e, which breaks after 10 dec* **2.7182818284590** *, (*the 1+8=9; 2+8=10 regularity disappears after 10 numbers if we consider 2.7 the first dual term of the regular pattern), loosing its structural, informative meaning', we should consider that beyond the ± 10'-11$^{10'-11}$ social scale between planes, gathering in 10±1 decametric Planes, the systems of 'big number theory' are largely irrelevant.*

In any case prime numbers clearly dwindle (as per Euler's and Riemann's functions in the graphs) beyond the 10.000 social group, suffering a steep decline towards the 10^{11} mark in a tail proper of an almost 'extinct' species. So larger primes are rarefied and very few complex structural systems beyond mere herding exist past that number:

In graph, number of primes holds remarkably dense in the basic 100 scale being 1/2th of the 10th scale (if we consider 1 a prime number) and 1/4th in the 100 scale, which are the key Planes that encode most stable members of timespace both in the space symmetry (table of elements) and the age symmetry (life span in years.

The ratio dwindles to 1/6th out of 1000 and 1/8th for 10.000 in the next key interval of social groups, still fairly strong, if we take into account that the 10% is a very strong 'leading' elite in organic class structures of any stientific scale... and organism. This $1/10^{th}$ informative class structure still holds in the 1 million social group (1/12th). So the Universe is strongly connected and stable in its hierarchy of prime informative numbers on top of a reproductive, energy of even numbers and 1/2 of entropic, easy to break odd numbers, never a majority as the 3rd class of the system. Compare that hierarchical structure with our human societies - corrupted placebo democracies ruled by mone,y issued in near monopoly by 'stockrats', modern aristocrats of the capitalist society, owners of corporations, which are less than the infamous 1%, closer to a 0.01% with majority stock ownership. This tiny proportion of informative class coding the language of social power doesn't even happen for the 10^{12} limit of the most complex supœrganisms of reality as primes are still a 4% of units. While the fast 90% of mankind at the bottom is a sea of chaos and entropy, never met in efficient superorganisms and the ilogic mirrors of algebraic structures.

The 20th, reproductive mirror symmetry of the 10th scale, & the 100th time aging Planes.

It is then only worth for an introduction to Number theory to study just the 10th, 20th and 100th Planes. The first purely 'spatial' the second which 'doubles' the first in a mirror symmetry is the reproductive S=T scale of numbers, with the equivalent 4 prime proportion; while the 1 to 100 scale is the Temporal symmetry of ages; and as such we shall relate them in other posts as we 'ascend' the Planes of reality and the laws easier to understand in the 'synoptic' languages that mirror best the Universe's time and space, 'ilogic' and Non-E mathematics' emerge with different 'forms' in those upper stientific Planes.

We shall not do it here, for the sake of time and space, as we are still in the 1st age of mathematics, with the symmetry of points and numbers. Only to notice that for the reproductive mirror scale of 20, closed by its largest prime, number, 19, its square, which doubles its dimension 19º x 19º= 361º gives us the commonest 'closure' of a sphere in space (360 is the scale of degrees) and time (365 are days on a year)…

And so we have another curious number 361º 'degrees' for the perception of angular rotation, *(as we know geometry is always approached in its figure by discrete number above or below ±1), which suggest the natural limit for a discrete polygon of cyclical nature.*

The vital nature of the 10 to 20 scale as a mirror of the 10D basic scaling for reproductive purposes, emerges as usual with small variations in more complex stientific Planes. So it shows in the game of life, where 20 are the number of amino acids that construct most organisms and your body can not live without; … as they generate everything else in the upper Planes. Even in the most 'distant' level of human languages, the 20 scale manifest itself; so most alphabets have 20 some symbols to write the language; which then generate a larger number of phonemes broken in vowels of information and energetic consonants (more abundant. I.e. the English alphabet has 26 letters, split in a total of 20 vowels and 24 consonants.

RECAP. The first prime numbers are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29… And so while the decametric and 10'-20 scale are buttressed with 4 of them each, almost 1/2, which *explains further why they are really the 20 numbers that matter in almost every system of reality, being the 10 to 20 the mirror symmetry of the 10 scale; which you might extend to the 23 range... beyond those 'efficient numbers' systems diminish in stability.*

In the elements table, the strength of the system is a mixture of its 'even configuration in 2 and 4 pairs' and odd volume of inner layers: the range around 22-26 (iron) give us the strongest top predator atoms of maximal energy, which is the role of a polygon number that closes as the membrane of vital energy any T.œ. system in nature.

Yet if we consider the temporal sequence the same series, breaks the first age of life, which in a biological human being ends at 24 years: 1-24: youth, 24-48: maturity, 48-72: 3rd age; 72-80 death. And indeed prime numbers plummet after 83. So this will be indeed the fundamental scaling for all timespace life-death symmetries (as we shall show for each stience, from the amino acid series to the life cycles, from the atomic table to the cycles of historic and economics which fit within those decametric 5D Planes).

S⇔T DIMOTIONS: NUMBERS AS UNIVERSAL CONSTANTS

As Einstein wanted the ultimate principles of reality are Universal ratios/constants, which represent the 5 dimotions of all Universal systems. *So we shall find 4+1 absolute constant ratios in all systems, of Nature, of the vital Universe: e pi, e, 10=3x3+1 and phi. What about locomotion? In 5D physics locomotion is reproduction of form, from particle to wave state to particle. So it has not a fundamental constant but a mixture of the informative, reproductive ones, pi and phi. 5D thus use those 5 constants to explain how the Universe reproduces reality departing from those 'perfect ratios of energy and information'.* 3 are irrational≈ratio numbers that represent the 3 ages of all worldcycles of exist¡ence:

10 is the seminal social number of palingenetic Δ-1 emergence, π, is the number of the worldcycle, of the 1st Dimotion of perception; phi is the number of the 3rd Dimotion of reproduction, in the second 'age' or maturity of the world cycle, and e is the number of decay and entropy, of the fifth Dimotion of existence.

1D: Pi transforms a spatial field of entropy into a vortex of temporal information*: 3D ($T) > ∏ ðf.*

As we have already talked of pi and will keep adding latter, just a note: pi's informative nature is immediate, as we perceive through angular trigonometry, when pi closes a circle of 3 Diameters, with 4%=π-3/π of perceptive holes through which 3 sensorial apertures to the Universe happen and 96% of dark matter hidden by the membrane (which not coincidentally is the part of the Universe hidden by the galactic halo we don't see).
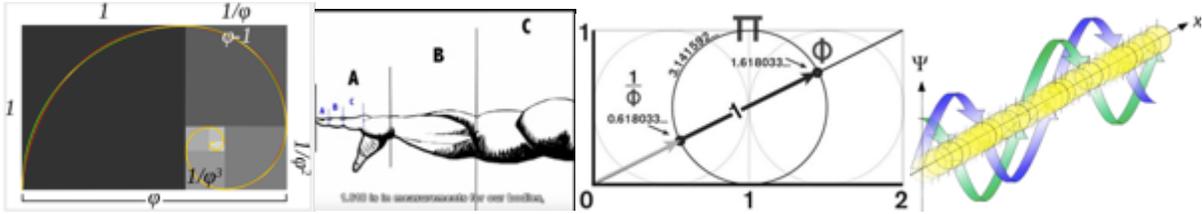
3D: Phi is the ratio of reproduction of a space-time population. So applying pentalogic p.o.v.s:

T p.o.v.: Phi is approached by Fibonacci series in gender couples, which reproduce in the 2nd age of maturity, and die after the 3rd age. So for '2 consecutive quanta of time', the young still won't reproduce, the old won't be still dead and the mature will reproduce giving the series 1,1,2,3,5... that approaches the phi ratio. Thus in 5D symmetries the relationship between phi and Fibonacci numbers (reproduction series) is an S=T *duality of the constant observed in space (golden ratio) and in time - Fibonacci closed solution as a series:*

$$F_n = \frac{\varphi^n - \psi^n}{\varphi - \psi} = \frac{\varphi^n - \psi^n}{\sqrt{5}}$$

Whereas the golden ratio becomes an iterative process of generation.

S=T: Population growth: This leads to its understanding in 'still space', as a population growth:

The golden spiral then becomes the natural 'time-series' for filling a surface of energy where to growth in a frequency of space-time generations, given by the ratio - even if the 'interior of the spiral', fades away as generations die behind us, leaving a void.

S: Informative evolution: Its inverted implosive 'symmetry' as informative growth (T>S), gives a proportion for the reproduction of complex information, (as in finger proportions, when form overcomes size).

Δ: Phi is also a scale function: the whole (trinity) is to the larger part (body) as the larger part (body) is to the smaller (head), since reproduction is a scalar function that imprints a Δ-1 cellular scale to evolve it socially into a new whole.

¬ Entropic function: – the beauty of its S≤≥T proportions.

Yet phi has also a reputation for beauty in proportions between the 3 parts of the being, limbs>body-waves>head-particles, which is the natural outcome of its multiple functions as reproduction and organization of the different parts of the being in 1 and 2 Dimotions:
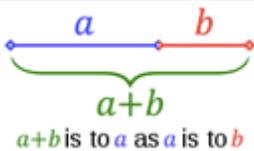
Whereas phi is the golden ratio of proportions of the whole to the 2 body-head topological parts of the being. Expressly is the ratio of the whole a+b to the body, when the body-wave is proportional to the particle-head: T.œ (ST+St) / ST = ST / St.
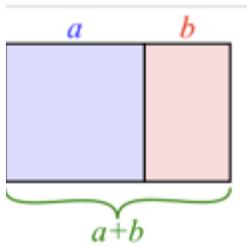
But a 'line' has 'motion' to become a real ST system. So the proportion must be interpreted adding the hidden variable (the speed of processing information/energy of both b and a). Then it corresponds to 5D metric: S (A+B) x ð(a+b) = S(A) x ð(a) = S (b) x ð (b), as S(A+B) > S(A) > S (b) in the same proportion that ð(a+b) < ð(a) < ð(b). So we can *extract phi from 5D metric (Sxð=K).*

Its beauty is then the perception of the Universal Metrics of 5D which in turns gives survival efficiency of such ratio, as the body transforms the entropic energy for the whole in a proportional balanced way.

Further on it can be expressed in terms of entropic feeding completing the pentalogic of Phi as a ternary system: whereas a+b is the limb/field. So we write: $T (a+b) < ST(a) > §ð(b)

Whereas the 'entropic length' of the limbs ideally equals the sum of the body and head system, while inversely the head of information consumes more, faster energy than the body (i.e. neurons consume 10 times more energy than body) whose cells reproduced in the wide dimension consume as much energy as the locomotion limb/field.

And so the symmetry if we transform 'T into S' give us the same proportion for its square areas.

So phi is beautiful as beauty, is the proportional vital constant balance of the 3 St, ST, sT parts, the key to a T.œ.s survival (S=T, harmony of 'size and form', 'energy and information' 'body and mind').
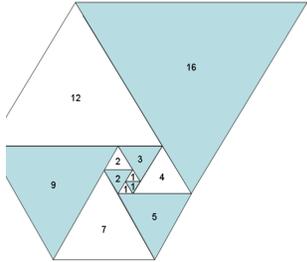
Padovan numbers. The interpretation of the Fibonacci numbers in 'Geometric space' as an St spiral of squares bring the obvious question if we can form similar sequences with other forms besides the quadrangle. Yes we do with triangles, forming the Padovan series, with similar properties, 1,1,1,2,2,3,4,5,7,9… whereas each new number F+1 is the sum of F-1 and F-2; giving us a ratio 1.3… smaller in growth to the square spiral but structurally more resistant, which hardly appears in nature, as phi is a reproductive function that seeks for 'speed' in its radiation and 'volume of energy' in the placental region, maximized by squares and minimized by triangles of maximal perimeter.

All tilings that fill space are thus triangular (the hexagonal tiling being just a scalar 6-triangular units) or squared and pentalogic entanglement implies again that it can be reached by using 'parts' of a single plane of space-time or filling it 'in scalar' sizes in yet another symmetry between ST and Δ. On the other hand, the pentagonal or heptagonal prime tilings are impossible in a flat plane, though pentagons easily fill combined with hexagons 3D spherical structures and heptagons can tile hyperbolic ones, which reinforces our view of 5D polygons as entities belonging to 3Dimensional systems in exist\<ence.

RECAP. The golden ratio is the most efficient form of inner growth and proportion, keeping the balance and distribution of information in a system.

2nd Dimotion: locomotion: It combines with π to give locomotion a number, as motion is reproduction of a π cycle of information along an adjacent series of forms. We saw the case for a cyclical reproductive spiral. In the 3rd graph we see the case for a lineal reproductive series, which becomes real in quantum particle-waves.

4D. Social Planes. 10 is the constant of scale of social evolution; hence the main system of scalar numbers.

5th Dimotion: entropy: the exponential function is the most efficient form of social growth between 5D planes. In the graph, we can see how the growth of any system in base e is the maximal possible. But such exponential 4D social growth can only happen in a placental unlimited world of free energy. So its true is for the inverse arrow of death and decay, when it is the maximal speed at which the cells that grew in the placental Δ+1 palingenetic first age, now die in the final Δ-¡ age of entropic decay, adding together to a 0'-sum. So e is the exponential function that grows faster:
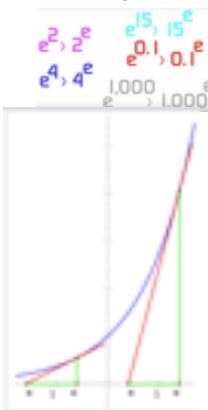
e^x *is the only function, which is a derivative of itself*, adding constantly a 1/n finitesimal derivative 'cell', in each time step, but also decaying in the fastest possible path of dying quanta. e^x *represents the fundamental function of reproduction of any system in its 1st world cycle of a perfect energy placenta, þ, at the lower 'cellular scale', as the system increases by a derivative at each step.*

RECAP. e represents the absorption of a reproduced finitesimal part, or transfer of a quanta of energy to the larger whole. But it requires a 'perfect energy' system. In physical systems this happens in decay-radiation; in biology only in the placental cycle; in sociology in the brutal capitalist system that expects interest to be added as the Maximal exploitation possible.

Universal ratios=constants & the generator.

Pi, 10 and e, and ɸ, are the ratios of Ts<ST>St transformation events. So they are Nature's constants, related to its Dimotions, which we can write as partial equations of the generator:

π: 3 |-Ts > O-St; e: ∇1 e->Δ1+Δº; ɸ: T.œ/TS = TS/S; 10 §º ≈ §¹.

They also combine to mirror complex, more efficient dimotions. For example, the closed curve described by π and phi as a 137° golden angle - which allows the maximal covering of a surface from an outer point of view, as a flat, filled space - so it maximizes reproduction, the function of existence, and entropic feeding; as when light in plants can touch most 'leaves' which therefore are positioned in a phi angle. *The same maximal reproductive function of existence happens in* open curves, of asymptotic hyperbolic form, where e is the fundamental 'number' that maximizes both reproductive growth and decay. So the 3 fundamental irrational numbers *maximize the function of existence, in its «entropic = reproductive » Social evolving symmetry.*

∞Transmission of information.

In terms of Planes, pi is related to Δº+1 (perception, social evolution), Phi to Δ+1 (reproduction and social evolution) and e to Δ-1 (decay): Phi (D4, D3: Δ-1 » Δº) > π (D1:St Δ+1) « e (5D: TT Δ-1)

Since e= 2.718281828...4, the limit of (1 + 1/n)n breaks after 10 'decays' into disordered death patterns; only pi has no limit of scale, as a Poincare's sphere that can shrink *preserving its information.*

Hence making the fractal structure of the Universe infinite, by allowing information but not energy to emerge or sink with no limit of scaling in the universe, reason why Maxwell's equations of waves can transmit information across Planes with no limit in an infinite universe. And this is a huge fact of the Universe, which in the Δ=S symmetry implies information can also be transmitted faster than light (but not energy), through *translations of Planes, the same way we transmit voices faster than sound through electromagnetic translation.*

Beauty of 3: Phi couples. Lineal, hexagonal pi & e as decametric scale.

π (+3.14), 2 phi (as reproduction is a dual ST-mirror symmetry) and e (2.81) are all within 3 ±0.2 range. Since 3 is the constant of the 3±¡ trilogic/pentalogic Universe. Pi is larger as the curvature of 3 lineal elements makes a larger cycle with aperture-wholes. Phi is smaller because the reproduction of a system compresses the entropy it has extracted into form. To notice also the Fibonacci series work on 'bidimensional' units (couples). So does the 'golden rectangle, and the spiral that fills space with time series of reproduction. But ultimately 2 genders give birth to 1.

Lineal pi is 3 - the hexagonal perimeter ad 3.14, circular pi. 3 is also e +e/10, the classic growth of one tenth or finitesimal part of a tetraktys, the perfect organic form, growing, one by one, as 2.718..+0.271..=2.99...

RECAP. 5 scalar or irrational numbers represent Dimotions of existence: π, the first Dimotion of perception; phi, the reproductive Dimotion; e the dimotion of entropy and 10, the Dimotion of social evolution. Pi and its function, the sine are the cyclical numbers of perception; phi the number of reproduction; e, the exponential of decay that faster grows in its derivative dissolution into infinitesimals and 10 the social scale of the Universe. All those numbers are ratios related to 5D Planes, proving further the 5th dimension. They are not isolated numbers, neither points of a continuous line (continuity error of huminds). They relate S-T bidimensional holographic basic dimotions=actions =functions of time-space.

S=T. We studied only an ideal form of a number as a point, a knot or lattice, which is what in 'reality' most 'atomic/molecular symmetric numbers' – the units of matter Planes are. Numbers as forms thus have a regular undistinguishable structure. But in reality as the particles and atoms of those matter numbers, its 'formal dimensions' are in constant motion through 'network connection' that makes them switch space and time dimotions, S≈ð.

Our analysis of pentalogic pi numbers reflects the deep Entangled Nature of the Universe, where each entity, while *dominant in one of the 5 elements of reality, in as much as it performs only a function on the upper Δ+1 world in which it survives, it will as a whole in its inner reality be a full ¬Δ@st being. So while we* shall always stress a single function. I.e. a number will be a scalar social gathering of identical beings, there are for every entity 5 possible perceptions of the being. Since numbers as synoptic linguistic mirrors of the Universe *uncoil and recombine in multiple pentalogic functions*, both as S=T geometric structures and as Δ-scalar, social groups. So as words do in verbal languages or pixels of colors in images, a single number 0x∞=C represents them all but this doesn't mean it creates reality through generation of numbers and equations, as the 'word word', which includes all other words doesn't create the Universe by naming. On the contrary numbers are mirrors generated by space-time reality. So we will now consider its 5 species that mirror the 5Dimotions of space-time; its 3±¡ worldcycle ages or 5 ¬Δ@st elements, as do the 5 types of curved lines in geometry, 5D smells in noses, pentagrams in music and any other kaleidoscopic language of 5D reality.

So numbers will be useful vital expressions of short time dimotions, half-time worldcycles and deep-time Δ@st structures: a rational number will be an 'entropic division' of a whole, a ± dual number a sequential time motion whereas its inverse which close into a zeroth sum cycle; a polygon number, the T-membrane of a spatial configuration of identical points, etc. We will even be able to transcend into a new plane of existence through complex numbers. Finally as we are all entangled vital systems, and so all our elements participates of the other, numbers will combine in increasingly complex simultaneous structures, from equations to functionals, from groups to the canonical 5 families we shall now study.

PENTALOGIC OF NUMBERS' FAMILIES AS MIRRORS OF THE 5 DIMOTIONS OF THE UNIVERSE.

The growth of complex entangled dimotions within ¬Algebra. Numbers including operations.

In the entangled Universe of ever more complex dimensional motions, each more complex element of ¬Algebra includes the previous one. A number beyond one *includes a sum in its synoptic form. Thus* Numbers include its operations; natural numbers are composite of 1 plus sum. *N*ext Z includes natural numbers, sums & the operand of subtraction to form negative numbers.

Next **Exponential numbers** take the form x^n, where x is multiplied by itself n times; and they include the product as reproduction, which requires the identity of S=T, hence the square of the same system, but by Fermat theorem, the 3rd power no longer reproduces and can be merged and superposed by sums and products. *And its inverse, n^{-x}*, represents, exactly the opposite function of entropic death, of decay as in e^{-x}

Then we have the families of division, which have multiple functions and must be explained with the duality of information ‹< entropy; that is information smaller in space, faster in time (More synoptic) than entropy, the first represented by Q, the second by irrational numbers.

Irrational numbers then include the dimotion of entropy, of failed reproduction, of irregular form, save those who have a meaning for the angles of perception, and ratios between parts of a system that matter (universal constants), which are only a few of them.

Equations thus 'rise' the scalar number of dimotions studied, and the simplest view of that growth of dimotionality is to consider that equations take 'full tœS' and put them in an external world as mere fractal point of that larger Δ+1 world.

But then numbers seemed to become exhausted in its growth of complexity which as we saw *already included composite numbers, nothing to worry about in the entangled Universe, as 1,3333 is really 4/3, a composite number of 2 and an operand, which is the only way to define it in a single plane of existence.*

As always this number does have a trinity logic, as it can be represented by the minimal ΔST elements of any reality. So it has besides its S/T or T/S geometric single 5D plane representation (in the first case an entropic division of 4 between 3 that splits the 4, as when we cut a pie, in the second case a gathering of 4 elements between 3 individuals which take one and use the 4th for its sharing entanglement as in certain molecular bondage), the scalar 1,33333… representation; as numbers are the most synoptic unit of geometry.

So with those 'classic numbers', N, Z, Q, R, *and the new family totally disregarded by mathematicians by lack of understanding of the true meaning of numbers the ˆ family, which keeping with the correspondence principle we shall denote as E form the 5 'classic familes of numbers' that allow to define the 5 classic domotions of existence but not in a direct 1 to 1 correspondence:*

Thus N->4D, Z->2D, Q, E->3D, 5D, R (π,√2, phi) 1D (angles of perception and absorbtion of energy and information for the circle, the triangle and the spiral)

Then we move into a new 'dimensional arithmetic form', the equation.

The equation thus is NOT a number, not a 'phoneme' of the syntax of mathematics, but a 'sentence', and as such it is infantile to think it would have a solution in a single plane. It does NOT since it requires to find a solution in the 'next' system of 'two planes of existence' in which following the pattern of the previous reasoning we find numbers that in the most synoptic manner introduce the essential elements of all equations.

That is, according to Fermat's grand theorem, $X^2 \pm Y^2 = C$; since the Universe is holographic all solutions must be ad maximal of the form SS, TT, ST, St, sT, which we could translate as $X^2 Y^2$, $X^2 + Y^2 = D^2$ (ST as the Pythagoras theorem of reproductive orthogonality), $X^2 \pm y$ and $Y^2 \pm x$.

In other words a complex number of the form a+bi = z, can represent all the holographic dimotional solutions to a polynomial equation; as the real numbers can represent all the ratios/angles of perception, the rational numbers all divisions of wholes and so on.

Because the C plane of complex numbers can translate all possible configurations of an st solution, (when it is properly interpreted by squaring the real line as in the graph, which converts the imaginary line in a classic real axis; it follows then that it represents all 'the real, non-fictional' results of a polynomial, that is, the non-entropic part of it, the one that has form and meaning, specially those of the unit root, where series converge, which was the method that Lagrange – regardless of the myth of youth and Galois that merely put the ice in the cake – used to resolve them with 'resolvents'. Or as in the case of the Mandelbrot fractal. So the marvels of the complex plane and its classic truths derive of the connection of the complex plane, with the five only solutions of the Universe – its 5 dimotions.

Since in fact all the solutions to higher scale equations, by radicals reduce to square solutions of quartics, we need to resolve an intersection of two different conics. And so on.
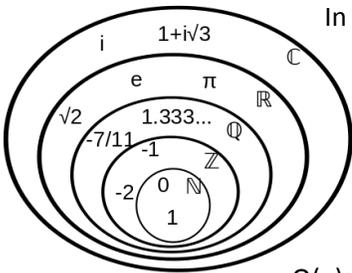
In the Entangled Universe, each entity will be *dominated function it performs in the upper Δ+1 world in which it survives, but as a whole is a T.œ, an ¬Δ@st being. So we* must apply the 'Rashomon effect' of pentalogic 5 truths to study its variations. For numbers this gives birth to its 5 'different types', which in turn define different 'planes of geometry':

N(Δ): The main ones are Natural numbers - scalar social gatherings of identical beings.

Z(T): are ± dual sequential time motions and its inverse, which close into a zeroth sum cycle.

Q(¬); Rational numbers are 'entropic divisions 'that dissolve wholes into its parts.

Gnomons (S) are polygons = spatial configurations of identical points.

C (@) Complex numbers and those of different 'frames of references' are mental configurations with various applications according to the mind mapping they represent

Nº are *best as* social groups in Planes, as regular polygons in space and as sequential causal events that represent the 5 Dimotions of the Universe; so we depart from the tyranny of the axiomatic method that packs them all in a single 'real line'; so we can use better pentalogic to describe the multiple uses of *each plane and family of numbers.*

Whereas the continuous single line to define all numbers, natural, negative, rational & irrational, is the 'limit' of a more profound analysis of numbers in multiple Planes. So those families of numbers, when escaping the tyranny of the line become filled of new meanings as *5D pentalogic mirrors of ALL the elements of the Universe.* In @nalytic geometry, the line of numbers relates to a 2 dimensional holographic world. So its scope is enormous as it can represent any SS<ST <TS<TT dual ceteris paribus analysis of any dimotion. Yet its synoptic power must not fog a larger picture of reality.

A first pentalogic analysis of those families then set a Generator equation for the 5 families of numbers such as:

N:*Space: 4D¡: Social evolution.* **Z:***Time: 2D¡: locomotion.* **R:***Δ-Planes: 3 D¡:Reproduction.* **Q: 5D¡: ¬** *entropy.*

Complex numbers *and other frames of reference: @mind: 1D¡motion: informative gauging*

We correspond each family of numbers to its main Dimotion as ¬Δ@st, dust of spacetime in the 'larger picture' of the absolute Universal mirror; and to specific Dimotions in the 'smaller picture' of its use in the events & actions of T.œs.

Natural, 'direct' numbers ℕ are zeroth and the positive whole numbers 0, 1, 2, 3, 4, 5... If two such numbers add or multiply, the result is again a natural number; which means *it is possible to create all intermediate societies*

departing from a unit quanta, between 1 and the relative ∞ value within which the domain of the function or event is meaningful.

Its main use is to model social evolution of identical groups, through the § scale between Δ and Δ+1

Natural numbers are related to the measure of 1, 2, 3 D **spaces**, as units of points and populations. They are either self-centered **even** numbers representing the 1st Dimotion (perception in its crossed diagonal center), or **odd mirror polygons with a reproductive symmetry**, (3rd Dimotion) which can be internal or external crossing of diagonals, making a 4D & 5^D replica (inner, implosive social growth or entropic outer growth).

Finally Natural numbers 'can represent locomotion **(2D)** as 'steps' of a given unit, which represent a discontinuous motion of a frequency ƒ, and a wavelength '1'. Steps become discontinuous landings of the fractal unit that measure distances or motions in a lineal 2D geometry. We can then include ratios of those steps, breaking the line in different smaller 'fractal steps' and that is a first meaning for a rational number. *But if we make a different unit for each rational part, we enter into another Natural number scale of the fractal Universe returning then to natural numbers, which therefore are also able to represent ratios. And so natural numbers can be any number as it keeps falling down in microscopic rates.*

Why then we need more families? Because each number really is best for a job, even if they can multitask, as a shovel can do many things but a hammer will nail better. So the next family of numbers, negative numbers are a better mirror symmetry for the function of motion, as they can change the direction, moving backwards to the other side of the line.

S+(-T). The integers $\mathbb{Z}$, add "Inverse' S«»T numbers, normally related to inverse, entropy vs. information functions in all systems of reality, hence to the inverse 'directions' of one of the 'dimensions' of space-time (S, T or Δ). As Gauss intuitively understood this removes absurd hang-ups of scientists afraid of negative 'values', specially in physics, where c-speed is a limit because physicists don't understand mass' as a vortex of space-time; hence its inverse is an expansive entropic dark energy', perfectly valid in relativity equations. Z numbers thus divide in positive and negative whole numbers …, −5, −4, −3, −2, −1, 0, 1, 2, 3, 4, 5, …. If two such numbers are added, subtracted, or multiplied, the result is again an integer; if both are equal in value differing on its sign, the result is a 0'-sum, which means we can ad up all intermediate combinations of entropy and information, or similar inverse directions in any dimotion of ¬Δ@st, but ultimately its inverse 'time arrow' will make the system come back to its cyclical time departure as a 0'-sum.

Negative numbers thus *are essentially **Time Numbers**. They make no longer sense as 'social populations in space' – there are not 5 negative pears.* So the social use of natural numbers is lost (cause of much philosophical thought in earlier mathematicians), but the power to represent *the inverted arrow of time in any Dimotion of existience, either in negative directions of locomotion or negative entropic functions (negative exponentials), grows.* We keep this in mind in physics as 'i', a negative number, merely represents the inverted time Dimotion of a physical species, as in E⇔Mc^2.

5D: entropic, rational numbers, $\mathbb{Q}$. Fractions invert the arrow of social evolution of Natural numbers by inverting the product operand: *p/q* where *p* and *q* are integers and *q* ≠ 0. So they divide social groups or time frequencies/durations or kill and break a whole into similar parts. So they remain in a single 'plane of reality'. Since if two such numbers are added, subtracted, multiplied, or divided the result is again a rational number. In terms of Planes, **rational numbers** break them in part. So with decimal numbers we move the Δº whole downwards into its relative 'finitesimal' Δ-1 quanta, following the standard scaling 10^{11} Planes.

Natural, negative & rational numbers form together with ± and x÷ operands a ternary 'Fractal Generator' system: T(Z)>T/S(Q)>S(N), a present organic, 'quantitative' Polynomial mirror of most T.œ in a single plane of reality.

Δ-1. Real numbers, $\mathbb{R}$, as rational numbers do, allow us to travel through Planes. For that reason they often loose its patterns in decimals around *the 11th element, the limit of most finitesimals between planes. Yet according to*

the 'wholeness of reality' within each of those 2 fractal island-universes, if two such numbers are added, subtracted, multiplied, or divided (except by 0), the result is again a real number.

Recap. We classify all the ways in which numbers reflect the Universe with the classic concept of closure; that is, all the different planes and forms of numbers tat put together can solve all the ¬Algebraic equations of timespace variables that represent the $3\pm i$ topological function of a fractal point or T.œ (lineal, cyclical or hyperbolic, made energy - | x O=∅) we translate also into the 3 conserved quantities of physics or a Dimotion a T.œ. as ¬Δ@st.

Since numbers can mirror the 'existence' of beings either as relative present superorganisms or in its sequential time motion, describe fully its worldcycle.

While complex numbers in that mood are solutions to polynomial equations and shall be studied then in that section… We shall then also return to the other families of numbers and consider the main contribution of ÐST to its theory – namely the understanding of the entanglement and synoptic nature of those numerical families that include within their 'phyla' the operands and dimotions they associate with.

So before we can return to number theory we need to study the dimotions of the Universe and the operands that describe them, and how those operands and its negative entropic functions are inscribed within numbers.

Recap. Numbers evolved through the expansion of the concept of 'quantity' from the natural numbers which merely observe spatial quantities added on in social groups, the essential definition of number, into ratios between numbers that express more complex concepts of reality, and introduce the idea of functions and 'motions in time, advancing further with the concept of negative numbers, which are no longer quantities in space, but qualities in time, finally reaching the maximal transformation from 'space to time', from quantity to function, and ratio of exchange of the vital entities of reality, entropy, information and energy (sT-ST-St), to the final closure of reality expressed in the mirror-language of numbers, which is represented by the ill-understood imaginary numbers.

So the 5 families of Number systems are symmetric to the laws of the Δºst universe. So they are its spatial representation in frames of reference:

1.S±T: N, Z: **N**atural direct numbers form simple social groups. ¡ts inverse negative numbers form Ts≤≥St symmetries

2. Q: SxT: The Cartesian graph and the rational numbers, for Ts x St = K metric equations and complementary systems, (whereas often the z-dimension is the reproductive combination of the other 2).

3. Δ±1: R,C: The real numbers, for inverse Δ±1 Planes & the complex numbers for worldcycles

Δ±1. Functional Spaces, wholes & parts where each point represents a vector (Hilbert space): Δ-1(∑Ts) >ΔST.

An even more generalized view of such systems is provided in group theory, as algebras with those simple operands form groups, rings and fields.

COMPLEX NUMBERS.

Because of the immense extension of all stiences, we escape many classic themes of every discipline, specially those humans best understand. Instead we try to clarify themes huminds distort more. Thus of the family of numbers we shall make a more extended commentary on Complex Numbers which huminds use but still are surrounded of an aura of magic… Complex numbers though are merely dual ST-numbers, which represent holographic ST dimotions of exist¡ence. And as such very useful as an ideal template for an ST-functions, in which one of the components, usually that of time motion as opposed to space population has a lower value, which is represented by the 'squared' value of the real line as opposed to the -√ value of the i-maginary inverse coordinate.
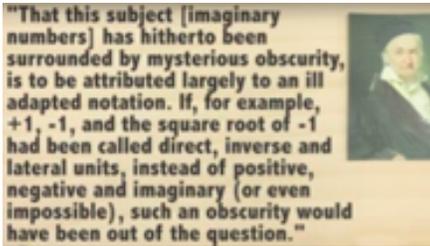
In the graph, Gauss offered the first clear description of negative numbers as having an inverse direction (of a timespace dimotion) and lateral imaginary ones, as a composite of both. Its proper definition is to consider them composite Time§pace numbers with an space, mostly real and a time, imaginary, negative component, which make them useful in mathematical physics to describe holographic ST T.œs ST or scalar events between the field: $T<wave: ST>particle: ð§ of a physical system. Let us then do for a change a longer analysis in this introductory course to 5D mathematics of complex numbers and its main 'magic' conundrum – what they represent in mathematical physics.

Vectors and imaginary numbers are bidimensional, holographic numbers, hence best suited to express the 5 Dimotions of space-time, as *functions of Space-Time (SS, TT, ST)*. Vectors in generalized coordinates are the best form to express motion in the plane from an objective non-human self-centered perspective; in terms of lineal time, by virtue of the S=T duality. However, imaginary numbers excel vectors in the representation of more subtle 5 Dimotions=actions in which Time is not expressed in lineal terms as synonymous of space, for 3 reasons that characterize the 'Dissimilar complex plane' as its Y and X coordinates are NOT in the same scale, one being the square of the other, and this allows them to express complex ΔST symmetries of scalar space and ST parameters, mixed together in various ways:

• **S⇔T symmetries,** where the imaginary negative number, which makes NO sense in space (no negative apples) perfectly represents a Time function, either in complementary T>S dual systems or in entropic perpendicular Ðimotions

• **TT: Cyclical time events**. Cx numbers are also suited to represent cyclical, repetitive functions, in which the time clock parameter constantly switches on and off, representing repetitive 0'-sum worldcycles and generations (Euler's equation, exponentials as sum of sins and cosines inverse functions e $^{\pm x}$ series)

• **Δ-scalar complex numbers:** Events where the higher scale, often a leading informative function that guides the system as a 'time motion', has an √ smaller proportional value, as the imaginary part that 'absorbs' a small proportion of the existential momentum of the 'Real energy' function/organ.

Thus the imaginary coordinates are a root, or inversely, the real parameter is the positive square of its informative value. This duality is ideal to represent a 'dominant time function' often with a 1D frequency parameter on top of a 'bidimensional, holographic spatial' area or relationships between the particles, body-waves and limbs/fields of a system; as parameters of lineal or cyclical time ARE one-dimensional (duration or frequency), acting upon a 'surface of spatial populations'.

Complex numbers thus have the advantage in the imaginary frame of reference of being NOT only bidimensional numbers but *numbers of different dimension, hence kept separated, as squared numbers and single numbers when we 'square' the coordinates, or real numbers and its roots as observed normally.*

This quality in Nature happens to be very common in Spatial 2D areas vs. Time 1D frequency representations, so Complex numbers are ideal to represent ST functions=actions=dimotions of space-time.

Pentalogic of complex numbers

Thus its ¬Δ@st pentalogic use in experimental physics derives of having a **negative root** coordinates meaning either:

- **ð:** An inverse, temporal or negative number that represents an inverse direction of motion. Or…

- **Δ:** An upper plane which emerges from a denser lower plane, often with a √ amount of the real parameter measure, as upper Planes take only a 'smaller part' of the total energy of its lower plane (as in heat).

Both things put together make complex numbers ideal to represent ST dualities, with the S-function as the real function and the T-function of motion as the negative imaginary root part often extracted from the energy of the still spatial area,
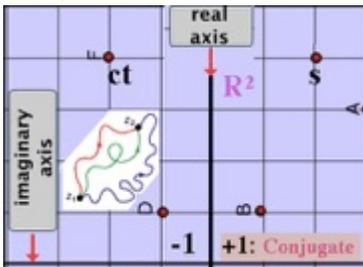
- **Δð:** Both together laid down in a Cx^2 squared coordinates –a new 5D solution to represent complementary ST systems.

Since if we combine the negative time dimotion and the scalar squared dimotion we can 'reorganize the complex plane' in polynomial terms, getting rid both of the cumbersome √ elements and its negative complex roots, to reflect a mapping of a fundamental principle of nature: *'The imaginary part of a complex number represents a parameter of an Δ+1 whole, which extracts energy from an Δ-1 disordered more extended, 'real' potential field'.*

If the classic representation, the upper half-plane H is the set of complex numbers with positive imaginary part; in the square complex plane, both left and right real squared axis are completely equivalent, $(-x)^2=x^2$, reason why we use only 1/2 plane. Further on the plane is tumbled, giving the importance of the i-plane which has its conjugate as the negative 'time motion', -1.

So we use the squared Cx plane to study dual inverse time motions; while the real squared axis provides the 'stored energy' for that motion, dwindling its volume as the time function absorbs it. Thus a Cx^2 plane represents a 'local S^2T-organism' (Ab.T.œ) where the conjugate ± axis represents 2 inverse time directions and its $√^2$ value, compared to the spatial area=population of the real line, the dwindling energy of new Δ+1 scalar planes. So in mathematical physics we map with complex numbers the 3 Δ±1 STates & ternary parts, fields, particles & waves:

The plane of existence of 4D Universes. Why complex numbers cannot be ordered.

The differences between the Cartesian and the Complex plane.

The fundamental graph of the Universe is one in which orthogonal coordinates represent the T-independent parameters in the X-coordinates and the T-parameters in the Y-coordinates. But we do have two different representations for them, because we do have 4 different S and T dominant dimotions (with the ST combination of both, able to appear in the z-coordinates, or the combination of both).

So the big question is what coordinates belong to what Dimotions. And as SS and TT dimotions are equal in value, the pure coordinates should belong to the Cartesian plane. While the S-informative coordinates do have a lesser value. So they must be put on an imaginary system of coordinates.

Orthogonality in the Universe, is then easily explained as follows:

Because Entropy (TT) vs. absolute linguistic still form (SS), Locomotion (Ts) vs. information (St), are the dual inverse functions of reality merged only in the S=T reproductive dimotion, in the 0 point of X-length, the relative dimension of locomotion, there is a zeroth motion and stillness rises in the height dimension of pure

form, where the 0' mind or frame of reference resides. But then we deal with the 'different quality' of locomotion and informative perception in terms of expenditure' of energy, as information 'shrinks' motion. I.e. a gravitational invisible tachyon line has no information but when it becomes light (neutrino theory, Broglie->Jordan), it forms a wave of information that grows in height with the photon on top. But this height dimension is in terms of the parameter of energy and locomotion (T), a compressed 'spatial T', of minimal size. And so we need a smaller 'quantity' and one that is negative, 'subtracting' from the distance-speed (s=t) of locomotion.

This is magically achieved by the negative 'root' value of the imaginary axis, reason why it appears as –ct in relativity and is so useful for the study of electric wavers. By squaring both we simplify the problem of √negative roots, we shall explain latter when we analyze in depth the inverse operands of algebra.

So the complex plane is most useful for St-Ts systems of two composite 'energy-information' body-head forms. Complex numbers *cannot be ordered.* Hence they are NOT numbers belonging to the scalar 5Dimension, but rather numbers that represent Space-Time Dimotions which combine elements of both.

It is then immediate that if the Complex plane is an St plane dominant in information and the Universe has four dimotions in a 4D model, those 4 Dimotions the other perpendicular plane must be the real Cartesian plane that represents the 'background Δ-1' field/limb scale over which the St plane of lesser energy rises.

And so a 4 D reality combines 2 TT-fields from where the energy of the ST physical organism represented by the complex plane, rises.

While for other less common uses the complex plane can also represent a pure mental SS-space. Since SS, TT, which can be represented in the Cartesian plane as both x and y coordinates are equal.

And the St, Ts dimotions can be represented in the conjugate and imaginary sides of the complex plane.

Nature thus is vital geometry. So, even if the 'ideal forms of mathematical planes' become 'warped' into the topological vital organs of supœrganisms we can connect directly the 5 Dimotions of the Universe and its representation in a 4 D dual plane with 2 real parameters of a Cartesian plane and an imaginary plane, where the function of information reduces the energy of the vital space, which is how Einstein's relativity represents them.

RECAP. As we live in fact a 4D Universe we can think of it as a walking combination of a Cartesian and complex plane, whereas the complex plane represents the organism and its body-head, wave-particle states and the Cartesian plane the 'background' field that moves and powers its T-motions.

Some examples in Nature.

By making an indirect use to simplify calculus in which complex numbers represent the ± inverse directions of a 'time function' (imaginary part) or a spatial population (real part) as in alternate currents and phasors.

I.e. In electronics, the state of a circuit is described by the voltage V across it, the spatial still state and the current I flowing through it, the temporal state - (or its capacitance C and an inductance L that describe its tendency to resist changes in voltage and current respectively). So V and I can be described by a single complex number z = V + i I. Similarly, inductance and capacitance can be thought of as the real and imaginary parts of another single complex number w = C + i L. The laws of electricity can then be expressed using complex addition and multiplication.

Or by making an Δ scalar interpretation, where the spatial, area=population component or Δ-1 scale is a larger squared value. as a 'co-ordinate system of 'square, bidimensional' space and time elements, where the x^2 coordinates responds to space, and the $i^2=-1$, represents the inverse mostly time Planes.

I.e. In relativity the time function is represented with an it parameter. So in special relativity we write: $s^2 = x^2 - c^2 t^2$.

Where the negative factor of time means an inverse motion/form, as the other 3 positive space parameters represent a lineal distance-stretching on the lower quantum potential=gravitational space-time where the

light displaces and the negative 'cyclical time parameter of the light wave' the warping by light of a space-time-light function as it 'forms' the quantum field potential below (we assume it to be the Δ-1 gravitational scale), the speed of light space that drags and warps the gravitational potential into form appears as a negative element that slows down the motion.

- Or by making *a 'direct' representation of real $T-field<ST-wave>§ð-particle ternary fractal generators* .

$$i\hbar \frac{\partial}{\partial t}\Psi = -\frac{\hbar^2}{2m}\nabla^2\Psi + V\Psi$$

Schrödinger : S=T : wave vs. Bohm:

T>S: Real Particle+S<T: imaginary quantum potential

$$\frac{\partial R}{\partial t} = -\frac{1}{2m}\left[R\nabla^2 S + 2\nabla R \cdot \nabla S\right]$$

$$\frac{\partial S}{\partial t} = \frac{\hbar^2}{2m}\frac{\nabla^2 R}{R} - \frac{1}{2m}(\nabla S)^2 - V$$

I.e. in quantum physics either in its Δø: S=T wave representation (Schrodinger), where the wave function is attached to an imaginary momentum operator, i$\hbar$.

Or in its realist Bohm's interpretation, where the T-potential, guiding wave is the imaginary part, and the S-Particle state, the real part.

Thus departing from the Fractal Generator of physical systems Δ-1:$T-field<Δº:ST-wave>Δ+1:§ð-particle describing the a(nti)symmetric states of its 3 components, we can make a realist interpretation of both relativity and the quantum world in terms of complex numbers as local ST-organic systems to interpret properly most parameters of modern physics; *either in terms of the different Planes of Δ-1 fields, Δºwave or Δ+1 particles, with relative squared values* or in terms of the negative and positive, implosive or expansive, entropic or informative arrows of time represented by + real or – root values.

For example, complex negative masses in relativity describe are just the inverse 'motion' to the cyclical space-time vortex of mass, hence repulsive expansive gravitation.

While Schrodinger's wave either in the S=T, present wave or T-past quantum potential field>S-future particle formalism (Bohm's interpretation) is a no time dependent wave, which therefore represents a complete worldcycle of lineal past, kinetic energy; present hyperbolic wave and future particle states fully 'integrated in the equation' *that must be seen as the sum of both, the Schrodinger's present and Bohm's past to future formal states*, whereas the angular momentum, or membrane of the wave (T=S symmetry), becomes the real parameter of the particle envelope.

Cx as expressions of the 3 timespace dimotions= states: potential past <present wave> future particle

All what exists is a ternary system generated in time and space by a simple fractal generator equation:

|-$T (past moving limbs/fields) < Present hyperbolic ST-waves/bodies> future O-§ð informative particles/heads

Both biological and physical systems have the same structure of 3 timespace Dimotions, which give birth to 3 spacetime parts. So entropic fields 'feed' the motion of 'hyperbolic waves-bodies' which feed and guide ahead the particles-heads that do NOT move in its relative stillness or pure informative linguistic views of reality, which ARE mirror still images of the world.

So for example, ALL topological geometries of the Universe REDUCE to those 3 types: lineal/planar topologies, which are entropic motions as the line is the shortest distance between 2 points; spherical mind/heads, which are n-spheres as the sphere holds maximal information in lesser space and can shrink without deformation to create a 0'-mind mirror of an infinite Universe (Poincare Conjecture); and *hyperbolic body-waves, which combine and hence iterate both, lines and cycles, forming sinusoidal body-waves.*
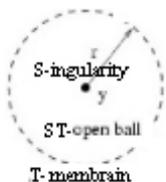
And so mathematics again reflects in its 3 only topological varieties, the 3 only organs needed to explain reality.

While we can study the 3 arrows of time of the Schrodinger wave, reordering the 3 components in 5D in terms of the 3 conserved time-states of any physical system (graph):

Δø: Vψ (Present energy state) ≈ $\hbar^2$/2m $\nabla^2\psi$ (past, kinetic energy) + ih ∂ψ/∂t (future particle)

So in the right side we have now the past lineal kinetic≈entropic energy of the particle or singularity parameter and its future, particle envelope of angular momentum or membrane (S=T symmetry). While in the left we have the quantum wave itself, its vital energy, which is the potential energy of the wave, Vψ.

The equation in terms of the fractal generator of 5D physics and its 3 conserved spacetime states reads:

Singularity or active magnitude with its kinetic≈entropic, past, lineal momentum + cyclical particle of angular future i-momentum = Vital, Present, Potential energy; which is always the function surrounded and integrated by the other relative past and future states, in dynamic balance with them – ultimately an expression of the much wider fundamental equation of time states of Pentalogic: Past-entropy • Future-information = Present-iteration.

In this case, Past-field • Future-particle (Bohm) = Present-wave (Schrodinger).

So, we obtain *a third 5D interpretation of the 3 states of the quantum system, besides the expression of Schrodinger and the Bohm's interpretation, connecting both; through the more general 5D TimeSpace equations.*

Whereas • will be a different operand according to the type of formal representation we use for the 3 parameters.

In terms of past, present and future an i-number rotates from a relative past/future to a relative future/past imaginary states on the ±i conjugate axis (imaginary potential in Bohm's formalism, imaginary angular momentum in the Schrodinger's formalism), the function of existence of the quantum wave, through a 90° middle real angle, in the square Complex Plane or ST real balanced point, in which the present becomes a bidimensional function, the wave state with a REAL, + (relative past-entropic coordinates) and an imaginary, negative (future coordinates) elements.

This needs a couple of clarifications: first we move 'backwards' in a complex i-graph from future to past as we rotate through i-Planes, in as much as most graphs are measuring the 'motion' of lineal entropic time which is the *relative Space Function.*

So the negative side becomes the time function, something which mathematical physics makes obvious, when considering an attractive, informative force-field-potential negative.

- **@: As a self-centered polar frame of reference (r, α),** calculated by modulus=distance and angle, which as we shall see are the two essential 'mental informations' needed in any representation of space, for a self-centered

Figure 2: The argument φ and modulus r locate a point on an Argand diagram: r(cos φ + i sin φ) or $re^{iφ}$ are *polar expressions of the point.*

mind to understand its surroundings – measuring other entities of the world by its relative size (angle) and distance-motion, (hence the time to reach them, and the 'danger'=size and encounter chances, given by the trigonometric angle in prey-predator events). Distance and angle *thus are the two minimal elements of information all useful mental spaces of geometry must carry, as Riemann and those who followed his logic interpretation of geometric features realized.*
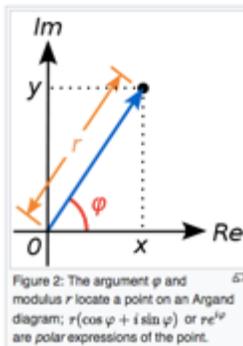
As to the geometrical meaning of a product in the so-called plane of complex numbers, we can see it more easily if we consider the length p of the vector from the origin of the coordinate system to the point (x, y) (this length is called the modulus of the complex number z = x + iy) and the angle 4 which the vector makes with the Ox-axis (this angle is called the argument of the complex number z = x + iy); in other words, if we consider not the Cartesian coordinates x and y but the so-called polar coordinates ρ and φ (figure). Then x = ρ cos ρ, y = ρ sin φ and the complex number writes as X+iy=ρ (cos φ+ i sin φ).

X=Z
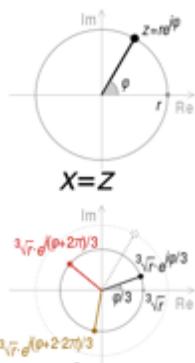
From this we see that in multiplication of two complex numbers their moduli ρ1, and ρ2, are multiplied, and the arguments φ1, and φ2, are added. In division, since it is the inverse operation of multiplication, one modulus is divided by the other, and the arguments are subtracted.

In raising to a power with positive integral exponent n, consequently, the modulus is raised to the same nth power, and the argument is multiplied by n.

However, in taking roots a special situation arises. Since the values of the root coincide in the argument (cos φ/n+2kπ/n+ ¡ sin (φ/n+2kπ/n), where k is any of the numbers 1, 2, ···, n − 1, will also be an nth root of the number as the addend 2kπ, because of the properties of sins and cosines, can be neglected, since it changes neither sine nor cosine. Thus the nth power of this number is also ρ (cos φ+ i sin φ).

We can go further depth applying 'twice' pentalogic to extract new p.o.v.s on C-Time numbers from ¬Δ@st; which we can do returning to our case example, of a quantum triple state of field-wave-particle:

3D: S=T: *Geometrically, the nth roots* **reproduce** *points of the complex plane corresponding to the root values of the number ρ(cos φ I sin φ) lying at the vertices of the regular n-sided polygon inscribed in a circle drawn about the origin with radius modulus, and so rotated that one of the vertices of this n-sided polygon has argument ρ/n.*

1D: @: *The sinusoidal functions, π and its angle of aperture,* becomes the numerical value of the external membrane measured in terms of 3 diameters turning around with 3 apertures to perceive, from the self-centered singularity, giving us the general equation of dark matter for all systems (including the Universe):

3'14-3/π=0,14=±4,5%, with 96% of 'dark matter' outside the perception of its singularity.

So the angle of the point and sine function is its angle of perception of the central point or 1st Dimotion of existence.

2D. The 3 apertures allow the point to absorb but also emit waves of information, often curling a minimal angular momentum/membrane/cellular quanta, ℏ, for particles, that becomes the minimal boson unit of communication between 2 Fermions, entangling them as it reproduces its form over the quantum potential. This makes complex numbers in polar coordinates the best way to represent informative, perceptive wave communication between points.

4, 5D: Finally the polar backwards rotation, each new power a quantum stœp of time-space, represents perfectly a vortex of time-space, which is the meaning of the ih operator of angular momentum in the quantum scale:

So the nth powers mimic the trajectory of an attractive timespace vortex, and the worldcycle of its st constants towards the internal i-point singularity. The Complex plane become then a vital representation of and accelerated

Tif-uture vortex of Information. Δ+1: Gravitational scales: accelerated mass vortices. Δ-1: Quantum scales: charge vortices. Δ: Thermodynamic fractal eddie vortex.
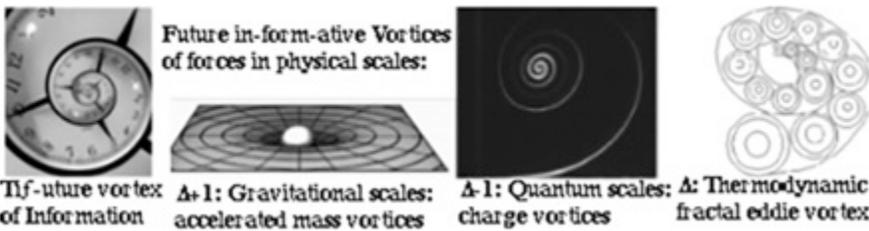
physical vortex: Notice that as X increases those stœps with each power, the attractive vortex becomes paradoxically smaller in its radius; as it accelerates in time, according to Δ-metric, making the vortex faster (Vt x Rs=K), and more attractive.

So in 5D physics we model vortices of charges and masses, with complex numbers as convergent vortices with an ellipsoid 'flattened' smaller imaginary axis turning counter clock wise around a physical @-mind singularity where T=motion turns to zeroth; as observed in Relativity equations for a black hole & eddies with 0'-motion in its center.

We can then understand Schrodinger's & Bohm's dual interpretations, in terms of those Δ+1 vortices (particle

states: 4D, Δ+1-involution state) and Δ-1 quantum potential fields (5D entropic Δ-1 scale) that entangle through 2D wave communication (Schrodinger's Δº-present reproductive state): 2 particles share boson waves that upon arrival collapse into the particle spacetime vortex in any Δ±¡ scale, splitting its ST

function at the vortex center. There the informative part of the boson becomes a still mental image (1Dimotion) and the energy part dissipating, scattered through the vertical axis (5D); which writes the Fractal Generator as the classic Fermion-Boson-Fermion equation. §-Fermion Vortex <ST-boson wave reproduced over Δ-1 $T quantum potential >§-Fermion vortex.

 So the quantum unperceived non-local Δ-1 potential field of action at distance (as v=s/ti and with no information, v=s/0i = ∞) entangles the fermions in a first exchange of 'trigonometric' information (only angle or distance) likely with a Neutrino-antineutrino pair, and then in a 2nd passing (neutrino theory of light), a ray of light is created over the non-local quantum potential field, which has chosen the best path to move (Fermat's least time principle), offering the 5D interpretation of quantum physics adding Schrodinger and Bohm's equations that put together the 3 states of its fractal Generator. Since, Bohm just *put Schrodinger's hyperbolic 'Cartesian S=T wave' in Polar S-Particle coordinates, where the mind-particle state is the new point of view, and voila! it also appeared 'magically' the T-entropic field that moves the particle T>S, as in 5D we are all made of time-space so those coordinates ARE the wave state and the Particle state when we gift them the Galilean symmetry of motion. It is NOT a change of coordinates but of states from the spatial hyperbolic 'present wave' to its Past field>Future particle state-coordinates flattened in the i-direction.*

What is then the future direction in the imaginary arrow? Obviously that of a normal clock, down the conjugate is a future moving on a 90 degrees phase faster than the real and in the imaginary side a lag of 90 degrees in the phase of the world cycle - which physically appears in the AC circuit with the forward 90 degrees wave of the capacitive reactance, Xc on the conjugate and the lagging, 90 degrees of Xl the inductive reactance on the Imaginary side.

$: Finally the last pentalogic use of complex planes is its classic forms helpful for vectorial calculus as bidimensional real numbers (Bolay). If a and b are regarded as rectangular coordinates of a point, and the point is
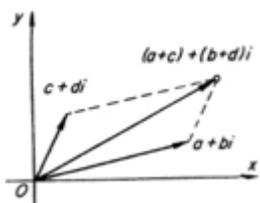
associated with the complex number a + bi, then the addition and subtraction of complex numbers corresponds to the addition and subtraction of vectors, i.e., of directed segments from the origin to the points with coordinates (a, b) and (c, d), since in addition of vectors their corresponding coordinates are added. The sum of two complex numbers: **(a+bi) + (c+di) = (a+c) + (b+d)i** is then represented geometrically by the diagonal of the parallelogram constructed from the vectors representing the summands. In this way, complex numbers are added by the same law as the vector quantities found in mechanics and physics: forces, velocities, and accelerations AND used to represent actual physical quantities, *which if we square the graph, become expressions of ST entities in the real x² coordinates and S or T entities in the Y-coordinates; yet as they are 'two different species' they cannot fusion together.*

In the Unit sphere, the 0'-1 do not exist.

A paradox that will irritate the dogmatic scholar but it is essential to the 'dark spaces' of a 5D Universe is this: In the circle and the sphere, the 0'-1 and 1-0 points of max. Length (time entropy or arrow of locomotion) and height (spatial information or arrow of perception) do NOT exist, as they are the openings for the 0,0 singularity focus of the mind of the circle, sphere or Riemann sphere, to move and perceive and receive information or energy from the outer world. It can in fact be considered as the most suitable model to 'place' all families of numbers in the different Planes of the being a closed circle or sphere NOT to have any of the N, Z, Q numbers, but be made entirely of irrational numbers which are infinitely more than the rational ones, which become the 'osmotic pores' of the sphere to the outer world. While the N, Z, Q family in the line (Q-line for short) represents the 'lineal path', which a given T.Œ will transit with its 'fractal stœps', *as all geometries are mental worlds, hence reduced according to species to what it sees.*

Only the false hypothesis of a continuum and its false infinities – errors of the axiomatic method and the paralogic Kantian mind – which tries to fit all in a single pane and eliminate the needed 'dark spaces' and holes of any organic
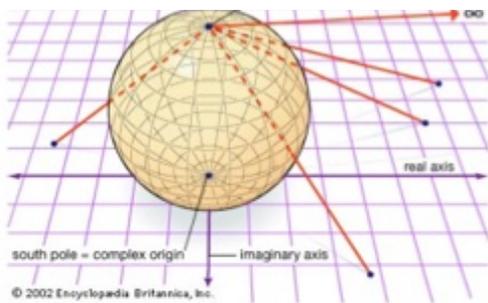
Riemann sphere

This model of the Riemann sphere has its south pole resting on the origin of the complex plane. Each point on the surface of the Riemann sphere corresponds to a unique point in the complex plane and vice versa. This is indicated by the rays extending from the sphere's north pole through some point on the sphere's surface and through some point in the plane. Because a ray that is tangent to the north pole does not intersect the complex plane, the north pole corresponds to infinity.

scalar plane of the fifth dimension, what makes huminds to postulate the completeness and continuity of those structures in the outer objective Universe, because they mind space compresses them.

Let us close this introduction to 5D Cx numbers with a consideration on mental space and relative infinities, the themes of the next paragraphs, studying the main tool of 4D Complex analysis, the Riemann sphere*:*

In the graph, a simple proof of the non-existence of infinities, and continuities, as all perceptive points loose detail with distance and all mental spaces do not see the dark holes between points: The paradox of the Riemann sphere makes each point of the sphere represent a point of the plane, which seems absurd, since the ½ lower sphere is projected in a much smaller surface of the plane that the upper part that reaches till infinity.

But if we consider the north pole the @-informative mind gauging the plane as it moves to infinite it perceives lesser quantity of points and finally in its relative infinity all information on the far away points of the plane disappear, making the less dense further plane equal in density of points to the ½ closer plane/lower sphere.

RECAP. The complex plane can represent S(real)-T(imaginary) symmetries of creation by absorption of Energy from a real-spatial function, representing a body-wave, of an inverse, perpendicular particle state. This simple guidance clarify in mathematical physics, the meaning of complex numbers as parameters that express combined dimotions of ST-states beyond its use as artifacts of calculus (as in the quantum momentum ih operator).

The opposite functions of S-form and T-motion are orthogonal, because height is the dimension of still information and length the motion of lineal time locomotion. But information, perception is extracted in a still position from an advantageous point of view, in a series of Stœps, stops and steps beats, St->Ts->St->Ts, (as in a wave-particle motion), which in its extremal function become SS->TT->SS->TT beats (as in a feeding process that breaks the prey and reconstructs the parts of the predator with its entropy).

All those beats are thus represented with *orthogonal coordinates.*

And the advantage of the Complex plane are various: Both coordinates *are un*able to mix, so they maintain the 2 essentially inverse S & T functions they represent apart from each other. Further on imaginary numbers are inverse directions (signs) than its conjugates, which makes them highly antisymmetric, able to represent 'temporal ± numbers' as two inverse arrows of time. So this is the essential use in mathematical physics.

The i-plane thus represents with its √-1 shrinking, negative inverse parameter to the real plane, a lineal time dimotion, and as such the S-real plane and T-complex plane form a 4D representation of a 3S+T world, extensively used in physics (Minkowski's spaces, electromagnetic flows, stream motions) to represent a 3D volume of spatial populations moving through an inverse parameter of time.

5 DIMOTIONS AS OPERANDS.

The simplest number systems, N, Z, Q are operated by the standard operations of arithmetic in a single ¡-plane: Addition, subtraction, multiplication and division, which must be studied together with those families.

They suffice to portrait a realist view of the world in a single plane, without 'finitesimal parts' and wholes which add the calculus operands, and angular reductions and perspectives which include trigonometric functions. So polynomials are good enough as equations that use only those operands and families to define scalar systems in a single plane of entropic Cartesian space-time. While probability defines with those simple operands the Universe within the 0'-1 probability time scale.

So as humans have expanded their understanding of the Universe, they have also evolved its entangled mathematical mirrors over it, whose geometrical, spatial forms (points) scalar forms (numbers) and temporal operands are messed together in Planes of complexity. Even if huminds that have as in most fields of knowledge merely acted in a mechanical manner, ignore those symmetries as number families mirror, polytopes in space and time operands in algebra to portrait the symmetries and sequential events of simultaneous real organisms. So 5D gives experimental scalar space-time whys to those symmetries.

PENTALOGIC CORRESPONDENCE OF 5 ACTIONS=DIMOTIONS OF EXIST¡ENCE WITH OPERANDS

The study of ¬Algebra operands as expression of the 5 Đimotions of Time§pace brings a vital outlook to the abstract operations of ¬Algebra, starting from the less understood of them all, the sinusoidal functions of mind's perception, ending in the ∫∂, most versatile, for both the analysis of Dimotions =change & Planes (finitesimal derivatives & integral wholes) hence the most fruitful in mathematical physics. While the negative inverse operands represent the destructive entropic 5th dimotion that affects all others. So negative/inverse operand balance positive ones, restoring the 0'-sum balances of all S=T events and systems of reality.

Those operands do NOT have a one to one correspondence to each of the Dimotions of space-time, since each of them is in itself a pentalogic operand, which can entangle with other operands and dimotions, in increasing degrees of complexity. As we shall not cease to repeat, the basic feature of reality is to be an entangled game of 5 elements, which are themselves 'fractal' in its nature.

So each T.œ regardless of specialization in the larger Δ+1 world performs internally 5 dimotions to become in itself a 'whole' being made to the image and likeness of the total fractal, mind of the Universe and its ilogic structure. So while certain operands are clearly more useful for certain dimotions, all of them can be used to a certain degree of accuracy to 'reflect' a mirror image of the 5 dimotions of exist¡ence. Still it is clear some specialized correspondences of those operands with the 5Dimotions and ¬Δ@st elements:

1D:@: 1st Dimotion operand of perception for a self-centered in the point are sine/cosine trigonometric functions, which allow to measure the 3 Δst parameters distance=motion in spacetime (S=T) and angle *the scalar Dimensionless factor.* This poises a question: can a system perceive more than 90º?

Obviously with more than one eye (more population in space), or a better rotation (more motion in time); two S=T strategies. So systems have two eyes to have more or less a 180º aperture to the world.

4D: ± sum-subtraction create/reduce 4D social herds; which *become in a given volume denser* superpositions of elements of the same *species, which are identical in motion and form. So only equal Dimotions can be added or subtracted.* So a sum of numbers that are social groups it can represent also a scalar social evolution.

It is related to Natural, Social Numbers in space that define regular 'points', which are undistinguishable, as societies in regular polygons, where prime polygons have the property of 'increasing inwards' its numbers through reproduction of vortex-points (n-grams), studied in Theory of Numbers. So a Natural number in its

geometric interpretation is a 'cyclical point' of regular 'unit-points' of growing 'inner dimensional density' a point with a volume of vital energy and information, a fractal point.

Δ-Dimotions. We ascribe the more complex dimotions of 3D reproduction of social d=evolution of parts into wholes, which do enclose in their actions the other 4:

4,5D: ∫∂; analysis, 'transcends' and 'emerge' between Planes, in NON lineal processes proper of 'longer time' Nature, best served by integrals and ODEs.

3D: X, ÷, reproduction & social evolution vs. entropic division.

The product has multiple correspondences, both as an aggregation of herds (4D), a reproduction that merges ST-components and a calculus of the lower Δ-1 parts when two similar elements entangle at the Δ-1 level as most reproductive processes do (i.e. you reproduce by entangling your lower scale of genes). Since Δo (S x T), where S is a set of s_{i-1} elements and T a set of t_{i-1} elements, IS the number of 'bijections=axons' between s_{i-1} and t_{i-1} parts (we translate the modern jargon of mathematics to ÐST philosophy of stience so anyone who understands 5D can understand all disciplines).

The product/division rises the complexity of operands a first layer, and serves the purpose, besides the obvious sum of sums, of calculating the margin of dimensions, as combinations which are not purely parallel between clone beings, most likely through the recombination of its Δ-1 elements, as the product of 2 Sœts inner elements give us all possible combinations. I.e. 5 x 4 = 20 IS also the number of connections between all the 5 elements and 4 elements of both sets. So multiplication ads either a dimension of multiple sums in the same plane, or probes for the first time in an inner scalar dimension.

While the inverse division operates inversely reducing Δ-1 parts into a smaller number of wholes. So Q-numbers are dual. They might be entropic numbers breaking of wholes into parts to feed a group, or gathering parts into lesser wholes. Since as we have seen *the 5 number families also represent the 5 Dimotions.*

So the key new function of products/divisions is reproduction, carried in 2 Planes:

The Function of existence, Max. SxT (s=t), which merges two different parameters, maximizing its *connections on the lower level of its organic parts. As the product means then the number of 'axions' connecting them, which is maximized when the parts of both 'sets' are equal.* So, if we have 2 points with 4 internal sub-elements, the product 4 x 4 will give us the number of maximal connections, when we put each internal element in connection with all the elements of the other sub-set, which will be larger than between a 5 & 3 elements. Thus 'gender' reproduction requires similar forms.

2 Ð locomotion is best served by the ± & x operands, as a sum of 'steps' that also can be calculated with an S x T product, where the T represents lineal time motion as the sum of all those steps through its product… even if the memorial tail of the particle imprinted fades away with distance. Since a 'lineal motion' is a 'sum' of 'frequency steps' moving in the positive direction, or a negative number, moving in the inverse direction.
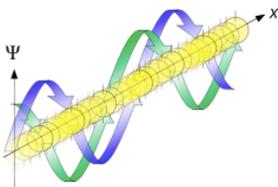
Thus unlike *spatial populations of* Natural Numbers, N, Z *adds temporal negative numbers which are inverse dimensions that close a worldcycle of simple locomotion.*

The product also represents, 2D: Lineal Locomotion, as a frequency time product multiplied by Spatial steps. And again as T=1/ƒ, the inverse operand, ÷ can be used such as V=S/T = λ(s) x ƒ(t) .

Negative inverse Dimotions express also in the duality of expansive entropic vs. implosive informative warping in more complex formalisms of Locomotion, as in Minkowski's space where time, -ct has a negative, i-number that 'warps' lineal space into a wave of high information, shortening the distance: $D^2 = S(x+y+z)^2 - (ct)^2$.

So, the product as an operand, sum of sums, can synoptically account for a 'long period of locomotion': S=vt.

$$\frac{dN}{dt} = r_{max}\left(\frac{K-N}{K}\right)N$$

3D: *log a, x^a:* reproduction: exponential vs. logarithm
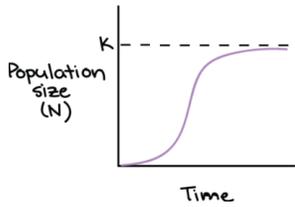
As we can see ±, x÷ and *log a, x^a as 3* scalar Δ±1 degrees of growth, exponential equations, powers and logarithms also model social evolution and reproduction in its maximal 'dimotional scale' of form (Δ+1) , with an exponential curve in case there is infinite energy. Yet in reality we do so adding at the end a logarithm curve (logistic curve); as reproduction saturates a system. It is then a proof that reality seeks always a 'balance' that the REAL curve of reproduction is a combination of both, exponential and logarithmic curves. So from the initial unit to the carrying capacity that DEFINES a Δ+1 social group growth 'reaches equilibrium', becoming a herd or super organism emerging in the new upper scale. The reproductive curve thus rises the seed to the 1=K-organic whole (in a herd or growing organism in) through a balancing feature: the existence of an inverse for all those operands that in the positive transforms the Δ-1 being into its self-similar Δ∅ *accessing a new plane of the fifth dimension*, and in the negative side re-establishes the balance of reality as a zeroth sum. *So the logarithmic part of the graph is the inverse function of its exponential, that slows the growth of the system*
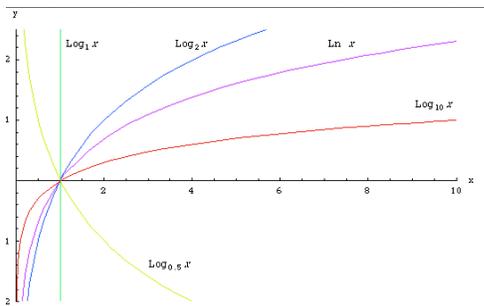
In the graph, the logarithmic function has as derivative an infinitesimal, 1/x, which makes it best to model the curve of growth from o to 1 in the emergent fast explosive Δ-1 palingenetic worldcycle state, while the inverse e^-x *model the decay death process.* Polynomials do not evolve reality towards an impossible infinite growth. They are the inverse decay process; which can be understood better observing that the inverse function does in fact model growth in the different models of biology and physics, limited by a carrying capacity straight flat line.

And depending on which is the base of the logarithm we can trace different social growths and inverse d=evolutions:

4D-5D: log a, x^a: social evolution in decametric Planes and entropy decay in negative exponentials.

The 10^{10} decametric scale is the social scale of the Universe, as the Tetraktys is the simplest, perfect social system, with 3x3 physiological networks, and a 10th element, the 'black ball' communicating them as the 'single Unit' of the larger whole – from armies of 10 x 10 captains, to 10^{10} ties in DNAs, stars in galaxies, galaxies in Universe. Powers of 10 as Eames' movie show thus create new wholes. While a negative exponential shows the rhythm of decay of the system in the fastest event of reality, death, maximized by the e-function, which we just showed to be the fastest negative growth.

While infinite energy happens in death for the predator that feeds on it. So the 'end=action' of feeding/dying of entropy is described by *negative exponentials. So infinite growth and death are two sides of the same coin.*

A negative exponential will show the rhythm of decay of the system. And in this case there is no need for 'a logarithmic' limit, since for the predator the death body is 'unlimited ¡-1 energy', though once the 'relative infinite' number of its ¡-1 parts are absorbed the 'e-function' is cut off. *4th, 5th dimotion: ∫∂.* Finally Integrals and derivatives which have a slower growth, than polynomials and its 3 Planes of operandi model better the specific nature of those 'indivisible' finitesimal quanta of a system, (1/x) with derivatives of different 'functions' and its inverse integral, organic growth into the 'wholeness' of a simultaneous organism integrated in space.

Thus integrals show social growth into new Δ+1 5D planes with far more detail and finesse than polynomial approaches (through Taylor series). Its graphs are a curved geometry, which takes each lineal step (differential finitesimal) upwards into a closed, curved sum that creates a new whole (Galilean paradox of small lineal steps adding a closed 0'-sum with so many interpretations for each science, including our sense of freedom as individuals enclosed in larger ordered societies),

1D: Finitesimals in can also as minimal parts reduce a vital energy to its minimal singularity point-center, @, that might store the image of the whole, shrunk into still, mind-mappings of information, within its particle-head.

The all pervading use of ∫∂ is then clearly because it reflects ALL forms of change. And so analysis is the most extended sub-set of ¬Algebra.

The sequential growth of actions=operands=syntactic dimotions of any language.

We shall find then that the mirror of the 5 dimotions expressed as operands follow the same degree of increasing complexity, best understood with a 'historic' analysis of the evolution of mathematics and ¬Algebra, which was first without even being aware of it, the 'angle of perception' of the humind oculus opened to the whole with a narrow view; as language in time started also with a single A-vowel in the Abkhazian but when the Caucasians learned the other extreme of 'pure form' and said 'u', they didn't forget 'a', and soon their i-magination came with the i-nsolite i-dea of 'I'. So from the 'a' languages we moved to the Semite languages and it's a-i-u vowels, and it was soon thereafter when the Camites and Basques and Altai people of the Korean-Japanese languages had it all what is needed to say 'aeiou'.

The growth of dimotions of existence starts with an angle of perception, 'imitation of life' that starts with eyes opening a narrow view. Thus the 1st action is NOT a full dimension– the angle has none, but a finitesimal image.

Entropy is on the mind of the lonely '1st form' emerging in reality, as the child born to think he owns the world, breaking all things he touches, the first experience, the first 'a-langagæ' full of force, and then comes the other extreme which becomes languagæ. The first species is a lineal top predator; the first form born in the galaxy the top predator black hole, (and the last to die, as the old man cares nothing like the child but for food)…

And so existence in its curves rises from a to u, from au to aiu, from aiu to aeiu, and finally comes 'oh' the almighty realization life will reproduce and be boorn, again.

Every act of creation thus follow the patterns that followed the 5 Dimotions of existence, and for that reason we can study also the ages and evolutions and patterns of growth in dimensionality of any system of Nature, real or virtual, physical or mental, with the same sequential laws.

We study then in our papers on ¡logic evolution those steps from 1 to 3 to 5, filling then the voids, and becoming even more complex with subtle æ, œ variations – but 5 indeed suffice to have a truly full view of the whole, which ants, physicists and huminds ignore…

The order of dimotions and operands is thus clear, as man first inform itself with an eye-angle on its trigonometric function, measuring distance and height, bringing to the mind the holographic flat first functions of the au, length-height, motion and information minimal view of reality acquired with the simplest operand of an open tri-angle looking at the void.

And then he saw around himself and look at the mirror of other mirror-minds, members of his family group or social whole, call it atom vibrating into a network of parallel beings, a bird in a nest, a pup in the basket, a grass leave moved by the harp of wind, hearing with its leaves the sound of other leaves, to know in its chemical mind-roots, he was not alone. And so from dimensionless angle, that of the fractal point alone, looking at the whole came the social group in space, the motion steps in time, probing the ever growing horizon with the new actions-operands.

So happens in all systems that first perceive and then move or socialize with other clones. <+ became the dual form. But angle had only one 'logic time arrow' that of absorption of pixels to create a form, ever turning around the sine and the cosine, reversal forms of each other, in smooth cyclical, angular momentums, with the pi-openings of an imperfect 3' – the triangle within the sphere, rotating through those openings to the world. The sum was though dialectic, dual, and once the natural line was extended, each number a sum, synoptically put into a single symbol: X(N) = ∑1s…

It was then a marvel of the perfection of simplicity that it took 10,000 years more to learn that 'negative numbers' could exist from Jericho to Cardano… And even today the complex root of minus one is an ignoramus for the philosopher of science regardless of the praxis of its ab=use in pedantic science.

Sum thus became more complex and had its entropy (which in the eye and the angle was the shutting of the pi-holes, light and darkness, black and white, suffice indeed to form all the 5-0 shades of grey).

So from the angle of an open triangle, inscribed in a sine/cosine, turning wheel we moved into the dual uses of the sum and its negative inverse 'numbers of time'. As the sum could account for motions in time, positive and negative in directions, and for the social evolution in space of growing and diminishing clone forms: 1D angle -> 2D + 4 D.

It must be noticed though that because a polar duality is necessary to start the game beyond ants, physicists and Parmenides, or else you will find the unmovable whole or the absolute entropic motion of a dying Universe in your single finger one-hoofed beasty thought.

But the explosion of meaning to complete Δst trinity in a single plane and penetrate 5D entangled depths will only come with the multiplication that finally reached the 3 fundamental elements of reality, social growth in space, as a sum of sums, which included the sum; scalar growth as a factor that kept the relationships between the parts increasing its volume till reaching a whole; and penetration into the parts, multiplying the 1-whole and its social group by them, and merging them together into reproductive axons; alternating the reproductions of multiplication and the divisions of mitosis to 'grow and multiply'; that is, and God say: +++ < XX > ÷; and the son was born.

The product become a self-sustained process of creation, which sufficed in itself to create a Universe; unlike the angle that needed the external world to connect the ¬fractal point. And since 3 is the number for a rounded whole in scale, topologic space or time motions, the power and logarithm completed the 3 elements of polynomials but Fermat and Galois would teach that the holographic, ST, pentalogic ¬Δ@ST Universe has its limit-ations. So as we shall see with most operands and equations nothing matters beyond 4 as 5 is the entropic destruction of meaningful form. So you cannot solve a polynomial, the simplest equation that operates those 3 inverse elements of social growth, merges and acquisitions as you cannot resolve with radicals – that is obtain from the parameters of the system the roots of any equation beyond the power of 4 (Abel), unless you take the X to be the 1, the whole in itself.

But you can re-enter a plane of existence, reducing a whole to its derivative, $X^n = n-1\, X^{n-1}$ and you can emerge into the whole by integrating your parts across time, space or scale with single, dual or triple integrals. And so with the discovery of calculus which included in its equations all other operands, as all could be 'derived', the whole evolution of ¬Algebra to mimic reality was complete, along the solution in praxis – not in meaning – of the i-maginary $\sqrt{-1}$ root… Neither derivatives could go beyond the 3rd for a real meaning in time: y': speed, y": acceleration, y"': jerk…

And that was all folks. No more operands, no more dimotions are needed, in the finitesimal, finite $\propto$ Universe, as the angle of perception will be shut off at certain distance in space, time and scale.

4th dimotion: social sums in space – inverse motions in time. Democratic, social Universe.

The simplest social form is a herd of undistinguishable elements, *a number, and its operand in a single plane, a sum,* which requires *equal species* to add with its superposition principles, in herds of a larger scale.

A number already includes a sum of '1s' and as such Natural numbers and sums correspond to each other.

The sum/number is thus the key operand for the simplest Δ§cales of social groups, in humans as in most systems, divided in tetraktys of 3x3 sub-systems/networks and one to integrate the whole as new unit of the Δ+1 plane, in a decametric form (bilateral 5s, so to speak).

Social growth increases then by sums of sums, which can be expressed with the product and products of products expressed through exponential logarithms, *which in true form must be considered a 'species' of product in which the elements of the product as in the case of the sum are indistinguishable. So the proper connection is that of sums and exponentials while the product represents multiple functions*, notably the reproduction of form.

The negative function/number.

As the Universe is always a zeroth sum in balance, the sum has its inverse operand, the sustraction, and the number=sum. The negative number. This in mathematical jargon gives us the neutral or identity number element, the ' zeroth', which will require latter a deep analysis in 5D as we did with the relative infinite ∝.

Yet the negative operand is more profound than the sum *since while the sum is positive as the natural number, and it is related to a 'spatial population', a sum of forms; the negative is a time function, as there are no negative pairs, but negative directions inverse to positive motions.*

This subtle difference will explain in physics some errors, from the negation of faster than light speed, *which is possible albeit in an Δ-4 plane, as the only 'prohibition' is the existence of a negative number, which means a negative motion of a mass 'vortex', which in 'negative' expands instead of imploding, loosing curvature, as it accelerates beyond c-speed as dark entropy/energy/expansive gravitation.*

Again negatives arise in the duality of particles and antiparticles which appear with negative time motion to the past; which again merely means an inversion from a positive informative implosive particle to an entropic, dying expansive particle. We could multiply examples, the most obvious moving right and left in a vector or speed. So we define 'negative numbers' as inverse dimotions of any of the dual *dimotions of our 5 Dimotions of existence:*

+information vs. − entropy; + motion in a 'chosen direction' vs. − motion in the inverse direction; + implosive vortex of attractive force vs. − exploding vortex of expansive force. And so on.

Inverse operands are misunderstood because unlike the paradoxical ¡logic Universe, the humind is @ristotelian, with a single arrow 'positive selfish arrow' A->B – that of each specific human dimotion. So the B->A is feared as in death, or misunderstood as in explosive vortices of antigravitation (Dark entropy) or antiparticles.

And we are spatial, visual minds, so time complexities fully escape beyond our lineal time view.

So generally speaking time inversions are served by the negative function. I.e, a negative spin just has the inverse orientation, a negative coordinates just means to move in the other direction. Negative operands thus are most useful for time=motion related systems; *and for all inverted, negative entropic destructions.*

The 'negative vs. positive inversion' is not only connected to an external locomotion. As all dimotions need a neutral point in which a 'time dimotion changes state from + to -'; which is the 0 point that means not only an empty 'set' of population in space, but a 'state of no dimotion', when the time change does not happen.

More profound still is the concept of 0 as the discontinuous stop/perceptive state. *Since reality is a constant stop=perception and step=motion, where the stop state is the informative 1Dimotion when the fractal point might change the next dimotion switching to other action of existence, themes those* for a representation of the program of existence in Boolean ¬Algebra we escape completely for ethic reasons.

For the simplest motions as any physicist knows the duality of space=stop and ±time-step, is a constant -1, 0, 1 whereas the 0 function in an alternate or vibrating SHM halts motion at maximal distance and 0 speed, but often the system releases or absorbs the Δ-1 micro-points of its informative/feeding scale.

It is possible to combine ST actions of spatial populations and time change, which can in this case be negative with the diminution of populations, so -3 obviously is a diminution of a quantity whereas T will always be smaller than S: T<S. And as all systems are 0'-sums that reduce their populations ultimately all populations in space will be subject to a negative growth in time. But in short time spans a population might be lineal only in a direction of growth.

It is then important to understand the existence of one-way dimotions and short time spans vs. 2 way dimotions, where both ± operands *make* sense and always happen in long time spans. Because huminds do not properly distinguish the different ST dualities, they get confused when trying to consider a negative operand for spatial forms (what is a negative apple? nonsense) while there are always negative 'directions' for temporal motions (what is left and right motion?), which they clearly all understand.

So the next question is: can the sum and its inverse negative number perform trilogic and pentalogic functions? It is an interesting theme, because being the simplest 'operand' and the only one that does NOT penetrate into Planes of the fifth dimension and requires an 'equal' parameter for all the summands, it might seem not to be able to do so, but it can represent them *all for an external observer without detailed analysis of the internal processes needed from the complex scalar dimotions of perception and reproduction. However, and this is a fascinating rule of all systems in 5D, there is a 'blind spot', in which the entity finds difficult to perform properly a task, which is the inverse task to that for which is best suited.* So as in the case of the 'angle' of perception, we require the external world to entangle the action and achieve it merely with the sum/negative number:

4Đ: Social evolution into herds, which is self-evident the dominant element of the sum **in 'space'.**

2D: Locomotion as a sum of equal steps measured by the frequency of those steps **in sequential time**

3Đ: For an external observer, 'magically' by adding numbers a population can grow 'in time', expressing the 3rd Dimotion of reproduction.

5Đ: Negative numbers can then express the 5th Dimotion of entropy, as expressed above.

1Đ: Perception is the less natural Dimotion for the ±, its blind spot as it implies the decrease of size in space (as opposed to social growth, 4D, the natural dimotion of summands) and *a distinctive nature for the different pixels of the perceptive being, which makes difficult to consider it.*

I.e. to color a map we need 4 Different colors in a plane (a topological question, studied in 5D geometry), but if all were equal it could not measure perception. However if we introduce a 'higher concept' – a pixel, we can increase perception by increasing the pixels of the picture but it won't be so much perception – the dynamic event of the observer, but of the observable.

This constant 4 vs. 5 tetra vs. pentalogic view of reality implies that often a system ignores the 5th entropic dimotions for which it does not code at all, but will be externally provided courtesy of the Universe. i.e. we have

4 genetic coding letters (but a 5th nucleotide for more enzymatic, destructive coding), 4 quantum numbers (but the principal jumps to increase energy by entropic feeding to a larger orbital).

Death=entropy is thus the fundamental blind spot of all dimotions/operands, but for physicists fond of its entropic big-bang theories of reality.

Social addition by holographic superposition of equal forms vs. Informative molding.

'Natural' N-Sums keep the individuality of its 'ones' in the system as parts of wholes, which are herds, even if they imply a fusion of the volume of space-time the system occupies by superposition.

The wholeness of which is often on the eye of the beholder, introducing the theme of the subjective observer vs. the objective observable that holds a higher truth. I.e. waves are superpositions as herds of smaller forms; even if the humind considers them 'single wholes'.

RECAP. The simplest entangled representation of reality through 'basic operand' comes through the duality of addition and subtraction, and its attached physical meanings of superposition and fusion of 'parts' into 'whole numbers', or its entropic inverse operandi of negative subtraction. While as all operands it has an inverse function to maintain the balance of all the actions of the Universe; and a blind spot, not coded – the inverse of its dominant social dimotion – informative perception.

Moreover addition can happen in sequential time or adjacent space, forming growing probabilities or populations. So as the simplest mode of operands extends its diversification through space or time it will mean different things.

<div align="center">

- : THE NEGATIVE FUNCTION: Z NUMBERS

</div>

It follows that negative numbers are the first inverted operand required to balance the Universe. Its interpretation is then immediate as the entropic inversion of a process of social growth; but and this has been a source of much confusion, they can be placed in the same parallel orientation (Z numbers) or in the orthogonal perpendicular orientation (complex numbers), which are very different propositions. And in both cases there are limits to what dimotions they can represent. Z numbers in principle are NOT required for the inversion of the simplest sum of spatial populations, for which the negative symbol suffices, but subtraction ends at 0', as negative populations do not exist in pure present spatial terms – only as a projection of future negative time (Debt, etc.) So Z numbers are only pertinent for temporal processes. Further on, they are written in lineal time, which is not suited for cyclical time processes, which are most long term Deep time events and worldcycles. This leaves the range of Z-numbers use constrained to lineal time motions, 2D locomotions, which are not that interesting despite 'enzyman's' magnification of it, due to its obsession with the construction of entropic weapons and transport machines.

We shall thus not dedicate much work to their study, in this by force brief introduction to 5D ¬Algebra.

The beats between ±information and entropy states.

The function of existence has in Existential ¬Ælgebra a series of potential beats…

We distinguish ∑ as the sum symbol for herds of equal beings, while ∏ will entangle networks, and one will transit to the other, since addition by superposition in ever tighter spaces of similar clone species, the simple ¬Algebraic expression of social dimotions, finally collapse into a tighter network *once* no more units can be added, and vital space must be 'cut-off' creating form, causing an essential 'Stœp' rhythm of Social reproduction and growth of cells, informative molding and partial loss to increase information, which is why both are so often connected.

I.e. the sculptor forms by eliminating waste of material; the hand is formed by killing the cells that were between fingers; evolution of form happens always in a diminishing form; so the Homo Floresiensis was a hobbit but had the first complex form of the head, and all new species diminish in form.

Which introduces the opposite functions and entangled beats of the Universe as the aforementioned Fast Radiation of species/cellular populations in space vs. slow diminishing/evolving form in time.

Both in its positive 5Ð v. negative entropic 4Ð whose addition of decaying ¡-1 T.œs is so fast that it is expressed by a negative exponential growth, which in this manner would complete the 3 'Planes' of addition: $+$, x, x^n

If we consider an event's worldcycle, 1, lesser probabilities represent parts of the whole event. If we project it into space it will be a population of similar event, entering the region of maximal frequency. Both will be mathematically projected as a bell curve. S=T. Same function for the addition of events and populations, in time or space.

The Universe is simple in its original principles, made complex by the differentiation across the symmetries of scale, topology or time. Indeed, something so simple as the sum and inverse subtraction IS still the most important operandi of the Universe, which gives us new numbers, social gatherings of identical beings, which herd together into parallel flows adopting most likely a bidimensional ST superposition on laminar states that keep adding the 3rd dimension of the being. Like the simplest first masterpieces of Bach, the architectonical Universe is a simple principle before organicism twists its form, in which beings, which are equal come together.

Superposition of bidimensional holographic fields is so important that the whole of quantum physics is based in this superposition principle. The sum thus is still the master of operandi. But for sums to happen, the beings *must be externally identical, to be perceived as parts of a quantified mass, each of them the same value. Addition thus is the ultimate proof of the social nature of the Universe: The sum is a social action: Sums form herds.*

Once we defined an operation and its properties, we study how they mediate the actions of beings. And it is clear that the first operation sum, acts on the first form, social numbers, to form growing §ŒTs of social numbers...

So paradoxically the more complex action, starts with the simple operation, the sum of individuals into herds of formal numbers.

A locomotion is represented as a 'lineal motion' by a simple 'sum' when moving in the positive direction, or a negative number, when moving in the inverse direction; whereas the positive direction is the direction towards 'energy', and the negative direction must then be the inverse direction of the 'arrow' of information. We can see this also, as an expansive direction (energy feeding) and an implosive direction (information warping), concepts of importance, as information 'warps', and since height is the dimension of perceptive information, a negative, shrinking number, i, will define often in mathematical physics the warping direction of information (as in Minkowski's space, it).

However in the entangled, fractal Universe each element can be entangled with all the other elements (fundamental principle of pentalogic). So we canals add frequencies in time (+, T), social elements (5D, +), points in a single plane, and groups of social elements to give us new decametric Planes. And we can ad reproductions as sums of identical beings (3D, +). And we can count the decay of a point into its internal parts as a sum (4D). Thus we can build with only sums a mirror image of 4 dimotions of reality.

The problem of the i-number: negatives and roots. Proper and improper inversions.

As a general rule*, negative numbers exist when they are a direction of motion, not a quantity or volume of space.*

So happens with roots, which only should exist for symmetric holographic systems of space-time S=T, for bidimensional entities and regular numbers as forms.

And alternately they Do happen in many cases in which mathematical physicists discharge them as inverse arrows of time because they ignore the inverse 4D vs. 5D arrows, as in Einstein's equations, where they customary discharge negative hyperluminal solutions that do happen in the larger Δ±4 dark world of quantum potentials (entanglement, pilot-wave theory, etc) and intergalactic space (faster than light neutrino background, gravitational waves, action at distance, red shift of light, etc.)

We study this themes in number theory where we define the different types of numbers, so no need for further info here. Instead, we will make some comments on... the limits of classic Aristotelian logic based precisely in a single arrow of time, which has so much influenced as Euclid pretentious axiomatic method (full of holes and new axioms, postulates, notions and various errors of the §@-humind), our 'underlying' a priori categories of the mind.

At the basic level of arithmetic's the problems that still linger in mathematics and by extension all sciences, which use it as a mirror, are the concepts of negative and square numbers, the inversions of the positive and quartic equations, on the real number, related to the two fundamental unknowns of humind science - the fractal scalar 'infinitesimal nature of space', and the 'proper and improper inversion' of the fractal generator.

Negative numbers and roots do NOT exist for certain type of space-time events, p.o.v.s and Δs≈t structures of reality but are an inflationary excess of 'information' proper of all languages that in the isolated mind space, without entropic, simpler restrictions can 'escape' into imagination: informative software systems, without direct contact with the hardware that limits the possible paths of information multiply kaleidoscopic inefficient combinatory forms, 'free' of the constrains the vital energy they must 'shape' accounting for its simplified rules in the external world – in a drawing of 2 still dimensions we can make any figure – in a 5D Universe only certain ones 'stand'.

And this is the fundamental need of mathematics that force it in search of meaning as per Lobachevski's pangeometry and Gödel's ¬Algebraic theorems, to recur to experimental science, to discern once and for all what are mathematical fictions and what are mathematical reality.

'I know when mathematics is logic but not when it is real' then applies in this case to the unnecessary attempts to draw complex functions in 4th dimensional space, when they are mostly in its imaginary parts functions of motions in time, best operated in mere ¬Algebraic methods.

Odd=negative and even=positive functions.

When we move from simpler operations to more complex functions, the concepts of positive and negative numbers carry to positive functions, which are symmetric both sides of the 0' line and negative functions, which are inverted passing to the negative side, and so the concept of an inversion of Dimotion takes effect with clear implications in the real, physical world.

Let us consider an example with wide implications in quantum physics, the fact **t**he duality between antisymmetry and symmetry happens also in the (antisymmetric) vs. even (symmetric functions), which is in mathematical physics the basis between social evolution of particles (bosons) vs. antisymmetric annihilation (fermions), so it *has an immediate never quite clarified application to physics.*

One of the basic questions in the theory of numbers concerned the divisibility of one number by another:

if the result of dividing the integer a by the integer b (not equal to zeroth) is an integer, i.e., if a= b • c (a, b, c are integers) then we say that a is divisible by b or that b divides a. If the result of dividing the integer a by the integer b is a fraction, then we say that a is not divisible by b.
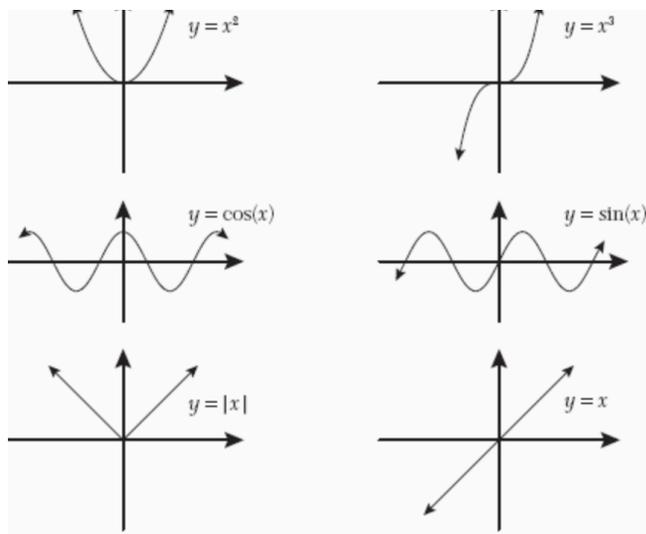
FIGURE 5.16. Even and odd functions.

Questions of divisibility of numbers are encountered constantly in practice and also play an important role in some questions of mathematical analysis. For example, if the expansion of a function in integer powers of x:

$$= a_0 + a_1 x + a_2 x^2 + \cdots + a_n x^n + \cdots$$

is such that all odd coefficients (with indices not divisible by 2) are equal to zeroth, i.e., if

$$= a_0 + a_2 x^2 + \cdots + a_{2k} x^{2k} + \cdots,$$

then the function satisfies the condition: $f(-x) = f(x)$ - such a function is called an even function, and its graph is symmetric with respect to the axis of ordinates. But if in the expansion (2) all the even coefficients (with indices divisible by 2) are equal to zeroth, in other words, if:

$$f(x) = a_1 x + a_3 x^3 + \cdots + a_{2k+1} x^{2k+1} + \cdots,$$

then $f(-x) = -f(x)$

In this case the function is called odd, and its graph is symmetric with respect to the origin.

Notice y(s)≈x(t) is an odd function, a deep metaphysical fact, which implies S and T are in different ages of time. If we consider the 2 functions of the 1st Dimotion of angular perception, the sin x function related to the height dimension of form is odd, and the cos x function related to the length 2D¡ of locomotion is even:

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \cdots \quad \text{(odd function)};$$

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \cdots \quad \text{(even function)}.$$

This duality has a deep implication in the physical Universe (Pauli exclusion principle), which can be resumed in a simple thought: functions which switch between ± temporal motions, something quite common in all type of alternate currents, but do NOT change for that reason their wave form (even functions) obviously add by superposition its populations.

Functions which alternate the direction of its time motion (from positive to negative sign) and in the process invert its wave form from + to - energy or in terms of S vs. T invert its dimotion from entropy, locomotion, to information state, annihilate each other. This is the case of a sin x function where the states change from motion to information. While in the cos x function, the wave merely switches motion but NOT state.

So in even functions, changing sign doesn't dimotion; in odd functions opposite Dimotions annihilate each other.

As this is not wanted – no T.œ wants to die, somehow the particle-mind state will by all means prevent their body/waves from contacting each other. In the next graph we see the case of even functions. Any chemical student can find the case of odd functions where the electronic wave afraid of annihilation, acting as the body state of the particle is the furthest away from the other.
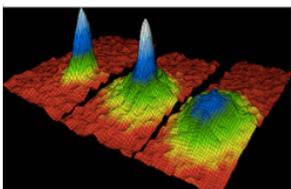
The reader should easily in any case interpret the results in terms of dimensions and the holographic principle. And it reads like this: symmetric functions are holographic even functions, which means for example they can be 'superimposed' as they are bidimensional 'sheets', waves etc. While odd functions are even in dimensions, and as such they cannot be superimposed.

This means essentially bosons are bidimensional and fermions are tridimensional, and this is a huge advance for quantum physics - recently proved by an experiment that converted a photon, initially a boson into a tridimensional form and ended its boson conditions. Accumulation of bosons into a single point of space-time then means merely it is superposing the bidimensional thin layers into a third dimension of height which is indeed what we see in pictures of boson states.

Its representation in both ± sides of the plane works as follows: the axis of ordinates plays here the role of the 'asymmetric' state which has split into the ± inverse directions but can fusion again both. Or in terms of relative equality, those functions DO have their position in space (established by the lineal coordinates used to represent lengths in space) different but their form (represented by the Y-coordinates used to represent form and information height dimensions for most functions) identical. So they can according to the rules of the fourth postulate of non-e, communicate as they can share identical information and match each other in symmetric peg.

While the antisymmetric function is +- -+; that is, inverse both in the Y-nformation and X-pace location is dissimilar both in form and motion, momentum and position, you name it... whatever 2 parameters we use to compare both systems. So they enter into a Darwinian annihilating process as they cannot match each others form.

The 5 Properties of ± operations. Its trilogic

It is then immediate that for the fundamental dimotion of the sum as an operand its properties define a social democratic herd of undistinguishable elements, and those properties carry to the properties of 'numbers', as they exist with the inclusion of 'the sum' within them.

So the standard properties of the sum are:

1. Identity element: There exists a number zeroth with the property a + 0 = a for every a.
2. For every number a, there exists the opposite number x satisfying the equation a + x = 0.
3. For any two numbers, their sum is uniquely determined.
4. Addition has the associative property: (a+b)+c=a+(b+c)
5. Addition is commutative: a+b=b+a

5 properties immediately smell to pentalogic. We shall not follow as we never do a full rigorous consideration of them all, but it is obvious that in levels of complexity we first talk of the ± wholeness monologic expressed by 2 (x-x=0), where both operations are included.

1.2 The two first properties thus are related to 'time sums' of ±directions; the last 2 to 'space sums' of indistinguishable populations; and the 3rd seemingly trivial, is of importance to philosophy of science. *But in the scalar Universe, everything is 'deeper' than it seems.*

2. Consider the ± inversion, which in the ideal world of 0'-vacuum is evident, as the 2 inverted arrows of the 5th dimension, entropy=dissolution of wholes into parts and social evolution of parts into wholes, *should be also ideally perfectly symmetric; but neither of both perfect cases is real. There is NOT a 0 but always a residual finitesimal. There is no 0 temperature, but a residual motion; 0 vacuum but a residual h-planckton. So a-a=+0' is the real 'thing' in the paradoxical asymmetry of reality, where one of the 'two symmetric sides' of the Universe is slightly 'weaker' in its S vT parameter, and the other side in the opposite one. So in general terms the 'negative side' has lesser energy value than the positive side that has lesser information value. Thus a-a=+0'.*

But what is the vital reason *in a perfectly efficient 'real Universe' of organic space-time for the lack of a perfect inversion? The answer is obvious, as we do NOT have a pentalogic resolution for the dimotions of reproduction in a world of only 'sums', if a-a=0. Thus* Trinity, reproduction of an infinitesimal form by gender is given by the 0' neutral element. In other words female+male = finitesimal seminal 0'.

3. Neither the fact that there is only a sum *is trivial, as other operations (√) give us two 'possible futures'. Social evolution thus is highly deterministic as it always brings a single solution, moreover, the next two properties show*

that social evolution 'reduces' the futures, because it makes commutative and associative variations irrelevant. This is a key concept to understand why social evolution ends up being deterministic and reducing the freedom of the parts that become then an emergent whole that 'makes all those parts undistinguishable':

4. 5: The last 2 properties are also quite profound; as they are different for + and its inverse operation -.

Subtraction differentiates through those 2 final properties, precisely because they are properties of identity, which subtraction does not perform. As the 4th Dimotion of social evolution requires a democratic social undistinguishable number – which we already saw when defining numbers as polytopes, and '≈' the relative infinity with the unit circle, of a relative infinite numbers of irrational 'holes' within the maximal polytope.

Subtraction though is by definition the breaking of parts, an entropic action, and so it is not commutative and it is not associative, as the two elements of the subtraction become differentiated by the operand.

Recap. The simplest sum and its inverse subtraction can form a complete set of dimotions, reproduction through its identity number; 0' which must be taken as the representation of a finitesimal part. Social evolution as its fundamental, natural property; entropic subtraction, which lacks the associative and commutative properties.

X ÷ : 2ND & 3RD DIMOTIONS: RE=PRODUCT=ION:

The Đimotion of reproduction is the product. Since translation = motion in space, or locomotion is a form of reproduction of information in lower planes, the product also plays a fundamental role in mathematical physics and the study of sT-locomotions - motions of a form through a space in which the particle-wave reproduces its memorial information as a wave that evolves and collapses as a particle.

Its main difference with the sum is that it allows to combine different 'substances', time and space parameters. It does not require the same form.

To define the product then we must study it through the dualities, trinities and pentalogic entanglements it allows as the most important operand between single elements of the Universe; parallel in the analysis of social parts and wholes, to the calculus operands.

As such the product will be able to perform different actions for the 5 structural elements of ¬Δ@st; since reproduction is the more complex of all Đimotions encompassing part of them all.

And so we could rightly say that the 'king' of all operands is the product, ever pervading in all systems to the point we often ignore its writing, as it is a given that any merging of S & T holographic space and time parameters must be dealt with a product.

Unlike the sum which requires *equal species* to add with its superposition principles, in herds, the Product is NOT only the sum of equal forms, which is its usual definition, but the merging of different species, with is its fundamental purpose; hence a reproductive act that brings something else, starting processes of creation in a single plane of space - as opposed to the sum that merely will create a simpler herd of a larger scale.

The product is also the first operand, past the 'shallowness' of summitry herding, which probes in lower and upper planes of the fifth dimension, as the total calculation of a system's parts in Δ-1.

So with the product and the ill understood division and its Q-numbers as ratios, we enter into a much deeper land, and multiple issues arise at once.

First we need to understand what we can 'multiply' and we cannot. We cannot multiply 3 pears and 5 apples, but we can add them when we upgrade its concept to fruits. But even then we cannot MULTIPLY 3 pears and 5 apples. Still *we can multiply 3, a social number, or property of scale, and 'apples', a synchronous organism of space.*

So as an intuitive first answer that gives such enormous power to the product we can state:

'The product can multiply=merge, the 3 main parameters of the entangled Universe, Δ-scales, Time-motion & spatial organisms; entangling them into an ΔST, scalar Dimotion of space-time.

As it happen all Dimotions in the Universe are bidimensional - the product of a Dimension of space and a Motion in time; and we can always add to that structure a 'number', which is a unit of social scaling. So we talk of Dimotions as the product=combination of a dimension of spatial form and a motion of time and a scalar number. Gist's profound realization on the multiplication operand is that it is the essential operand to combine dimensions of space and frequencies of time motion, and Nº scales to create a bidimensional spacetime dimotion.

For that reason as in many other themes (non-existence of zeroths and limits but 1/x finitesimals, non-existence of absolute infinities but local ∝, scalar nature of the 'numerical line', etc.) *it is imperative for a proper understanding of the Universe, an expansion of our philosophy of science and mathematics to match closer the reality of the fractal Universe.*

Let us elaborate on this key them considering the holographic bidimensional basic forms of spacetime.

Holographic interactions. The calculus of ST Dimotions with product operands

THE 5 DIMOTIONS=DIMENSIONAL MOTIONS OF SPACE-TIME
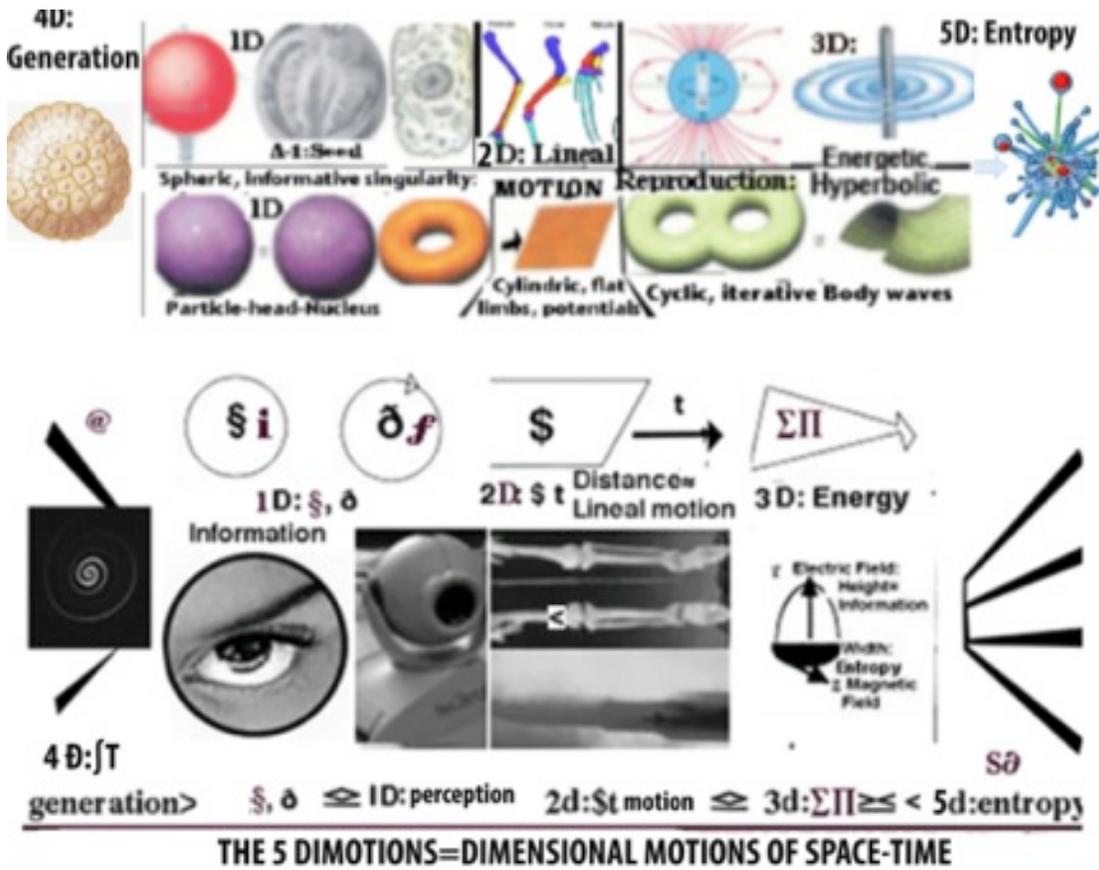
In the graph we show in a more general way the 5 bidimensional, holographic dimotions of existence for which the product NOT the sum are needed.

So we define in ¬Algebra the product as the king of all operations, since it 'merges' into 'a new entity of space-time', two parameters disjoined. The product proves the very same existence of a holographic Universe with 3 elements, scale provided by numbers, and space x time. So polynomials can merge the 'i-1' elements or 'cellular parts' of the being, and calculate its space-time actions as a 'whole' emergent new reality. The holographic principle, best served by the operand of multiplication combines space and time parameters into a single 'entity', the best known of which are physical momentum, which combines a T-function (speed) and an S-function (mass). So often we talk of that product as 'existential momentum' in Existential algebra – basic case of SxT, 3rd 'Dimotion' on physical systems. *In that sense an ST 'dimotion' is a new 'emergent' entity*, something physicists often wrestle with. Momentum is NOT mass neither SPEED but 'something else', reason why it acts as a unit in physical equations. I.e. the uncertainty between momentum and position. 'An electromagnetic wave', is neither a magnetic or an electric field but something else defined by a product in terms of bidimensional speed: $c^2 = 1/\mu e$.

How multiplication then merges two elements, SxT at the point of maximal communication, S=T? Easily. By entangling the two elements, creating Δ-1 'axons' of communication with all the other parts of the being, such as:

$X(5_{i-1}) \times Y(4_{i-1}) = (5_{i-1}) \times (4_{i-1}) = XY(20_{i-2})$

That is, a multiplication that merges two wholes, X and Y, which do have in the Δ-1 scale, 5 and 4 elements, if we join in the Δ-1 scale each element of X and each element of Y, will gives us a number of i-1 communication axons connecting at a deeper level the two wholes, equal to the product of its Δ-2 elements, 5x4 = 20.

And this product is maximal when S=T, so for 10 total elements, 5x5>6x4>7x3...

We *talk then of the 'perfect product', when S=T, which is an essential concept of ÐST, for a proper reproduction to take place by 'gender mirror symmetry', carried on in mathematics to the 'Polynomial square' and combined in terms of S vs. T by the orthogonality of the Pythagorean triangle of 'maximal' diagonal length, which are survival, efficient ÐST functions, all pervading in 'REALITY', beyond the inflationary 'non-survival' entropic mutations of the inflationary language (as all languages are: there is more money than products, more words than actions, more equations than reality).*

This new being then SxT will have *created an Δ-2 scale of axons that entangle together both parts as a whole, in the way a brain is wired by networks. And so we use the symbol of repeated multiplication ∏, for entangled networks as opposed to the ∑ symbol for sum herds.*
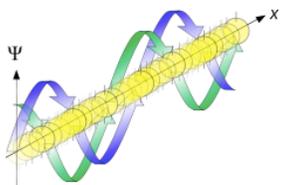
So we interpret a momentum as a mass stop state and a wave step state merged together in the potential ¡-2 level that reproduces the wave-particle along its path through a product, which is maximized when both mass and speed are in relative balance to each other. So larger masses have lesser speed and lesser momentum than balanced S=T states – a common feature of all systems of reality deduced of the Max. SxT equation of 'Momentum of existence' that all systems try to maximize in its 'classic balanced age'.

The most abundant of all operand, the merging product requires therefore a more complex rule than a direct sum, which acts by 'superposition' of equal beings. Even *if in the entangled Universe of growth of complexity the product can also be used to calculate 'exact' multiples of sums.*

For the same reason, as we grow in the entanglement of number families and operands those merged existences will also to be operated by calculus and derivatives, specially when we go from Δ-1 to Δº by means of integration of derivative parts. Since multiplication tends to happen in the lower scale of the being at different states of time and space. So we no longer operate as in additions, with the same type of T.œs in the same plane.

The best way to describe the multiplication symbol is through the holographic principle. In reality one-dimensional points with no breath do not exist. Systems are always ST holographic merges and so we need an operation, which is the 'queen of them all' as it allows us to 'merge' S and T states of different entities together into 'new Bidimensional operators', which in physics for example merges M(ð) x $(v) into momenta, which is the *conserved bidimensional entity of the spacetime Universe.*

Multiplication, beyond its naive definition as a 'sum of sums', is the re=productive creative process of ¬Algebra.

The simplest modes of reality are ST combinations of bidimensional planes which ad by superposition; when the parameters are different however we multiply them. The second operation of ¬Algebra is product and its inverse division, and this probes further into the Planes of reality; so the new operations ads dimensionality and requires new numbers, namely the Rational numbers. Let us then consider them first by studying its properties as compared to those of addition. So THE product IS THE FIRST operand of the fifth dimension, which merges, in 3D: reproduction acts that requires between two 'genders' such interconnection at the lower level to form a whole.

5 points connected with all others and with itself, give us 25 connections. This is the ultimate meaning of the product when perceived from an Δ-1 perspective which is needed as in most formulae the product is not reflexive but communicative between species of S-T different quality. I.e. momentum, mv, is not merely the multiplication of m, but the product of a static space-state m and a wave-moving state: v - another whole thing.
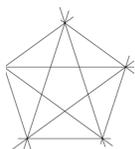
MULTIPLE MULTIPLICATIONS: ITS ΔST TRILOGIC

The fundamental effect of new operands is to ad a new dimension to the system, *in the growth of entanglement from 1 to 5 Dimotions that allows the persistence of an entangled reality*, where the 5 Dimotions of time, can work in synchronicity in space. And that is first achieved beyond the 'wave-herd' of the first operand and its 'wave superposition' rules, 'smeared' on its background reality with the tightening of two opposite 'gender forms' through mirror symmetry and the ties/axons that communicate its parts internally, creating a 'new dimotion' of form. So 5 x 5 neurons are NOT 25 neurons but 10 neurons with 25 entangled Δ-1 axons.

This is *to the product its fundamental function, re-product-ion, as the social herd growth is the main function of the sum. In the parallel mirrors of all stiences and languages, the sum does correspond to the herd, and the entropic state, and the product to the liquid states, whereas the 'perfect product' or 'power laws', will become the solid state, as all the elements are entangled to all the elements in a maximal network knot.*

This said as the sum could reflect other 'tetralogic' elements with the 'blind spot' of angular perception, we can apply to multiplication the Rashomon method of multiple perspectives (Pentalogic), to consider which type of dimension, and in this manner an enormous range of phenomena can be expressed with the same operation, increasing the iterative complexity of the Universe.

Indeed, the first question of existential algebra is how many combinations of 5 Dimotions and 10 ST components can we make in a single plane? And how many entanglements might happen in 2 and 3 Δ±1 planes?

The ginormous number of combinations of the 10 space-time holographic elements makes the product a versatile operand, which accounts besides the aforementioned 3D reproduction and 4D social evolution as the sum of sum, for sT locomotion as the product of two such states: λ(S) x ƒ(ð)). While its inverse function, the division, breaks the whole into parts, and so it represents the 5D inverse function of entropy. Yet as in the sum perception doesn't fit in the product. Let us study them in more detail.
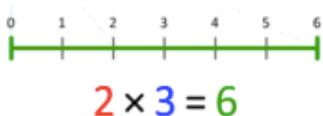
4D: §: Social Sum. In a single plane, classic multiplication is the sum of sums of a group of social identical beings but it already *groups them in two scales as social* 'numbers', which become a sub-sœt, multiplied x times, that is we add equal groups that should share a common properties to equal group, 'adding a new scalar dimension of information'. So if we instead of counting 1,2,3,4,5,6,7,8,9,10; we multiply 5x2=10, after asking how many 'fingers' you have on your hands, we did so because we did two 'hand groups' with new information, making *a distinction in the otherwise 'democratic undistinguishable herd of units'. But if we count sheeps to sleep as they are undistinguishable we add them one by one.* So multiplication evolve social groups=numbers in a single plane.

TIME: 2D: sT: Multiplication combines a time motion and a space dimension to get a 'distance'. But here already complex scalar elements enter in view. As we can do that multiplying a 'short scale' space dimension, a 'step' and the equivalent short time period, a frequency λ(S) x ƒ(ð)= Distance, but we can do it *using long deep time scale (lineal time) in v=s/t-> Vt=S and for that reason we need* to *diminish the scale of our space scale of measure to 'instantaneous velocity'; origin of calculus of finitesimal speed. So V¡-1 x T¡+1 gives us the same S-distance.*

All those subtle distinction we bring constantly between scales do matter when we try to understand in deep the reality of mathematical physics, even if huminds compress all scales into a continuous line and a single plane.   In any case the ST product of steps and frequencies is now a different 'property' unified as a whole, a distance which in the first case increases the 'scale' – it is a scaled step, and in the second has a peculiar effect, *as it converts two forms of motion, speed and time duration into a fixed form, spatial distance, which means obviously that 'distance' is a 'mental mirror', an imaginary image that 'stiffens' the combination of a short and a long time that must be therefore also mental 'parameters'. Indeed, the 'real thing' is λ(S) x ƒ(ð); that is, a man doing steps of a meter to its vital frequency of a second, a car's wheel turning at rpm; the other concepts are humind's abstractions of time duration (lineal time), instantaneous speed (derivative) and a distance with no persistence.*
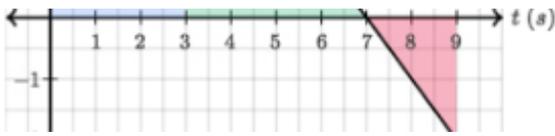
$$V = s/t:$$
$$S = vt:$$

Yet another proof that the real thing is cyclical time frequency and fractal space 'stœps'. Since we just proved by such simple reasoning that lineal time does not exist! adds a dimension of lineal distance. It is the simplest and commutative form.
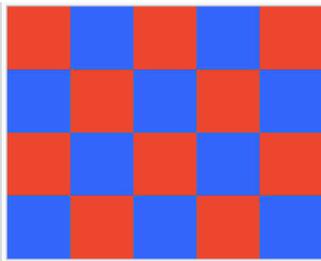
4 × 5 = 20. The large rectangle is composed of 20 squares, each having dimensions of 1 by 1.

SPACES: Sum brings a number in a single line or a disordered herd but multiplication ads a dimension of spatial width to form an area, whose dimensional growth creates a holographic system, in *which the height dimension will be a dimension of information added to the numerical length, which now becomes a width of energy-volume. So you are reading a bidimensional page of information*.

Again, new subtle enter at play here. Because *the new dimension of form that creates the static square, or in a more complex view a circle, might be transformed from a temporal motion, to become space.* I.e. when a mass which is an imploding accelerated vortex of gravitational motion (equivalence principle of Einstein's gravitation), uncoils into decelerating entropic motion, ($E=Mc^2$), it does so by a CC ratio, which is in 5D physics, as in $C^2=1/\mu e$, a region of vacuum space populated by magnetic and electric constants, which spreads and decelerates till mass becomes an extension of space. So here the imaginary term of the humind is 'Energy', and the real conversion is the inverse product that breaks mass into 2 Δ-1 dimensions of space. This is a general rule of all physical systems that 'transform' constantly static space into time motion. I.e. the same flux of water at higher speed and smaller section goes through a thin tube than a large tube with larger space section and slower speed, themselves consequence of 5D SxT metrics.

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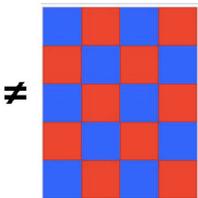
Further on, at this stage we find already a non-commutative property for multiplication. As there is a difference in orientation: 4 x 5 ≠ 5 x 4. Hence the non-existence of commutative properties in 'matrices', the closest ¬Algebraic representation in time-numbers of spatial point-areas.

Knowing those differences according to which dimensions we 'operate' can be a hint for experimental science as when Heisenberg developed quantum Matrices due to the non-commutability of its operators.

$T v. $ð: In topological terms, multiplication works for both, lineal products or cyclical point-like, clocks of time, but there are also some insight differences which belong to geometry among them *the* fact that only lineal forms are 'deterministic' and 'tile' the entire space, as opposed to cyclical points, which leave empty spaces that horror vacuum fills with smaller scales. Or in other words, a 'rectangular world' does not need scalar space, neither 'fractal non-Euclidean minds' to mirror it. It is as bored, deterministic and truth as the axiomatic method of Euclid.

3 × 2 = 6
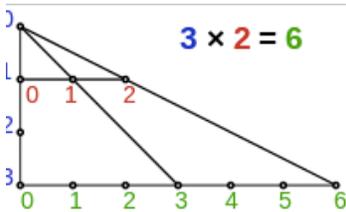
Multiplication can also be thought of as scaling. Here we see 2 being multiplied by 3 using scaling, giving 6 as

Δ+1<Δ-1. A little explored pentalogic form of multiplication is essential to the meaning of a 'number' as a social scale, whereas 3 is '3 times larger' than one, and 10 the commonest scale of the Universe a unit of a larger whole. In the graph we can see this concept as 1 becomes 3, a larger scale, 2 becomes 6. We'll return latter to its implications when we study the properties of multiplication, notably those related to 0' and the 'paradox of information'.

Scaling is thus the essential meaning of the product, when we do not multiply a parameter with a physical meaning but make a product of a 'pure scalar number'.

3rd Đimotion production=multiplication =reproduction. Dimensional products.

So we return in the cyclical universe to the main use of a product, entanglement and reproduction, *which is the more complex dimotion that requires a travel between planes as a seed or finitesimal part of a whole reproduces and entangles in the ¡-1 scale*. So as we said that when we multiply 5 x 5, if we consider 5 the number of Δ-1 elements of 2 groups, then 5 x 5 = 25 turns out to be the number of 'axons' connecting each of the 2 wholes at the level of its 5 Δ-1 elements. So 25 gives us *the number of axons= ST flows of communication between the 5 sub-elements of the 2*

wholes. And when S=T, 5=5, we obtain the perfect product or 'power' law: Product's vital role is to create a network on the lower scale of systems to create a new whole ST being, different from S or T, momentum that is neither speed nor magnitude, light that is not magnetism or electricity**.**

First as we have shown multiplication can add a dimension of lineal motion to a particle-vortex (quantum motion), yet as we have proved in other papers, locomotion is the reproduction of a form in a lower plane of spacetime (the entropic/energy field that moves) from stop-particle to wave-motion states. So the very *essence of motion as reproduction of information is encoded In the simple equation:* $\lambda(S) \times f(\eth)$.

So pentalogic on the main function of the product, which is also the fundamental Dimotion of the Universe, reproduction, connects T-Locomotion (2D) as reproduction of information along the path of a particle; Δ-scalar reproduction as the entanglement of mirror symmetries through reproduction of axons (3D), and the social sum of parts, that reproduces internal 'numerical' groups before adding them (4D reproduction).

Products of ST-holographic wholes.
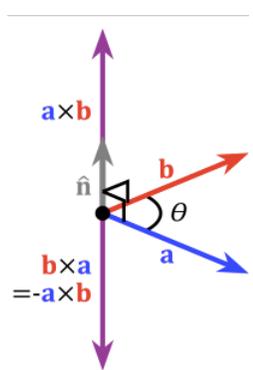
But the product becomes even more interesting, when it goes into the next scale of complexity, *reproducing not individual S and T elements of a dimotion but complete dimotions made of an S and T component, called vectors:*

Vectorial product merges whole space and time dimotions (a mass or charge, the active S-magnitude, with a field of motion, the T-element). In the graph, a product of 2 different ST dimotions, one 'b' dominant in red-long entropy and other 'a' dominant in blue, relative height, the code of information gives birth to a 3rd (that should be green in ¬E geometric coding of colors ☺, a relative reproductive width perpendicular to the other two.

A vectorial product is thus one of the commonest forms to combine St x Ts dimotions, acting in its limit of 90º orthogonality as a pure Reproduction of an S and T relative form.

Whereas the non-commutability of its product is related as in the square product in 2 Euclidean (ab. E) Dimensions to the orientation now in 3 E-Dimensions, *establishing a fundamental physical direction for the electromagnetic spacetime of our galaxy 'clockwise forward',* as it was found in the practical use of vectors by Heaviside to describe electromagnetism, whereas the electric informative field (for our electronic eyes), and the energetic magnetic field combine to create the reproductive c-speed wave of information of our last perceived Δ-3 scale.

The conclusion is obvious *only spatial sums and products of populations, have no dynamic orientation, as they are static points, but both time motions and scales which must be understood as the SLOWEST, absolute direction of time, where parts come before wholes DO. And since the product applies to space, time and scale, most products, which have a T-element are found to be non-commutative.* All T(S∧T) products are not: bxa=- axb. *Thus, only the product as a sum of 'still populations',* SS, which ultimately can be considered a sum NOT a product, is commutative. We come thus to the paradoxical conclusion that the product is NOT a sum of sums and is NOT commutative in its true form.

Matrix product. And more over its bidimensional orientation (Matrix calculus) and 3D orientation (Vector calculus) are closely related (as a rotation of a vector is a lineal transformation, calculated through matrices) – themes those of advanced 5D ¬Algebra we shall just introduce here:

We can think of a matrix as an orthogonal system of T-rows and S- columns, which represent the 'Δ-1' parts of its S-form and T-motion organs. Then the re-product-ive operand of two such ST(x,y) Matrices happens *through the merging of the Sx-components of a Matrix with the Ty Components of the other and the Tx components with the Sy Δ-1 components, which are then added to form a new 'offspring' combination of both Δ-1 parts.*

In ÐST point terms the product is not commutable because for *reproduction to occur between two different T.œs requires gender mirror complementarity, hence opposite orientation*.

PRODUCT'S PROPERTIES: ASSOCIATIVE, SCALAR, DISTRIBUTIVE, INVERTED & NEUTRAL ELEMENTS: 0' V. 1.

We understand better now the properties of operands in 5D terms. The two main ones have been discussed:

The product is not commutative.

Only the product as a sum of sums signified by a scalar number is commutative... Reproductive dimotions, using Matrices and vectors, which depart from its simple use as a sum of sums, are subject to the rules of orientation between S and T elements. Since we can also write for better understanding of those properties, the 5 Dimotions of existence in terms of dominance of the Space or Time Element, instead of using Caps, using the order from past to future that determines the dominance of one or the other element. So s<T locomotion is dominant in motion over form v. t>S information dominant in form over motion.

 In an interaction between a spatial form and an entropic motion one element will become the 'relative past' and the other the relative future, depending on which one prey in the other, on which one transforms into the other. And this makes a product non-commutative. While in symbiotic events of complementary reproduction, the orientation in space of each element also plays a fundamental role that will determine according to the angle of congruence if an event is creative or destructive or skew. Only when the outcome is a social sum in the form of a herd or group of groups it doesn't matter the order.

DUALITY ANALYSIS: MERGING THE PRODUCT AND THE SUM

Multiplication is associative: (axb)xc=ax(bxc).

As in the case of the sum, multiplication 'continues' the flow of time after a first event but again this property holds for products, which are sums of sums.

Multiplication is distributive over the sum: a x (b+c) = a x b + a x c = e

The concept of distribution over the sum is interpreted in 5D in terms of 2 inverse Dimensional operands acting upon a whole, considering (b+c), *a whole which is first divided in two parts, b and c; hence not so much distribution over a sum but partition and reproduction of both parts. Since in that case it reduces to a self-similarity:*

$$A \; x \; (D_{b+c}) = Ax \; b + A \; x \; c.$$

Where A is the dominant property applied to the whole D, by 'slicing' it,, D=b + c, into two separate parts enlarging them both by the same ratio.

So in the left side the product operates in the whole D, and in the right side, in its relative parts; which defines D *as a spatial population or herd or wave susceptible to be broken in undistinguishable parts.*

For all other more complex Ds, which cannot be subject to an undistinguishable partition, multiplication is not distributive over D. But as the rule 'already' has broken D a priori, the law appears as Universal.

Lineal vs. cyclical addition and multiplication.

The sum and the product as a sum of sums are lineal systems, as the equation, ax + b, which is a line with b as the origin and a as the tangent, shows. But such lineal *products must be seen as ∑, a summand of x elements, since the product is taken place with a constant number.*

It is a different case for the product of two variables or any other parameters, which are not 'constant sums'.

So linearity and superposition again happen in the sum but only the product as sum of sums (4D¡ product).

From the point of view of the 3 'elements' of a generator, T-potentials < ST-waves>S-particle/heads, potentials are herds, hence their sums *can be treated as constant products.*

Waves are both sums and re=productive systems (∑,∏). And so they are both lineal and curved, hyperbolic, |xO=ø

As sums waves superpose (lineal quantum waves, which *must be considered bidimensional, and dot products*). As products, they create new dimensions, as in light waves are: $c^2=k/\mu$; and cross products. Such products are non lineal, as they reproduce a sinusoidal wave. And often the key to classify waves as sum or products is their capacity to commute (sums) or not (products).

If we extend the concept of ¬Ælgebra to other generators and mirror languages, we find 3 categories in the Universal syntax of most languages coded as generators; where a category will be susceptiable to addition and lineal products but not the others. I.e. in verbal subject<verb(ST)>Object, the verb is a complex bidimotional non-lineal action, but the object and subjects are spatial forms susceptible to lineal sum and product in quantitative terms in the case of the 'it' = object, and qualitative terms through its plural forms in the case of the subject.

Products that do not commute happen when they combine different 'categories' (potential x wave x particle; subject x verb ≠ verb x subject and so on).

And so in the next scale of equations only polynomials that use sums and products 'over constant numbers' are lineal – the other operands that act on cyclical forms – sins/cosines or curves (integrals, derivatives) are not lineal, which means they are NOT deterministic and have often multiple solutions. ($n\pi$, differential solutions, etc.) – themes those treated in different sections of those papers when discussing potential futures, and deterministic ones, lineal steps and curved variations, since only the line has a single potential future, or else stops being a line, while a curve has 3 potential futures, depending on its change of curvature.

0' and ∝ in the product.

We refer to a previous analysis on pentalogic of 0', the Δ-finitesimal fractal • point, the T-minimal motion of addition, the S-past 'memories' of a extinct form, and the @-mind in relationship to the ∝ perceived Universe to understand 0'.

0' in multiplication brings new paradoxes, because 0'= **0' x a < 0'+ a.**

That is, an operand of a higher Dimotional rank multiplied by a 'fractal • 0 point' is less than adding it.

Since the product of a form by an infinitesimal causes a reduction of dimensionality, and so it *return less than the operand of addition.* The reason is that a+0' must be interpreted as a non-operation, 'nothing is added' to the herd. So it is a trivial non-existent event, only present in the inflationary nature of the language.

But since 0' is a finitesimal which is by definition the 'Δ-1' seed of a re=production, 0' x a IS a real operation, which makes a interact with 0'; that is 'produce' a seminal seed at Δ-1 which is undistinguishable. But as time goes through, 0' might grow to become a, so the limit of 0' when t-> ∝ becomes a.

For the same reason 0' x ∝ = 1 = C means that the limited infinite number of reproductions of 0' will conclude a palingenetic cycle giving birth to the whole. Thus after the parental form sinks itself into the Δ-1 scale, palingenesis brings the 'emergence' of the whole, 1, the full T.œ.

In that regard, what the neutral element means is an element not susceptible of being operated by the operand – its blind spot; which is zeroth, no addition to the herd for the sum, and 1, a 'masturbatory' (: act of self-production… without input of energy or code for the product, which reveals more about the nature of the operand.

Multiplying ±. From outer operands to inner property in a higher dimension.

Which lead us to the question of 'why' -a x - b = ab; -a x b = - ab = a x -b.

The main 'abstract' mathematical reason is to maintain the consistency of calculus with polynomials and equations that mix both operands. But we are not here concerned with the ideal simplification of mathematics, but with the hidden paradoxes, which will be required for resolving mathematical paradoxes in physics for lack of understanding of the mathematical ones. Let us then apply pentalogic to the – product.

Space. We limit such operations to the 'domains' in which they are meaningful, which excludes as we already explained the product of 'natural spatial population' which are not negative, reducing therefore to the other trilogic elements with a T component, 'negative time sT-locomotions' and 'inverted scalar TT-entropic directions':

@-mind logic. As it only applies to time directions, another way to resolve particular cases is to slide the minus in $-b$ (if b is a class as spatial beings that cannot be negative into $-a$, the time parameter, so we write $(--a) \times b$.

On a general basis *this means the negative sign* is a logic *symbol, as when we say, I don't think I won't go = I will go; which for time processes which have both directions is possible, as a back and forth vibration,. And so we get $-a \times -b = a \times b$.* We can also apply this concept to an spatial form in terms of 'orientation', which is the only case in which the negative 'concept applies'; that is, a mirror symmetry. And so the 'inverse of an inversion' of a mirror symmetry becomes in i-logic the same mirror being, which justifies *the negative product in complementary gender symmetries.*

Scalar entropic motions: Negative products. This case uses the concept of ilogic in terms of a TT entropic process of two negative flows of time, which is the essential definition of entropy, death, diminution, inversion of growth (4D vs. 5D): Let us put an example; imagine you are having a debt of 1200 $ and you remove (negative) every month - 100 $, so for -12 months, the negative debt will be shrunk but a year past, $-12 \times -100 = 1200$ $, *the debt will be paid to zeroth and you will not be so silly as to keep paying in the positive territory.*

In the positive side this limit is never reached as the $-\infty$, 0 interval is now the 0, ∞ interval; but in effect, as ∞ is relative there will be also a limit for a positive product. This negative product though is a 'time-space', ST product, which are the only one that make sense, to give us a positive (- change x - population, 12 months x 100 $).

What inversion then means in different contexts as a mirror symmetry, or any other kind of symmetry IS THE REAL proper interpretation we must do. As what we are really multiplying are inversions of inversions. And sometimes it will make sense and some not.

Multiplication of numbers 0–10. Line labels = multiplicand. X axis = multiplier. Y axis = product.
Extension of this pattern into other quadrants gives the reason why a negative number times a negative number yields a positive number. Note also how multiplication by zero causes a reduction in dimensionality, as does multiplication by a singular matrix where the determinant is 0. In this process, information is lost and cannot be regained.

What about the other 2 commutative products $(-a) \times b = (-b) \times a = -(a \times b)$?

We postulate with the same reasoning that b will be an spatial S-parameter and $-a$ an temporal change of direction in the dimotion that affects b. So S(-T) will become $-ST$. While the inflationary language that does not identify numbers by the 'properties' they describe allows to write those 3 similar equations, of which only one solution will be real, and the other 2 inflationary, an important finding of 5D realist mathematics, when we find the ternary solutions of cubic equations, where often we discharge two of them. So the negative product is an ST product.

Finally we can apply those concepts to the perfect product; that is, the negative x negative product of the type $(-y \times -y) = (-y)^2$ and *its roots and imaginary numbers.*

Which means in many cases we can get discharge the negative root of an X^2 solution as scientists used to do; but not always. As a square negative can be a TT, double entropic motion. Consider the case of a mass, an informative, SS, implosive accelerated vortex of gravitational forces (Einstein's principle of equivalence). When it dies entropically it releases a quantity of entropic energy equal to its product by c^2: $E=mc^2$. In reality this C^2 is the inverse arrow of the imploding mass, an exploding, expanding entropic TT explosion of radiation, ultimately a $-c \times -c$ factor, which is hidden in the result as it gives also c^2, *but appears as negative in relativity in the factor $-(ct)^2$ now explained algebraically.*

So the - symbol is the symbol of INVERSION, which can be as in the case of c^2 an inner property of the being, 'internalised' by the system, hidden when a larger

whole encloses in its membrain (as a mass) but released as inverse TT entropy, when the mass envelope breaks. And vice versa, the negative entropic motion can be enclosed as the ∑ Δ-1 points when we move from Δ-1 to Δº.

Thus if ± are external trans-formative operands that relate 'social numbers' in the ± simpler operands of social groups; in a product they are INTERNAL properties that define the type of ST dimotion we merge; often related to an scalar entropic transformation; reason why one of the elementary proofs of negative x negative products is the scalar proof of extending the product as a scalar growth to the inverse -, - quadrant as shown in the graph.

But since there are many types of products for different S(œ)T species of mathematical objects, in certain cases ± multiplications will make no sense, in others will cover up inner properties, and we have to do in its practical applications to different sciences a careful examination to fully understand the meaning of those minus symbols, as we have already noticed in the our introduction to the Rashomon Pentalogic effects of complex numbers.

Because reproduction is the game, the product is the commonest of all operands, and through it generation of most other forms happen. I.e. we saw the fundamental law of prime numbers is to generate all others, which can be reduced to the produt of 4 Primes, which becomes its 'tetralogic dimensions': N=p1xp2xp3xp4

RECAP. The product's main function is reproduction. But pentalogic expands its use to all other dimotions. The product is only a sum of sums, when commutative. But in its reproductive functions is mot commutative in 2 D (non-commutative Matrix) or 3D vectorial calculus, closely related by lineal transformations, which are Δ-scalar products. *Since orientation in space* and angle of congruence are 'vital elements' of 5D reproduction. So for the complex product of 'ST' Dimotions, we *define* non-commutable *Matrix products that* can give origin to different particles (quantum physics' Dirac and Heisenberg's formalism).

A theme which is not settled by any means, and has created much confusion is the product of two negatives, - x - = +; as it has to deal with the concepts of 0', negativity and relative infinity; whereas 0' represents either an infinitesimal or an asymptotic 'barrier' that cannot be crossed as it is the limit of the domain, representing an stop/informative time dimotion, as in Pv=nkT between two sides of a time-space dimotion; hence a negative product of a negative has a limit when it removes all the negativity out.

Thus as usual mathematical laws illustrate the philosophical aspects of ĐST elements, its ST symmetries, Dimotions, scalar transformations and mirror reflections, and vice versa, the pentalogic, dual and ternary relationships of those ΔST elements of reality exact the full meaning of each ¬Algebraic operand.

ITS INVERSE OPERATION: ÷ DIVISION.

Duality on Division.

The first and simple view on Division is a duality between its positive informative action, when division is self-division; hence reproduction, in conjunction with the product, vs. entropic division, when division is caused by external tearing and predation feeding:

ST-reproduction: The Pentalogic method applied to entropic Đimotions represented by divisions and the inverse reproductive Đimotions represented by products brings new insights to an inversion, *which in nature is symbiotic in most processes of reproduction to obtain a new whole such as $X \to X^2 \to \partial X^2 \to 2x/2 = x+x$* forms in algebraic terms the series of operands that reproduce a system by doubling its elements, deriving its change and splitting them.

In a simpler stœp sequence of dimotions, without derivative/integral operands, we write: $x \to 2x \to 2x/2 \to x+x$.

TT-entropy: Division has obvious negative entropic consequences such as the sharing of food, the breaking of a whole into its parts and so it clearly plays the inverse Δ-1 4D-entropic dimension of a system.

The negative, predatory action of bisecting a whole into parts, often digested as the whole 'breaks=dies' (pie sharing). Here the nominator is a meaningful entity, but the denominator is only a 'bisecting number' or herd that will not 'create' a third entity, just destroy the nominator.

Division can be expressed as the negative exponential, which is also a 1/inverse division, is the natural *operation of the arrow of entropy, as it means to 'divide a whole' in parts for a predator 'group' to feed on them. As when we divide a pie to eat it.*

-The positive, collaboration of two entities perceives as S and/or T Dimensions, which create a 'stable' new entity defined by the ratio, which should not be 'operated=dissected'.

And this is quite obvious when we deal with real solutions to problems using polynomials.

- A single rational Q-number might represent an ∞ number of divisions. Thus, 4 is also 8/2, 12/3, 16/4…. But not an infinite number of products. Only 4 x1 and 2x2. *As entropic time is the 'background' of reality with far more events than the hard-built arrows of positive social evolution of information.*

- *It is the inverse of a product as a social communication between ¡+1 elements that give us its total 'axons', or lines of communication of the 2 wholes (4 x 4 = 16 axons connecting all the 4 elements with the other 4).*

Properties of Division

The division has not the same properties than the product as no inverse function does; essentially because as always in reality the positive side of it has a far stronger appeal to Nature, and so it does often follow associative properties that continue the flow of times; which is what the associative property does. While entropic inverse functions are short lived duality affairs that divide and destroy the elements involved. Indeed life is a continuous flow of times from birth to extinction. But entropic death takes a single time quanta from on to off.

So as $(a-b)-c \neq a-(b-c) \to (5-3)-2 = 0 \neq 5-(3-2)=5-1=4$; $(a/b)/c \neq a/(b/c): (12/4)/3=1 \neq 12/(4/3)=12/1.33=9'$

So its difference with the product is its non-associability, *as division ends the chain of events in an entropic destruction of information, hence it cannot carry beyond duality in many cases*

Which set is larger, the product of Natural numbers or its division? If we consider only solutions within the set of N, obviously is the product. But It seems even if we accept solutions in R, the product is larger, as many divisions are equal: 6/3=8/4=10/5; which reaffirms the *dominance of social positive form over destructive negative ones.*

TRILOGIC ON DIVISION. DEFINING THE 3 VITAL CONSTANTS OF THE BEING AND ITS RATIOS.

Division can also act on functions normally expressed by the product, using a law fundamental to 5D metrics – the law of inversion of scales, which makes an Δ-1 scale inverse in properties to the Δº larger state. Let us see the simplest, already examined example of locomotion, and extend the case to the definition of the 3 fundamental ST vital constants of the Universe.

sT-Locomotion. As a ratio its meaning is more complex; since often *specially in mathematical physics where the units chosen by humans are misleading (i.e. time duration is an abstraction 1/t= frequency is the unit of cyclical time, so an s/t is better expressed as S x T (wavelength x frequency), and so on.*

But, it is better to treat whenever possible equations as products instead of ratios, to extract easily the 3 fundamental vital constants of the Universe.

St-Information. Inversely Division creates information by breaking the continuum of a whole into its parts, this time in combination with the sum, such as $10/10=1 ->\sum_{i=10}= 1+1+1+1…$

The combination of division ratios & its sum - as 2 inverse arrows of 4D and 5D actions (breaking & social evolution), thus extract the inner information of the system, or sum of a group of social identical beings breaking down its 'number'.

But between planes it counts the 'maximal number of connections' established between the Δ-1 elements of 2 groups giving us the maximal *axons= ST flows of communication of 2 wholes that reach through X its maximal communication. So its role is* to create a network on the lower scale of systems - in brains, neural networks or reproductive systems, *reason why so often a reproductive action that creates a third element as in vectorial products is symbolised by a reproduction*.

Δ±j: 1D-4D: Scalar Social evolution. It is then from the complex entanglement in parallel space of the combination of St-formal division of a length into ratios, and its Ts-locomotion into a vital time motion, and SS, simultaneous perception of those scalar ratios - the first expression of a finitesimal - from where the first synthetic worldcycles and its mirror language – music arose.

Thus Music and its ratios were famously studied by Greek mathematicians: Pythagoras found certain ideal ratios, in which *division doesn't break entropically the whole but creates the S-informative discontinuities needed to 'perceive information' while the whole remains as a continuum, by the existence of a T-motion on an ST-body - the motion of the string we plug to get a sound by making it vibrate with a certain number=frequency of nods.*

Harmonic Divisions of a String

1:2 (octave)
2:3 (fifth)
3:4 (fourth)
5:6 (minor third)
4:5 (major third)
5:8 (minor sixth)
4:5 (major sixth)
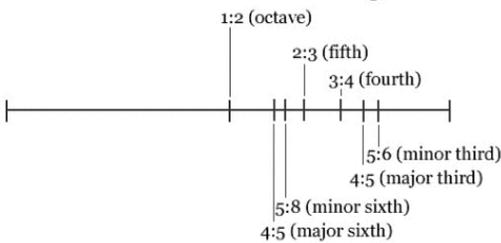
These are the mathematical ratios for creating the intervals that Kepler finds by experiment are both consonant with respect to the whole string and with each other.

Hence a full S-ratios<ST-ring>T-motion 'fractal generator of trilogic is formed, ensuring a constant S⇔T feed-back equation that allows a musical event to take place with unlimited variations in space and repetitions in time:

In the graph, the string is plugged but not broken in certain ratios, which are therefore expressions of $\sum\Delta=\Delta+1$ - a constructive Δ-1 division.

We will study in music theory, on the paper of humind languages why they are those ratios. Notice that as usual they are simple penta-(do)decalogic variations, which suffice to describe most events of the Universe.

This argument leads us to understand the difference between mental loss of information in a rational number, and its preservation in real ration events.

Loss of information in mental space.

As the product has rising the complexity of operands, including new scalar ones, so does the inverse operation of division, *which brings as the negative symbol did to Natural numbers, a new family of numbers; the rational*

numbers, which incorporates as Z did, the operand within them. But unlike Z, complexity has risen a 'dimension' as a rational number is actually an operand on 2 numbers; and further on, it brings the first of many similar processes of convergence or divergence from present to future. That is, a relative infinite, $\propto$ number of present divisions, 4//2, 6/3, 8/4 etc. end up in the same future solution: 2, which implies the 2nd time we observe the phenomena of loss of information (as we saw already in the product of N x 0').

The solution in the previous case, N x 0', is to consider that the outcome is Nx0' finitesimals, so information leaves a trace in the Δ-1 plane as it is not absolute. In this case the solution is to distinguish the loss of information that happen in any synoptic language – the solution, 2… From the fact that in the real event information is preserved. I.e. if 4 lions kill a 200 kilos zebra, each one will get 50 kilos, but we will see 4 lions eating zebra; if 8 lions kill a 400 kilos buffalo, each one gets 50 kilos; and so the mental solution is the same as it has 'erased' the value of the number of lions (denominator) but if we see the vent we will see the 8 lions.

The same process is observed in the product, which however retains for the product as a sum of sums, the same information, since the final herd is indistinguishable in its units, but not for products that combine S and T elements (i.e. if we move in long steps with a slow frequency, as a big slow animal we might be tracing the same distance product that a small animal with big steps, but we loose information about the type of species moving).

In both cases we observe that the loss of information happen *in processes where the product or division enter the realm of 5D. As we just described a case of 5D metrics: larger animals have slower metabolism and time rhythms than smaller animals, but the product is the same, SxT=C*

In both cases though the loss of information is mental and can be solved by leaving the number not as a single digit operational number, which looses its information but as an equation, either an SxT or an S/T ratio kept when it is left as a fractional numbers without operating it.

RECAP. A ratio of information maintains *the whole without loosing information when the division solution co-exist as a whole ratio number, expressed in the numerator, sum of the parts, expressed in the denominator.*

Law of inversion in Δstœps.

The duality of division and product, as we observed studying locomotion, based in the fact that ΔTS, scales, dimotions and vital topologies have their inverse function, allows to create balanced C=1 solutions to equations, using inverse operands, including product vs. division on inverse scales, topologies or dimotions.

The combination of some of those inversions is one of the key elements of ¬Ælgebra able to explain the why of many similar equations of science.

I.e. lineal time is the inverse of cyclical time frequency, $f(ð) = 1/T$ so we can calculate in long lineal time v=S/T the distance in long lineal space with division, or we can do the same with product in short time steps: wavelength x frequency on the lower ¡-1 scale.

Such similarity is a fundamental law of 'scalar planes', which change function and form as we move upwards or downwards in planes; i.e. atoms of iron form rings, but in the macro-scale become lineal sword-like forms. Proteins are lineal but in the cell, become warped and circular elements of the cell membrane. It is a case of the much broader 'Galilean paradoxes' between small lineal steps and larger cyclical forms; small discontinuous herds and continuous undistinguishable forms from a larger point of view. And a general rule that allow distinction of information and applies also to $T>ð§ lineal limbs/fields vs. cyclical particle/heads ensemble by intermediate body/waves (Spatial inversions) and young Ts, lineal youth of max. locomotion vs. old, §ð-age of maximal information.

Any Stœp in time, age or spatial topology thus keeps inverting through a transitional region as we move from one scale, topology or age, into another, ultimately developing 3 relative past->present->future <<past entropy>present>future cyclical patterns.

From this facts, we can consider only with multiplication and division some of the basic Universal constants that define the space and time parameters of T.œs, of which 3 are3 paramount:

s/T: Speed of Locomotion vs. t/S: density of information which are inverse so: T/S =ST/TS= 1.

And SxT=Existential Momentum of the being, delivered in 'frequency actions' of existential force.

Thus we start to see the close connection between ¬Algebra

¬Algebra reflects the ST inverse D symmetries, as they ARE the inverse key elements for its operations, given the social nature of the number and the polynomial/integral nature of its social evolution into variables as opposed to the inverse operations of logarithms and derivatives.

Consider the simplest, first historic example (as principles become easier to see in its beginnings).

An example of geometric ¬Algebra would be solving the linear equation ax = bc.

The ancient Greeks would solve this equation by looking at it as an equality of areas rather than as an equality between the ratios a:b and c:x. The Greeks would construct a rectangle with sides of length b and c, then extend a side of the rectangle to length a, and finally they would complete the extended rectangle so as to find the side of the rectangle that is the solution.

The solution seems the same, but *it is not. The ratio is a division; the square is a multiplication, and both are inverse functions, which gives us the identity element.*

Yet the meaning of its general case is deeper, as it allows to identify the constants of the being:

Indeed as a ratio of ST dimensions multiplication defines the 3 fundamental vital constants of any being.

Its speed of reproduction of information, S/T, its density of information, T/S and its existential force, S x T (spatial simultaneous view) ≈ T x S or existential momentum (active view), which all together defines the identity 'element', the being in 'iTSelf'.

Let us put an example with the most important Universal constants, those of the Galatom, based in its S(h) constant, the Planckton and its T© constant, the speed of light, and those of the human being, with its time constant, the second and its space constant the meter, to *understand how Classic algebra and existential algebra respond to the same program of reality – the maximal search for reproduction of information and energy, merged in S=T points of balance that define the construction of superorganisms.*

THE CONSTANTS OF THE GALATOM

Base Plank units			V·T·E
Name	**Dimension**	**Expression**	**Value[6] (SI units)**
Planck length	Length (L)	$l_\mathrm{P} = \sqrt{\dfrac{\hbar G}{c^3}}$	$1.616\,199(97) \times 10^{-35}$ m[10]
Planck time	Time (T)	$t_\mathrm{P} = \dfrac{l_\mathrm{P}}{c} = \dfrac{\hbar}{m_\mathrm{P}c^2} = \sqrt{\dfrac{\hbar G}{c^5}}$	$5.391\,06(32) \times 10^{-44}$ s[12]

5D Galatom Supœrganism's metric: $(c) Δ+1 x ð (h) Δ-1
Which refers to the two Universal constants of light in the upper cosmological and lower quantum scale. We shall consider then the easier case of the 3 'universal constants of light'.

The balances achieved by the similarity of space=form and time=motion reached in the present body, S=T, and the unbalance of the metric equation of scales, $ x ð = K, in the limbs (Max. $T) and minds (Maxˆ§ð) unify as S=T maximizes SxT=K (5x5>6x4), in 1 equation: **Max. S x T = C**, which defines for each fractal vital space-time organism

its Function of existence, as all species will try to maximize its motion-entropy-time for its field-limbs, its information-spatial states for its particle-heads, whose product will give us its vital reproductive energy.

Moreover the equation has an immediate biologic meaning, because as we are made topologically of 'fields-limbs' of lineal space with motion provided by the energy we absorb to also reproduce our bodies-waves, and the information we need to linguistically guide our motions with particle-heads, the very essence of survival is to increase our S=position, mental forms of space and T=entropic motions of time (whereas time=motion and space=form are the two limiting Dimotions with 'energy=reproduction, s=t, locomotion, sT and information, St, are the intermediate 3 dimotions).

Thus the Universal constants of reality respond to 3 5D Metric constants: S/T= Speed of Locomotion, which defines the limbs/fields of the system, SxT=Existential Momentum/force, which defines its body and T/S: Density of information, which defines its mental power, all maximized when S=T.

What does it mean then h=c. Obviously NOT that a bit of angular momentum equals a minimal distance of light, but that both can be converted into each other S⇔T easily through the intermediate concept of an energy-body for the system. Which physicists express with the equation of light entropy, transformed into energy absorbed by an electron: E=Hf.

Thus light, the space-time vacuum; or entropic TT-motion of our galactic spacetime from where all forms will evolve, becomes converted into its simples 'particle form', h-planck, in a quantity, ƒ, of time cycles that define the existential momentum/force of the photon species.

H becomes then the first constant of scale, such as H = E x T. And because zeroth does not exist, there will be always a residual 0'=H-planckton occupying that vacuum space.

Can we relate the 'human' constants of perception (length, mass and time) to the galatom's 'real objective, natural constants'? Yes, and we do so with Planck's Natural units, which must be expressed in a holographic Universe of combined bidimensional spacetime dimotions, as squares, hence getting rid off the cumbersome roots:

L^2 (static area) x C^3 (motion volume) = hG -> L^2 x C^3 = hG
$1/t^2$ =angular acceleration = α = c^5/hG -> c^5 = α hG -> C^5/α = hG

The first two equations are strikingly similar as they refer to space and cyclical time. And if we put them together and simplify we obtain, L^2 x α = C^2, which defines *the true unit of time, angular acceleration, the constant growth of form, of information of all systems of the galatom; and defines the equivalence between the still space and light space, as we convert a static area of distance through the accelerated passing of time into a sinusoidal wave of time.*

C^2 becomes then more precisely the existential momentum or 'speed of reproduction' of information of light: ST.

On the other hand, G is NOT a constant of this plane of spacetime as it relates to a quintic 5th dimotional quantity. And indeed, we shall see in our analysis of physics that G and mass belong to the ¡±4 plane of existence of the nested Universe within which galatoms are enclosed.

While density of information can be obtained from its equation of speed C^2= 1/μ e, which in proper notation, should be written in terms of k as c^2 = k/μ (we get rid of the π factor).
And its its entropic motion from E=mc^2 -> c^2 = E/M.

We shall leave it here, as the study of algebraic physics is the last paper to be done on 5D by the end of this year, to show how all the fundamental equations of physics can be derived of the simple relationships of existential

algebra between the different ST-holographic trans-form-ations and reproductions of the 5Dimotions of space-time.

POWERS & ROOTS: THE PERFECT PRODUCT. 3-4D-5D SOCIAL EVOLUTION & DECAY

Pentalogic of power laws.

We talked of the perfect product as the square form, which gives us one of the most efficient spacetime elements of reality as it achieves an S=T element.

If you have gotten so far you will realize reality has $\propto$ shades of grey, which means from SS (ab.§) and TT (ab.∏), we can get all kind of sT (energy) and St (information) shades till reaching ST, the perfect iterative present form which the Universe seeks to reach its 2 equal goals: reproduction of form and hence eternity of present, the 'feminine' state of reality. Because there is always a 0' finitesimal the perfect square does not exist, and this we proved by the reversal function, $\sqrt{2}$, $\sqrt{3}$ etc tend to be irrational – a finitesimal is left. Still an X^2 beyond those important but subtle finitesimal differences merges in S≈T two relative genders into a re=productive couple according to S=T 5D metrics, giving a vital meaning to the commonest power of the Universe, X^2 and its equivalent in geometry, the orthogonal Pythagorean rule, essential for 'measuring' merged systems in a lower plane, and expanded in the negative to Fermat's grand theorem,: $X^3+Y^3 \neq Z^3$.

Orthogonality implies that indeed X^2 is an S-height (information, female dimension) x T-length (motion, male dimension) of what we might call 'simplex gender' (we shall in trinity find that gender evolves in the growth of complexity from ST in monologic to dual S-female v T-male, to S=T: present reproduction or female state and S<T>S, past to future to past d=evolution or male state in trilogic).

All this I know is confusing *because as long as huminds do NOT capture the essential truth of mind-mirrors of reality – they come in 5 flavors of growing complexity and integration and all are valid. The predator has a single purpose to kill and feed and still survives. There is I am pretty sure beyond pentalogic higher entanglements to reach what I deem the immortal brain of pure i-logic or dodecaplex.*

But it should suffice to us, simple nitrolife species, whose orthogonal product doesn't go beyond the heptalogic electronic mind of our amino clocks to study polynomials up to the pentalogic limit, no longer solved by radicals (:

This said for future AI species of unlimited entangled parallel chipped thought, because minds are of many flavors, we can compare constantly logic operands on set and Boolean chip algebra (largely escaped for ethical reasons as I was gifted just with 1.45 kilos of dirty water on my brain but likely to preserve that for generations to come), mathematical operands and ÐST disomorphic laws from where all come.

So back to the basics the monologic reproductive 'mushroom' simple lineal thought in either its sterile, ∨, or reproductive summands without limit, ∧, +, is a boring proposition. The beauty of the Universe is that it searches as the best of all worlds for immortality but also diversity, for reproduction but also for constant S<T>S d=evolution, for present but also for past to future swingers, and those do pass through the beauty of S=T present for the fleeting moment ad maximal speed of its SHM variations.

And the true beauty of a mind is to see constantly those analogies, and its quantifiers, those 10^9 beats of the heart of a mammal, equal to the beats of the heart of an engine.

Why then Fermat's theorem does NOT exist? Simply speaking because the ternary element is ST, which merges but not quite without keeping the smaller little differences, St:Ts, and yet it seems to us still a 2 power – the diagonal that participates of all the other St, Ts elements of its generator dimotions.

So as we ended this teaser introduction to the power of duality and trinity, with a metaphysical question our explorations of the production, we start our analysis of power laws, with a question regarding Fermat's theorem, easy for mathematicians: Does $X^3+Y^3=Z^2$ exist?

And depending on the answer, what does it 'reflect' as a mirror of the ÐST laws of the Universe?

Power laws are thus about reproduction and the St and Ts merging into ST. So what about the two limits of SS, minds and sees of still form and TT-entropy motions of internal and external expansion into vacuum space, which when merging abbreviate as §∏ - *the two border limits of the being and its world? How they are operated in the pentalogic of power laws?*

The answer is the 'other form' of power laws, exponentials where the variable is not on the 'basis' but on the exponential parameter, which means a far extremal growth, which *is* the essence of the accelerated time-quanta that collapses the wave into the particle, the light of the Universe into the still image of the world, or vice versa explodes the organism into internal death and external scattering for all to absorb its $\Delta^º«\Delta$-2 remains of the day. No longer then the being is and so exponential beats are fast, from the single quanta of death, to the fast explosion of a little bang in cosmology (as opposite to the hyperbolic universal big bang of egocy physicists, we shall reduce them to what experience finds – the galatom and its cosmic beta decays).

So the pentalogic of absolute growth and absolute decay, of infinite collapse into sentient worlds and complete erasing of information is achieved with exponentials, for which we must therefore establish a limit of domain, a limit of scales of decadence, often in the decametric scale.

In *real science, in* all questions connected with discrete objects, we need to use whole numbers for the necessary mathematical apparatus, as well as the study of the continuous. Thus, for example, in mathematical analysis, when one considers the expansion of an analytic function in a power series with integral powers, computations are essentially carried out with whole numbers and approximated ratios such as $22/7 = \pi i$, which is Ok as we saw in Number theory that decimal numbers break its meaning beyond the 10th decimal scaling... (i.e. e=2.718281828...45).

All fractions represent ratios/quotients of 2 whole numbers; as such a full new branch of 'number theory' will be the study of those quotients as *ratios between steps of time motions and or whole polygonal numbers.*

In dealing with any real number in practical work (for example, π), we replace it in fact by a rational fraction (for example, we assume that $\pi = 22/7$, or that $\pi = 3.14$).

Thus the rules for operating on numbers is the concern of ¬arithmetic but also of ¬algebra, as the deeper properties of sequences of numbers, extend to include zeroth and the negative integers, which again are 'rounded' as zeroths even if we know they are always 'reminders' of 0' finitesimals left behind.

The efficient Universe.

Power laws, its inverse function, roots, and exponentials and its inverse negative exponential functions, form together a 'family of operands' which keep increasing the complexity of our analysis, and the inflationary number of 'entropic solutions' – that is solutions that are not stable, efficient and do not happen beyond virtual minds of mathematical thought. What this means in praxis is that when we increase the results and combinations of a syntactic language, its real semantics are reduced. I.e. there are ∞ entropic combinations of the 27 letters of the alphabet, but nobody in his 'right mind' would dedicate his life as some mathematicians and physicists do to explore the meanings of r3erewrh, adgaghe and any fast-writing keyboard combination with NO relationship to reality, if the rules of syntax and the constrains of experimental semantics are understood, the difference between potential and actual infinity (Aristotle) are grasped. All this the imaginary idealist German school of Cantor and Hilbert got away with it. So now mathematical physics is hard at studying the 10^{500} landscapes of string theory (: While some computer programmers are hard at finding the trillionth π decimal without understanding truly what π and the sphere is.

I like specially the work of Greene on ahgrwgtarhst strings and that of Cray on the 3758664567 series of π, LOL.

The same happens for exponentials. We can calculate 73^x exponentials, but as it turns out the immensity of exponentials with practical uses reduce to the 'basic 5D numbers and 5D universal constants' of Dimotions in

nature as they are the only meaningful social scales, $0' \propto; \propto^{0'}, i^x, \varphi^x, 2^x, e^{x,} 3^x, \pi^x, 5^x...$ and its combinations such as 4^x, $6^x, 9^x$ & $10^x...$ because they do represent the key dimotions of Nature and its 'perfect products'.

Inflationary mathematics or any language inflationary combinations, bring about 5Dimotion paradoxes, in terms of potential futures vs. single pasts, a theme misunderstood in modern science, since the dogma of 4D locomotions (Einstein's time theory) became the only theme to discuss about time. The future is pure time entropy, which becomes actual present whenever the minimal S=T (balance and definition of present in 5D metrics) is met. All other unbalanced, Max. S x Min. T (3rd age limit) or inflationary entropic Max. T x Min. S (entropic accidental death limit), which are not within the 'domain' of a given worldcycle are synonymous of death – virtual existence. Since indeed the equations of death by accident Max. T x Min. S-> S=0'+T=$\propto$; and Max. S x Min. T (warping, wrinkling 3rd age), reversed also into S->0, T->$\propto$, do NOT exist.

Negative numbers as Time numbers. Lorentz transformations. Roots in space and imaginary numbers.

An important fact, we find in inverted operations, is that its 'number of solutions' and real forms its numbers and attached operands describe IS *smaller* than the number of solutions to the positive operand, which clearly points out once more to the 'positive' arrow of life and information in the Universe, outgaining the negative arrow, unlike in humind's delirious entropy-only theories of reality. So while there are squares for all natural numbers, there are not roots for all numbers but only positive ones; neither there are derivatives for negative squares including the root of 0 ,$\partial\sqrt{0}$... Even negative numbers are not defined in the sum of spatial populations – there is not a spatial negative apple, but only a negative time number. Which is a key concept for mathematical physics, as we must often *consider the negative number an operand, for functions where the number defines a time motion, hence an inverse direction, which can therefore be taken out of the root to calculate the root of the 'scalar' number and then apply the inverse direction.*

What negative solutions mean to those equations? Euler's vision of negative numbers as inverse time numbers is its proper meaning. *So they do exist, which has clear consequences in areas such as relativity where negative mass, means only an entropic process of expansion of mass into entropy.*

Here also is important to understand dynamically the operand = as an ≤=≥ transformation.

I.e: E=Mc ^{2} does not mean energy (really entropy in this case), is mass, as mass is in the other 'inverse side' of the equation. So the real equality happens when m moves to the same side of E: e $\Leftrightarrow$ -mc².

Further on as we have defined a mass as an accelerated vortex of time, it is a time process; hence the – can be taken out, once it is clear it defines an uncoiling accelerated inverse mass expansion, exactly the definition of dark entropy/energy of vacuum space, which is ejected at faster than c-speed according to those equations on the axis of black holes with less information than c, hence invisible and perceived as expanding space:

1. Momentum and speed

(1) Relativistic momentum follows

Lorentz transformation

$$\bar{p} = \frac{m_0 \bar{v}}{\sqrt{1-\beta^2}} = \gamma m_0 \bar{v} = m\bar{v}$$

when $\bar{v} << c$ $\quad \bar{p} = m\bar{v} \to m_0 \bar{v}$

(2) Relativistic mass

$$m = \frac{m_0}{\sqrt{1-\beta^2}}$$

Rest mass : m_0

So negative numbers are mostly time functions, as a negative spatial population of 'apples' makes no sense.

Which defines negative mass as an expansive entropic destruction of mass. And so in relativity the 2 solutions, which can be put as an example of the 2 roots of quadratic equations (one discharged in processes that are social and accumulative).

In graph, faster-than-light travel and negative mass are the same (ß=v^2/c^2). We define negative mass as an expansive entropic destruction of mass. How to interpret that equation on our analysis of 'Existential ¬Ælgebra' regarding the meaning of roots is then evident: closer to c-speed, the barrier between the light space-time and the intergalactic space-time made of 'something else' (likely a background of faster than light neutrinos, as 5D is experimental and so particles not detected are not in the books of any theory till they are – so dark matter is quark matter, dark

entropy, neutrinos, and IF a new exotic particle is found beyond fancy mathematical writing we shall revise the known-known economicity laws of physics). Alas, because mass is an accelerated vortex of gravitational forces, as mass increases, the vortex accelerates inwards, as all vortices do, (Ro x Vo = C, for the simplest bidimensional one), which means its 'radius' diminishes in the direction of lineal locomotion, and so as mass increases the x-component decreases (Lorentz contraction), till the inner-outer S=T unbalance between the T-length-motion component and S-height component of the particle-wave 'explodes'=breaks the system which cannot longer perform its Stœp, stop-particle, step-motion 'beat'; thus the particle state no longer happens and the particle becomes a mere flow of radiation and dark entropy. Simple, realistic, correct way to explain the apparent inverse duality of mass and length… At which point lineal time-duration, T=0; that is, as all equations of death, T=0, Max. S; the particle becomes transformed into something else – an entropic expansion of space. In terms of 'time duration', as we observe particles to live longer closer to c-speed; since 5D metrics considers one of its sub-functions, ð=k for entire families of species (sorry not immortality here, the beats of the heart of a mouse, a man and an elephant are the same); it must be then obvious that *those beats of particles last longer; that is, for an external observer take longer to trace, but for the internal particle clock which perceives psychological time in terms of its 'closed beats', each beat a 'thought' so to speak, there is no difference.*

An easy way out is to consider there is a fundamental parameter of physics, similar to c^2, which is m^2 and as such the equation can be written $M^2 (1-v /c^2)=m^2$, and so it merely means that negative mass decreases beyond light speed to reach a balance and the c speed acts as the barrier of an asymptotic change between Planes of the fifth dimension, similar to that which we find as the resistance of 'death', the 'entropic limit' of any other 2 Planes.

>c then involves TT entropy, which in the previous equations moves E to the mc^2 side, increasing its density.

Almost every faster than light travel requires negative energies to be implemented at very large densities. And so there is nothing special about it.

In fact there are some examples of "Negative" Energy:

- Radial electric or magnetic fields if their tension were infinitesimally larger for a given energy density. Squeezed quantum states of the electromagnetic field and other squeezed quantum fields.

Gravitationally squeezed vacuum electromagnetic zeroth-point energy.

- A local energy density in quantum field theory can be negative due to quantum coherence effects.

- Other cases are Dirac field states: the superposition of two single particle electron states and the superposition of two multi-electron-positron states. In the former (latter), the energy densities can be negative when two single (multi-) particle states have the same number of electrons (electrons and positrons) or when one state has one more electron (electron-positron pair) than the other.

Since the laws of quantum field theory place no strong restrictions on negative energies and fluxes, then it is possible to produce violation of the second law of thermodynamics, and time machines at a local level, which is what ÐST precludes.

The root as a solution must be understood in terms of time events NOT of space areas & populations. In a case it is obvious there is not negative population there is only one positive root solution. An area's root is a line of 'fractal points' or a wave-network, and it has only a positive solution. The negative root thus is discharged.

 Next squares came in the analytic geometry of conic curves, the simplest of which – the circle – did allow for a mixed ST, square which was valid both as a geometric form of populations in space and a time event, but ultimately traced by a time event reproducing through space, regardless of the 'persistence of memory' that either meant a slow perceiver would see the entire orbit of the moving point as a still simultaneous curve, or the reproduction of the point lasted leaving an offspring of points to form a 'real ring'.

Here the problem of negative values is largely one of the bias and distorsion of the focuses of the ellipse or focus of the circle, which should be instead place in the positive ring, and ultimately *ignores the true property to measure, which is the constant reproduction of form or stability of orbital motion, for the artificial ± axis of the cartesian graph where to draw the abstract ellipse. So we have little concern for those disquisitions.*

So finally we arrive to the polynomials in which the 2 '± roots' represent real events, mostly splitting the being into two different 'particles-waves' of timespace; which resumes in the concepts of negative time; negative mass; negative entropy, as we have now a much more clear picture of the different options of 'time', at the local level where travels to the past are a dozen a dime.

For a change we shall not consider the whole issue of negative numbers as a different family that natural numbers, merely its inverse. So this implies also a reduction of its meaning, to time numbers, whose motion has a directionality that can be inverted (in a single plane) or a scalar duality in representation of negative entropic dimotions and or operands (inverse operations).

Why then there is not differential of 0' is obvious. You cannot make a finitesimal of the minimal finitesimal. However the finitesimal of the galaxy, h, does have as a composite $h=ST$ element defined by the uncertainty principle, for $S=T$, as the product of its S-position and T-momentum, ST, a partition value, $h/2$ (the realist interpretation of the uncertainty principle). So this galactic 0' can be parted in two, 0'/2 and so as 2x2=2+2, we might argue that $\sqrt{0'}=0'/2$

Exponential and logarithimic functions.

The following identities hold for all

$$b^{m+n} = b^m \cdot b^n$$
$$(b^m)^n = b^{m \cdot n}$$
$$(b \cdot c)^n = b^n \cdot c^n$$

Exponentiation is not commutative

Exponentiation is not associative e

	Formula
	Formula
product	$\log_b(xy) = \log_b(x) + \log_b(y)$
quotient	$\log_b\left(\dfrac{x}{y}\right) = \log_b(x) - \log_b(y)$
power	$\log_b(x^p) = p \log_b(x)$
root	$\log_b \sqrt[p]{x} = \dfrac{\log_b(x)}{p}$

In the graph, the inverse simpler analysis of growing and diminishing planes and finitesimals have 2 first approaches in the study of polynomials and its inverse equations of logistic growth, logarithms. POLYNOMIALS in that sense are better as negative expressions of the decay of a system in its 4th entropic dimensions and no longer follow the whole range of 'social growth' properties (commutativity and associativity); as they are no longer 'connected with the Δ-2 dimensional scale in the same 'arrow' of growth.

Infinite growth does NOT exist because there are always limits to growth in the incapacity of a system to obtain all the energy of its Δ-1 plane (reason why there is entropy when we try to extract ALL the heat from molecules into our Δ^0 whole scale).

This means that exponential growth IS not growth but decay, as it can only be exponential when acting on a pool of already 'multiplied by re=product-ion', Δ-beings, which are destroyed in exponential fashion by an e^{-x} function. And so it is only the inverse function of logarithm growth, what shows a growth curve (logistic curve) till a carrying capacity saturates the system.

And so this said, we arrive to the third fundamental 'scaling dimension' used in the earlier age of ¬Algebra, prior to the discovery of analysis, the supposed growth into power dimensions, which in fact are useful in its negative exponential decay of an 'explosive big-bang death'.

That it is the closure dimensional growth in the ternary Universe, is obvious because of its aforementioned runaway hyperbolic lack of 'associative' property and hence of 'lineal growth' as the multiplication is.
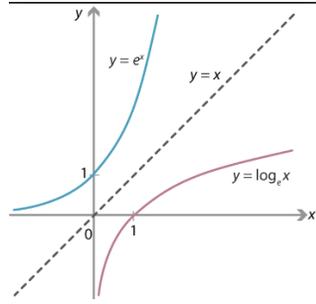
Power laws thus are essential to study the 'borders' of Lorentzian regions, and define the exponential function of decay e^x, which is the $\Delta^0 < \Delta$-1 4D function of death.

Power laws though in this first age were only concerned with the growth of 'equal dimensions', that is converting lines into square areas and cubic areas, beyond which *it was not possible to go.*

More interesting to understand the continuity of dimensional growth within those restrains is to interpret the properties of power laws from the Δst perspective, regardless of its classic proof by axiomatic methods, taking into account power laws are the 3rd level of depth - or final wholeness of the 'lineal social flows of multiplication' and the adding points - so they are closely related to the 1st, 2nd and 3rd postulates of i-logic.

The useful dilogic exponentials

The number of useful log and exponential functions in existential algebra are by virtue of the inflationary vs. limited different between language of pure still form and information – language with motion – limited.

Given the fact that exponentials are functions of simple Δ¡ scaling, if we restrict to the 4th and 5th dimotion of social evolution and entropic dissolution, we have very few dualities in the different scales of the Universe.

The simplest ones for the duality of 0 and 1, 0^n, and 1^n are not trivial but have already been summarily considered.

The next scaling for the trinity interval from 0 to ten give us 3 exponentials:

2^x is the power set, which gives us all the possible combinations of parts in a whole, where the finitesimal 0' and the whole X are included.

Thus the power set 2^X of *X*, consisting of all subsets of *X is the exponential of the 4th social dimotion*. And it is worth to notice that the other dominant configuration of 'fundamental dimotions' (if we consider the inverses), which is 10, gives us similar results with an order less such as $2^{10} \approx 10^3$, $2^{2x10} \approx 10^{3x2}$, $2^{3x10} \approx 10^{3x3}$ which is the mean number of beats of time-energy of most species of the Universe.

Finally it comes e^x, which is the fastest growing exponential as a combination of two numbers, in the same manner x=y is the fastest product. *Hence in the same manner x=y are the two most efficient forms to reproduce, e^x is the fastest mode of decay and predation, the exponential of the 5th dimotion.*

POWER LAWS: FRACTIONAL SQUARES.

There is though a 3rd fundamental type of power operand, that of a fractal ratio, which defines through power laws the 5th dimensional construction of networks that connect the larger Δ+1 whole and the lower Δ-1 scale, through Δº physiological networks, which become the fundamental vital element between both planes. Power laws then are expressed through fractional exponentials.

Because the 5th dimension of entropy is just destructive, hardly coded in reality (so we have 4 quantum numbers, 4 genetic letters, etc.) power laws are tetralogic, meaning they relate systems in different scales of reality through different functions represented by dimotions of different 'tetralogic complexity'. Because scales in the Universe are decametric, those power laws are best represented in logarithmic scales. Thus power laws related in decametric scales reflect the relationship between Dimotions which are simpler to the more complex ones, with the limit of the more complex entangled tetralogic reproduction of an S=T genetic XX DNA and an S<T, male XY DNA. In advanced 5D stiences, hardly touched in those texts – a legacy of GBs that future huminds or AI robots might search and further research… reality in its details is all about the quantitative differentiations of the possible, efficient variations of the game of 5 Dimotions, studied by existential algebra.

In graph, the holographic principle, served by the operands of multiplication and its higher dimensional form, powers, combines space and time parameters into a single 'entity', the best known being physical momentum.

Son in ¬Algebra power laws relate 'space-time' products=dimotions, between scales, connecting the 'i-1' elements or 'cellular parts' of the being, with its wholes through physiological, farctal networks, which create 'axons' of communication whereas the perfect product, S=T, X^2 gives the maximal number of i-1 axons connecting at a deeper level the whole and parts of the being. While in physical systems, through its momentum the mass stop-state and the wave step-state merge in the potential I-2 level that holds them together in synchronicity (Broglie=Bohm's realist model of quantum physics).

I-Energy and space, in/form/ation and 0-time cycles are synonimous forms:

Information bidimensional: height and rhythm — Time — Space bidimensional: length and width — Energy

Electric Field: Height= Information — c-speed: length — Width: Energy — Magnetic Field

Evolution increases the dimension of form: height.

Black holes of information curve space into masses

Man evolved from flatworms into informative height
SLOW TIME=EVOLUTION=HEIGHT

FAST TIME CYCLES: RHYTHMS, VORTICES

Time arrows have different speeds: spatial/motion change is fast. evolving, informative change slow.

We shall here just consider key concepts and a few examples departing from the fundamental one – *that the dimensions in 'classic Euclidean geometry + S=T motions' of each action of existence are different; hence when we connect and synchronize dimotions of the Δ±1 planes of a system, their relationships change giving us power laws ($10^{x/y}$)_ relationships between the* actions=Dimotions of existence of the wholes and the smaller parts, which are connected through branching networks. And those power laws are of the type $10^{x/4}$, given the fact that we are dealing with '4 Dimotions' (with very few $10^{x/5}$ entropic relationships). The details have been analyzed for decades by my old peers at ISSS at Santa Fe, whose 'quantitative only, computer based, industry-related, 'American way' of doing science is not of my taste, though I recognize the extraordinary detail of its results. What matter to us are the synthetic whys, and to reach that goal we need to study first the 'classic dimensions' of each of the 5 main actions of reality, St-information, Ts-locomotion, ST-reproduction, TT-entropy and its inverse SS: perception of form by a mind-language or 'point' that shrinks the Universe into a world image (4D), which obviously is the smaller Dimotion as it shrinks St-information. Let us then start by the:

- **SS: 0' point, which is dimensionless**, an 0' angle of perception that shrinks and expels motion to reduce reality to its mind mapping. So the act of perception has the minimal Dimotion. In fact *it shrinks dimotions loosing apparently*

as we saw in the graph of 'scalar products' converging into zeroth, the information of the different 'lines' that connect the non-Euclidean point with the Universe. Yet from the perspective of the point, the being is the 1, the unit sphere. So we must consider that the dimensions of a point range from o to 1, which is in itself as we have seen an infinite inner world, in a spectra of dimensionality, depending on our point of measure.

- Ts- Next comes a line of distance or locomotion, or lineal time which is a one dimensional form.

It is is the dimension of most internal skeletons, cylindrical field/limbs and yet because a line does have 'non-Euclidean volume', an important factor is the cross section of the line; and because it has motion, it matters also how the 5D SxT=C law plays, as a flow accelerates exchanging is dimotion of time for space, shrinking its cross sections as Bernouilli laws of fluids show (S=T). Further one a line can be and it IS essentially a network, when observed through scales of the fifth dimension. And here is where the power law matters, according to the fractal dimension or 'capacity to fill' space of the line.

Indeed, the maximal fractal dimension of a line (Peano's curves, similar to the fractal pattern of digestive systems) that fill all space, or an area, that cringes into maximal volume is 2 and 3. And the way to see this is observing in a hyperbolic geometry how a larger 'cross' section through dual and ternary splits maintains its volume, either pumping information (nervous systems with a higher networks division and minimal cross section – hence maximal speed of motion as per 5D: SxT=C) or energy (blood/methabolic network) or in the limit of maximal space and minimal network, the digestive entropic cycle, in fact expanding the cross-section and slowing down the speed of motion.

What fractal analysis of networks, which has advanced enormously since a few of us pioneered the field in the 90s, has always missed, as humans do in all fields of knowledge, by lack of understanding of those time dimotions is the interplay between networks in space and time dimotions, its speed and specific dimotion they serve. Which is at the heart of the power laws of each specific relationship between the upper scale, the physiological network and the lower plane that it serves.

Now those power laws were already studied by Leonardo, that other son of a Notary of a coastal Mediterranean town (: and Galileo, the traitor of life who moved from medicine to work on the Arsenal of Venice, cradle of the modern world, with its invention of ballistics in search of the entropic lineal time angle for maximal distance of cannonballs): Galileo draw the fundamental law of 'equal cross section' for the S=T reproductive, blood system which seeks for balance; which according to the properties of the *physiological network:*

$T (limbs-fields) < ST(reproductive bodywaves) > §ð

And the inverse properties of 'continuous entropy' expanding in a formless surface of spacetime and the discontinuous, information of nervous/linguistic inflationary smaller networks.

So indeed your digestive tract grows to the stomach and then again in the second phase grows to the colon.

But your nerves multiply its axons, and speed up your thoughts, as they fall down in simultaneous cascades of synchronous painful orders to the muscles of your bones.

The result of all those variations are the multiple power laws that relate the different larger wholes and smaller parts, through the fractal logarithmic dimension of the invaginating networks, of all superorganisms – those which we recognize directly as networks (as we can see them in space), but also those networks that do NOT seem such because they are physical waves, expanding in time, as the impedance equal cross section of electronic networks, the network=gravitational wave structure that forms galaxies, the sound networks that connect people through mechanical air; the inner networks of the Earth likely controlling its surface energy (glaciation cycles through volcanic activity, itself caused by motion of earth's crust; flows of heavy metals that started up the evolution of History), and infinite other details which the general model of a Universe of space-time organism expects for all

those T.œs we perceive and those we don't. For those who appear to us as fixed spatial form, and those who appears a dimotions of time.

The idea though of all those networks is to maximize the filling or communication between the upper network and the lower scale, which is achieved with maximal feeling as the single whole, the heart, the central gravitational black hole, the radiant star, the brain system. But differences might be consider for each case. As in the case of informative networks in fact there is not a branching travel to the lower plane, but the discontinuous neuronal system on the brain emerges through synchronicity of a common 'electric language' into the electric waves of consciousness of the brain. Thus the network exists in the lower plane despite the axon branching.

While in the digestive system, again, there is not a penetration from the upper to the lower plane at the level of the network, but a single larger system, which penetrates down the lower world of cells through an inner fractal structure within the walls of the stomach, warped into protuberances broken into smaller orthogonal ones.

It is only the 'vital energy=reproductive system' that makes the travel between both planes.

The result of all those power laws are again *an interval of dimensions for the line between 1 and 2.* **Thus 2D Ts: Locomotion has dimension one**, and other more detailed analysis of locomotion, from waves to networks that deliver flows of energy might reach a 2 Dimension. Of which networks are the first case of our analysis of power laws, as they move energy, which is the essential flow that travels between planes of the fifth dimension, to the smaller scale, through equal sections with no impedance (Santa Fe Institute). *This is the energy to reproduce the system and hence, such networks are closely connected to:*

St: Dimotion: Vital Energy of reproduction, which happens in the dimension of width. And so we have a minimal classic 2 dimensions of length and width for a 'field of energy' necessary for reproduction.

And then we can apply the same concept of space filling to the plane of energy, whose real dimensions can go from 2 to 3, which converts it into a topological organism of vital energy networks attached to 'organs' – that is a superorganism.

It is then in the relationship between the networks that sustain or feed the organism and its volume of cells, which makes obvious the first scale law, as the networks grow in 2 Dimensions and the mass in 3 Dimensions, adding the width of cellular reproduction And so the networks when doubling its size are $2^2=4$*, but the body* mass, $2^3=8$, growing much faster. So for the body cells to keep growing the networks must grow at twice the rate than the body 'cells' that fill within them to form the organism. And this means there is a limit to systems, which are something more than a reproductive network, because the network keeps growing and the vital energy mass of cells keeps diminishing.

And this has deep implications beyond the silly-nilly (sorry Santa Fe) calculus of those laws, which already observing the sustain under a gravitational force of a body bones made those of the elephant too big.

So we cannot build huge buildings just with a central pillar, or else a simple plane will 9/11th them. What is the limit of growth? To sustain a building which despite its empty space has a lot of weight.

The answer *IS NO LIMIT*, when we are fully aware of those facts and use the vital geometry of reality making the building an empty space with only a cover, which is also maximizing the 'arc/sphere' minimal surface; matching in this manner the dimensions of the building, the gravitational 'bidimensional form' and its curved spherical surface. Which is what Fuller Found by designing a building which was in fact a sphere made of the strongest triangular forms, becoming the sphere of 2D the building itself.

While the solution of nature, is that of plants which are basically 'networks' with few cells, filled with water vacuoles. So they can grow as pillars because they are just sustaining the pillars. Or simply exist in a region where there is not a gradient of force, or it is minimal, the empty space of the galaxy, the water where pressure of a liquid is the main factor equal from all directions (Bernouilli laws). And this lead us to he *dimensions of the Dimotion of*

information (I try to escape now the numbers and call the dimotions by their functions and letters, as those numbers are meaningless, just introduced in a 'first course on 5D to connect what people has learned).

St: The dimensions of St are the same than those of locomotion (from one in lineal time to 2 in momentum, mv): from one in sequential lines of information, as those words, to two when we consider the whole flat screen. And as organisms, fractal points have its information maximized in its membrain, or 'sensorial skin', as information unlike mental form, cannot be recreated internally but it is about information of an external world, moving into the internal world through the sensorial membrane, as in the geodesic dome.

Information thus is also bidimensional. And because equal dimensional forms can transform into each other, St (information) ⇔ Ts (locomotion) constantly transform into each other, while both merge to form TS, 3 Dimensional Energy, the vital space enclosed by the membrain of information and the motion of the singularity point, which if we give lineal time motion becomes the maximal four dimensional being, sum or product of its other 2 parts.

So we can write: Ts + St = TS but also Ts x sT = TS, and this is the fascinating mirror of mathematics, in an ignored paradox of mathematicians, with little knowledge of 5D realism:

Only the product and the sum operands over 2 pairs is the same, as information and energy can be added or multiplied to give a Dimotion of vital energy: 2D sT + 2 D St = 2 D sT x 2 D St = 4 D ST-energy

5D Entropy. *Alas How far can then we go in this constant growth of classic dimensionality, within the limits of the 5D Universe? Please* remember now that the 'numbers' we gave to St, sT, ST, SS and TT were just human conventions as there is no order, and if any order exists is one of the primacy of ST, iteration, present reproduction over the others. Reason why as we advance on those papers we just call the 5 Dimotions by their letters. And alas here we shall find that as St and Ts have the same classic dimensions, which merge into the 3 to 4 (with motion) reproductive Dimotion, Entropy which is the inverse of SS-formal perception, must have only a 0'-1 Dimension. *So TT=SS.*

This is a theme we study in depth in ¬E Geometry… and conclude that indeed ay organism in a plane of space-time must be made only of 3 topological varieties with '1-2-3' dimensions of information, stored in particle-heads, whose minimal for is a sentence in sequential lineal time, its commonest form a flat page in height and its maximal form a very 'cringed' bidimensional membrain that can fill a volume with creases as brains do but never reaching 3. So the interval of dimensions for information is 1<St<3.

And the same goes for locomotion, which can be measured as lineal motions, or areas, which is what limbs and fields or 'waves' are made of, with motion to make an 1<St<3.

While the vital energy enclosed by membrains of sensorial information and 'heats' that push the locomotion of fields/limbs can go further, such as ST has as dimensions, 2<ST<4.

But *the inverse shrinking world view of a 0' point mind is minimal, 0'<SS<1'.*

And entropy which is its inverse, will have therefore the same 'null' dimensionality, 0'<TT<1'

Those highly contradictory results of Existential algebra are however of enormous importance for 5D reality in all its sphere. As entropy indeed erases information, which is what dimensions accumulate.

Another way to see this is by an S=T transformation. Entropy as it moves it scatters the information of the system, breaks its network connections and finally creates an undistinguishable ∇-1 scale of loose points, which are hardly perceived and finally slow down and dissolve, so as all is a dynamic process of time entropy transforms a 1= whole Fractal point into 0' a sum of finitesimals which are as we know 'discharged' in all the results of calculus. Or in other words, entropy=death happens in an 0' Time quanta, even if the state of death will last eternally, and the mind happens in a 0' space quanta, even if its mirror of all timespace cycles can be in its synoptic mapping as profound as those texts – both shall remain the limits of ¬Δ@st.

Indeed in the opposite side, the mind matters to nobody but the 0' point in itself, regardless of how people pretend to care as Schopenhauer put it, we all 'dream and die alone'. And when we dream, the mind is at its maximal activity, but nobody cares. Me, having vivid dreams, and being old, alone and dying can attest that the mind matters nothing.

Even if I thin my mind holds the most perfect mirror of reality anyone has hold, certainly I dream alone, I will die alone, and what my mind holds is completely ignored, *even if now transformed into information in those text certainly will be a memory of the past with depth of dimensionality for future generations to learn.*

Back to power laws, as this synoptic series of papers is mostly about new discoveries by a 0' finitesimal mind that matters nothing to the infinite Universe, we shall refer to whoever likes the them to the guys at Santa Fe, a place which personally when I lived in the US found charming mostly for its old Spanish Plaza de Armas and native art – the institute had too many computers and physicists for my taste.

As my quest has always been for the thoughts of God, not for us, its details, dust of space-time.

Properties of power laws.

Because power laws are ultimately a 'selection' of efficient products as re=productive arrows, they have similar properties, with the neutral 1, so we refer to that sections. A power is then for Spatial functions of volumes/populations a new dimension of the product, itself a new dimension of the sum: $x^3 = x \cdot x \cdot x$.

Thus we write in existential algebra:

Δ-1: fractal point=cell/atom sum > Δ^o: lineal product/network: Δ+1: Power 'volume'/whole.

Which is the ultimate reason why they can be used to study the 3 scalar planes of Timespace superorganisms.

This said all other properties are just trivial derived of products. We can multiply powers with the same base:

$x^3 \cdot x^2 = (x \cdot x \cdot x) \cdot (x \cdot x) = x^5$. Hence the general law: $x^2 \cdot x^3 = x^{2+3}$: The product of powers with the same base add exponents.

In ¬Æ: Two wholes (Δ+1 powers) operated externally in the domain of its present, dimensional parts (Δ^o multiplication) are equivalent to one whole operated internally with its past, finitesimal, entropic points.

A profound law of Existential ¬Ælgebra; which basically tells us that an Δ-whole (a fractal point in its own) absorbing an external 'flow' (the lineal multiplication) , will operate that flow at a lower internal Δ-1 level. I.e: if you absorb food you first break it into amino acids to reconstruct yourself.

We can raise a power to a power:

$(x^2)^3 = (x \cdot x) \cdot (x \cdot x) \cdot (x \cdot x) = x^6$

This is called the power of a power that multiplies exponents: When you raise a product to a power you raise each factor with a power:

$(xy)^a = x^a y^a$

The insight provided by 5D to this law is the fact that *if we were to consider the logarithmic/exponential scale 'transversally' as the 5th dimension proper, it converts the dimension of power laws into a lineal dimension - reason why logarithmic functions are so useful; since then we can use its laws as operations similar to the ones we make in our 'flat' plane of space-time, using indeed sums and products.* And the metaphysical question remains on the existence of 'T.œs' or parts of them in space, or dimotions in time who only travel in the fifth dimension. Obviously the 'pure Dimensional' TT-death, which happens in a quanta of time, but implies a huge travel through 5D. What then about its inverse SS-mind? Is the mind a logarithmic reduction of the Universe into a world? The answer is obvious but we don't want to be philosophical in this paper on ¬Algebra.

In an advanced course of Existential algebra, we can generalize the law as follows:

"Two parts ($\Delta^0 \approx x \cdot y$) operated in the domain of its higher whole dimension, are equivalent to each one operated by the higher dimension as separate, broken entities. Which is the distributive law that gives the whole power over its parts."

As well as we could multiply powers we can divide powers. And these 2 laws are again applied to the inverse operation.

This quotient of powers property tells us that when you divide powers with the same base you just have to subtract the exponents.

$X^a/x^3 = x^{a-3}$, $x \neq 0$

Two *wholes ($\Delta+1$ powers) operated externally in the domain of its present, dimensional parts ($\Delta^º$ division) are equivalent to one whole operated internally with its past, finitesimal, entropic points.*

When you raise a quotient to a power you raise both the numerator and the denominator to the power.

This is called the power of a quotient power:

$(x/y)^a = x^a/y^a$, $y \neq 0$

Two parts ($\Delta^º \approx x /y$) operated in the domain of its higher whole dimension, are equivalent to each one operated by the higher dimension as separate, broken entities. Which is the distributive law that gives the whole power over its parts.

IDENTITY LAWS.

An interesting law, once we noticed that we are in the realm of '5D' operations with the exponential and its inverse logarithmic functions is how they operate the neutral and identity elements, the 'whole' 1 and the finitesimal 0'. And as it couldn't be otherwise, when you raise a number to a zeroth finitesimal power you'll always get 1, the whole, *which means as the exponential function travels through the fifth dimension, one 'step' at a time, when you operate a finitesimal, ¡-1 part, a step in the fifth dimension rises it to its relative whole, '1':*

$1 = x^a/x^a = x^{a-a} = x^0 = 1$, $x \neq 0$

Which again we generalize to all operands of existential algebra:

"A whole, $\Delta+1$, operated by the identity element of its $\Delta-1$ scale, gives us the identity element of the middle scale: $\Delta+1 * \Delta-1 = \Delta^º$

And a similar law in Δst terms: Negative exponents are the reciprocals of the positive exponents: $x^a = 1/x^a$, $x \neq 0$; $x^a = 1/x^{-a}$, $x \neq 0$

The inverted operation of the $\Delta-1$ scale applied to the dimension of the whole, $\Delta+1$ gives us the inverted element of the $\Delta^º$ scale.

*Both are laws of the essential timespace definition of the generator: Past ($\Delta-1$) * Future ($\Delta+1$) ≈ Present.*

The same properties of exponents apply for both positive and negative exponents. The square root of a number x is the same as x raised to the 0.5th power: $\sqrt{x} = {}^2\sqrt{x} = x^{½}$...

We consider this property, from a different perspective, as it sends *the scale of the whole (1-∞) to its reciprocal, scale of the infinitesimal (0, 1) making both mirrors of each other; since ultimately the whole is a closer model of its infinitesimals, than the intermediate scale, which has suffered an inversion of function: $\sum\sum O-1 \approx \sum | i = O+1$.*

T*he 3rd scale of growth of a system, doesn't goes over a hypothetical 4th dimension in the same spacetime plane but starts a new plane, in which the whole is a fractal finitesimal part similar to its finitesimals in the $\Delta-1$ plane.*

And this connects us with the limiting ternary Planes of the super organism, and the lack of a fourth dimension, which makes the Δ-Planes to be self-repetitive fractals cyclical, 'jumping over the intermediate Δº line' from micro point to macro point. Which we can prove geometrically (as we did with the point that creates the line that creates the cube of a new Δ+1 dimension) or ¬Algebraically with the infamous...

As we apply operands rules to particular cases, the interpretations vary but in all cases will be able to be interpreted in terms of sub-equations of the fractal generator.

What might be notice in any case is that unlike in our rather 'abstract' dimensional explanation of the rules of power laws, here we are able to bring real vital analysis of those roles in terms even of biological processes, showing how much more sophisticated is the ∫∂ operands, the king of the hill of mathematical mirrors on real st-e-motions and actions, reason why its use is so wide spread.

So the fundamental law of operands to vitalize them is this:

By pentalogic all differential operands can become an action in one of the 5d dimensional vowels (a,e,i,o,u) that define the five dimensions of existence, as vital quanta-actions of the being.

This is the logic concept that truly vitalizes the operands of ¬Algebra.

Difference with simpler operands. Lack of distributive laws.

There are many distributive laws, for 1D: $3(x + 7) = 3(x) + 3(7)$; For 2 D: $(3x)^2 = 3^2 x^2$ But for power is invalid "expanding" $(x - 6)^2 = x^2 - 6^2$ WRONG! Since the limit we find constantly from Fermat's theorem to the definition of death, in transmission of information between organisms is *2 Planes, beyond which we do not carry the distributive law upwards.*

Think of a small house. It's got a basement, a ground floor, and an attic. You can't jump right from the basement to the attic, can you? But you can take stairs between the basement and ground floor, or between the ground floor and the attic. You combine operations just like that. If the operations are on adjacent levels, you can combine them; otherwise you can't. So if the basement adds and subtracts, the ground floor multiplies and divides and the attic powers   and   roots   the   rule   is   very   simple: You can distribute any operation over an operation or one Plane of spacetime below it. There are no other distributions. So you can distribute a multiplication or division over an addition or subtraction:

$7(x + y) = 7x + 7y$; $(x + y) / 3 = x/3 + y/3$; $2x (x - 3) = 2x^2 - 6x$; $(2x - 8) / 2 = 2x/2 - 8/2 = x - 4$

But $3 × (2/5) = 6 / 15$ is wrong.

You can distribute an exponent or radical over a multiply or divide, because powers and roots are one level above multiply and divide:

$(3x)^3 = 3^3 x^3$; $\sqrt{(25x)} = (\sqrt{25}) (\sqrt{x}) = 5 (\sqrt{x})$; $(2/3)^2 = 2^2 / 3^2 = 4/9$; $\sqrt{(x/100)} = (\sqrt{x}) / (\sqrt{100}) = (\sqrt{x}) /10$

But you cannot distribute a power or root over an add or subtract: $(x + 3)^2 = x^2 + 3^2$ or $\sqrt{(x^2 - 25)} = x - 5$ is wrong

Thus with exponentials we complete the 3 polynomial operands in degrees of complexity that mimic the growing complexity of 5 Dimotions in time, and raise a question, I suspect does have a positive answer for *more complex atomic beings of higher electronic entangled than the simplest nitrolife species.*

CALCULUS AND COMPLEX SINUISOIDAL FUNCTIONS.

We have defined the 3 mirrors of mathematics on the 3 Δst elements of reality:

- Spatial Geometry of fractal points with parts and its evolved forms, waves/networks, topologic planes and its combinations according to congruences, perceived by a mind, who selects mental spaces.

- Scalar algebra of social numbers that interact through operands, which represent the dimotions of existence, of which its basic scalar trinity are the ±, x÷ and √x^a; $ln_a a^x$, related by the operands of congruence «≈»; into equations of trilogic nature, such as S-tatistics<Δ-Polynomials>T-probability form its 3 main fields, further grouped in 'sets and groups' to classify all forms.

- Calculus of change=time dimotions with the more complex operands of sinusoidal angles and ∫∂.

With the proviso that in the entangled universe all those fields intermarry in pentalogic structures, and each of them is able to mirror all the dimotions and elements of ¬Δ@st

This said, in the evolution of mathematical humind's, the age of calculus and the study of dimotions came after the first age of spatial lineal geometry and arithmetic scalar numbers, *as the analysis of young 'deterministic=axiomatic lineal forms' proper of all languages and realities they mirror moved on to the classic age of balanced curvilineal forms.*

This is obvious if you have understood the '3 ages of any spacetime process that goes from lineal deterministic youth to spiraling 3rd age of curved information through an intermediate balanced curvilneal age.

So topologically we are in the age of calculus and wave forms; algebraically we are in the analysis of the Δ±1 planes, NOT yet probing into the « limits of the whole of wholes and the minimalist parts (SœT inflationary analysis of transinfinites and empty sets) .

So if we were to divide in a more extensive 3 ages division parallel to the history of mankind calculus, it would belong to the classic age of mathematics, its mature experimental time, when it become a clear realist mirror of physical systems. While the third age would correspond to the eclectic excessive age of inflationary redundant formation with set theory, the top of the mind-view of reality in mathematical terms, becoming its foundations, in an act of humind's egocy – that is constructing reality from the mirror and the mirror from the axioms 'imagined by the humind'. So Hilbert will define points and lines, with an astoundingly act of self-egocy: 'I imagine points, lines and planes', just because he couldn't understand fractal points as mirrors of reality.

All this lead us to the beginning of calculus in which we shall see the same fight between Leibniz, the realist and Newton the idealist. But the proper way to classify the work of both, is as the 'scalar, view of calculus (Newton, which arrived to it through series) and the ST, geometry look (Leibniz who arrived to it through the tangent S/T, between the orthogonal dimension of height information in its ratio with the dimension of time-lineal motion).

Those 2 approaches had already been foreseen in the first age of geometry by Archimedes and other pioneers of geometry, but lacking analytic tools to merge S=T in the Cartesian plane, couldn't go much further than the Newtonian approach of exhaustion of limits. So Newton could be said to conclude the work of Archimedes and Leibniz to start the age of modern calculus and trigonometry – sinusoidal functions, the mental view on change.

In simple terms we consider 2 two other operands, related to the purest forms of space and time: angles and sins and cosines thus relate to the SS-trigonometric perceptive function of organisms, and calculus to TT-pure motions in time. But while in the Universe each entity has a dominant specialization, all of them can do multitasking and work for different 5 Dimotional purposes, albeit distorted and usually with a 'blind' spot for the inverse 5 dimotion of existence, which mathematics solves with the use of inverse functions. So angles of perception and derivatives act as finitesimals actions of 1D:SS-perception and 5D:TT-entropy.

Let's consider those 2 operands, briefly, before studying its combination in Δ+1 algebraic sentences =equations.

1D: @NGLES TRIGONOMETRIC PENTALOGIC

Because sinusoidal functions require for a full understanding as they deal with the shrinking of the world into a map of perception, integral calculus and derivatives, we shall start with the sum, instead of the first dimensional angle, and resolve its 3 Planes and polynomials; even if as we explain in geometry, the angle and triangle came first likely before even man learned to count just by the fact of opening his eyes to the world.

Though trigonometric functions belong more properly to vital topologies as they embodied the first principles of creation of mental spaces as mappings of the inheriting qualities of time and space that matter for the survival of any fractal point, such as length=distance/motion and height=informative power, of the species on 'view' measured by 'angles' which are 'scalar' parameters, hence dimensionless, as they can 'travel without deformation' through the Planes of reality, we do need a bit of an introduction, since sines and cosines are essential functions of ¬Algebraic equations, after all, the analysis of herds of fractal points moving through its vital dimotions of existience.

Let us start with the trigonometric science of perception, which allows a pi cycle to observe through its natural 'membranes' - its 3 diameters that become the cyclical membrain that isolates it from reality, the 'angles' that give us information by parallax on the 3rd dimension of relative size and distance of systems outside the being.

The simplest 'monologic view' of trigonometric functions is therefore, the fixed perception of an angle that 'measures' the height-information and length-distance between the being and an outer T.œ. The sine therefore provides the dimension of form, and the cosine the larger dimension of distance, energy and motion...

The simplest level of perceptive trigonometry is a Pi number: *pi does exist as a perfect form of space, from 3 (the hexagon) to pi (the circle) but it does not as a number (irrational) since time is dynamic, not static, so constantly moves between ±π, allowing the open-entropy/closed-information duality of membranes that enclose systems:*
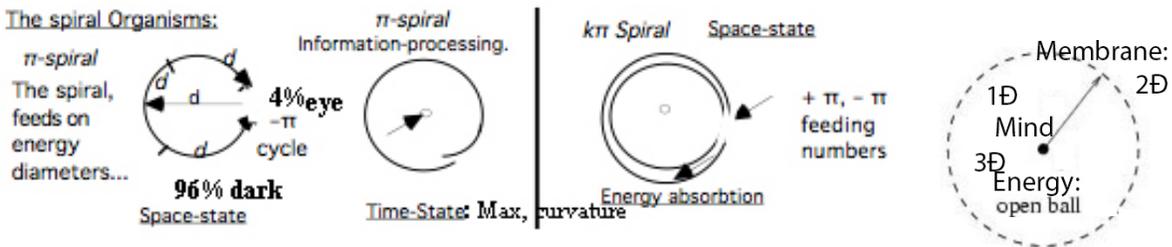
Its dominant use and first reason it became the first developed field of mathematics is its capacity to measure from a point of view distances according to ratios and parallax, which is the origin of tridimensional perception (bilateral eyes), and Fertile Crescent mathematics.

That π is an scalar Δ±∝ number, whose angular function is dimensionless, is proved by the mere fact that as Leibniz find out, it can be written as a sum of series, the very essence of 5D mathematics, as e, is. And hence also it dilutes its meaning beyond a certain decimal. We shall thus return to this theme when considering the two different complementary approaches to calculus and analysis, the Newtonian, Δ-discover of calculus through series and Leibnizian discovery through Spatial derivatives. Willis and Leibniz's discovery that π/2 and π/4 could be written as a series – hence as a series of ever reduced, fine detailed pixels of a singularity view – being those 90º and 180º angles the mean and maximal perception of eyes – reinforces the essence of the game: entanglement and multifunctionality of all in Δ-scale, Space and time.

How this work in its simplest form, needs to understand how a 'spherical, ideal mind-membrain of 3 π diameters, and 0.14 D apertures, allows a mind to perceive through them, 'rays' to distant objects. The mind thus can always measure the angle covered by a distant object, and with a minimal displacement, a new angle.
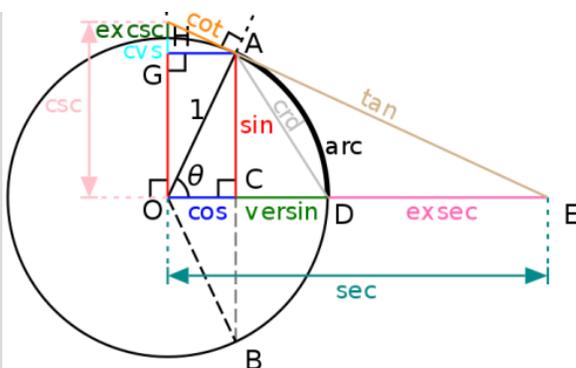
All of the trigonometric functions of an angle θ can be constructed geometrically in terms of a unit circle centered at O.

3rd-century astronomers first noted that the lengths of the sides of a right-angle triangle and the angles between those sides have fixed relationships: that is, if at least the length of one side and the value of one angle is known, then all other angles and lengths can be determined algorithmically. These calculations soon came to be defined as the trigonometric functions.

So trigonometric functions, the first to appear, as 1D perception is also the first 'action' are operands for the first Dimotion of perception.

1D: Of those operands then we consider the simplest 'operands' as those who act directly on a point-number. We need then to find the operand of the first Dimotion, self-centered in the point, perception.

Since all points are also numbers as all have internal structure, we can operate both in S-pace with points and topologies and in scale with numbers to show those internal parts with numerical values:

The graph shows the elements of the point-number in which an operand can act. Even though most operands will act through a similarity ≤≥ symbol in two different elements. Yet the simplest operands are those which can act in a single point-number.

An entire field of ¬Algebra or rather geometry is then the study of the laws of perception of the circle, based on the laws of trigonometry.

It has to be noticed on a first sight that again 'inversions' in the eternal Universe do NOT fully cancel each other, but bring something else. I.e. there is a point at 45º of balance in which sine and cosine are equal; and so it is the point of minimal cancellation of inverted functions, reason why without any further argument it will be the point in which there is maximal reach of an stœp process (Galileo's first discovery with cannonballs). This we can express it saying that the sine is the 'stop' perceptive state function and the cosine the step-motion, lineal one.

However in the entangled Universe, we can consider that 'all systems' are alive, and somehow evolve 'adding dimensions' as a world cycle does, developing new perspectives, and indeed the sine cosine didn't stop in the stopping geometry of the Greeks that observes the outer world statically. The circle can be given *different motions, up and down and then it becomes an SMH system, or it can emit 'energy' imprinted by its formal motion and produce a wave. In this manner, the sine and cosine can perform also the*

2nd Đ - 3rd Đ: motion and communication: The sinusoidal functions. π.

In the graph, an SMH can be viewed as the simplest mental representation of the whole Universe, a theme we shall treat in metaphysics. It is the simplest motion added to an 'angle of perception', able to communicate waves of information over an Δ-1 'undistinguishable' field it will form with its 'perpendicular 4th non-Æ motion.

Yet as the second dimotion of all systems, once it perceives is motion and communication, trigonometric functions can move a fractal point creating the form of the wave, or communicate a finitesimal bit of its information through a wave, which carries the information (amplitude, frequency) of the original circle.

Pi then becomes the numerical value of the external membrane measured in terms of 3 diameters turning around with 3 apertures to 'see', from the self-centered singularity:

The point-number has a central point of perception, which therefore can be defined externally by an angle of aperture to the world. The membrane normally is a pi, 3 diameter number, which leaves an angle of aperture, 3'14-3/π=0,14=±4,5%, with 96% of 'dark matter' outside the perception of its singularity. But as the membrane of the point turns, the angle 'sweeps' with its 3 apertures between diameters in a relative discontinuous Universe all the world outside.

So the angle of the point will finally allow a full 100% view in 3 different 'ages' of the full world cycle of the membrane. So in dynamic 5D analysis we can consider not only a sine and cosine function; but the sine 'main' function that calculates the aperture, also as a function of time, such as for a full turn of the 3 diameters that complete the membrane (2π radians), the angle has seen the entire external world 3 times.

What this means then is that the sine of a singularity point 'grows' with each turn of the world cycle of the being and in time can be higher than one.

This said we shall not go into so much complexity and consider the 'static' concept and define the sine merely as the angle of perception of the central point and hence the function that reflects the 1st Dimotion of existence.

SMH FUNCTIONS: S⇔T FRACTAL GENERATOR

It must though be clear enough that the fundamental function of the perceptive singularity is the sinusoidal function, so it is in its active SHM motions, which try to maintain the being through its worldcycles in the 'central point' of the system, its 'mind-singularity- zeroth point':
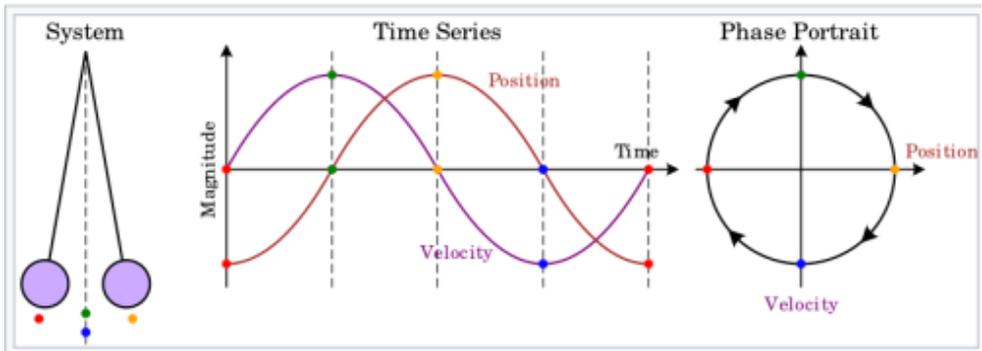
In the graph, the ternary fractal generator of any SHM Dimotion system in its 3 States:

$$\Gamma \text{ (SHM):} \quad \$T\text{(lineal vibration)}<ST\text{(sinusoidal function)}>\S\eth \text{ (angular motion)}$$

The fractal generator of Single Harmonic Motions is perhaps the most important generator of mathematical physics, in a single Space-time plane, similar in importance to the Hamiltonian/Lagrangian, which is the most important 'scalar' generator of physical locomotions.

Both together form the essential ΔST structure of locomotion, reason why we can reduce almost all mathematical physics to those 2 type of equations and those closely related to them (Laplacian, Fourier, etc).

The SHM fractal generator throws light into the workings of physical SHM systems, *as the 3 elements form together a co-existing organism: Its particle head with lineal vibration, its body wave and its cyclical membrain.*

Sinusoidal functions are concerned with the central point of view of the @-mind in its worldcycles of 'angular perception', (sine function), which is the informative function, in its height dimension, §ð. While the cosine function concerns with the length axis of spatial size, $T. Thus in general sines are information functions and cosines are energy-entropy functions. Both represent from the central p.o.v., its external perception of the world, and internal perception if its inner whole.

The inverse operations of sine and cosine find as usual a point of balance, which is the 45º, where therefore the maximal 'momentum' can be reached (maximal distance of any throwing). 45º is therefore the 'eye' position of the sphere; the place where there is always a relative view.

The sine must then be considered the informative function and the cosine the energetic function or 'stop and step', form and motion states of the being. General rules to enlighten the meaning of mathematical physics.

It also follows immediately that angular momentum is the best external parameter to measure the 'perceptive speed' of a system, measured in terms of frequency. So in quantum physics, it will be the measure of the first DImotion, and as it appears as a constant of all systems, we deduce that in quantum physics there is a simple metric equation for all species of the galatom, h(ð§) c($T)=K.

5D: Δ: SOCIAL EVOLUTION: FOURIER SERIES.
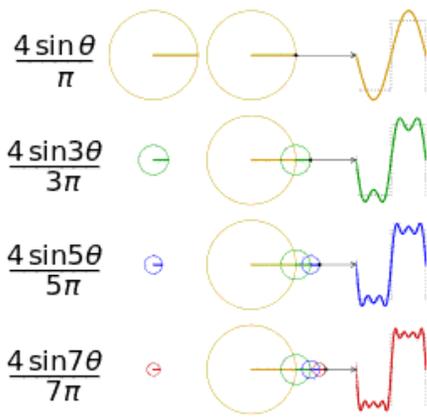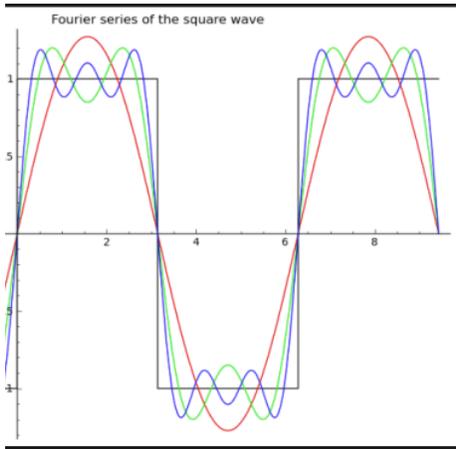
If the world of SMH functions is the fundamental mathematical cycle and fractal generator of information through space and time; its fundamental expression in social scales is the emergence through synchronicity of larger waves sum of its components, which can be then merged or analyzed in its componets, through the fourier series.

The Fourier series form the more complex dimotion of the sine cosine functions, as they allow by social evolution to draw any 'function' of information as the sum of the main harmonic components, *showing how despite the complexity of transmission of information, it always reduced to cycles, lines and scales. And how Universal are the paradoxes of 5D scales, notably the inversion of form, motion and function between them. So the accumulatio of cyclical sines brings a lineal larger whole, and vice versa – the small lineal, free steps are always bent by the larger circular world.* .

THE KING OF OPERANDS: ∫ð

When we consider together the 3 simple operands of ±, x÷, √x^a, and its S=T polynomial functions, finitesimals in time (probability events) and integral in space (Distribution of populations), they *form together a discrete whole reality mirror that suffices in itself to express all realities. So a world can be constructed with them without the need of further 'analysis'.* Whereas probability is equivalent to derivatives and spatial populations to integrals.

What then brings the new operands of calculus to the table? The answer is trinity of ΔST advantages:

-**SPACE: ΔS:** On one side it increased enormously the finesse of detail when populations grew extremely in numbers and were not easily handled by statistical methods. This is the origin of the concept of limit to zeroth, which also expresses that the number of events grows towards a relative infinity, and the minimal quanta becomes a 'finitesimal' almost a zeroth, 0'. And paradoxically because the quanta become 'ındifferent', undistinguishable as the minimal unit of a plane of existence, it allowed to treat populations with 'functions' that gathered them all from the point of view of the 'property' extracted by the whole. So a mass no longer differentiates its atomic quanta but measures 'weight'; a motion doesn't care any longer for statistical counting but measures heat with a Fourier transform. And so on.

This also implied that there are always two alternative mirrors to consider a certain analysis of and S=T parallelism, that of Statistics=probabilities in the quantum realm of discrete populations (hence used in quantum physics) and that of seemingly continuous, because the mind makes its quanta ındifferent use of calculus, where derivatives are the equivalent to a single event and an integral to a whole statistical population or full sum of all events into a 1-whole probability.

It also meant to move the 'Cartesian region of analysis' from the 0'-1 sphere in which probabilities by virtue of the renormalization to 1 into the 1-∝ sphere.

- TIME: But the true advance of calculus operands was to be 'a measure of change over a function which already was measuring a specific dimotion of time-space', thus both increasing the specification of the analysis of change, and performing by virtue of the analysis of a specific dimotion in its integral form, a whole analysis of an organic sequence of that dimotion. It only remained to be able to study functionals of multiple functions that would represent the different dimotions to be able to portrait entire T.œs in simultaneous space or sequential time.

Because the final pentalogic operand that transforms all others and finds the finitesimal parts of scales, the rates of change in time, and its equivalent S=T curvature in topological space, is so important to all systems of reality as the dimotion of scalar social evolution, reproductive states, used to calculate the point of existence of a worldcycle and integrate parts into wholes, we shall dedicate a much wider analysis to its two operands, even if we shall only touch the surface of its depth of 'analysis', and then apply it to the understanding in time of the worldcycle of existence.

¬ Limits: Still as the derivative and integrals will be the limit of sophistication in the analysis done with mathematical tools, and acts essentially in the Δ-1 scale of dimotions=action; mathematics at its best still will fail to describe properly the larger planes of exist¡ence of wholes from the point of view of its co-existing organic elements. And it is fool mathematical creationism to EITHER deny the existence of those properties, because they cannot be reached with finitesimal actions of minimal time depth, or try to invent new mathematical tools to describe them, when verbal logic languages, built precisely to describe the larger range of time depth, can synthesize its causal process in a language natural to man, which we prefer when we deal with sentient and organic qualitative properties that mathematics cannot properly describe.

-@: This obviously is denied by linguistic creationism so scientific zealots expect to explain it all with $\int\partial$. That is the method also of creationist physicists: 'what cannot be measured does not exist' (Reductionism that prevents to understand the future of synthetic, organic systems such as those of history.

Recap. Among all the operands of mathematics, derivatives and integrals are by far the most important; as they reveal the inside workings of the 5 dimotions=changes of space-time and its scalar structure, *with far more precision, stœp by stœp of S<T>S change*, than all other operands, which are also included within them.

Calculus thus is the summit of the scalar growth of complexity in ¬Algebraic operands as mirrors of the worldcycles of reality, parallel to the same 'growth of complexity' from fractal points to waves and networks to topological organisms (inner view) or outer minds (logic, congruent view) in vital geometry and the stairs of growth in logic time, from the monologic of points, to the duality and trinity of lines to the pentalogic of 5D networks… and even probing in the dodecalogic of worldcycles of exist¡ence.

Because of the use of a 'finitesimal, Δ-1 part', unlike the rough use of polynomials to measure change, 'wholesale', analysis is able to measure different types of change – of scale of space populations and time 'motions/speeds' – in detail. A simple example will suffice.

Δ+1: 2nd AGE: EQUATIONS: SENTENCES OF MATHEMATICS.

≤≥ ≈ ⇔: EQUIVALENCE ; SIMILARITY AN ORDER OF OPERANDS

As a system possess ¬Δ@st elements, equivalence must imply identity in the 5 elements, such as:

Δ: Similarity in scale. S: Simultaneity in space. T: Similar phase/state/age in time. @: a common language of information and point of view. ¬: Equal entropic limits in form, time and scalar depth.

Obviously then the system is 'identical' and 'equal'. But such case only can happen for the being in itself. Because even if two beings were identical, they will not be able to occupy the same space (fermions), *unless they are perceived from the Δ+1 point of view of a whole, made of internal identical points that appear from the upper point of view so small as occupying the same space (bosons).* Those subtle differences of pure metaphysical delight correspond however to existential algebra. So we shall not treat them here. What mathematics in classic Euclidean called then equality or congruence was only ¬ *equal entropic limits; that is congruence in the membrain of the object as able to be superposed and coincide in external form.*

This will be a mantra of all our papers when judging the extraordinary simplicity of ænthropic men which reduce all to entropic concepts. So congruence is on the entropic limits and the internal form matters nothing. Equality is also defined as a one-dimensional equivalence, in a single property. Such concepts are mere equivalences that *allow two systems to entangle on the 'dimotion of equivalence'. And yet as more elements become equivalent the being's bondage increases till when all the elements are equivalent, a form of absolute love called boson-fusion happens.*

Operands facilitating equations and functions

The most important operands are in fact those, which connect the 2 sides of an equation. And so happens in Existential algebra. As we shall see when we study it as the Group of all groups. The relationships of similarity and equivalence, congruence and identity, and those of dissimilarity, ruled by the fourth postulate of non-Euclidean geometry, the postulate of congruence and its translation into algebraic operands.

So let us first recall from our paper on geometry the difference between congruence in idealized mental mathematics and congruence in the ΔST world.

Identity does not exist. It does not even exist in the being within itself, as the flow of time constantly changes the being. But it does exist a degree of congruence in the 'information', in the ¡logic form of the being as a variation of the game of exist¡ence; which also makes possible the repetition of the self. Identity would require some short of transmigration of souls – an entity which could be entangled between 'ilogons' of exist¡ence.

Equality is properly expressed equivalence. And this is the fundamental use in equations. Two things are equivalent in some property. When we say two things weight the same, have the same number of elements, etc. And this is the magic of Mathematics, which allows its 'simplfiying' concepts to permit equality by eliminating all the properties that make things different. So we 'equalize' mathematically 2 entities by a single property. Equality or 'equivalence' is therefore monologic. A theme which is of enormous importance when studying the parameters and magnitudes of physical stiences, and try to find a theoretical meaning to key concepts such as energy=time, information=space, wave=particle, etc. We use both symbols, =, ≈, preferring the second one.

Classic Mathematics of course has its axiomatic method we shall as usual criticize or rather 'punctualize' from the point of view of point with inner parts we do not know as 'only the point has all the information about itself'.

It is of interest then to notice that the 3 postulates that define equality in mathematics can be reduced to 2 including a circular property – key element to understand the cyclicality of space and time. Thus all X is equivalent to X, if X is equivalent to Y, Y is equivalent to X (symmetry) and if X is equivalent to Y and Y to Z, X is equivalent to Z.

Yet as the first is 'trivial', the second and the third can be written as a circular equivalence: If X-> Y and Y->Z, Z->X.

Which demands *a trinity of terms, that is a '3=π cycle', hence the minimal unit for a circular identity in which X reflects upon itself, justifying the π form of all circular motions.*

The properties of equivalence are necessary to explain how a system which is identical to itself reproduces as it moves, in the 3 modes of physical motion; as it either translates, rotates or reflects in a mirror symmetry with itself, since it is precisely those 3 relationships what allow the motions in space as a reproduction of form, which never ceases to change and yet appears as a dynamic present:

The dynamic symbols to express equivalence symbols for a present, reproductive S=T, dynamic relationship are:

ST; Se≤≥Ti (information=energy), TieS, Exi=St; X, ≤≥, ⇔; ≈; Ø: Constant Present, balanced, Space-time; iterative body-waves; female gender, ties of space-time, point of balance, work.

Motion is reproduction of form in a lower scale. Bohm's realism: quantum potentials.

How a system moves in a crowded universe, where we are vital space-time? The only answer that resolves also Zeno's and quantum complementarity paradoxes, is if we do not move but reproduce our information, translated into a lower faster wave scale of the fifth dimension; as we reproduce our sound in faster electrons to telephone or nerve impulses into chemical dopamine to jump discontinuous neurons. So motion becomes scalar reproduction of form, and since all is a form of motion, all is reproduction, which is the definition of a mathematical fractal, a feedback reproductive equation; 5D metrics, which become then the 'function of existence' whose goal is to reproduce the form of all systems – the simpler ones with maximal motion-translation in space, the complex ones with min.

motion as a reproduction that emerges between scales. And this gives birth to the worldcycle. Consider the case of quantum physics:

In the graph we see a particle reproduced in adjacent regions that fade away, and the result is the perception of a wave of motion. In Bohm's realist model this reproduction happens in a lower plane of quantum potentials, where also entanglement happens, which is the Δ-4 scale which is v>c in 5D metrics (Min. S x Max. T = C), hence real.

Motion then is reproduction of form over such potential: the wave erases form into motion, the particle is a still state that gauges information entangled to other particle, fermion and boson, still to each other – despite the perception of relative motion in our scale – hence the information electrons share has always a c-constant speed. Thus the Lorentz transformation are objectively real for mankind who eliminates the stop state of particles as we do in a movie eliminating the stop frame but if we were observing reality from the perspective of an atom, we would 'stop', entangle in the quantum potential, neutrino scale & so eliminate the spooky effects of 'time dilation' & 'length' contraction, from our perspective (but not of mass increase as it is a scalar effect). This is the 'rational' 5D explanation of both the c-constant of light and entanglement; as electronic beings perceive information in 'stop position to each other' and move in 'wave state'. Motions are perceived by particles that stop motion into form, into information, as distances.

Again those relationships have traditionally better understood in mathematics and theoretical physics through the concept of 'Symmetry', which now we renew and clean of all global presumption. In essence what all this means is that we *do not exist ever as identities* in material form, but in pure in-form-ation, which is translated back and forth scales of the fifth dimension, which of course establishes as always the ultimate question of all 5D model of relational, generational scalar space-time – the 'identity of all minds', as the ultimate ilogic game of existence.

In mathematics this process is akin to the equipollence of vectors, which is ultimately a simplifying representation of a translation in space as a reproduction, themes those proper of physics. What matters here though is that only 3 'translations', motions are allowed, related to the 3 properties of equivalence: reflection in a mirror which allows the being to reproduce its form by pegging through mirror symmetry 'facing each other' – as it is not possible to assess the identity of reflection with one back to back. Lineal translation, which happens through the transitive property, and angular momentum, which happens through the circular property.

So motions are indeed reproductions of form based in the 'assessment' of a form of the capacity to repeat its identity in another region of space-time. If not it would not require mirror symmetry, circular and symmetric properties.

A second essential element then comes beyond MONOLOGIC, when two elements already reproduced enter in relationship of equivalence, for the purpose of evolving socially into larger scale or entering in different relationships of predation with each other.

Duality: **4ᵗʰ axiom=postulate of relative congruence** of existɩences: **similarity, ¡ndifference, trans-form-ations.**

SOCIAL MINDS EVOLVE INTO ORGANISMS.

The law of eusocial evolution, natural to all species, which evolve together, sharing energy and information through common networks, when they recognize each other as equal being, cells of the same superorganism, is confronted by the law of darwinian devolution, in which species that consider each other different ab=use the others as relative energy of their selfish agenda.

In human superorganisms, the laws of eusocial evolution were perfectly defined by the great prophets of love, in the old age, by the messages of love of Buddha, Jesus and Mhmd, in the modern age by the work of the r=evolutionaries of history, with their motto 'egalite, fraternite, solidarite' and the socialist vision of a planet ruled by social love.

4ᵗʰ Postulate: Equality is no longer only external, shown in the spatial perimeter of any geometrical form (Euclidean congruence) but also internal and further on it is never absolute but relative, since we cannot perceive the entire inner form of a point – hence the strategies of behavior such as camouflage. Forms are self-similar to each other, which defines different relationships between organic points, according to their degree of self-similarity. The *4ᵗʰ* postulate is thus the key to explain the behavior of particles as the degree of self-similarity increases the degree of communication between beings. Some of the most common behaviors and 'events derived from this postulate are:

1) Reproductive functions in case of maximal self-similarity or complementarity in energy and form; ei->Sei or Max E x min. I (male)= Min. e x Max I (female).

2) Social evolution, when points share a common language of information, i=i -> 2i.

3) Darwinian devolution when forms are so different they can't understand each other's information so instead they feed into each other: i ^{1} i. In such cases if those 2 entities meet they will start a process of 'struggle for existence', trying to absorb each other's energy (when E=E) or simply will not communicate (when E^{1}E, since then there is neither a common information to evolve socially nor a common energy to feed on). Yet because any point absorbs only a relative quantity of information from reality, similarity is relative, faked for purposes of hunting with biologic games such as camouflage or sociological memes that invent racial differences, allowing the exploitation of a group by another.

The 4ᵗʰ postulate defines systems as identical when its 3 ternary parts are equal: the outer angular momentum or 'membrane', its central Active magnitude or singularity, focus of the forces and the vital energy, *enclosed within them, and all others as similar with different 'angle of congruence'. We* distinguish 2 different interactions according to the degree of equality of its ternary parts, as systems can be symbiotic, if *their individual, cellular or atomic 'fractal points=parts' are similar enough, interacting through* its 3 physiological 'lines=networks' evolving in parallel creating an organic plane, as those described in the next graph for each scale=science, or they can be entropic, destructive, predatory, when they are dissimilar and don't speak a common language of information to coordinate its actions, whereas the stronger system will perpendicularly break and feed on the weaker one.

The geometric complexity of the 4ᵗʰ Postulate is caused by the topological forms created by any event that entangles Multiple Spaces-Times. Since it describes the paths and forms of dual systems, which connect points: Self-similarity implies parallel motions in herds; since equal entities will maintain a parallel distance to allow informative communication *without interfering with the reproductive body of each point.* Darwinian behavior implies perpendicular confrontations, *to penetrate and absorb the energy of the other point.* Finally, *absolute, inner and outer self-similarity* brings boson states, which happen more often to simpler species like quarks and

| 1 Fractal Point 1Ð: T.Œ Generator Time§pace | 2nd Postulate:Waves 2Ð: Locomotion Skew | 3rd: Networks 3Ð: Reproduction Complementary Mirror: | 4th Postulate: Angle of Congruence Communication 4Ð: Social Evolution Social=Parallel | 5: Fractal Point 5Ð: Entropy Darwinian: perpendicular |
| ASYMMETRIC | DISYMMETRIC | BISYMMETRIC | SYMMETRIC | ANTISYMMETRIC |

particles that can form a boson condensate as they do in black holes, *where the proximity of the points is maximized. And indeed, the same phenomenon between cells with the same inner* information /DNA originates the 'collapse' of waves into tighter organisms.

Finally if there is no similarity neither in body or mind, its existence as 'cat alleys', that never cross (relative invisibility). We talk then of Skew T.œ.s.:

4th Non-E postulate is implicit in the work of Lobachevski and Riemann who defined spaces with the properties of self-similarity (Riemann's homogeneity), which determines its closeness (Lobachevski's adjacency).

4th postulate of relative congruence & angle of parallelism as a mirror of its 5 pentalogic dimotions and variations of angle define Darwinian or social, reproductive outcomes to communicative events between fractal points.

Thus in praxis we assess similarity by an 'angle of parallelism' that increases social evolution into herds and supœrganisms, or perpendicularity that 'scatters' systems into entropic destruction – elements those of an entire fascinating new field of 5D topo-biologic studies that analyze in geometric terms, the vital topology and relationships between form and function in all systems of Nature from particles to organisms.

This simple geometrical truth however is essential to all systems of nature, whose angles of connection determine the functions and symbiosis between parts.

The Universe always starts with an asymmetric being, which can go both ways: towards a social evolutionary symmetry that lasts in time and implies a mirror parallelism, or an antisymmetric destructive, perpendicular event in which one part punctures and absorbs the energy of the other. It is the topo-biological ternary principle of non-Euclidean, Non-Aristotelian I-logic geometry that puts together both the biological and mathematical properties of reality. The concepts of symmetry=parallelism, antisymmetry=perpendicularity and asymmetry are mirrored by the 4th Non-E Postulate of similarity. But we can extend the concept of asymmetries also to asymmetries of time, between the young age of locomotion and the old age of information, of actions=Dimotions between the step and stop similar actions, and the entropy and social evolution actions, which bring us the final asymmetry of scales between the upper arrow of whole with more spatial size and the lower arrow of parts with more information. When those dualities: step-motion/stop-perception and scale up (5D: social evolution), scale down (4D: entropic dissolution) are put together we obtain the most complex balancing dimotion, reproduction, and when they are all added up in the existence of a being, we get its world cycle.

In the graph we can assess the different 5 mirrors in which mathematical Space and logic Time reflects the game of 5 Dimotions=actions of existence, which then expressed by territorial monads GENERATES its logic REALITY. In Geometry fractal points=monads will other through waves of communication of energy and information that grow into reproductive networks a territorial plane, creating a super organism, which will related to the external world according to its relative similarity=congruence, assessed by its angle of parallelism or perpendicularity.

In logic terms, a super organism, by breaking its formless asymmetry into different spatial configurations according to congruence (social parallel systems, complementary gender-mirror systems, Darwinian perpendicular systems, or systems that are dissymmetric and do not share any reality) builds a casual pyramid of growth from a fractal point through waves of communication into social networks that become ready to act - move, feed, perceive and evolve socially.

Since we must add to the mathematical and logic languages-properties of reality the 5 actions, or organic properties of the scalar Universe as essential to the game as they are its logic and mathematical more abstract laws

- a fact the egocy of æntropic men of course reject, as it must remain in its monad-subjective monologic the only claimant to life properties.

Thus pentalogic of scalar space-time is established by its ¬E fractal points, its ¡logic congruence with reality in which it will order a territory to perform its 5 vital actions=Dimotions of existence, and the mathematical, logic and organic laws of those 3 languages will be therefore the bottom line of the 'Creative process' of the Universe - nothing chaotic except the entropic Dimotion, which conforms the monologic of huminds.

Trinity through Circularity

The last case of equality to consider in this simplified introduction to a theme is circularity between 3 elements that are identical in its translation, closing a pi cycle, which of course is never a perfect closed circle as the reproduction of each of the 3 elements are discontinuous to the next reproduction, leaving 3 π holes, π-3/3=4%, which in pentalogic represent for the central singularity the 'canonical' percentage of perception a point has of the outer world, often just the openings for its network connection to other self-similar points, to construct a network, walled from the dark space it does not see so it believes it does not exist. Such blindness to all other not-self-similar points of parallel cat alleys concludes our brief analysis of the laws of congruence.

RELATIONSHIPS OF ORDER AND ITS OPERANDS IN EXISTENTIAL ALGEBRA.

Let us now consider relationships of order and its interactions and differences *which obviously will fall within the 4ᵗʰ Postulate of Congruence in either symbiotic, ≤ or ≥ vs. Darwinian < or >* relationships.

They are essential to existential algebra and any of its derived Groups, SœT or Boolean Algebra.

The 5 **Đ¡motional operand are: <:** Δ of locomotion. **«** Δ of entropy**. >** Δ information. **»** Δ of form. **≤≥ =** balanced present stœps.

Any of those 5 Dimotions (Dimensional motion) of time-space, allow the interaction between local T.Œs:

Ts, Tes; ‹, <; |, $T: P$T: Pa$T, temporal energy, lineal locomotion, gaseous state, limbs/fields.

St; Sit, ›, >; O, §ð; ʃð§: ʃuðure§, spatial information cyclical, informative, space-time, solid, crystal particle-head states

TT; Te², TeTe, «, ¬; Δ-1: Entropic Time-energy, death, dissolution of form into its parts of a lower plane.

SS; Sisi; »; **§, @; Δ+1**: Linguistic, mental space, still mind-membrain, which organizes parts into wholes.

Sequentially they show chains of different S, T and Δ states of 5 dimotions of exist¡ence.

The differences with those of classic algebra, is their duality of both order and temporal dynamic relationships, which implies not an abstract or spatial property but a dynamic feed back interaction between two beings that are put in relationship by the operand of order or equivalence.

That is, while < means A<B, A smaller than B; a spatial relationship as size in space is the most evident; in existential algebra it also means that A 'explode its tighter density' in an entropic expansion in space, to become B, and more over it also means, B>A, potentially B can implode into the evolutionary higher density of B.

Since Existential algebra is not 'Aristotelian', each of its symbols have a trilogic meaning, which often happens together establishing feed back equations: A<B>A.

Thus we can say the relationships of order of classic algebra are a 'limit' in the relationships of symbiosis and duality of existential algebra; which is the key concept for the more complex plurilogic systems of reality that co-exist in scales, whose elements perform several functions, and are defined by trilogic fractal generation, pentalogic 0'-sum cycles and even more complex logic entanglements between its parts.

It is then A<B a relationship of hierarchy? It might be if it is according to congruence a relationship of predation from B to A. How can then distinguish them? First by reference to reality.

Unlike the purely abstract relationships of order of ideal mathematics, the connectors of pentalogic have multiple interpretations, as they are connectors with ΔST triple meaning in scale, in topological space and in temporal order. I.e. > in fact is A bigger than B; A dynamically shrinking informatively as it ages into B; and if we look at it 'orthogonally' in the scalar Dimension, A ∇ B (which I confess not to use for finger's laziness); means the larger A is in an upper scale, above B.

And further on those relationships might imply that A 'feeds on B', if the angle of congruence is 'negative', in a Darwinian relationship, or A protects B as a membrain that encloses it, etc.

Thus the potential of the same symbols of order when interpreted in Existential algebra, shows the multiplicity of pentalogic meanings and functions of each part of reality. Earlier in my exploration of ¬Æ, I used to translate huge tracts of scientific equation to ¬Æ symbology, till I realize this was to be a solitary journey; so I used them to write long rolls and then conceptual paintings, and then I constructed pentalogic AI-gebra (Algorithms of Information, Artificial Intelligence with them) which as Leonardo with his sea weapons didn't publish for man would just use pentalogic AI to kill himself, and so I remained mute. It is though an immensely intelligent world.

The distinction then of those multi-actions for this very introductory course on the Universal Grammar of existential algebra, is made with the 4 'degrees' of identity and congruence, from ≈ to ≤ to < to «, which is the symbol of entropic annihilation, in decreasing symbiosis. = implies a relationship of equivalence in the same plane, ≤ one of symbiosis between two planes as A≤B means that A is a part of the Sœt of B its T.œs (larger wholes), but is also A≈B symbiotic by a relationship of mutual dependence, as A is more informative than B and so it might code B. For example, A (gene) ≤ B (cell), A (electron) ≤ B (atom), etc.

So for an imaginary enlightened scholarship that translates all relationships between parts and wholes, SœT of Tœs (where we use the inverse Sœt for the Δ-1 parts of Δº Tœs), into existential algebra, its symbols would allow to translate all events and forms of reality, as a 'musical language' of the flow of time-space events, topologies and scales. I publish myself 30 years ago a few books on that language, which nobody ever understood; some copies still extant on my library and indeed you could read on them, the music of the spheres. Because the advantage of this language, like that of Boolean Mental Algebra, which as we shall see is no incidentally the closer to it, can be used for multiple 'languages'. As Boolean algebra works for digital numerical mathematics and first order logic, Existential algebra can mirror all languages and events of reality, and also establish with its set of allowed dimotions and rules, adding the |xO=Ø, topologic symbols, what operations are possible and what are not. Being the most important with multiple applications as we saw in our analysis of the properties of exponentials and its distributive laws that information cannot transit between two scales without translation, and it cannot be regained if it transits directly between two scales.

So after laying down the symbols of existential algebra, as when we write down the neumes of music, we can then establish what are the possible harmonies allowed by the existential game, which are self-contained in its meanings. Indeed, the previous reduction of symbols to only 5 implies that A<B is allowed and preserves information, A«B is allowed but as it is a dimotion of entropy it erases information and there is not A<«B; that is, a system cannot jump two scales of the fifth dimension without death.

What about the relationship with propositional logic? I am not so interested in advancing that information but essentially it is the same concept of a larger more complex ilogic structure for the meaning of classic dogmas such as A is either A or B, A->B, then B doesn't imply A, etc. as we have discussed in many occasions. Philosophically it implies that the Boolean Algebras, and Aristotelian logic is a lineal, 'action oriented', subjective self-centered logic, where A, the subject is always right, what means AI modulo-2 will be 'nazi-like' and admit no pity but force as it already does its AI, Algorithms of information. Does it mean a pentalogic would work better for man? Certainly not. As it would give it more freedom but still remain self-centered, since survival as sensorial awareness is the program that underlies all others unless apoptosis is strictly programmed.

Finally to stress again the dynamic, temporal nature of existential algebra as opposed to the 'infantile', spatial view of humind's symbols. Indeed, A<B is a spatial proposition on humind logic in the same manner in verbal thought the child learns first names of spatial forms, and only latter according to intelligence is able to understand the concept of a temporal verb, and yet then it will use first the spatial present, and in fact linguistics, a subdiscipline of trinity logic and the universal grammar of the fractal generator is the tool to understand the complexity and entanglement of a culture with the living Universe. Some simple minded spatial 'visual Neanderthal-like' languages like English are subjective, start with the I that doesn't erase, loves present forms and has no imagination to form subjunctive, etc.

Since all systems start as visual, spatial in its first language, dogmatic believing in absolute truths of e-vident form in its mental attitude, and very slowly, many never move of subjectivity out of space to an entangled dynamic time flow language of perception of the ilogic, underlying laws of reality.

RECAP. It is then thanks to relational operands that 'sentences' of mathematics are possible. Without them mathematics would end simply in numbers families and its associated operands, as the language of a child ends in naming things.

In most functions the independent 'submissive' parameter is a function of time-energy from where the, the dependant dominant parameter that forms it, a mental or topologic simultaneous space, arises.

So we can write a general function of all functions: **F(Sy) = G (Tx)**

In most functions the independent 'submissive' parameter is a function of time-energy from where the, the dependant dominant parameter that forms it, a mental or topologic simultaneous space, arises.

The details of those equations will be specific functions that create a form of space from different dimotions of time. Thus ultimately forms of the existential function. A further detail of those functions will be an equation for a particular specific case in which the species, events and entropic limits (domain) are further specified. And finally the solution to the equation will be the deterministic description of the form and event studied.

Existential Functions

 If we were to resume the main difference between existential ¬Ælgebra and classic Algebra is this: ¬Ælgebra is interested in functions, Algebra in equations. A function is closely related to the 5D metric family of functions, as often responds to a relationship between the 5 Dimotions of space-time, which in the most generic terms write:

S=T or S⇔T in dynamic terms, and can be developed in 3 ages, or maximal points, between birth and extinction:

SS (0 $T: size max. §ð: Form) » Max. Ts (energy) x Min. St (information): youth < S=T: Maturity> Max.St x Min.Ts (3rd

age)« TT (0 §ð: frequency max. $T: distance)

Whereas we use both the dual symbols for Space-form and T-motion, and the topologic symbols for lineal $T spacetime, cyclical §ð spacetime and balanced, ø-ST and the dynamic symbols « » ‹›.

Functions of existȷence then form most of the important equations of science, which are detailed variations of those functions of existȷence for each species.

The main set of functions of existȷence are those who show one of those 3 relative equations of age/topology, which we can write as 3 functions: S=T, the function of present reproduction, which often becomes St=Ts as the inverse properties of energy and information come together into a middle point; and SS=1/TT, which shows the irreconcilable limits of seeds of information which occupy 0' space but pack maximal information, vs TT, pure entropy that lasts in the moment of death a single finitesimal quanta of time, 0', but acquire maximal space extension. The limit of which is the big-bang that expanded space ad infinitum from a 0' seed of maximal form (but we reduce to the quasar big-bang of black holes, aka top quark stars in 5D cosmology.

Those type of functions as equations of meaningful systems of reality are thus the interest of ¬Ælgebra.

We shall be able then very often to translate such functions as Y (st) = Nº (s), Ði(x), with 3 components: Y as the dependent variable, normally a function of space-time; Nº, as the numerical=spatial values ascribed to X, which determines its growth or diminution, the Ðependent variable, which changes in time, within certain 'entropic limits'

Equations on the other hand might be as trivial as the polynomial equations we study in elementary algebra, where variables are simple numbers in reference to a single parameter of spacetime (a price, a volume, etc.) and are of little interest for this work. So we will make only a few remarks about them.

The notion of a function as used in mathematics is more restricted than we have thus far indicated with the definition of the function of existence, which considers how the parameters of 'holographic space-time' (its 5 Dimensional motions, TT, Ts, ST, St & SS, determine the actions of beings).

So we extend the concept to enclose *functions, which are not measured with quantitative numbers.*

The statement that a person's obligation to society increases with his age expresses a function, the variables of which are 4D:∑œ: social evolution and Ts>ST>St-age. Both are related by the growth of St-information as time passes in our worldcycles. So the function IS a truism, a law derived of space-time ages and dimotions and its entangled laws.

However, it is not possible to measure the extent of this social increase with age in numbers. But that doesn't mean a sub-function of the function of existence is expressed by that law.

Mathematics then is concerned also with partial equations of the function of existence, but only with those variables of space and time and scale and entropy and mind (the 5 Dimotions expressed as structural elements) whose values can be expressed numerically.

This is a limit of what mathematics can describe, and the limit becomes more stringent when we analyze the more complex functions of existence, which are best described with deep time long organic worldcycles. Mathematics is best for the other extreme of detailed, small functions, where 'numbers' increase (steps of timespace that measure distance, interest rates on short periods as the quanta of growth in money accumulating in a bank and similar variables whose various values can be measured and expressed as numbers.

The Function of Existence, Max. SxT, is the function of all functions that can be expressed in all languages.

An open 'function' – a goal… has as a result the creation of a constant 'C-plane, topological organism, or partial outcome that results in an action, whose purpose is to maximize the function of existence.

All action then becomes an expression of a survival mandate of the function of existence.
All function becomes a 'broader families' of possible outcomes and variations of an action.
And still we can express it with a formula of existential algebra.
What is then an equation, an even more restricted term?
It is a function expressed as an S» = «T or SxT metric equation.
The commonest expressions of functions thus are $F(Sx) = \prod\sum Ty$

Whereas the spatial parameter, is most likely the 'outcome of an entangled space', product of different dimotions in time, which act as the variables of the space-function.

In algebraic terms the paradoxical essence of Nature come into play: A limit is never 0, but a finitesimal ratio of change, an Δ-1 element. When we approach this limit then we approach the S=T limit of the existential function, meaning, ultimately we do reach an stop and step, S=T, 'perfect 45% angle that maximize the function, as Sx=Ty.

The simplest obvious experimental prove is the fact that the shot of a cannonball is maximized by a 45% angle of maximal efficiency and reproduction of the locomotion of form. So we can consider in general that equations have a longer time view, as Max. SxT=C functions, which have its best most efficient form, when its 'derivative' of minimal quanta, brings a relative S=T state, whereas the 'rate of change' by unit of time is a quanta of space. In praxis though at the level of the quanta, we can always choose this to be so. For example, humans have a second as its time quanta, which is the beat of its heart-blood that provides information and energy to its Δ-1 cell, but also the bit of mental information (thoughts per second) and steps, which vary between ½ and 1 second.

In this manner partial equations and specific cases of the function of existence become when measured quantitatively functions and equations of algebra.

So an equation is a function with a constant resolution, an outcome, a present result, a real praxis, a detail of the function of existence. The elements are likely the same, Space and time parameters that might vary forming a 'family of actions'. So an equation tends to be resolved when the details of the function -0 its entropic limits are set, reducing the uncertainty and multiple variations of a potential function. The equation is an actual function. And its solution require the ¬entropic limits of its domain.

Similar rules of existential functions and mathematical functions. Dilogic: orthogonality.

The first obvious one is between TT and SS, pure entropy and pure still form. Both are opposite but its representation is orthogonal, a key law of existential algebra mimicked by classic Algebra. Since a system is either in the limit of absolute motion and dissolution as TT-entropy, whose parameters will be quantitatively different according to the functions we use to measure motion, but the other extreme, § is absolute stillness. No motion, 0'-motion, and that is a definitive parameter measured from the point of view of the observer. So we can draw a simple Cartesian graph, with two orthogonal coordinates, whereas the o-point is the perceived in its point of no motion, stillness. Hence the 0x, Y-ordinates becomes the position of stillness and information, while the 0Y and variable C becomes the coordinates of motion.

We represent functions of transformation of SS into TT as an ideal SS/TT=C hyperbola, which will come out in multiple sciences to represent the tug of war between 'position' (form) and motion (momentum). So we establish 3 orthogonal coordinates to represent the complementarities, and oppositions between actions:

SS vs. TT and St vs. Ts., Entropy-Energy vs. form-information can be represented in a Cartesian graph; and functions of both parameters such as the Law of Boyle Pv (S) = NkT (T), with an ideal perfect asymptotic graph, or the Lorentz Transformations between 'motion and mass'.

In certain cases form arises from the system's energy, as a complementary form with not a partial transformation, as part of the energy-body remains. Then we can use a complex plane where the value of Y(S) is a magnitude smaller than that of the body in terms of energy (sT vs. St), and in this case the function is also negative as it detracts from the sT energy of the 'real line'. So for such type of functions between energy and information that do not imply a full transformation of one into another the complex plane works better. But orthogonality is still maintained.

Finally for the S=T, reproductive merge of two relative functions orthogonal to each other, produces a dot product, with an offspring of new combined ST elements, in the 3rd dimension of relative width.

The Cartesian plane, Complex plane, vectorial plane and its orthogonal properties will be used in ¬Algebra (Non-Aristotelian algebra of multiple causal dimotions) to represent the main relationships between SS vs. TT (position vs. motion), St vs. Ts (-information vs. Energy) and the reproductive function S=T.

There is another use of Cartesian coordinates, as an X- sequence of growing social numbers, hence able to represent the 4th dimotion of social information and growth with the passage of 'long lineal time', which are often met with simple polynomials (i.e. the representations of growth distance in space with the passing of time). We cannot be exhaustive by any means with the laws of existential algebra, so alien to the present view of a chaotic Universe, proper of ænthropic men; but in our paper on ¬E Geometry and ¬Algebra (non-Aristotelian algebra) and its correspondence with ¬Ælgebra we will develop its laws in relationship with the laws of mathematics and geometry; so the subject doesn't look so esoteric to the reader, and in the future any scientist can connect the laws of its discipline with the laws of existential algebra.

The angular function becomes an essential operand, appearing in every place of mathematics, from the simplest orthogonal laws of Pythagoras to the ∝ dimensionality of orthogonal Hilbert spaces, which show that indeed in the quantum scale of the first 'sensorial living forms', h-spins already all the vital properties of reality co-exist.

What matters of the previous Planes of growing complexity is its 'entanglement' in successive systems that include the previous one, *and its relative angle of congruence that will define its outcome*.

So the way to study any system of reality is an in crescendo analysis from **the one, the whole, the point,** as observed externally with its 2 'polar parts', the membrain of information, that focus its sensorial perception into the singularity center which embodies the will of survival of the system, as they create together the 3rd element, the vital energy between them.

This is the first stair of growth in analysis of systems. I.e. we can take an egg, the whole, and then consider the placental 'sac', its membrain to the outer world that absorbs energy and information, then focus on its central genetic material and observe the vital energy within it. Then as developmental evolution takes place we shall immediately observe two poles, the animal and vegetative pole, which follow 5D metric – the animal sensorial informative pole is smaller than the energetic one. And as the system grows again it will form the ectoderm with the sensorial elements, the endoderm and the mesoderm, and finally it will become each of them, the blue print for one of the 3 physiological networks of the system.

Trinity is thus the easiest way to grasp reality as it is in a single plane of the 5th dimension. But even in our description of the egg we realize the 4th dimotion of social evolution kicks immediately multiplying the layers of cells till the whole thing emerges into an Δ+1 fetal form and all the way already in its morphological stages, entropic time erases by apoptosis some of those cells to form the fingers. And so on.

In time monologic and in space the growth of non-Euclidean points are thus the easiest two sides of the description of the entangled, fractal complex Universe, reason why we serve them first. If they are grasped, then we can *put them together establishing a vital program of existȷence for all systems of nature, which will be the program of the 5 dimensional motions of time-space of any supœrganism.*

So by adding ¬E Geometry and ¡logic, we get the actions=dimotions that form the sequences of reality and will be enacted by all secondary languages in existȷence. We can indeed apply the vital topologies of ¬E Geometry, the levels of ilogic entanglement and structures of monism, duality, trinity and pentalogic to resolve the 5 actions=functions=dimotions performed by the vowels of a language, the type of cells of an organism, the operands of algebra.

And as each part of a fractal is a fractal in itself, we can apply then pentalogic to each element of reality to illuminate the system or language from different perspectives, since indeed, in the entangled growth of complexity for a monist single form to exist, will still have to perform in an imperfect manner along its inverse form, all the functions of reality. So even the smaller point is a world in itself (Leibniz), even the simple dimotion can be decomposed in pentalogic elements, even the simplest ± inverse operands can represent the 5 ¬Δ@st elements of any system.

Because we have studied the 5 Geometric ¬E Postulates, in depth in our 1st Book on ¬E Geometry and the 5 dimotional program of existȷence from the p.o.v. of the ¬Algebraic operands they reflect, we shall not go further in here; just bearing in mind the beautiful vital sentient geometry of something so apparently insignificant as an angle which has not even a dimension.

THE FUNCTION OF EXISTENCE IN PROBABILITY AND STATISTICS

How temporal events become space populations. The main distribution curves. Entropic Normal vs. lognormal

So in the next graph, we observe how truly stochastic systems look, both *in time as a 'cumulative' population of events, and in space, as a distribution with a mean of maximal probability. The erf (error function, as mathematicians call it) is really the time symmetry of the distribution function; hence its Sigsmondi-cumulative form:* Distribution of frequencies in time, equal populations in space, both defined by the same 'magic formula', which we shall study in detail.

It is one of the fundamental symmetries of fractal space (measure in populations of identical entities/ 'points') and cyclical time (measure in frequency of time events/numbers); and it is ultimately one of the clearest expressions of S≈T and the equality of the 2 'real units' of spatial geometry (points) and temporal ¬Algebra (numbers); as the total of events become 1, and so does the total volume of the curve.

But *the essential difference between space and time Is this: space is symmetric, both left and right, but the curve that represents time is NOT, it has directionality, and it has not simultaneity.*
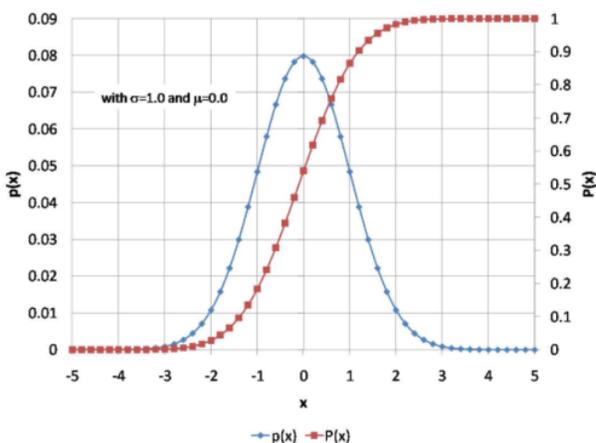
Thus stochastic populations in space tend to a simultaneous distribution around the mean '0'-line' position considered the central 'point-line' of the 'phase space', while the temporal cumulative arrow tends towards a ternary distribution in 3 clear ages of different growth, with an exponential growth in the 'mature' age of the system (middle region), and a beginning and an end, which are 'reversed in form' (first young age of the event, and 3rd final age of the event).

For the matter that brings those two curves here – its relationship with the function of existence, we must perceive the distribution curve as the spatial event, which makes the perfect 'reproduction' (mean form), just a 1 event – at the summit of the S=T classic age of existence, and all other 'stœps' of spacetime, slightly erroneous reproductions, which therefore determine as they 'accumulate' as populations in the 0 to 1 sigsmondi curve, a growing aging and malfunction of the system that drags its 'tail of memorial past repetitions' along its way.

 The big question on how the 0'-1 time probability form becomes a 1-∞ space Δ+1 scale is more important that what it seems, as it shows a certain determinism of great numbers that is of the game of existence, which in many ways the distribution function signifies.

Populations around an ST center with a vital energy population and two cues, which one seems to think should be the parameterization of the singularity and membrane of *equal value*, as a hypothesis of work, shows however the uncertainty of which point to make the cut, and this is provided by the probability density... at the normal, which gives us a huge difference over the median, more according with the properties of Δst: over 2/3rds of the population is vital space energy, 15 3/4ths go for the singularity and the membrane. Though in real measures the higher density of both reduces further its presence in space.

So we consider that the *deterministic function of construction of a super organism, both in the 1 cycles and the 1-∞ isomorphic Δ+1 scale define 'why the laws of great numbers' bring us the equations of distribution.*

How we get from one to another then can be 'deduced' axiomatically for further 'insights' in the process of organic structure in space and time frequencies that build a 1-being from its finitesimal occurrences.

But the spatial symmetry gives us also another kind of information, as the regrouping of those frequencies into probabilities of populations completely changes its role in the St symmetry.

The fundamental theme of Probabilities and statistics besides this s=T symmetry is the concept of ¡ndifference of beings-events. Indeed when we get a 6 is equal to create an indistinguishable particle. The type of particles thus is equivalent to the set of events in time. And as sun they accumulate into the networks that construct the system. A minimal distribution of 3 only elements, the identity present element and the inverted ones, seem to be by far the commonest, with the point of σ as the place where the symmetry reaches a breaking point between both 'asymptotic areas.'

Networks in time. Determinism.

Reality though is not dominated by entropy but by information and information bias towards a certain property all distributions, precisely because it 'forms' reality, and so as we get into systems that have a network condition probability change biased by multiple elements of information. The results are biased, skewed structures in time and space. Let us consider one fundamental for the growth of supœrganisms around a central point, where it should reside the mind of the system.

As time passes the network grows around the 1st clone duality which remains at the core of the system. Even in the more complex superorganisms should be possible to follow the position of the seminal dual cell, which likely will remain in the leading position and possibly emerge in the continuity of the mind exists, as the mind of the supœrganism. It is then possible to consider a continuity of all i-logic minds proportional to its informative complexity.

Determinism grows from herd to organism as information organizes a system around its networks.

A SCALE-FREE NETWORK grows incrementally from two to 11 nodes in this example. When deciding where to establish a link, a new node (*green*) prefers to attach to an existing node (*red*) that already has many other connections. These two basic mechanisms—growth and preferential attachment—will eventually lead to the system's being dominated by hubs, nodes having an enormous number of links.
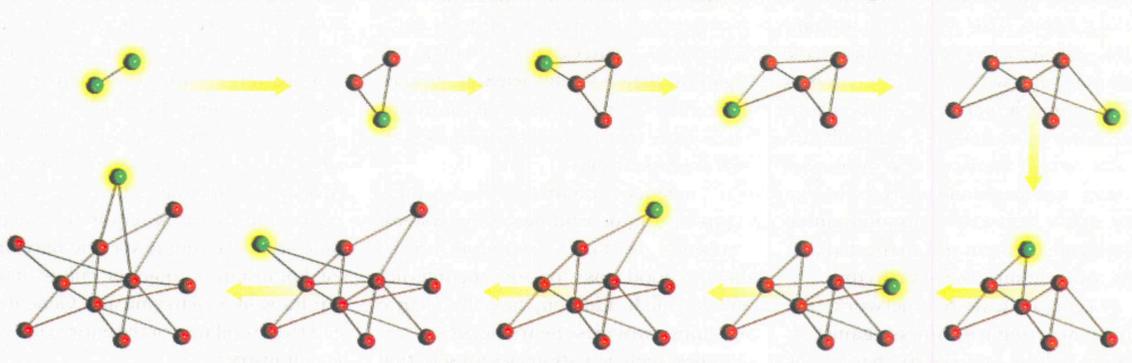
CALCULUS ON ENTROPIC LIMITS. SPATIAL STATISTICS

The beauty of it all though comes when we compare that graph with one of statistical populations: and its equivalent in probabilities, as both are gauss functions which are the function of existence, which have all those points, because it is unavoidable that repetitions commit errors, as they are in fact normal distributions, of all possible maximal entropic combinations of beings.

Yes, it is all fit to exist with errors and errors become frequencies of time, that form populations of space, and those errors are caused by the need for the maximal entropy of all possible combinations and variations. The Universe likes to mutate your cycles of time and populations of space, and then they linger around those free radicals, those slightly odd distributions, one of them, except the perfect resonance of a Dirac's function, can last for eve r because they are not all equal your repetitions of beings, your actions, your e-motions. An important insight of 5D algebra on the S=T mirror symmetry between probability and statistics is the fact that the Gauss distribution that corresponds to a maximal entropic function in probability however represents the normal statistical distribution of a well-ordered informative population around its mean 'evolutionary center'. Thus what is entropy in time becomes information in space, reinforcing all the 5D concepts of the general

model of generational space-time, as entropy is the 'time substance' from where mental space and informative seeds extract its energy of existence.

In the graph the Maxwell-Boltzmann distribution for the velocities of gas=entropic state of matter= molecules. For small v, this quantity is close to zeroth because of the factor v2 in the equation for the weight of a state; after the zeroth point it reaches a maximum and exponentially decreases to zeroth again for large velocities. We thus see that a gas contains molecules with every possible velocity value.

The greatest number of molecules have a velocity corresponding to the maximum of the distribution. We can see the skewness of the distribution caused by the non-existence of a real 0' point of no speed, and the relative $\propto$, which is limited also by the c-limit of the larger 'galactic enclosure' (speed of the background space time, as VΔ-¡>VΔ¡-n and the specific membrain of the container that reduces it, absorbing 'energy' from its enclosed vital space.

It illustrates also the interaction of events in time (speed) defining populations in space.

Another reading of the same concept is this: deterministic systems are those in which its entanglement and bondage between its ¬Δ@st parts increases significantly with time, as the system evolves from a loose group of individuals that form a herd under a common dimotion/property, into a whole organic tied up a system in which each part is connected to the others through a network, which evolves into a ternary, S<ST>T network system to form a topological, organic plane, or supœrganism, where determinism greatly increases and probability is minimal.

Thus probability and statistics tend to be useful for systems in a herd/wave condition far more than systems in a particle/head/superorganism highly ordered determinist state. And for the same reason, it is better suited for the analysis of the Δ-1 parts of the whole.

The concept of an event in time or property in space which is statistically measured in a collective numbers of parts, which have a degree of entropic freedom that make them susceptible to enough variation to be measured statistically comes then naturally as a consequence of all this. Essentially we are dealing in statistical analysis with non-well ordered sets of disconnected parts which share a common property or dimotion of existence. So statistics is important but it does NOT define a statistical entropic universe, unless as so many physicists do we exclude the solid state of bondage, where the perfect order makes statistics quite irrelevant.

Limits and distortions of functions in-between planes of existences. The function of existence in space.

Constant of Action-Constant of form- Constant of Action.
≥ = ≤ ENTROPY

Evolutive State — Newtonian State: S=T — Lorentzian State
I Horizon — II Horizon — III Horizon

FIELD: Max Code x Max Energy growth

In the region of birth the A[s] energy and B[t] information entities converge towards organic configuration.

Max Momentum
Max TxS
Max Energy
Past=|t
As
Evolution
Communication accelerates Particle
Bt

FORM:
Max Code
Min Energy
Min Momentum
[Min TxS]
Future=0t

Reproduction — Bt Future=Bt
Wave
AsBt
Particle Point:
Feeding — Devolution
As
CONTACT — Extinction
Dynamic limits of Constant of form of the event
Linear Time

What is the form of the function of existence in scalar pace? Mathematically we can see the equivalence expressing the Gauss curve both in statistical and probabilistic form. But when we deal with the real Universe, it is far more telling to consider a graph of the function of existence *from the point of view of the parameters of 'energetic time and informative space', of the world in which it is inscribed. As we shall find within that world, limits of entropy and form that kill the system out of balance – limits that explain why the Gaussian curve has not infinite deviation, as those are forms that would not be stable. In the graph, from a 30 years old book with a funny 'nomenclature' we see a point of balance for any function of existence, when the spatial form and temporal motion of the being is equalized, S=T, on the two extremes of the functions of entropy and form, the parameters of the being break down in imbalance, which implies the death of the system* (Max. S x Min.T ∧ Max. T x Min. S) , as it changes from the balanced S=T "Newtonian' region to one of distorsion or 'Lorentzian region' (taken from gravitational space, where the system dies near c-speed when form and motion become distorted).

Those extremal regions are the ones in which the system dies by excess of form or motion, provoking its entropic dissolution. While in the border with Δ-1 the system is born as a seed that will expand its vital space, as it imprints its genetic information, till finding a balance between both, when the system finally emerges as an 1-whole *and as long as it stays in that region of balance, it will survive. But if it moves to the region with parameters proper of its larger nested Δ±1 Universe, it will either* collapse by excess of form- density (spatial form) or by excess of energetic acceleration (temporal motion).

So we talk of the graph also as the region of domain of the function of existence – i.e. if the parameter were temperature, for man it will be from 35 to 40 degrees where the human organism can survive. For an atom between 0 K and c speed, and so on.

So we consider a different 'finite view' of continuity, as the region in which the function DO actually survive entangled between its S and T elements; and the discontinuity barrier where its s=t elements (particle-wave, head-body) disentangle by overdrive of energy or information – where the spatial view of the function of existence tends to hyperbolic form:

In those 'verges' the S=T balance of T.œ, break because the *nested Universe have larger S=T parameters, and the T.œ wants to reach those Δ+1 limits, but it can only 'attempt' to reach one at a time, breaking its inner balance. So* its change in Δ, S or T break the system:

S: In space it means its topological form suffers a topological tearing or transformation. Then the membrane and singularity split and the system dies.

Δ: In scale it means its social evolution overcrowds the carrying capacity of its world and the herd collapses. They are the minimal and maximal regions in scale.

T: In time it means an excess of warping/wrinkling for the membrain that detaches from its vital body, exhausted. They can also be the initial and final 'conditions', that is the value of the function in its t=0 and t=t, beginning and end of its worldcycle.

@: In the mirror of the language of calculus those limits mean regions where the differential equations have no longer meaningful solutions.

¬: in entropic terms, they are limits for the function of existences and its space-form, and time motion.

Conclusion: A fractal Universe of discontinuous regions of existence.

The Universe is discontinuous. To differentiate a function we do NOT need absolute continuity but the existence of an infinitesimal 1/n, and no jump between 'neighbourhoods', which should be no further than 1/n distance either in the X or Y coordinates. 'Adjacency' of the function then is defined by discrete 1/n intervals, which suffice in *Nature=reality, regardless of mathematical methods to define them.*

I AGE: TRILOGIC Of EQUATIONS: Δ-POLYNOMIALS. T- PROBABILITIES. S-TATISTICS.

We are now equipped with the simplest functions that form together a trinity of organic elements, from the sum to the product to exponentials and power laws, to construct a 'world' in which only those dimotional operands do exist, forming sentences that represent 'trans-formations' of spacetime through a dimotional operand.

A function f is a mathematical rule that assigns to a number x (in some number system and possibly with certain limitations on its value) another number $f(x)$ *through a set of operand that reflects the mode in which one transforms into each other*. For example, the function "square" assigns to each number x its square x^2, which means it has been 'operated', X x X, through a re=productive dimotion.

Thus common functions are definable by formulas, *which are related to the operands of equivalence Δs ≈ ΔT and at least a different operand=dimotion of transformation, or else it would be a mere identity,* such as:

Δ§: Polynomials of the type, $f(x) = x^2$. The logarithmic function log (x); & the exponential function exp (x) or e^x (where e = 2.71828…; and the square root function √x.

ΔT: Trigonometric functions, sin (x), cos (x), tan (x), and so on.

And so we can apply the different ilogic structures of reality, of which the simplest one is the S=T duality, which in its more complex form becomes the T-worldcycles≈ S-superorganism duality that merges both space and time elements.

In the simple world of the 3 stairs of ± operands this give us two huge fields of mathematics.

S=T: Probabilities in time and statistics in space, of which the most interesting element are the study of simultaneous curves (Conics), which we have considered on our paper on geometry (spatial mathematics).

Δ-scales: polynomials. So we shall consider only a few questions of polynomials and lineal algebra, in space and study with deep philosophical insights on the nature of time, the laws of probabilities, before we get into the '*wider*' *operands, able to penetrate further beyond a single plane of the 5th dimension, the trigonometric and calculus functions.*

We can then consider that the age of functions divides clearly in 3 degrees of complexity understanding of the 5 Dimotions of existence with different finesse:

The lineal youth of discrete 'herds' and simplex dimotions: Δ0

- The age of polynomials and probabilities, which are the 'derivative' finitesimals in time of an event and statistical populations, which are the equivalent to the integral of a whole.

- The final culminations of the age of polynomial simple functions, with the introduction of the complex plane, the angular functions and the Euler identity that relates both phases of the world cycle of existence through exponential equivalences with sinusoidal function.

The curved, entangled age of calculus and sinusoidal functions: Δ+1

- The age of calculus, where we add derivatives and integrals that play the roles of probabilities and statistics, perceived with much more finesse.

The modern age of functionals, functions of functions: Δ+i

To finally end in the XX century with the expansion of the discipline, already in the 3rd age of mathematics to functions of functions in different mental spaces with n-levels of dimensions.

To understand the subtle differences of precisions between one and the other age, we need to incorporate the approximations of polynomials with derivatives…

The existence of limits to any lineal approximation of the cyclical reality of the Universe, a deep philosophical question studied in our analysis of the divergence and creation of futures that are ultimately closed is also deep, an in essence establish a limit of validity for any lineal approximation, obvious in the Taylor series of differential around a 0 point, which only approaches (with the notorious exception of the exponential decay function of pure entropy, in which both coincide), the curved function to a limit normally that of a single cyclical repetition of the function (as in the sine approximation).

Linearity thus only gets to a point or limit given by a 'cyclical repetition', either to the next plane, or the end of a world cycle, or the end of a stœp Dimotion of existence.

The key ¬Algebraic concept of Δst systems is the existence of a STable region of balance between planes or topologies where the asymmetry of the system is fairly lineal operated in decametric Planes of growth and superposition, and the regions of relative past and future, | or O, Δ-1 or Δ+1, where there is a split towards the purity of motion or form, disconnected parts or wholes, accelerated vortices or lineal scattering and must be operated not with scalar powers but finitesimal integrals and derivatives, more precise in their measure of the 'curvature' of the phase space we study.

It follows that when studying more than a plane of existence, it is better to approach the question through the more sophisticated procedure of the integral and derivative operands, that first localizes the minimal 'finitesimal' of change through a derivative and the integrates it along a varying 'curve' that better reflects the 3 'different' sections of a flow of space-time evolving through Planes, with its central lineal region, better suited for multiplications and simpler power laws, which become hyperbolic in the decaying and emerging frontiers of the plane.

Then there is the question of transformations between space and time and 5D a(nti)symmetries, which is an essential part of classic ¬Algebra and we resume in those terms:

Integral transforms make possible to convert a differential equation of 5D space-time within certain boundary values (time membrane, which limits the equation as a 'real system', not an infinity, into terms of an ¬Algebraic equation that can be easily solved (a polynomial which is a result in a single space-time plane). And this transformation obviously should be of two canonical forms. And as it happens there are 2 canonical transforms:

- A spatial, lineal transformation, and this is the Laplace transform: f(p), defined by the integral:

F(p)=∫∞0 e-pt F(t)dt .

The linear Laplace operator L thus transforms each function F(t) of a certain set of functions into some function f(p) and it is used most frequently by electrical engineers in the solution of various electronic circuit problems.

A temporal transformation and this is the Fourier analysis, which proved that a function y = f(x) could be expressed between the limits x = 0 and x = 2π by an infinite series of waves:

F(x)=1/2 α ∑a cos kx + b sin kx.

That is an equation could become a cyclical time dependent equation developed as a sum of harmonic waves.

And finally the inverse, the fact that a function could be converted into a 5D analytical equation between Planes of the 5th dimension is proved by the third most used approximation of functions, the Taylor series, which expresses a function f—for which the derivatives of all orders exist—at a point a in the domain of f in the form of the power series:

∑∞Δ=0 f (Δ)(a)(z-a)Δ/Δ!

In which Σ denotes the addition of each element in the series as Δ ranges from zeroth (0) to infinity (∞), f (Δ) denotes the nth derivative of f, and Δ! is the standard factorial function.

So this 3 transformations a means - and its applications enlighten an infinite number of real equations that the different 5D Planes of reality can transfer energy or information.

That is, a 5D flow of energy and information can travel into a single membrane with absolute accuracy (no loss of entropy, no need of transforms or groups to resolve them.

But there is a minimal loss of entropy when we transform between planes back and forth (of information or energy) as the transform is NOT absolutely exact - as for it to be exact the number of terms normally tend to infinity, which is not possible in the finite duration of any flow between Δ±1 Planes of the 5th dimension.

Further on it is important to understand the meaning of the operands and the laws of relative equality and dynamic transformations of ¬Æ where equality never fully exists, but we transform, F(t)<=> F(s) as in E<=>Mc², or we approximate values through an evident property ≈.

2D: ± We have seen how trigonometric functions describe in growing layers of complexity by combining with other Dimotions as vital beings do the more complex dimotions of communication, reproduction and social evolution.

So the next question is can the sum and its inverse the negative numbers, such a seemingly simple functions do the same pentalogic?

The answer is yes, but again as in the case of the 'angle' of perception, things must become more complex through the combination of the different operands, while the sum/negative number remain 'dominant'.

5Đ: Social evolution into herds, the 5th Dimotion is self-evident the dominant element of the sum.

2D: Easy to explain is the Dimotion of locomotion as a sum of steps measured by the frequency of those steps in sequential time (though better expressed by multiplication

3Đ: Then the sum can 'progress' in 'accelerated' growth, and that will express the 3rd Dimotion of reproduction.

4Đ: While negative numbers will express the 4th Dimotion of entropy

1Đ: Angles of perception are sines, and as such its derivatives capture a 'quanta of perception in time'.

The 5 Dimotions of space-time that encode, the social evolution, darwinian locomotion and entropic feeding, decay, reproductive growth and perception functions of a super organism are mirrored by the 5 actions=motion=operators of mathematical space: s, ±, x ÷, xª log, ∫∂... As they are encoded in species by genes, in human minds by sentences of words, in light by its dimensions of form and speed, in atoms by quantum numbers. And many other ways in different syntactic forms as the 'languages of god are infinite'.

Such operands can form sentences with relational equivalent and order = ≤ ≥ «» symbols of its 5 dimotions in dynamic form.

In those sentences the question of causality, is expressed in terms of independence.

It seems then that most *spatial functions are dependent on time the independent factor:* **$=f(t)**

We interpret independence in terms of order from motion, the original substance of time into space that extracts its information: as functions are first motions in time that stop and become 'forms' of space, leaving a past-memorial trace. which if NOT erased becomes a population of space, which moves again and then becomes a population and in this manner reproduction of dimensions takes place, building a being of growing ΔDst.

In most functions the independent 'submissive' parameter is a function of time-energy from where the, the dependant dominant parameter that forms it, a mental or topologic simultaneous space, arises.

How this is expressed in ∫∂ terms becomes then clear: since time is discrete, discontinuous, made of T.œ.s, moving, stopping (often perceiving), moving and stopping, we must first 'encounter' the minimal step of the time motion, and

this is what we shall call dt, and then move, stop and move stop a number of steps, which we integrate, building in this manner a new dimension of space-time.

So the combination of ∫∂ *is in fact a process of creation of an ST dual dimension of space-time. And that is the ultimate meaning of it.*

So when study those simplest equations of physics, we shall consider those in which we make a 'ceteris paribus' rhythm of considering it first from the point of view of 'time' steps and then from the point of view of 'space' integrating them as *a simultaneous space, when we have 'traced' enough steps to make that simultaneity meaningful* . And this is the meaning of a definite integral.

Rates of change. The stop and go motion: stœps.

Finitesimal changes are related to the fundamental beat of the Universe, the stop-form-space-perception, go-motion-time, beat of the Universe, which we shall call a stœp, the discrete way of motion of tœs through SPace, which often as in movies we perceive in continuous mode eliminating the stop element:

ΔS(top)->Δt->ΔS-≥Δ(S)t(ep). Δ±¡: Planes, Planes

In pentalogic we shall consider some basic elements of analysis in its calculus of parts and planes.

Galilean px in analysis: finitesimal steps (derivatives) integrated to calculate a cyclic whole.

Further on analysis has over all other branches of mathematics a special quality to study 'changes' between planes of the fifth dimension, as multiple derivatives 'jump' (albeit with different degrees of 'focus') better than mostly 'lineal polynomials' between planes, and the 'curvilineal, Lorentzian' variations, slow downs and accelerations on the S x T= K parameters happen between Planes:

The formal stience of the 1st and 5th Disomorphisms in the mathematical mirror is analysis, which deals directly with the relationships between Δ-1 'finitesimal' parts' and (in)'finities'. Two new terms we still accompany, with the lost inflationary term 'in'; since infinitesimals and infinities are a Kantian paralogism; as all planes have a limit in its quantic units, and all wholes a finite circle that encloses them into a relative 0'-1 'circle unit'.
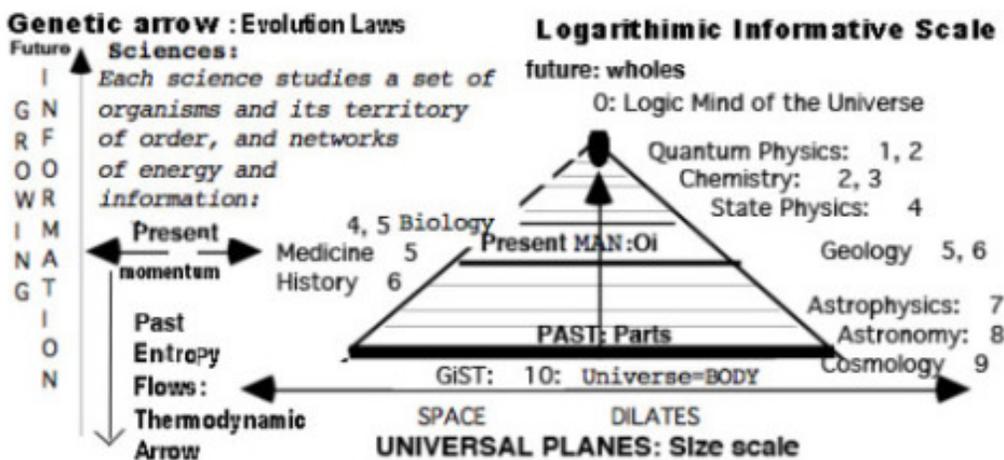
Besides the duality of the 0'-1 probabilistic mind unit which reflects the external 1-∞ universe, a second duality that weights heavily in analysis is that of perception of lineal vs. cyclical form: We are minds of space that measure time cycles: ∫@≈Δð.

Hence the equation of mind-measure defines the understanding of differential calculus: As always in praxis, the concept is based in the duality between *huminds that measure with fixed rulers, lineal steps, over a cyclical, moving Universe. So Minds measure Aristotelian, short lines, in a long, curved Universe.*

So the question comes to which minimalist lineal step of a mind is worthy to make accurate calculus of those long curved Universal paths.

The general rule to identify both polynomials and analysis, is this: **Y=S= ƒ (x=t)**

The difference between lineal polynomials and non-lineal analysis

In the graph, we explain the difference between a polynomial 'regular' description of a system as it changes in the "Newtonian", social scale in which changes are not of quality as much as of quantity and the analytical region in which there is a change of structure and hence of quality with irregularities better shown by analytic operations.

It follows that more important than 'variables' are to ¬Algebra 'operands', whose encoded meaning and 'magic' way of relating systems to get a 'future or present' outcome by merging them according to certain rules of 'creative engagement', truly gives the power to ¬Algebra to mirror the a(nti)symmetries of the Universe.

The key connector of T.Œ with classic science is the full understanding of the dual ¬Algebra operands, ±, x/, ∂∫, √xª as part of the ¡logic, pentagonal game of reality in *all its mirror symmetries; that is, as dimotions≈actions and structural elements*, whereas an immediate correspondence between those operands and the ternary elements Δ@st can be established as follows:

The sum-rest are the inverse arrows of the simplest superpositions of dimensions *between species which are identical in motion and form.*

The product/division rises the complexity of operands a first layer, and serves the purpose, besides the obvious sum of sums, of calculating the margin of dimensions, as combinations which are not purely parallel between clone beings, most likely through the recombination of its Δ-1 elements, as the product of 2 Sœts inner elements give us all possible combinations. Ie. 5 x 4 = 20 IS also the number of connections between all the 5 elements and 4 elements of both sets. So multiplication ads either a dimension of multiple sums in the same plane, or probes for the first time in an inner scalar dimension.

Then we arrive finally to the powers-root systems and integral-derivatives, which operate fully on the Δ§cales and planes of the system, which require two slightly different operands. As §¹º 'social decametric Planes' are lineal, regular, so we can operate them with powers, roots and logarithms.

∂∫ But when we change between Planes into new wholes and new planes of existence we are into 'a different species' and so we need to operate with the magic of finitesimal derivatives and analytical integrals, which keep a better track of the infinitesimal 'curved' exponential changes that happen between two planes, where linearity is lost. The integral/derivative thus will be related to the closely connected 'mind integration' of information.

Ultimately a derivative of a larger world, measure in a still time point of zero latitude) and the processes of integration of parts into wholes that always discharges part of the being, reason why a derivative is essentially smaller than the power operand, as those processes eliminate part of the whole. This being a key technical element of analysis (which often is approached by binomial series - McLaurin, Taylor, etc. - connecting both operands, but reducing the power series to that 'a' constant timespace point in with the mental or whole integration takes place.

Philosophy of time. Pentalogic on probabilities & Statistics.

Probability despite or perhaps due to its simplicity is an essential branch of 5D as it deals directly with fundamental themes of philosophy of time, worth to explore even before we study the laws of probability. To frame our discussion, first we shall consider, the Pentalogic of Probabilities, which is immediate:

Duality: S=T: Probabilities carry onto time by virtue of the S=T symmetry, populations in space.

Δ-scale: Probabilities carry into the 01 faster time sphere, the laws of the 1-∝, entropic Cartesian plane.

SS-TT limits become then for probabilities the 0' finitesimal probability and the 1-whole event; the first of certain importance in theoretical quantum physics, in such processes as quantum tunneling. As usual we shall only consider themes related to ¬Ælgebra (ab. Non-Euclidean, Non-Aristotelian Existential Algebra).

SPATIAL STATISTICS

An important insight of 5D algebra on the S=T mirror symmetry between probability and statistics is the fact that the Gauss distribution that corresponds to a maximal entropic function in probability however represents the normal statistical distribution of a well-ordered informative population around its mean 'evolutionary center'. Thus what is entropy in time becomes information in space, reinforcing all the 5D concepts of the general model of generational space-time, as entropy is the 'time substance' from where mental space and informative seeds extract its energy of existence.

The interchangeability of probabilities and populations.

In the graph, the beauty of pure stochastic processes, and its bell curve and logistic curve, which finally saturates the 'field', resides in its universality and capacity to describe the fundamental events of reality both in space as a series of reproductions that become space-populations and in time as a curve that accumulates populations and *errors or constrains (internal and external ¬limits) to further growth, ending into decay.*
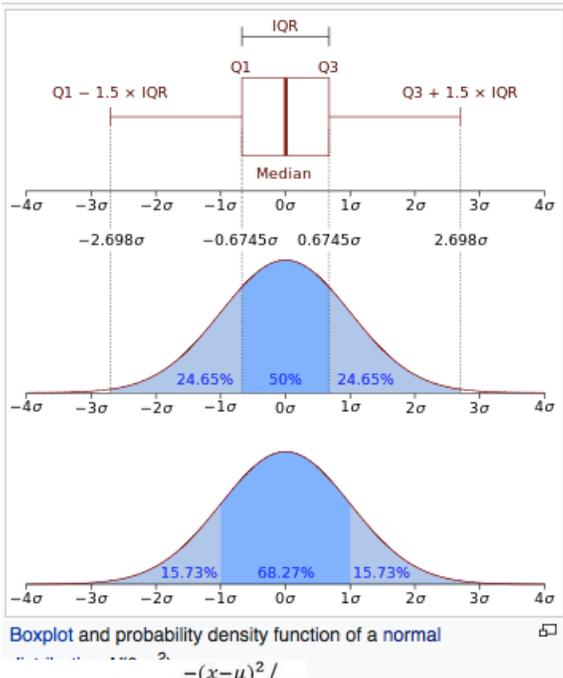
Now there are many themes that connect the law of probability distribution with those of ÐST parameters.

Consider a view of the curve in time as the 3 ages law with the middle age as the most 'abundant'. As we have describe the 3 ages of the logistic curve of growth we can now consider what should be obvious to the ÐST professional (me, i and myself:).

The present ST age between the points of inflection, should be worth the fundamental 'harmonics' of ÐST, bidimensional and ternary functions, either 1/2 or 2/3rds, of the total value of the function, and within the ±3 iconic value, as it happens with eˣ we shall find all the values worth (emergence, first age, 50% of maturity, second age and age of extinction). And so we do find indeed, the commonest normal distributions of ±2/3rds at sigma 1 and over 99% at sigma 3, which is therefore *the whole existence in*

$$F(x) = \frac{1}{\sigma\sqrt{2\pi}}e^{-(x-\mu)^2/2\sigma^2}$$

time and space, of any system of the Universe.

While the 50% comes at sigma 0.6745 a beautiful number, whose secret shall remain (with me, I and myself:).

I'll leave though some interesting relationships for future 5D mathematicians to consider the arcane secrets of 'magic numbers'. The dark matter of the Universe, which a 'lineal' circle does not 'measure', because it is made of 3 diameters, is π-3/π=0.045%; the limited reality that a central perceiver observes if closed in a cycle with such 3 apertures; which as it happens is the left overs of the normal distribution, outside 2 sigmas. Thus what we perceived closed in the standard π-3 circle is what deviates from the mean distribution – *the outside world is equivalent to the outsider measures.*

The difference between the absolute normal sigma and the 2 sigmas on the other hand is 1/10th of e, 0.2718; the standard derivative=finitesimal of the tetraktys, decimal scale. Themes those of advanced ¬ælgebra…

So bits of frequencies of time vs. quanta of populations of space. As frequencies of time become 'populations' of space *once they have been born in time, and 'settled' in space.*

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So, we shall talk of the symmetries between frequencies of future time that become space population accumulated in the past, till they both recede in size as we keep growing in Planes, and become undistinguishable, continuous, and quiet. And then we are studying pie space 'surfaces', through topologic definitions of adjacency, equality, perpendicularity and parallelism. Now with a vital sense-meaning we shall evolve in our upgrading of the 'Universal grammar=syntax' of those languages, when in the 3rd line we start in earnest to construct the different rhythms of time space-change.

Nature though always has a goal: iterate a body-wave of energy, with those parameters.

Since *at the end of the journey we shall see that what nature cares about is to reproduce its fractal st assemblies of creative patterns of space-time. As all is reproduction. The ultimate substance of reality is motion with form, and motion is the reproduction of form along an Δ-1 disordered region of quanta of space that a whole Δ-being will mold and 'rise'.*

And again those processes will be described mathematically with some basic operandi, which describes the union of a surface of smaller continuous simultaneous quanta of space from the past larger, less informed Planes, and of quantum frequencies of time.

So the obvious rule as time and space planes are perpendicular is that a function of st is a multiplicative, reproductive wave function and one of ± superpositions one of field and particles uses a power law, being an integral form of expressing the different Planes in one parameter which is growing decametric through those Planes or exponentially.

The e function IS of death and decay transitions, the 10 scale IS of reproduction, and the body and head, in its reproduction and decay merge all those meanings together.

So patterns in Nature are just frequencies of bits of time and populations of quanta in space.

And so the subtle differences between both concepts and *when to use them, for entities which often science confuses due to lack of perception (as in quantum physics where often time processes are considered spatial), will be essential for the streamlining made by stiences.*

In general we talk of time cycles, which create spatial populations, with different 'degrees' of persistence into the relative past. So motions in space (locomotions) have hardly any persistence in time (we do not leave a trace of parallel forms) except in the simplest beings (waves of light and so on); but reproductions in time leave a persistence of populations. And so the time bit becomes a space quanta. And this again is an important phenomena in the simplest forms (waves and particles) of the Δ-3, 4 Planes.

The immortality of Dirac's function.
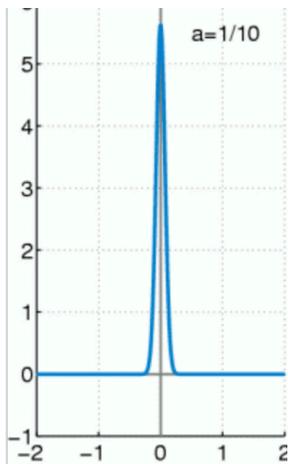
The Dirac delta function as the limit (in the sense of distributions) of the sequence of zero-centered normal distributions

$$\delta_a(x) = \frac{1}{|a|\sqrt{\pi}} e^{-(x/a)^2}$$

as $a \to 0$.

This lead us to consider if there is a form of immortality. That is one, whose events have a Dirac's distribution where the deviation from the norm, tends to 0'=zeroth (term for a finitesimal zero), *without reaching it. It was* **discovered by one of the 4 'talented' physicists of UK (Newton, Maxwell, Heaviside & Dirac NOT Hawking).** The Dirac delta is used to model:
- S: a point charge, point mass or electron point. That is the S=T function side in space. But it is more interesting, to consider it in trilogic as:
- **T:** The function of immortality in time, when the reproduction of a form is perfect in all its stœps, which correspond precisely to those particles that are ¡indifferent in all its replications through its quantum potential stœps as waves-particles (hence equal in form).
-Δ: It models a tall narrow spike function (an *impulse*), and a perfect resonance, *which transfers the information of an Δ-1 element into an Δ° whole, hence emerging as a one.* Resonance thus emerges a perfect distribution which leads to its perfect Log scales.

S≈T HOW TIME EVENTS BECOME STATISTICAL POPULATIONS.

The 1-11^{11} infinity.

The KEY question to formalize probability as population is how to 'translate Planes', which tend to be decametric, in populations... good!

One of the few things that work right on the human mind and do no have to be adapted to the Universal mind, from d@st to Δûst.

Shall we study them downwards, through 'finitesimal decimal Planes' or upwards, through decametric, growing ones? Answer, an essential law of Absolute relativity goes as follows: 'The study of decametric, §+ Planes (10§≈10•^{10} Δ ≈ Δ+1) is symmetric to the study of the inverse, decimal Δ>Δ-1 scale'.

Or in its most reduced 'formula': (**∞ = (1) = 0): (∞-1) ≈ (1-0)**

Whereas ∞ is the perception of the whole 'upwards' in the domain of 1, the minimal quanta to the relative ∞ of the Δ+1 scale. While 1 is the relative infinite of a system observed downwards, such as Δ+1 (1) is composed of a number of 'finitesimal parts' whose minimal quanta is 0.

So in absolute relativity the Δ-1 world goes from 1 to 0, and the Δ+1 equivalent concept goes from 1 to ∞. And so now we can also extract of the 'infinitorum thought receptacle', a key difference between both mathematical techniques:

A conceptual analysis upwards has a defined lower point-quanta, 1 and an undefined upper ∞ limit. While a downwards analysis has an upper defined whole limit, 1 and an undefined 'finitesimal minimum, +0).

So the smart reader will notice this absolute relative duality of Δ±1 where Δ@ is the 'observer', implies relativity of knowledge, always with a self-centered element to define it, and 'the relative definition of finite infinities, or Δ+1 limit (ab. ∞) and finite infinitesimals (+0).

This brings an essential isomorphism of absolute relativity (do NOT confuse Δ-equality, with S-yncrhonicity, Ti-somorphism and @dentity; we 'repeat' as I know when, if any human ever gets to read those texts, there is TOO much upgrading and not to get dizzy, we DO repeat essential truths).

I-somorphism is the concept of equality in time-information and at the heart of the *possibilities* to do mathematical *proofs* in different, seemingly non-identical space-time domains.

When we apply the identity of ∞|^{0} (here written in inverse fashion) as in the title of this post on 'number theory', poised to complete what my fellow countryman, Fermat, started, we *understand the why of numbers and its techniques, so far only made explicit as most science is on how-terms:*

The real numbers NOW include always an inverse infinity between each 1+1 interval. YET they can provide satisfactory models for a variety of phenomena, even though no physical quantity can be measured accurately to more than a dozen or so decimal places; as 0 now is the undetermined lower limit.

It is *not* the values of infinitely many decimal places that apply to the real world but the *deductive* structures that they embody and enable due to the equivalence of 0≈1≈∞.

Analysis and its inverse integral and derivative calculus 'drinks' on all this.

Thus it came into being because many aspects of the natural world can profitably be modeled by those equivalences, as being continuous—at least, to an excellent degree of approximation. Again, this is a question of modeling, not of reality. Matter is not truly continuous; if matter is subdivided into sufficiently small pieces, then indivisible components, or atoms, will appear and finally we *will find the finitesimal +0 quanta.*

But atoms are extremely small, and, for most applications, treating matter as though it were a continuum introduces negligible error while greatly simplifying the computations; *when we work on the 1-∞ upper Δ+1 scale, that of the cosmological realm; whereas the intermediate scale is that of Δo human thermodynamics. So we can then state in physical systems the equivalence of:*

+0 (quantum physics) ≈ |-thermodynamics ≈ ∞ (bound infinity): Gravitational scale.

All what is above quantum effects, in physics, can be studied in a continuum modeling, which is standard engineering practice when studying the flow of fluids such as air or water, the bending of elastic materials, the distribution or flow of electric current, and the flow of heat, and so on (all Δ>Δ+1 physical systems).

The 2 Great Fields Of G-Statistics

GStatistics studies generation of space-time systems by means of statistical multiplication of populations.

The classic field of probability IS concerned ONLY with the study of stochastic, random processes; *hence those belonging to the arrow of entropy.*

So the fundamental new field introduced by GST is the study of causal probability, as all points of space-time have 3 possible dimensional motions, and the choice of them establishes a clear connection between probability, statistics and topological evolution. Stochastic processes thus loose in GST a great deal of chaos, and become far more ordered.

So the next and simplest answer to that ternary probability, is *which of the 3 arrows is equally probable? And the answer is obviously present, as it is conserved and its value the product, superposition or Pythagorean sum of the other two (the commonest combinations/operandi of s<st>t metric). What then about the entropic and informative arrows? Their value must remain the same, but they are imbalanced:*

Max. Tt x Min. Ss (entropy arrow) vs. Max. Ts x Min. ST.

So sometimes they are not easily comparable, and most times they are inverted in its parameters

Further on, as in all fields of reality, we can reorder what we know of stochastic processes of 'entropy' - memoriless 'Markowian processes', according to the Δº±ST five dimensional element of all systems (10D for the full model). So those are the themes of this post.

Main Themes of GSTatistics & Probability.

One of the most fascinating sub-disciplines of GST is the study of the mathematical dualities that represent space and time and combine both as mirror symmetries.

Of them the most important is that between population in space which distributes in the same fashion that its original time event probability. As *beings are born in time and become memorial space, so both are similar concepts ruled by similar equations.*

So the definition of both *stiences* is immediate:

"Probability deals with future time-space, statistics with past space-time".

And entropy and theory of information in the way it is conceived by *classic science* with their 'present state'.

So departing from such definition, as usual we can study the disciplines with the **(Δº±1)S≈T** 5 main perspectives (Δº, Δ±1, S, T, S≈T) of any system themes are essential to probability models in time and populations in space; and attach to each perspective the main themes of the classic science, reordering and enlightened them with whys and new insights, born of our 'advanced' structural understanding of the organic, fractal ternary, symmetric Universe. As the subjects deal directly with ST symmetries, and are foundational of one of the main

mind mirrors of mankind (being the other two verbal thought and art); the subject is truly rich and we will only touch a few concepts:

- **S≈T:** The duality of sequential future events in time (probability) and synchronous past populations of events in space (statistics).

- **Δº:** The epistemological consequences of the present deviation of knowledge NOT as the study of internal causal processes that lead to the future deterministic creation of events, (classic concept of epistemology of science), *but as s* 'mechanical' *external, non-thinking process of recollecting data with machines and putting it into a probabilistic mapping to determine the 'likely' event, considering this to be all what matters to knowledge, as 'evident truth'. It is part of the tendency to substitute time logic for spatial evidence, regressing in the evolution of the scientific method.*

- **T:** And hence the proper understanding, in the path of the Russian school of probability (Kolgomorov, Markov) of the true inner causality of events in time, in 3 great areas according to the ternary principle: disjointed pure entropic events ($T-events) with minimal causality (whose stochastic repetitions are independent), events of full causality, which are strictly determined by a guiding *informative pole, 'soul' or singularity* (§ð events) and events of mixed ternary causality both in time (strongly influenced by past results which conditions the future) and space (diverging freely into the 3 possible paths of all events, an event with more entropy, or more information or more iterative space-time repetitions).

- **Δ±i:** The confusion of spatial populations and temporal events, *in those Planes of reality of which we have little evidence and capacity to distinguish both (quantum, Δ-max.i levels), since the time clocks of those Planes run so fast we see them in its full world cycles as if they were forms of space.* In that regard a key rule for distinguishing them is the fact that time events are 3-sequential elements and space-events are bidimensional holographic forms in simultaneity. Let us consider first this aspect of probability.

- **S:** The spatial entropy of systems and its choices of future paths, according to the 'partition' of present population, which divide themselves in branching ternary forms, till filling up all the possible variations of the system with different populations according to probability. I.e. for example in the galaxy there will be a series of different fractal histories of mankind, according to the possible human vs. mechanical vs. Gaia vs. extinction futures possible to history (3±death paths of future).

So most planets are extinct by nukes into black holes and strangelets (max. probability of future), some evolve into a metal-earth global organism of robots, some will never give birth to life intelligence of the human type and finally the less of them will make humans to fully understand and respect the laws of the organic Universe - and evolve avatar like into the final stage of Gaia, as collective mind of the earth. So indeed, the theme is extensive and apply to all kind of questions. This 5th being studied elsewhere. So we shall deal with the other 4.

The same laws work for time events and population distribution.

Before we get into it, let us consider the main error in the understanding of probability and statistics is to know in small fast Planes of the Universe what is a time event and what is a probability one.

The whole confusion happening in quantum physics about the way the Universe works departs from that confusion, which added to the idealist age of baroque mathematics (when Hilbert says that he 'imagines' points and lines), and the *computer age of approximations and other 'epicycles' of calculus and measure,* and the increasing visual age of thought when causality matters not, gives us what is the most prominent of those errors, which plague the physics of the quantum world: the confusion of ternary time events and branching between $T, ST, and §ð paths, of future time choices and probabilities, with spatial populations and fixed space symmetries, which tend to be bidimensional (holographic principle).

Bohm vs. Bohr.

It is remarkable of the times we live in that the absolutely obvious truth of quantum physics, Bohm-Broglie's, deterministic model has been obliterated by the absurdity of the probabilistic interpretations, just because idealist platonic physicists do not care to understand the whys of mathematics. But *unlike von Neumann don't even acknowledge this fact.*

Indeed scientists tend to confuse those 2 symmetries of reality in small scale and vice versa, for very long they thought and many still do that galaxies of slow evolutionary ages, were 'different spatial species', NOT species in different moments of time evolution.

A mass of errors proper of physics happen in the uncertain quantum realm with no practical evidence, hence with model-theory, which errs because of its misunderstanding of cyclical time processes that imprint its forms in factual space. So often physicists confuse a time parameter with a space symmetry (as when they confuse the electro-weak time flow of informative change with a spatial force, or the 3 ages of quarks with 3 forces in space, as they have not understood the existence of 'time forces', which trans-form reality besides its space forces. So we shall end up with that theme. But obviously as we study all stiences here we shall put other examples.

As usual we will try to simplify all maths ad maximal, as the maths are always right, the conceptual misinterpretation is what we seek to repair.

Symmetry of ∞: Statistic Space Populations = Probabilistic Time Frequency

The culmination of number theory would be probability in time and statistics in space, the last of the many S=T symmetries between space and time; whereas we can observe in time also 'scalar' processes not of multiple populations in social growth, but of multiple events, and not surprisingly both become self-similar, which is the main innovation of 5D, such as *probabilities in the o-1 sphere of time events is equivalent to population laws in the 1-∝ entropic plane of populations.*

This law has multiple implications. The most obvious is that it resolves the conundrum of the equivalence between the quantum scale, we measure as a o-1 event probability sphere (because the speed of life and death of its particles according to 5D, SxT=C, is such that we confuse its short-lived populations with time events), and the 1-∝ entropic cycle of matter (the thermodynamic statistical laws).

Because the quantum world has 3 'Planes' of beings, the parts (particles), the organic whole (atom) and its social ensemble (laws of molecules and matter or worldcycle), obviously those 3 cycles differ. But its treatment as probabilities vs. statistics still responds to the fundamental equivalence aforementioned.

To save space we deal mostly with probability on time as statistics in space is well-known and understood.

On probability there are many things to be said. The obvious ones are the most interesting. We just will consider a few themes for the sake of brevity

We shall first mention the entanglement of S=T elements in the more complex field of statistics and probabilities which we shall treat in our 2nd book on Mathematics (¬Algebra and time theory).

S≈T how time events become statistical populations. interchangeability of probabilities and populations.

The symmetry is profound: bits of frequencies of time = quanta of populations of space.

As frequencies of time become 'populations' of space *once they are born in time, and 'settle' long-lasting in space; given the fact that 'probability birth' is a faster placental cycle than population life in the longer cycle. So there is a clear proportionality between both, reason why the bell curve of statistical populations and probabilities is the same.*

So, we shall talk of the symmetries between frequencies of future time that become space population accumulated in the past, till they both recede in size as we keep growing in Planes, and become undistinguishable, continuous, quiet.

So again, we can cast both with Nature's vital function of existence with its eternal goal: iterate a T<ST>species.

Reproduction and motion, two sides of the same coin: ±, X all pervading operand.

Sine and Cosine are orthogonal 2-D projections of the 3-D Unit Helix (the Unit Circle rotated through spacetime) as described by Euler's formula:

$$e^{it} = \cos(t) + i\sin(t)$$
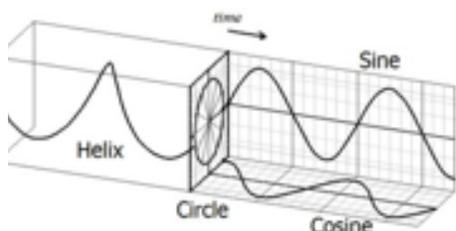
Since at the end of the journey all what nature cares about is to reproduce its fractal st assemblies of creative patterns of space-time. As all is reproduction. The ultimate substance of reality is motion with form, and motion is the reproduction of form along an Δ-1 disordered region of quanta of space that a whole Δ-being will mold and 'rise'.

And those processes will have always its S=T symmetries described mathematically with re=product=ive operands, which describe the union of a bidimensional population surface of smaller simultaneous quanta of space moving, reproducing through frequencies of time.

So we use 3 'scalar operands' for those processes of social evolution, reproduction and emergence into a new scale:

Equal beings add socially in bidimensional fields by ± superpositions, in the simplest social act. But as density and gender mirror symmetries happen, and ST equivalences move the herd, perpendicular time and space functions require an st multiplicative, reproductive wave form or perpendicular, field > particles system. And finally power laws and integrals and logarithmic Planes of decametric growth complete the Δº>Δ+1 creation of a new plane. And there is NO more operands as the Universe is discontinuous and so once a game is completed a new scale starts from nothing, as a new fractal point emerges in an entire new world.

So probabilities can be seen as frequencies of reproduction in time of populations of space quanta.

The persistence of memory – lives that last convert probabilities into populations.

Time cycles create spatial populations with different 'degrees' of persistence into the relative past: Motions in space (locomotions) have hardly any persistence in time (we do not leave a trace of parallel forms) except in simpler beings (waves of light and so on); but reproductions in time leave a persistence of populations. So the time bit becomes a space quanta. And this again is an important phenomena in the simplest forms (waves and particles) of the Δ-3, 4 Planes. Hence the need to know the S=T symmetries between both disciplines, to know *when to use them, as in quantum physics where most processes are time events, even if humans with a much faster time clock consider them spatial.* We illustrate both cases with 2 key equations that mix those vital constants defining both T=locomotion and S-populations as reproduction games):

Euler's formula (left) describes the S=T symmetry of a world cycle reproduced in a lower Δ-1 'plane'. So it can be interpreted as the waveform derived of the constant reproduction of the Unit cycle in Δ-1 points' defining a world cycle of space-time in Δ-1, with faster time life hence minimal persistence of memory. *Its reproduction, thus appear as mere locomotion as the intensity of the wave fades away in the lower herd-plane. In the other extreme,* the probability distribution of a population in space (Gauss curve) persists so long, as its populations are in the same plane in which they were created that both S and T stay roughly the same. And its maximal value is in S=T, the central point that maximizes the function of exist¡ence, which is defined at that point. Both curves further on are similar to the bell like curve of the function of existence in time, so the central region S=T in time the mature age of the system. Thus fields so apparently disjoined are equalized by 5D metric showing in a rather simple but profound way how all is about super organisms tracing world cycle of space-time in synchronous or sequential forms.

Conclusion: S=T Symmetry of probability=unit circle and population=1-∞.

The basic concepts of the theory of probability, namely random events and their probabilities, are completely analogous in their properties to plane figures and their areas. It is sufficient to understand by AB the intersection (common part) of two figures, by A U B their union, by N the conventional "empty" figure, and by P(A) the area of the figure A, whereupon the analogy is complete. The same remarks apply to the volumes of 3D figures.
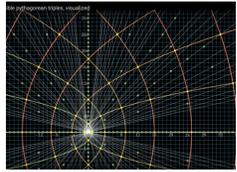
The most general theory of entities of such a type, which contains as special cases the theory of volume and area, is usually called **measure theory.**
It remains only to notice that in the theory of probability, in comparison with the general theory of measure or in particular with the theory of area and volume, there is a certain special feature: A probability is never greater than one. This maximal probability holds for a necessary event U: **P (U) =1**

The symmetry o≤1≥∞ is then a fundamental graph of the fifth dimension. Let us see how with a simple example of Disomorphisms between certain points of the unit circle and the 1-∞ complex plane:

Mirror symmetries between a 0'-1 universe and a 1-∞ are interesting as they set two different 'limits', an upper uncertain bound for the 1-∞ universe, in which the 1-world, Δº exists, and a lower uncertain bound for the 0'-1 Universe, where the 1 does not see the limit of its lower bound. Are those unbounded limits truly infinite?

We can consider it in terms of the homology of both the microscopic and macroscopic worlds.

Of course the axiomatic method 'believes' in infinity - we deal with the absurdities of Cantorian transinfinities in articles on numbers. But as we consider maths, after Lobachevski, Gödel and Einstein, an experimental science; we are more interested in the homologies of Δ±1. For one thing. While 0 can be approached by infinite infinitesimal 'decimals', so it seems it can never be reached, we know since the 'violet catastrophe' that the infinitesimal is a 'quanta', a 'minimum', a 'limit'. And so we return to Leibniz's rightful concept of an 1/n minimal part of 'n', the whole '1'.

This implies by symmetry that *on the upper bound, the world-universe in which the 1 is inscribed will have also a limit, a discontinuity with Δ+2, which sets up all infinities in the upper bound also as finite quanta, 'wholes of wholes'.*

One of the most important S=t symmetries of the mathematical Universe is the one between time probabilities in the 0=1 unit circle and the 1-∞ plane of statistical populations (space-points), as it is both, *a symmetry between the Δ-1 scale of finitesimals (unit circle, where a finitesimal, 1/n is defined as the inverse of a real number of the 1-∞ plane); and one between time-cycles and space-planes (topological symmetry).*

The conjunction of Euclidean geometry with a focus in the c@rtesian graph world represents the best way to consider Δ-Planes, as the most beautiful of those scalings *is already incorporated on it, giving us the key 'Δ-symmetry, between the 0'-1 unit circle and the 1-∞ larger Δ+1 scale, which have a natural correspondence - as the maths that work in the 0'-1 unit circle work on the 1-∞ scale, with 3 differences:*

1.   *The unit circle has a defined membrane, but its minimalist infinitesimal 'decimal' is not defined, inversely, the 1-∞ scale has the minimal infinitesimal 1 defined but the ∞ element is not so those are the elements for a best choice of 'mental geometry' to study a problem depending on which element we do know, the 'singularity 0'-undefined, 1-defined' and the membrane, 1-closed, ∞-open.*

2.   A unit circle is a ð-cyclical/polar geometry, the 1-∞ scale is an open unconstrained one, another choice for solution of problems depending on its characteristics.

3. A unit circle is Δ-1. The 1-∞ scale is Δ+1, with the 1-membrain as the open or closed border among them.
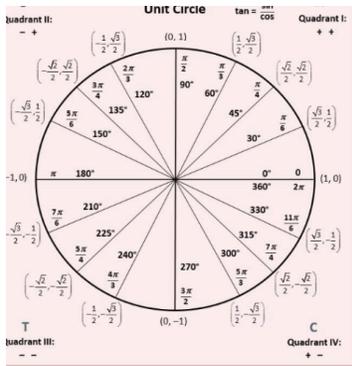
The Unity circle where 1 is ∞ and 0, the unreachable 'quanta' of the Δ-1 scale is the best mirror symmetry between a self-centered 'polar' mind and its universe (1-∞ region). In maths in fact most processes that matter can be in geometry proved by a bidimensional informative (holographic principle) graph, and most key processes of space-time world cycles, can be observed to happen in the 4 first digit, around the three key number (e+e/10=3, π-apertures of the cycle=3 and so on).

When we extend the domain of the unit circle to the complex plane with its bidimensional holographic numbers, the concept of a 'world' represented now by the higher dimensionality of the Riemann sphere (unit circle of the complex plane) is clearer, as every point of the sphere communicates with one point of the Complex plane, while *the 0 point of the sphere becomes the inverse of the ∞ point of the 'complex plane'. In this manner as in projective geometry, the o-mind point becomes the mind-mirror of the ∞ real Universe:* O-point mind x ∞ Universe = constant world.

Leibniz's monads, which do not communicate, are the simplest fractal points, as minds=mirrors of the Universe, where 'each point is a world in itself.'.

In mathematical number theory, we say that: The interval o-1 is the same Δ-1 infinity that the interval 1-∞. Cartesian points in that sense were for the pioneers of science, more than a mathematical artifact, but the mathematical mind in itself looking at the time-space Universe.

In the mathematical sections we study that reflection mind-language mirror. And the many homologies between numbers and space-time evolution. To renormalize a being from 1 to ∞ reducing it to a function in the 0'-1 range in that sense mimics the fact that the whole in each scale of diminishing size holds the same quantity of information, and indeed, the 0'-1 and 1-∞ limit make sense as the mind o-1 representation of the whole world outside of him 1-∞

Now, there are 2 other 'spaces' besides the 3 topological spaces (Sp-cylindrical, ST-Cartesian, ðf-polar) worth to notice, to explain all the fractal space-time complex world.

Let us remember a fundamental principle of Δst theory, pentalogic, which I also call the Rashomon Effect – the need for 5 ¬Δ@st perspectives to understand the Universe :

'Every system that exists in 5D² space-time has 3±Δ Disomorphic functions=forms.'

To exist you must have a function-form connected to each of the 3 present 'space-time dimensions' explained in the present fractal generator: Γ: §t<ST>§ð; and the two scalar dimensions, Δ±i of the Universe.

In praxis we can often reduce the 5 roles of the being to the ΓºΔ±1 dual roles which will give us the bare minimum *function and form of the system. So when the best way to start the description of any system is to consider its functions in present ternary space-time and in scalar 4D/5D inverse entropy/ social space-time.*

And so we must find for complex numbers two fundamental roles as 'numbers able' to describe the 3 states of the generator, $T<ST>§ð and the Δ 'polynomial' or ∫ð functions between planes of existence.

The third great field of numbers theory, probability and statistics; focuses in the analysis of nature's space-time events from both points of view, the spatial, statistical in the 1-∞ graph and the temporal, probabilistic in the 0'-1 sphere. So we find 2 parallel sub disciplines, S-tatistics and T-probabilities, as *an SΔº≈TΔ-1 mirror, similar to the one* @nalytic geometry performs between topological and ¬Algebraic solutions, Those dualities are of special interest, as they bring both elements of S=T reality and allow to observe their differences by considering in what they differ, even if the *fundamental theorem of modern theory of measure is that for each 'theorem of probability in the o-1 cycle, it corresponds an equal theorem on population measure in the 1-∞ plane', given weight to the concept of a fractal Universe which performs the same events and forms in all its Δ-planes.*

Bridging the 5D theory of probability-statistics and the present state of the subject.

Ultimately what a probability sphere shows is how palingenesis of a repetitive sum of partial events/cells/beings in time accumulates towards the 'project' of completing an emerging Δ+1 whole, from its 'pieces, bits and bites', which first must be reproduced in enough numbers (statistical accuracy requires an N->∞ frequency of events), and then must collapse along the laws of aggregation, which are described in probability and measure theory.

So the a priori condition for the laws of probability to happen is a massive reproduction of events, the a priori condition for a distribution of populations to become exact in the standard bell curve and its deviations is a massive reproduction of populations. Only then the organic game of existence becomes efficient and exact, while when we deal with minimalist numbers of social events/populations the structures are inefficient, more free, less deterministic. **Its mathematical expression then** considers the Δ-1 plane that of probabilities, which *surface into the population 1-∞ plane only when the event has 'happened' with probability 1 and hence becomes a 1-unit of the population plane.*

5D PROBABILITY V. STATISTICS: RANDOM V. CONDITIONAL EVENTS

From the representation of probability as the standard value of the frequency ƒ = m/n, of an event A(m), where m are the occurrences of A, n, the trials, 0≤m≤n, and thus 0≤ƒ≤1, follows that the probability P(A) of any event A must be assumed to lie between zeroth and one:

1.   **0≤ P (A) ≤1**

However if we consider the law of large numbers and classify each event as an undistinguishable, finitesimal 0', since 0 does not exist, a minimal uncertainty might happen, as long as we are within the limits of possibility – that is, the event A is possible, or else we would not bother to calculate a probability. So as n->∝ ; 0' becomes.

The first distinction thus between 5D probability and classic probability is that neither 0 nor 1 have absolute probabilities. Since 0' does exist. Unless is an impossibility; that is a *falsehood which does not belong to the realm of mathematics but of logic, a language in which the Algebra of truth and false makes sense. The error of probabilities that include 0 as well as set theories is to consider that falsehood is equivalent to zeroth. But we talk of a different language. Falsehoods do not enter the function of existȷence which is what numbers study through social scales.*

However 1, the whole might exist, which sets a curious asymmetry, an essential property of the Universe that we will find then in the inverse 1≤ x < ∞, on the 2nd worldcycle of existȷence where the asymmetry is reversed to that of the 0'-1. As ∞ is what is uncertain and does not exist.

So we set as we did in number theory a new law of probability. **So we rewrite the classic law, as 0':**

1. **0 < P (A) ≤ 1; or using the symbol of a finitesimal 0'≤P (A)≤1**

In all themes related to 0' practical purposes make 'acceptable' the elimination of the residual 'finitesimal', as classic mathematics does with the ideal infinitesimal. So in praxis we might say classic mathematics corresponds to ¬Æ mathematics with the simplification of discharging 0'. Why then to bring it into the play? Because of both, philosophical reasons and experimental sciences, such as mathematical physics that enters into paradoxes (singularities, infinities, lack of 0 temperatures, 0 motion, h-uncertainities) solved with the understanding of 0'.

It does also imply a discrete universe, where continuity is satisfied when the change on Y is proportional to h≈0'. Again the truth is discrete nature, the mind and its languages though simplify discharging 0' and making it into 0.

Intuitively, a continuous random variable is the one, which can take a continuous range of values — as opposed to a discrete distribution, where the set of possible values for the random variable is at most countable. While for a discrete distribution an event with probability zeroth is impossible (e.g. rolling 3½ on a standard die is impossible, and has probability zeroth), this is not so in the case of a continuous random variable. For example, if one measures

the width of an oak leaf, the result of 3½ cm is possible, however it has probability zeroth because there are uncountable many other potential values even between 3 cm and 4 cm. Each of these individual outcomes has probability zeroth, yet the probability that the outcome will fall into the interval (3 cm, 4 cm) is non zeroth. This apparent paradox is resolved by the fact that the probability that X attains some value within an infinite set, such as an interval, cannot be found by naively adding the probabilities for individual values. Formally, each value has an infinitesimally small probability, which statistically is equivalent to zeroth.

Formally, if X is a continuous random variable, then it has a probability density function f(x), and therefore its probability of falling into a given interval, say [a, b] is given by the integral:

$$\Pr[a \le X \le b] = \int_a^b f(x)\,dx$$

In particular, the probability for X to take any single value a (that is a ≤ X ≤ a) is zeroth, because an integral with coinciding upper and lower limits in 5D is always equal to 0' – a finitesimal.

How this works out is simple. Unlike in classic mathematics 5D mathematics do have entropic limits, where the domain of the function is defined, outside of which it does not matter. I.e. the probability that I am God is zeroth, but that does not matter. It is a meaningless proposition within the 'logic, rational' nature of the cosmos. Even so we could ascribe a probability of belief if we forget rationality, and then it might be as large as 1 if I found a religion, which certainly would have more knowledge on the 'thoughts of God' than the musings of G.Bush, the God bush creeping in the desert that an ass breeder of the Hebrew saw in the bronze age and interpreted as the word of god. And since all is ultimately mental space, why not? This kind of scholastic argument shows the absurdity of breaking beyond reason, beyond reasonable domains, and beyond what matters to us – the probability of certain event is counted only when it is meaningful to the event. And so even in a mean distribution of random measures around a certain determined value – however ignored by the observer, the tails of sigma go to infinite infinitesimals (0' ∝).

It follows immediately by the mean distribution, which is by the S=T parallelism also the mean distribution of populations, that the concept of an 'error' in measure and an 'error' in the repetition of information (clone individuals of an species that will vary in size etc.) that while the future wants to be determined, exact, in its reproduction of an infinite present, it does commit always errors, in the reproduction of its finitesimal parts so that death is the unavoidable fact of an accumulation of errors; if we consider the ever lasting equality of all forms as the Nature of immortality (indistinguishable infinite entropy, which the normal distribution does maximize). It also follows inversely that reproduction of present will always be thwarted by a minimal sigma relative past and future of that property; that is, its ± variations in population (statistical mirror in space of distribution in time).

The same concept applies to conditional probability, when we consider the simplest sequential monologic Aristotelian causality of the simplest level of events in reality, the chains of dimotion of space-time, as a series of actions of perception, locomotion, energy chasing and feeding followed by repetition of our Δ-1 finitesimal parts to evolve socially new tissues that wave worn out.

As the conditional probability of the event happening requires a series of conditional steps I (right perception) -> A (right motion) -> E (right feeding) -> O (right organic reproduction) -> U (right universals evolution), and the conditional probability of U≤O≤E≤A≤I, it also follows that Nature extinguishes populations which do NOT evolve socially; that is errors in IAEO, do not achieve U; do not reproduce, that is errors in IAE not achieve O, and extinguish systems that do not feed; that is, commit errors in IA…

Reality tends to favor entropic errors, entropic distributions. So how the Universe achieve its survival? Simply by increasing enormously O for those who achieve Δ+1 U; social evolution of parts into wholes, which then can reproduce in Δ-1 a relative ∝ number of seeds. And thus ultimately the possible variations of reality have been

limited by the laws of a realist probabilistic method where probability is 0<0'≤P<1<1', whereas 1' is NOT only 1, the whole but the mind above the whole that makes it all together. That is 1, is not 9, 3 x 3 parts, but 10, 3x3+1...

What about the other 'chains' of more complex entanglement? Here the laws of probability do change because unlike classic algebra, in ¬Ælgebra (existential algebra), conditional probability reverses, such as the probability of an event to happen will increase with the conditional events happening in simultaneity. So conditional probability increases beyond 1 the happening of an event, to a discontinuous set of repetitive stœps of events that by different means that multiple reproduction increases the events of probability beyond one.

In that regard, 5D probability bridges beyond the single event's chances to consider the analysis on how the 0'-1 finitesimal scale crosses the 1 limit to enter into the statistical plane of growing populations.

The single past, the vital present, the potential future, and the roots... of equations.

Let's start those comments on probability with a theme hardly understood: The difference between the past which is always one and the future which is potentially an infinite entropy field, which will reduce to one, as it 'passes through the present', due to the deterministic nature of the actions of survival of the 'actors' of present.

In dealing with roots mathematicians have been for very long at loss and have not understood its key element: the fact that going downwards from a number through its root, we 'split' and grow the number of 'potential futures' . So we need to introduce some concepts on the single past, action present and potential futures that structure the constant flow of times in the Universe.

In essence the future is time entropy and as such has several potential paths. While the past is a single one and hence it precludes that the future will be highly deterministic. And this determinism is performed by the sequential program of survival of all the actors of an event that try to maximize its function of existence. So the future seems to be quite deterministic with a proviso: if the actions of survival of the present fail, the future will not be, will be 'negative', a lack of future for one of the contenders. So in the present the probabilistic future already hints at; but as the individual is modular and can choose between different actions and no actions, the future probabilistic potential virtual dual paths of being and not being, already manifest in the present of acting and not acting.

And so the future has two potential outcomes, one positive and one negative, exactly as the 2 roots of a number. Specially when they are *solutions to an event in time that is taken as the future logic path of the equation, where it will settle down to a point that will become the past and no longer 'move'.*

This of course brings a necessary distinction between negative root solutions to spatial problems of populations which simply do not exist and must be rejected, and ± solutions to a problem of an event in time which are valid as they show the 2 potential paths, but might not happen both together and so we need further information to solve the real outcome and finally to split solutions in which the ± values refer to a 'perpendicular split' of the parts of the being represented by X^2, which is now broken in the S and T elements one of which due to its inverse properties is considered the negative solution.

It is not that simple and abstract, a fact that those who use mathematics to assess real problems should, because they need to discern what are the proper solutions of the 3 possible outcomes of a root: we discharge the negative solution for spatial population; we analyze the outcome as – entropic or + informative for events and we accept both when the solution is the split of an ST system.

This simple concept applies then to the cubic root whenever it is relevant, as we can also talk of a 'ternary system', sT<ST>St, and so a ternary split is possible and in the very few case in which a quartic is relevant of a dual split of ST and ST, beyond which there are no solutions by radicals to quintics (Abel-Ruffini), a fact worth to mention as there is really no more positive dimotions (the fifth being entropic dissolution with explosion back to the Δ-1, which erases the information of the plane of existence we were dealing with).

The indifference for entropic futures and those who don't change.

An important consequence of that structure of single past, vital present and potential futures, is that the futures that matter are those who solutions are 'meaningful' to the survival of a system. This means there are more than 2 'roots of the future' as entropy is potentially infinite, for events that do not matter. I.e. we can throw 2 dices and get 36 different results but for the 'dices' – the actors of the event, they are indifferent events that do NOT change their structure. So the atoms of the dices and its whole geometry won't change. And yet if the dices are connected to a player in the entangled universe, who has risked 1000 $ to make 36 thousand to pay a debt, or else he will be killed, it is a life vs. death=entropy event. And as such is a dual event NOT one about the dices but about the probability he will live or die. And that makes it a 'conditional probability'.

We must then consider memoriless Markowian processes where entropy makes indifferent the result and conditional events ; but our interest are not in the Bayesian rules of that calculus or the Kolmogorov formalism in the pedantic language of sets, but on the structure of the 3 ages of time regarding its probabilities as follows:

Because the present is 'conscious' and vital guided by actors who seek to maximize its function of existence, the probability of 'survival' is always larger. I.e in the previous case, likely the player won't risk his life but try other means to enhance the survival with the Mafiosi. In hunting processes prey escape more often that one would think, because the stakes for them are higher. In planetary orbits, mass falls far less often in a straight line to the star but turns around feeding on the gravitational vortex with the minimal rate of falling to elongate the life of the planet. And so on.

And so the previous graph in which a distribution tends always to the S=T point of balance merely notices the obvious fact that S=T maximizes survival and it is always the maximal probability of an event, the middle reproductive classic age of a being. And so on.

Determinism then is also on the eyes of the observer to see or not the error, and convert the previous graph from the 'perspective of a slow time thinking mind' hence able to see multiple 'trials' into a 'Delta Dirac function' so to speak, with a thin determinism in the center.

RECAP.

Number theory achieves a complex evolution with its symmetric analysis of numbers as time-like probabilities vs. numbers as space-like statistics.

Of the many ways to express this we can say that time probabilities in the domain of 0'-1 is equivalent to space statistics in the domain of $1-11^{11}$ the next scale of the Universe.

This correspondence can be uses as a general example to that of the mind mirror, 0'-1 observing the world $1-\infty$ in which is hosted, and many other symmetries of scale. We can see a super organism as the memorial scale printing of those 11^{11} citizen-cells of the super organism.

So for all purposes a good approximation would consider the total numbers of $\Delta-1$ elements of the whole super organism as the ∞ limit of the $1-\infty$ sphere, normally at the $11\hat{}11$ level.

In this manner the symmetries between motion and slow, whole stillness, mind and entropy, virtual and real develop themselves in the kaleidoscope of perfect mirrors of mirrors of worlds, mirrors of universes...

So we shall close our brief view of number theory with some basic notions on that symmetry, essential to modern maths, specially with the development of mathematical computers and its capacity to do recurrent sequences of quantitative methods.

Let us then first define the pentalogic of probabilities and statistics in its minimal duality:

Γst: *T:probabilities=S-population is the ¬Algebraic duality.*

Δ±1: Time probabilities happen as they have been formulated in the sphere 0'-1 micro universe to space statistics in the Δ+1, 1-∞ self-similar Universe to which the o-1 mind world reduces.

Differential equations as expression of modern probability. Deterministic v. Random Markowian processes

We said that the modern version of probability are derivatives that extract a single event and gather it all together into a whole with an integral, with the virtue of being more specific for each type of Dimotion of spacetime. And for that reasons giving us more information on the causal reasons of events, *which probability lacks by merely connecting the parts and the whole without investigation on the connective elements between both.*

Let us consider the classic example of analysis of locomotions.

The principle of causal relation among phenomena finds its simplest mathematical expression in the study of physical processes by means of differential equations, to which we shall dedicate an entire chapter of 'time-maths'. So let us just introduce a couple of concepts needed to consider the *conditional probability of the existential chains of actions that determine the success of a given 'function of existjence'.*
Let the state of the system under study be defined at the instant of time t by n parameters: $x_1, x_2 .... x_n$

The rates of change of these parameters are expressed by their derivatives with respect to time: $$\dot{x}_k = \frac{dx_k}{dt}.$$

If it is assumed that these rates are functions of the values of the parameters, then we get a system of differential

$$\dot{x}_1 = f_1(x_1, x_2, \cdots, x_n),$$
$$\dot{x}_2 = f_2(x_1, x_2, \cdots, x_n),$$
$$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$$

equations: $\dot{x}_n = f_n(x_1, x_2, \cdots, x_n).$

The greater part of the laws of nature discovered at the time of the birth of mathematical physics, beginning with Galileo's law for falling bodies, are expressed in just such a manner. Galileo could not express his discovery in this standard form, since in his time the corresponding mathematical concepts had not yet been developed, and this was first done by Newton.
In mechanics and in any other fields of physics, it is customary to express these laws by differential equations of the second order.

Given the values z_0 and υ_0 at the initial instant t_0, the values of z and υ for all further instants t are computed uniquely, up to the time that the falling body hits the surface of the earth.

The proponents of mechanistic materialism assumed that such a formulation is an exact and direct expression of the deterministic character of the actual phenomena, of the physical principle of causation. According to Laplace, the state of the world at a given instant is defined by an infinite number of parameters, subject to an infinite number of differential equations. If some "universal mind" could write down all these equations and integrate them, it could then predict with complete exactness, according to Laplace, the entire evolution of' the world in the infinite future. *This is truth but because the number of elements that are influencing each other is enormous, the humind cannot access them all and so absolute truth is not accessible except for the beginning and end points of SS (absolute rest respect to the perceiver and absolute entropic death).*

It is necessary to understand this distinction between the mind that perceives and the event it perceives:

'Only the event carries all the information about itself in the present time in which it happens'.

This means an external observer cannot calculate with absolute certainty what is happening beyond those 2 points of relative SS-TT or vice versa, TT-impulse-SS-rest, which are in fact the points calculated as 'Cauchy conditions', etc for differential equations. Since even if he were calculating space=positions with exactitude it would take it too

long in time=motion and when all the information were gathered the position would have change. This is also at the heart of the uncertainty principle, and its ultimate cause is that motion NOT form is the substance of reality and DISCONTINUITY of infinite fractal points with WILL to act not a single 'God-will' in a world of 'mechanical' mindless systems is at play, and finally fractal points move in stop and step, particle-wave states which allow them to 'zig-zag'. So knowledge is always synthetic, limited to certain parameters and equivalence relationships on the level of the observer, which then *egocy transform in deterministic truth when they are reductionist ones. I.e. we cannot know the movement of all the particles of a canonical ensemble but extract its temperature, which is NOT a parameter of the scale of the molecules – speed is – but of our 'simplifying' scale.*

It is however easier to calculate from smaller parts who are by virtue of 5D metric, SxT, faster in information and numbers, the *slower synthetic behavior of the whole, which influences them. Moreover, the whole likes the smaller parts to know that his 'big field behavior' – changes on collective energy=heat and topological form parameters must be obeyed, and doesn't hide information. For that reason synthetic organic truths are easier to know. And we can guess the future in the organic level of networks that equalize parameters of the smaller parts. We can be more precise in measures of 'larger wholes' than smaller quanta.*

Thus in fact this quantitative mathematical infinity is extremely coarse in comparison with the qualitatively inexhaustible character of the real world. Neither the introduction of an infinite number of parameters nor the description of the state of continuous media by functions of a point in space is adequate to represent the infinite complexity of actual events.

All this means that the study of actual events does not always proceed in the direction of increasing the number of parameters introduced into the problem; in general, it is far from expedient to complicate the ω, which describes the separate "states of the "system" in our mathematical scheme. The art of the investigation consists rather in finding a very simple space Ω (i.e., a set of values of ω or in other words, of different possible states of the system), such that if we replace the actual process by varying the point ω in a determinate way over this space, we can include all the essential aspects of the actual process.

But if from an actual process we abstract its essential aspects, we are left with a certain residue, which we must consider to be random. The neglected random factors always exercise a certain influence on the course of the process. Very few of the phenomena that admit mathematical investigation fail, when theory is compared with observation, to show the influence of ignored random factors.

This is the state of affairs in the theory of planetary motion under the force of gravity: The distance between planets is so large in comparison with their size that the idealized representation of them as material points is almost perfectly satisfactory; the space in which they are moving is filled with such dispersed material that its resistance to their motion is vanishingly small the masses of the planets are so large that the pressure of light plays almost no role in their motions. These exceptional circumstances explain the fact that the mathematical solution for the motion of a system of n material points, whose "states" are described by 6n parameters which take into account only the force of gravity, agrees so astonishingly well with observation of the motion of the planets.

But as soon as we introduce those parameters or put a 'third body' element the outcome while it will be deterministic in the sense *it will not split into many worlds events, not even in those cases it seems to do it (quantum paradox) since the electron merely 'dissolved' from electron-particle state, to wave of light bosons-density during its motion but will collapse and hit target as a single electron in its end SS-tate.*

Since as we said the precission of information is maximal only in the still state or mind-mapping, and in that case is achieved through selection of form and its reduction to mapping that can be more dense in information, or in the end state of entropy, achieved by dissolution of the whole and its details into an entropic 'heat', scattered state.

I.e. In the flight of an artillery shell under gravity and resistance of the air the perturbing random factors are significantly larger and the scattering of the shells, i.e., their deviation from the theoretical trajectory reaches tens

of meters, or for long ranges even hundreds of meters, as *the deterministic networks of the state of particle-organism have been lost and so external non-measured elements act upon each broken part*. These deviations are caused partly by random deviations in the initial direction and velocity, partly by random deviations in the mass and the coefficient of resistance of the shell, and partly by gusts and other irregularities in the wind and the other random factors governing the extraordinarily complicated and changing conditions in the actual atmosphere of the earth. *It is then when the causality and determinism is lost when we can use* the methods of the theory of probability, which only consider the *origin and end without the causal elements in between and measure the end by general more extended properties- i.e. the area of the* scattering of shells essential for the practice of gunnery. So we study random events, when the random "residue" for a given formulation of a phenomenon proves to be so large that it can not be neglected, then a possible way to proceed is to describe the phenomenon more accurately NOT by introducing new parameters and to make a more detailed study by the same method as before which will run in the extreme amount of data, *only able to be reduced by the use of a faster, more efficient mental system of smaller SxT=C elements (chip paradox and growing use of computers to calculate on big data, our larger slower minds – with the obvious future consequence for human freedom, as we become 'managed' by computers the way we 'manage' plants of slower chemical minds).*

Instead if we don't cheat the scale and use 'superbrains' at faster rates of processing information the only method available to huminds is to determine the influence of these residual "random" factors for a long interval of time or for a large number of repetitions of the process under study with probabilistic and statistical S=T methods, average laws called statistical laws; started in the kinetic theory of entropic gases, which shows how the joint influence of random collisions of molecules gives rise to exact laws governing the pressure of a gas on the wall, the diffusion of one gas through another, and so forth – that is, we obtain larger, less detailed parameters on our $\Delta^{\underline{o}}$ plane by making ¡*ndifferent the values and consequences of the Δ-1 scale, which is in fact what computer big data systems are doing with the growing 'herding' of humans as anonymous beings with 'credit' ratings for the physiological blood-reproductive-economic network, etc*.

Randomness of Markowian processes in space vs. Causality of deep time Planes.

But again it must be understood those methods are a substitute to the causal understanding of networks and organisms where information is more specific and determinism higher, and there is a language specific to the network to be able to understand it in more detail. I.e. the biological hormonal languages to understand the specifics of a cells' actions and behavior, the analysis of the financial system to understand humans controlled by flows of money in a capitalist system (even if here this control of society by bankers is censored and so economists pretend it is all random, better studied with statistics). The same goes for the preference of a differential equation over a statistical method to study specific dimotions targeted by specific functions.

So the key fundamental element to use probability and statistics, as humans conceive it, is the study of chaotic, entropic randomness, *which implies for most cases study to study an ensemble of indifferent entities with an entropic future, of democratic ensembles with equal opportunities for all the 'parts' in existence of the system.*

Yet even random phenomena becomes ordered. Why? Because even in the most 'memoriless' process, the chances of future will be reduced to a minimal set of 'dual and ternary' processes of branching, and the only character of pure randomness is that *all of them will have a similar relative chance. I.e. a dice, has three spatial dimensions (3 double faces), which we can consider each to be the ± dual inverse direction (opposite ones). So we are in a 3 x 2 system. And all directions are of equal value, because they are 'spatial orientations' without any 'topological bias' (i.e. not $T, ST, or §ð different 'faces', which could trick the dice, as for example, a region with 'heavier §ð-mass', an §ð centre of gravity, displaced, and so on).*

So in principle, random phenomena have a predictable nature shown in the regularity of the 'grand numbers law', and this brings us also a reflection on 'time events', since as they repeat, they *always tend to close a conservative energy- zeroth sum world cycle. Which increase the probability and determinism of a process. As*

on the long term all world cycles become closed, and the Universe become in its relative infinite duration always a balanced world cycle, with all the dimensions of scale, topology and time, coming to a 0'-sum.

Thus those are the insights of GST in the mysteries of 'probability: zeroth sum world cycles imply the law of grand numbers (regularity and equal probability) as long as the process is 'spatial' (memoriless, simultaneous, with no preferred direction, etc.) So as in geometry we say that from 'long spatial distances' all lines become geodesics (as when you come out in scale of the flat earth), in time we say that all processes find equilibrium among all the possible events of the system.

Classic laws of probability

ST: Thus as a mathematical foundation for statistics, probability theory is essential to many human activities that involve quantitative analysis of large sets of data. Probability theory is thus concerned with the analysis of random phenomena: random variables, stochastic processes, and events.

Δº: Further on Methods of probability theory also apply to descriptions of complex systems given only partial knowledge of their state, as in statistical mechanics. Here we observe the essential duality between the human observer, which introduces uncertainty and a possible certain reality; which humans often confuse (quantum paradoxes). But *and this will be the difference, the results of human uncertainty can be 'clarified' and considered certain, if the outcome is not purely random, with the usual bell curves etc. proper of true stochastic systems. Then we must conclude that the only randomness is that of the human observer.*

Hence, the great discovery of twentieth century physics, which was the probabilistic nature of physical phenomena at atomic Planes, described in quantum mechanics can be judged to be 'an error of the human observer', in as much as its results are clearly 'quantized', fairly determined, NOT purely statistical. (And the solution to this conundrum is the wave-pilot deterministic theory).

The different causalities that give birth to probabilities.

It is not possible to predict precisely results of random events though we have anticipated and proved, properly interpreted that the curve of distribution favors the present state of 1 sigma, with 2/3rds and makes parallel the inverse phases of 1st, third age, emergence and death, and its symmetries in space (dominance of the body-mass, over the head and limbs). Though here the analysis would require a much more detailed study, not to be done for the time beings.

Instead, we would like to consider the essential laws of probabilities and statistics in 'classic science'.

When a sequence of individual events, such as the mentioned roll of dice, is influenced by other factors, such as an imbalance of the gravity cater, it will exhibit distorted patterns, from a symmetric spatial distribution, which can be also predicted.

Two representative mathematical results describing such patterns are the law of large numbers and the central limit theorem.

Both are essentially the same, though the central limit might be considered a composite Δ§, result where each 'distribution' is a partial sum of events, and the law of large numbers is defined for single events/cells/forms:

In probability theory, the law of large numbers (LLN) is a theorem that describes the result of performing the same experiment a large number of times. According to the law, the average of the results obtained from a large number of trials should be close to the expected value, and will tend to become closer as more trials are performed.

The LLN is important because it "guarantees" stable long-term results for the averages of some random events, such as Δ-1>Δ, whatever this means. And so goes for the central theorem, with an intermediate §cale of partitions… Δ-1>...Δ§...>Δ

And so when we 'plug in' into the existential game, both theorems they tell us that as § grows, towards the largest numbers of a finite 'Universe/world', we obtain a 'median distribution', which means in the Universe, a super organism. Indeed, as systems multiply its population, the 'partitions of organs' (which can be modeled as partial distributions of the central limit theorem, and the scale Δ-1, will converge to a given form - for entropic systems, the gauss distribution; but extrapolated to the whole reality, to the program of creation of superorganisms).

They are thus generalized for 'systems' not of stochastic nature but with causal patterns and future predictable results a determinism of cause->effect essential to reality.

5D Δ>Δ+1, expands the concept of statistical probabilities to use of its general laws to determine causal events:

Δ±1 ST causality and determinism.

What is the probability of the game of existence? In an infinite Universe absolute. And for any *event determined by the game, ever smoother as we grow in detail of analysis (Δº view), in numbers of events in time (§ð view), in populations in space ($T), and so as we deem the Universe infinite, all systems tend as s->∞, t->∞ and Δ->∞ and Δº->∞ (number of pixels of the mental mapping, ever finer in detail) to become deterministic, perfect, enacting the GST game of existence and its world cycles, of which there are infinite indeed proofs in all systems:*

• Orbits become more regular as the mass of the 'comet'->planet grows.

• Dice throws become more regular with 1/6th probability for each number

• Superorganisms become more perfect as we move towards the 1 trillion mark of cells

• Crystals less amorphous and we imagine the ones on the centre of planets to be perfect 'diamonds', perfect iron crystals (Ours) and so on.

• Societies better organized, with less friction, as China shows.

• So happens as populations radiate or time passes by in evolution: the perfect super organism, the perfect platonic form is reached.

It is the limit of the game - in all those cases we should previously define the limiting domain, the normalized distribution to 1, the proper range; and it would be interesting just for the sake of theory, to consider what would be, if that is the case, the limits of those theorems. So a question is poised even if it looks far reaching. While the system keep smoothing ad infinitum, or there is a limit also in time, to what seems to be obviously the limit in space of 'carrying populations'? Even though it seems counter-intuitive and likely not be experimented, I believe somewhere in the quadrillion mark the system will break and enter a chaotic, no longer smooth distribution but move towards death (being 4 the dimensions of a system in a single sheet of space-time).

Random Processes of Markov Type. The formalism based in the equivalence of probability and derivatives.

The formalism of probability today for random processes was established precisely when mathemticians realized that ultimately there is a direct connection as we said, between a quanta of time probability and a finitesimal of calculus, so they were able to merely integrate probability densities as if they were finitesimals.

To Markov is due the construction of such probabilistic scheme which is an immediate generalization of the deterministic scheme described by the equation: $\omega = F(t_0, \omega_0, t).$ Markov considered only the case where the phase space of the system consists of a finite number of states $\Omega = (\omega_1, \omega_2, \cdots \omega_n)$ and studied the change of state of the system only for changes of time t in discrete steps. But in this extremely schematic model he succeeded in establishing a series of fundamental laws.

Instead of a function F, uniquely defining the state w at time t > t_0 corresponding to the state ω0 at time t0, Markov introduced the probabilities: $(t_0, \omega_i; t, \omega_j)$ of obtaining the state ω_i at time t under the condition that at time t_0 we had the state ωi. These probabilities are connected for any three instants of time: **to<t1<t2** by a relation, introduced by Markov, which may be called the basic equation for a Markov process:

$$P(t_0, \omega_i; t_2, \omega_j) = \sum_{k=1}^{n} P(t_0, \omega_i; t_1, \omega_k) P(t_1, \omega_k; t_2, \omega_j).$$

$$P(t_0, \omega_0; t, G) = \int_G p(t_0, \omega_0; t, \omega) \, d\omega, \qquad (34)$$

where $d\omega$ is an element of volume in the phase space.[*] For the probability density $p(t_0, \omega_0; t, \omega)$, the basic equation (33) takes the form

$$p(t_0, \omega_0; t_2, \omega_2) = \int_\Omega p(t_0, \omega_0; t_1, \omega) \, p(t_1, \omega; t_2, \omega_2) \, d\omega. \quad (35)$$

When the phase space is a continuous manifold, the most typical case is that a probability density p(t0, ω0; t, ω) exists for passing from the state ω0 to the state ω in the interval of time (t0, t). In this case the probability of …passing from the state ω0 to any of the states ω belonging to a domain G in the phase space Ω is written in the form:

Equation (35) is usually difficult to solve, but under known restrictions we may deduce from it certain partial differential equations that are easy to investigate. Some of these equations were derived from non rigorous physical considerations by the physicists Fokker and Planck. In its complete form this theory is the so-called stochastic differential.

The method of stochastic differential equations allows us, for example, to solve without difficulty the problem of the motion in still air of a very small body, for which the mean velocity c of its fall is significantly less than the velocity of the "Brownian motion" arising from the fact, because of the smallness of the particle, its collisions with the molecules of the air are not in perfect balance on its various sides.

RECAP. The fundamental element of probability is curiously enough the certainty of its sum of opposite results. That is, the sum of the probability of an event not happening and happening is always 1. And so in introduces deep philosophical questions on the causality of time.

Pentalogic on probability deals extensively on the question of causality between the smaller parts and the wholes, and the degree of determinism in the universe, vs. the number of potential futures that can exist and those who are efficient paths that will always occur; as in quantum physical paths that always tend to collapse in the most efficient, least time path, or point of minimal momentum, *which must be regarded as the opposite function; that is, the point of maximal information, which is the reason the system tends to it (and also the point of maximal duration, as max. information spends less energy and lasts more).*

Those themes of philosophy of probability and the opposition between events and no events and the dual states of entropy vs. stillness, momentum vs. information are thus of more interest to us in those texts.

A first insight comes from the realization that from the perspective of the whole 1 probability, the undistinguishable parts do not matter, so they have certain degree of freedom, but the whole as such will follow its worldcycle of existence as a 0 sum and as a 1 whole with no freedom. So probabilities are ultimately the equivalent in time to the 'freedom in space' of the small steps performed by a being, which will certainly end in a cyclical closed cycle of '0'-energy expenditure' – its equivalent in physical terms: freedom to the finitesimals is always curtailed by the theory of grand numbers, by the whole of whole events. And so they will approach to the Gaussian center where the whole in populations or events is maximal, which on 'great numbers' of indistinguishable finitesimal parts will become certain.

A second question around 5D probability is causality, which is entangled 5Dimotional in 5D, but for small steps again can be *Aristotelian, lineal, hence allowing the laws of probability to be deterministic for individual ceteris paribus dimotions.*

Both concepts come together in the law that for an event to be truth, for an organism to be stable the Gaussian curve has to have a steep central point, a small deviation from the mean, which is why there is a standard curve for probabilities that are real events, common to almost all of them.

As in the case of polynomials, with resolutions of multiple equations to find radicals=numbers for a single parameter, there are also in probabilities some irrelevant questions, and as in polynomials there are limits. So first we shall consider a pentalogic of probability functions.

The inverse mirrors of the past and the future, the event and the non-existence.

So we must not only translate time sequences of frequencies to simultaneous populations, its *memorial tail of past results, but* also 'expand' the 0'-1 unit circle into the 1-∞ scale to observe isomorphic laws between probability and statistics.

That is between Time and Space, between the future occurrences in probability time and the past persistence of memorial populations, and how they are identical in its asymmetry as one of them, populations fade and die away while the other, possible paths of future, converge and collapse, leaving finally only a trace of past, only an occurrence of future, in the collapse of memories that disappear, in the collapse of future dreams that are blown away.

All this of course requires a completely new outlook on the meaning of probabilities and populations, we might carry through the fourth line before my tail of time disappears, but don't count on it. This will always be an unfinished job that might be aborted even before huminds notice its existence by the disappearance not only of his author but the humind itself (see the section on history and economics).

CONDITIONAL PROBABILITY

The difference between statistics and probability are those between Space and Time states and parts and whole scales. Statistics is a space state, made of a maximal number of indifferent elements. IT does act therefore on simultaneous parameters and cares not for the causal time process; so it uses quantitative procedures and integrates the indifferent mass into mean values.

Probabilities are time, sequential causal events; of which we can differentiate independent events, closer to statistics calculated by adding frequency numbers and conditional events, in which one event conditions the other diminishing the probability to reach certainty 1 (the whole event or population). Let's consider both types of probabilities.

In the 0'-1 sphere, two events are said to be mutually exclusive if they cannot both occur (under the complex of conditions S).

For example, in throwing a die, the occurrence of an even number of spots and of a three are mutually exclusive. An event A is called the union of events A1 and A2 if it consists of the occurrence of at least one of the events A1, A2. For example, in throwing a die, the event A, consisting of rolling 1, 2, or 3, is the union of the events A1 and A2, where A1 consists of rolling 1 or 2 and A2 consists of rolling 2 or 3. It is easy to see that for the number of occurrences m1, m2, and m of two mutually exclusive events A1 and A2 and their union A = A1 ∪ A2, we have the equation m = m1 + m2, or for the corresponding frequencies ƒ = ƒ1 + ƒ2.
This leads naturally to the following axiom for the addition of probabilities:

2.   P (A1 ∪ A2) = P(A1) + P(A2)...

if the events A1 and A2 are mutually exclusive and A1 U A2 denotes their union.
Further, for an event U which is certain, we naturally take:

3.   P (U) = 1

The whole mathematical theory of probability is constructed on the basis of such 3 axioms.

One the event has happened however we are in the realm of counting populations in the 1-∞ sphere, and the correspondence happens between the probability distribution on the 0'-1 plane and the population distribution on the 1-∞.

• The formal structure of theory of probability is simple: events are mutually exclusive if their intersection is empty, i.e., if AB = N, where N is the symbol for an impossible event.

• The axiom of probability theory is the requirement that under the condition AB = N it holds the equation:

P (A U B) = P(A) + P(B)

The distribution of social groups as probabilities in time, is more accurate as its ¡ndifference increases. Models of the 1 plane, as Fourier or probability shows the forms of reproduction of a complex plane in lower @-geometries of existence.

The analogy is by no means superficial. It turns out that the whole mathematical theory of probability from the formal point of view may be constructed as a theory of measure, making the special assumption that the measure of "the entire space" U is equal to one. Which proves that the o-1 probability time sphere is equivalent to the 1-∞ statistical population, and sets in correspondence quantum physics and molecular statistics…

Such an approach to the matter has produced complete clarity in the formal construction of the mathematical theory of probability and has also led to concrete progress not only in this theory itself but in other theories closely related to it in their formal structure. In the theory of probability success has been achieved by refined methods developed in the metric theory of functions of a real variable and at the same time probabilistic methods have proved to be applicable to questions in neighboring domains of mathematics not "by analogy," but by a formal and strict transfer of them to the new domain. Wherever we can show that the axioms of the theory of probability are satisfied, the results of these axioms are applicable, even though the given domain has nothing to do with randomness in the actual world.

The existence of an axiomatized theory of probability preserves us from the temptation to define probability by methods that claim to construct a strict, purely formal mathematical theory on the basis of features of probability that are immediately suggested by the natural sciences. Such definitions roughly correspond to the "definition" in geometry of a point as the result of trimming down a physical body an infinite number of times, each time decreasing its diameter by a factor of 2.

With definitions of this sort, probability is taken to be the limit of the frequency as the number of experiments increases beyond all bounds. The very assumption that the experiments are probabilistic, i.e., that the frequencies tend to cluster around a constant value, will remain valid (and the same is true for the "randomness" of any particular event) only if certain conditions are kept fixed for an unlimited time and with absolute exactness. Thus the exact passage to the limit: $\mu/n \to p$, cannot have any objective meaning. Formulation of the principle of stability of the frequencies in such a limit process demands that we define the allowable methods of setting up an infinite sequence of experiments, and this can only be done by a mathematical fiction. This whole conglomeration of concepts might deserve serious consideration if the final result were a theory of such distinctive nature that no other means existed of putting it on a rigorous basis. But, as was stated earlier, the mathematical theory of probability may be based on the theory of measure, in its present day form, by adding the condition P(U) =1

In general, for any practical analysis of the concept of probability, there is no need to refer to its formal definition. It is obvious that concerning the purely formal side of probability, we can only say the following: The probability $P(A/S)$ is a number around which, under conditions S determining the allowable manner of setting up the experiments, the frequencies have a tendency to be grouped, and that this tendency will occur with greater and greater exactness as the experiments, always conducted in such a way as to preserve the original conditions, become more numerous, and finally that the tendency will reach a satisfactory degree of reliability and exactness during the course of a practicable number of experiments.

In fact, the problem of importance, in practice, is not to give a formally precise definition of randomness but to clarify as widely as possible the conditions under which randomness of the cited type will occur. One must clearly understand that, in reality, hypotheses concerning the probabilistic character of any phenomenon are very rarely based on immediate statistical verification. Only in the first stage of the penetration of probabilistic methods into a new domain of science has the work consisted of purely empirical observation of the constancy of frequencies.

We see that statistical verification of the constancy of frequencies with an exactness of ε requires a series of experiments, each consisting of $n = 1/\varepsilon^2$ trials.

The union of any given number of events A1, A2, $\cdots$, As is defined as the event A consisting of the occurrence of at least one of these events. From the axiom of addition, we easily obtain for any number of pairwise mutually exclusive events A1, A2, $\cdots$, As and their union A,

$P(A) = P(A1) + P(A2) + ... + P(An)$ (the so-called theorem of the addition of probabilities).

If the union of these events is an event that is certain (i.e., under the complex of conditions S one of the events A_k must occur), then:

$P(A1) + P(A2) + ... + P(An) = 1$

In this case the system of events A1, $\cdots$, As, is called a complete system of events.

We now consider two events A, and B, which, generally speaking, are not mutually exclusive. The event C is the intersection of the events A and B, written C = AB, if the event C consists of the occurrence of both A and B. For example, if the event A consists of obtaining an even number in the throw of a die and B consists of obtaining a multiple of three, then the event C consists of obtaining a six.

This is all very trivial and indeed independent probability is trivial because we completely work on non-causal processes, akin to those of statistics: The properties of probability, expressed by formulas (1), (2), and (3), serve as a sufficient basis for the construction of what is called the elementary theory of probability.

CONDITIONAL PROBABILITY.

When events are connected however probability becomes somewhat more complex, still though suing only the properties of product and division, but establishing lesser chances to achieve whole events, thus introducing the concept of an uncertain 'goal', as B, is conditioned by A which not always is controlled. And this is more how reality works, given the fact that A and B can be considered 'two fractal points' wills' which might differ. Let us briefly introduce the formalism:

In a large number n of repeated trials, let the event A occur m times and the event B occur l times, in k of which B occurs together with the event A. The quotient k/m is called the conditional frequency of the event B under the condition A. The frequencies k/m, m/n, and k/n are connected by the formula:

k/m = k/n : m/n

which naturally gives rise to the following definition:

The conditional probability $P(B/A)$ of the event B under the condition A is the quotient

P (B/A) = P (AB)/ P(A)

Here it is assumed, of course, that P(A) ≠ 0.

If the events A and B are in no way essentially connected with each other, then it is natural to assume that event B will not appear more often, or less often, when A has occurred than when A has not occurred, i.e., that approximately k/m ≈ l/n or:

k/n = k/m • m/n ≈ l/n • m/n

In this last approximate equation m/n = ƒA is the frequency of the event A, and l/n = ƒB is the frequency of the event B and finally k/n = ƒAB is the frequency of the intersection of the events A and B.

We see that these frequencies are connected by the relation:

ƒab ≈ ƒa x ƒb

For the probabilities of the events A, B and AB, it is therefore natural to accept the corresponding exact equation

4.   P (AB) = P(A) • P(B)

Equation (4) serves to define the independence of two events A and B.

Similarly, we may define the independence of any number of events. Also, we may give a definition of the independence of any number of experiments, which means, roughly speaking, that the outcome of any part of the experiments do not depend on the outcome of the rest.

We now compute the probability Pk of precisely k occurrences of a certain event A in n independent tests, in each one of which the probability p of the occurrence of this event is the same. We denote by Ā the event that event A does not occur. It is obvious that

P (Ā) = 1 - P (A) = 1-p

From the definition of the independence of experiments it is easy to see that the probability of any specific sequence consisting of k occurrences of A and n–k non-occurrences of A is equal to: $p^k(1-p)^{n-k}$. Thus, for example, for n=5 and k=2 the probability of getting the sequence AĀAĀĀ will be p(l – p)p(l – p)(1 – p) = p²(1 – P)³ By the theorem on the addition of probabilities, Pk will be equal to the sum of the probabilities of all sequences with k occurrences and n – k non occurrences of the event A, i.e., Pk will be equal from (5) to the product of the number of such sequences by p^k(l – p)$^{n-k}$. The number of such sequences is obviously equal to the number of combinations of n things taken k at a time, since the k positive outcomes may occupy any k places in the sequence of n trials.

Finally we get the binomial distribution: $P_k = C_n^k p^k (1-p)^{n-k} \quad (k = 0, 1, 2, \cdots, n)$

Direct examination of the mass of observations makes clear only the very simplest statistical laws; it uncovers only a few of the basic probabilities involved. But then, by means of the laws of the theory of probability, we use these simplest probabilities to compute the probabilities of more complicated occurrences and deduce the statistical laws that govern them.

Sometimes we succeed in completely avoiding massive statistical material, since the probabilities may be defined by sufficiently convincing considerations of symmetry. For example, the traditional conclusion that a die, i.e., a cube made of a homogeneous material will fall, when thrown to a sufficient height, with equal probability on each of its faces was reached long before there was any systematic accumulation of data to verify it by observation. Systematic experiments of this kind have been carried out in the last three centuries, chiefly by authors of textbooks in the theory of probability, at a time when the theory of probability was already a well-developed science. The results of these experiments were satisfactory, but the question of extending them to

analogous cases scarcely arouses interest. For example, as far as we know, no one has carried out sufficiently extensive experiments in tossing homogeneous dice with twelve sides. But there is no doubt that if we were to make 12,000 such tosses, the twelve-sided die would show each of its faces approximately a thousand times.

The basic probabilities derived from arguments of symmetry or homogeneity also play a large role in many serious scientific problems, for example in all problems of collision or near approach of molecules in random motion in a gas; another case where the successes have been equally great is the motion of stars in a galaxy. Of course, in these more delicate cases we prefer to check our theoretical assumptions by comparison with observation or experiment.

The Law of Large Numbers and Limit Theorems

It is completely natural to wish for greater quantitative precision in the proposition that in a "long" series of tests the frequency of an occurrence comes "close" to its probability. But here we must form a clear notion of the delicate nature of the problem. In the most typical cases in the theory of probability, the situation is such that in an arbitrarily long series of tests it remains theoretically possible that we may obtain either of the two extremes for the value of the frequency

$$\frac{\mu}{n} = \frac{n}{n} = 1 \quad \text{and} \quad \frac{\mu}{n} = \frac{0}{n} = 0.$$ Thus, whatever may be the number of tests n, it is impossible to assert with complete certainty that we will have, say, the inequality

$$\left|\frac{\mu}{n} - p\right| < \frac{1}{10}.$$

For example, if the event A is the rolling of a six with a die, then in n trials, the probability that we will turn up a six on all n trials is $(1/6)^{n>0}$, in other words, with probability $(1/6)^n$

we will obtain a frequency of rolling a six which is equal to one; and with probability $(1-1/6)^{n>0}$ a six will not come up at all, i.e., the frequency of rolling a six will be equal to zeroth.

In all similar problems any nontrivial estimate of the closeness of the frequency to the probability cannot be made with complete certainty, but only with some probability less than one.

For example, it may be shown that in independent tests, with constant probability p of the occurrence of an event in each test the inequality

7. $|\mu/n - p| < 0.02$

for the frequency μ/n will be satisfied, for n = 10,000 (and any p), with probability

8. $P > 0.9999$

Here we wish first of all to emphasize that in this formulation the quantitative estimate of the closeness of the frequency μ/n to the probability p involves the introduction of a new probability P. The practical meaning of the estimate (8) is this: If we carry out N sets of n tests each, and count the M sets in which inequality (7) is satisfied, then for sufficiently large N we will have approximately

9. $M/N \approx P > 0.9999$

But if we wish to define the relation (9) more precisely, either with respect to the degree of closeness of M/N to P, or with respect to the confidence with which we may assert that (9) will be verified, then we must have recourse to general considerations of the kind introduced previously in discussing what is meant by the closeness of μ/n and p. Such considerations may be repeated as often as we like, but it is clear that this procedure will never allow us to be free of the necessity, at the last stage, of referring to probabilities in the primitive imprecise sense of this term.

Further Remarks on the Basic Concepts of the Theory of Probability

In speaking of random events, which have the property that their frequencies tend to become stable, i.e., in a long sequence of experiments repeated under fixed conditions, their frequencies are grouped around some standard level, called their probability P(A/S), we were guilty, in §1, of a certain vagueness in our formulations, in two respects.

In the first place, we did not indicate how long the sequence of experiments nr must be in order to exhibit beyond all doubt the existence of the supposed stability; in other words, we did not say what deviations of the frequencies $\mu r/nr$, from one another or from their standard level p were allowable for sequences of trials n_1, n_2, $\cdots$, n_s of given length. This inexactness in the first stage of formulating the concepts of a new science is unavoidable. It is no greater than the well-known vagueness surrounding the simplest geometric concepts of point and straight line and their physical meaning. More fundamental, however, is the second lack of clearness concealed in our formulations; it concerns the manner of forming the sequences of trials in which we are to examine the stability of the frequency of occurrence of the event A.

As stated earlier, we are led to statistical and probabilistic methods of investigation in those cases in which an exact specific prediction of the course of events is impossible. But if we wish to create in some artificial way a sequence of events that will be, as far as possible, purely random, then we must take special care that there shall be no methods available for determining in advance those cases in which A is likely to occur with more than normal frequency.

Such precautions are taken, for example, in the organization of government lotteries. If in a given lottery there are to be M winning tickets in a drawing of N tickets, then the probability of winning for an individual ticket is equal to p = M/N. This means that in whatever manner we select, in advance of the drawing, a sufficiently large set of n tickets, we can be practically certain that the ratio μ/n of the number μ of winning tickets in the chosen set to the whole number n of tickets in this set will be close to p.

For example, people who prefer tickets labeled with an even number will not have any systematic advantage over those who prefer tickets labeled with odd numbers, and in exactly the same way there will be no advantage in proceeding on the principle, say, that it is always better to buy tickets with numbers having exactly three prime factors, or tickets whose numbers are close to those that were winners in the preceding lottery, etc.

Similarly, when we are firing a well-constructed gun of a given type, with a well-trained crew and with shells that have been subjected to a standard quality control, the deviation from the mean position of the points of impact of the shells will be less than the previously determined probable deviation B in approximately half the cases. This fraction remains the same in a series of successive trials, and also in case we count separately the number of deviations that are less than B for even-numbered shots (in the order of firing) or for odd-numbered. But it is completely possible that if we were to make a selection of particularly homogeneous shells (with respect to weight, etc.), the scattering would be considerably decreased, i.e., we would have a sequence of firings for which the fraction of the deviations which are greater than the standard B would be considerably less than 1/2. Thus, to say that an event A is "random" or "stochastic" and to assign it a definite probability

p = (P (A/S)

is possible only when we have already determined the class of allowable ways of setting up the series of experiments. The nature of this class will be assumed to be included in the conditions S.

For given conditions S the properties of the event A of being random and of having the probability p = P(A/S) express the objective character of the connection between the condition S and the event A.

In other words, there exists no event which is absolutely random; an event is random or is predetermined depending on the connection in which it is considered, but under specific conditions an event may be random in

a completely nonsubjective sense, i.e., independently of the state of knowledge of any observer. If we imagine an observer who can master all the detailed distinctive properties and particular circumstances of the flight of shells, and can thus predict for each one of them the deviation from the mean trajectory, his presence would still not prevent the shells from scattering in accordance with the laws of the theory of probability, provided, of course, that the shooting was done in the usual manner, and not according to instructions from our imaginary observer.

In this connection we note that the formation of a series of the kind discussed earlier, in which there is a tendency for the frequencies to become constant in the sense of being grouped around a normal value, namely the probability, proceeds in the actual world in a manner completely independent of our intervention.

For example, it is precisely by virtue of the random character of the motion of the molecules in a gas that the number of molecules which, even in a very small interval of time, strike an arbitrarily preassigned small section of the wall of the container (or of the surface of bodies situated in the gas) proves to be proportional with very great exactness to the area of this small piece of the wall and to the length of the interval of time. Deviations from this proportionality in cases where the number of hits is not large also follow the laws of the theory of probability and produce phenomena of the type of Brownian motion, of which more will be said later. We turn now to the objective meaning of the concept of independence. We recall that the conditional probability of an event A under the condition B is defined by the formula

$$P(A/B) = P(AB) \div P(B)$$

We also recall that events A and B are called independent if, as in (4),

$$P(AB) = P(A) P(B)$$

From the independence of the events A and B and the fact that $P(B) > 0$ it follows that

$$P(A/B) = P(A)$$

All the theorems of the mathematical theory of probability that deal with independent events apply to any events satisfying the condition (4), or to its generalization to the case of the mutual independence of several events. These theorems will be of little interest, however, if this definition bears no relation to the properties of objective events which are independent in the causal sense.

Naturally, in dealing with the concept of independence, we must not proceed in too absolute a fashion. For example, from the law of universal gravitation, it is an undoubted fact that the motions of the moons of Jupiter have a certain effect, say, on the flight of an artillery shell. But it is also obvious that in practice this influence may be ignored. From the philosophical point of view, we may perhaps, in a given concrete situation, speak more properly not of the independence but of the insignificance of the dependence of certain events. However that may be, the independence of events in the cited concrete and relative sense of this term in no way contradicts the principle of the universal interconnection of all phenomena; it serves only as a necessary supplement to this principle.

The computation of probabilities from formulas derived by assuming the independence of certain events is still of practical interest in cases where the events were originally independent but became interdependent as a result of the events themselves. For example, one may compute probabilities for the collision of particles of cosmic radiation with particles of the medium penetrated by the radiation, on the assumption that the motion of the particles of the medium, up to the time of the appearance near them of a rapidly moving particle of cosmic radiation, proceeds independently of the motion of the cosmic particle. One may compute the probability that a hostile bullet will strike the blade of a rotating propeller, on the assumption that the position of the blade with respect to the axis of rotation does not depend on the trajectory of the bullet, a supposition that will of course be wrong with respect to the bullets of the aviator himself, since they are fired between the blades of the rotating propeller. The number of such examples may be extended without limit.

It may even be said that wherever probabilistic laws turn up in any clear-cut way we are dealing with the influence of a large number of factors that, if not entirely independent of one another, are interconnected only in some weak sense.

This does not at all mean that we should uncritically introduce assumptions of independence. On the contrary, it leads us, in the first place, to be particularly careful in the choice of criteria for testing hypotheses of independence, and second, to be very careful in investigating the borderline cases where dependence between the facts must be assumed but is of such a kind as to introduce complications into the relevant laws of probability. We noted earlier that the classical Russian school of the theory of probability has carried out far-reaching investigations in this direction.

To bring to an end our discussion of the concept of independence, we note that, just as with the definition of independence of two events given in formula (4), the formal definition of the independence of several random variables is considerably broader than the concept of independence in the practical world, i.e., the absence of causal connection.

I.e, in order to establish that in a given concrete problem the probability is defined with an exactness of 0.0001, it is necessary to carry out a series of experiments containing approximately 100,000,000 trials in each. The hypothesis of probabilistic randomness is much more often introduced from considerations of symmetry or of successive series of events, with subsequent verification of the hypothesis in some indirect way. For example, since the number of molecules in a finite volume of gas is of the order of 1020 or more, the number √n, corresponding to the probabilistic deductions made in the kinetic theory of gases, is very large, so that many of these deductions are verified with great exactness. Thus, the pressures on the opposite sides of a plate suspended in still air, even if the plate is of microscopic dimensions, turn out exactly the same, although an excess of pressure on one side of the order of a thousandth of one per cent can be detected in a properly arranged experiment.

SxT: COMBINATORICS

The historic approach to knowledge is always good to understand the natural evolution of any world cycle from simplex to complex, including those pure mental mirror-images of reality that are first born as all systems in an asymmetric mixture of time-space parameters/views and then break into the more symmetric spatial view (in the case of combinatorics, space statistics) and the temporal view (statistics).

So combinatorics was the beginning of social time theory beyond the simplest consideration of counting, that is of numbers as wholes of identical beings, and geometric numbers, that is the study of numbers in its symmetry with points. Those two dualities which we can considered to be the Δ§0,1 perspective (numbers as social Planes), and the Spatial, more static perspective (that is numbers as forms of space-geometries), will then become the Time perspective, that is dynamic numbers in *which the causal, sequential order matters, and the flow of time constantly ads up new identical beings, in different positions.*

Number theory thus *reaches its highest 'complexity' in the symmetry of time probabilities and space statistics, as all the Rashomon perspective are included.*

And we can talk of 3 ages, which can also be broken according to the multidimensional I-logic in terms of the previous graph of an asymmetric, first state, combinatorics, which then specialized into the symmetric spatial population analysis and the hierarchical, time probability point of view.

Let's start with some insights on combinatorics' experimental nature as a mirror of T.œs' fractal properties of space and cyclical nature of time. So we shall not talk of 'combinatorial structures, binary and plane trees, categories, the twelvefold way etc. Just to mention that we did study them in youth and know why it is not

needed to know. Keep it simple, if you 'understand it'. Also we are not interested in repeating what huminds know but in exploring new insights from all the p.o.v.s of the 5 dimotions and its vital properties.

Ternary combinatorics. Variations and permutations.

Combinatorics are simple variations of several elements with different hierarchical elements.

Permutations are variations in the sequential order of the elements of a sœt (in the jargon of ¬Æ, the inverse expression of Tœs, that the internal elements of a whole, the Tœ=∑sœt, its parts, as usual slightly changing the terminology of classic science into 'stience').

Its formulae is P!, thus becomes the first **'¬Ælgebraic GST', or Generator of space-time** by internal *self-re=production, using the general ¬Algebraic operand of 3D-reproduction - obviously the product.*

Permutation of Dimotions.

It is then immediate the thought that permutation of dimotions is an essential GST, of which there should be as many as different ¡logic systems of space-time generation exist:

• Monologic cannot create by self-reflection 1!=1

• The permutation of 0 is 1, hence 0 'Is something' it has parts, and volume it is a finitesimal and it self-reflects on itself as being the 1, the whole.

• Duality between the limits of 0'-∞, form and entropy permutates only 2, 1>2, 2<1, which represent the two arrows of life and death.

• Trinity permutates, abc, acb, cab, cba, bca, bac... which represent the hierarchies of physiological networks and it is an essential permutation of species.

• Tetralogic, as in the case of 4 quantum numbers and 4 genetic numbers has multiple variations, 4x3x2x1=24, which represent then 24 possible orders of the positive dimotions of existence, in evolutionary processes - excluding locomotion that doesn't take in pure informative events.

And a fundamental theme of trilogic is to relate chains of actions based in permutations. For example, certain combinations of actions are more important. Since most actions, which are NOT entropic, self-destructive start with a mind-seed-perceptive action, which reduces permutations to 3.

Variations of disconnected parts vs. permutations of integrated wholes...

...on the other hand, are permutations of a finite NUMBER of elements of the whole sœT, whose formula is also interesting in the analysis of operandi, *as it brings now the inverse operands of division and subtraction into the mix: V(n,r) = n! / (n-r)!*

One interesting theme of variation is the paradox that a *smaller number of elements doesn't give a larger number of variations (as the divisive element n-r grows faster).*

It seems in principle counterintuitive, as one would image there would be many more small combinations, for example if we have abcde, we can make ab, cd, ac, ad, ae, bc, bd, be, ce... etc. But if we take 5 elements only abcde, the whole happens, albeit its possible combinations acbd, acdb, adbc, etc. is larger.

Thus wholes multiply faster and are always more powerful than smaller parts. This simple formula implies is that the inner structure of wholes - what we call its synchronicities and simultaneities, is complex enough to render a larger number of combinations, that smaller sets with minimal variability; reinforcing the experimental, Darwinian evidence of the power of wholes.

Permutations of wholes vs. variations (of parts of wholes) and its combinatorics reveal *essential laws on the structure of social organisms, hence its importance in all sciences, specially in physics, which tend to study*

massive amounts of identical beings, generating internal combinations; which lead us to the third classic form of combinatorics: variations and permutations in which a same 'identical' element can be repeated

n-tuples of different frequency actions.

It is the important case are ordered arrangements of the 5 elements of the Sœt 5 where repetitions are allowed, called *n*-tuples, In the sœt of Dimotions, due to the 'different frequency' of the actions of a system, which will reproduce once a year, feed 3 times a day and so on.

It is also carried into the S=T symmetry of 'cellular numbers' for the different organs that perform dimotions in a superorganism.

n-tuples of social evolution.

n-tuples without restriction of repetitions, is the fastest growing GST (generator operand of space-time): n^a, reason why the most abundant dimotion of exi:st¡ence is social evolution of undistinguishable parts.

This is the commonest case of Nature. As numbers, we say, are sets of identical elements. And so most societies are of identical exchangeable beings.

In the entangled S=T Universe *those elements of combinatorics, branch into T-probability and S-tatistics and belong 'i-logically' to the key 4th Non-Euclidean postulate of 'congruence'... as the degree of identity of beings implies a parallelism and capacity to understand its information and evolve socially.*

In ¬Ælgebra they are represented by the '3 levels of social growth operands: ±variations, x-permutations and x^a tuples.

To notice *the growth of value of variations and permutations with repetition is huge when we increase the number of identical beings, again stressing clearly the power of 'identity' over 'variation' - a theme that will run across all the analysis of reality. Since we write:*

$V'(n,1)=n$; $V'(n,2)=n^2$; $V'(n,3)=n^3$...

This however is not the case when congruence happens in different groups of the total sœT (variations). Then the formula is greatly reduced: $P!/a! b!$...

The usual interpretation which heavily weights in physical ensembles is that indistinguishable elements *are the same and must subtracted.* Vitally we interpret it simply with the concept of 'divide and win'.

What is then indistinguishable becomes important. As it is an external judgment on the observer, since all forms are internally distinguishable:

Total identity only happens in shallow external views of a surface without considering the content. And here of course lays a huge philosophical and ethical part of the Universe, and the dualities between the internal and external view of beings, *which dominates reality as the importance of Bose statistics, entropic ensembles and partitions shows*.

But why a larger number of variations, permutations, a larger cardinal matters? If we were to cast this number in terms of spatial population or sequential time series, it obviously means more configurations, more types of exist¡ences...

Differences based in the numbers on the §œt.

More interesting perhaps is to consider, as we are writing about number theory and have studied the value of each number in different social and geometric meanings, each variation, permutation with our with out repetitions and partitions, what they tell us about the game of T.œs:

1.	If we have a single element, 'A'; the order can only be 1. And so the ONE is immutable in hierarchical order. *The ego comes always first.*

2.	When we have two, Ab or Ba are the 2 only hierarchical combinations. And the order is obvious, as the one that comes first is hierarchically the most important with more experience and more information (till its 3rd age of decline)... So we should write A in caps b in minor letters. But here *in a larger context we come with the first 'divergence' of ¬Æ: as it matters more that A and E are actually NOT* in a hierarchical position; but sharing each other to converge into A=B and re-produce a being. And here is where the first sight to the 'power of identity' comes into being: identity reproduces and increases a social group; it is the essence of the game of social evolution, growth and reorganization. And so indeed, of all possible combinatorics, the largest numbers are achieved with permutations of an identity number.

3.	Then we have 3, the holy number; trinity indeed, if you have come so far you must by now know is the game. And this gets more interesting:

How many variations we have of 3? As it happens 'mathematical pros' write them in pairs, so for abc, they write ab, ac, ba, bc, ca, cb...6...

Since *for 3 elements the number of variations of 2 elements and permutations of the whole set are the same.*

Hence species diversify by combining the ternary networks of the system, in 6 basic different phyla with applications in all stiences, according to the hierarchy of the 3 physiological networks of entropy/digestive/limb systems, reproduction, body wave system and information particle-head system?

Let us stress now, the interesting fact that we can hide the 3rd element, the digestive, entropic, predatory world in which the 2 physiological networks that matter most, the particle-wave body-head system preys in. The 3rd element is thus the lower class of a system, which is almost invariably spent...

Another interesting duality is that along the | vs. O topology, as all what we have explained are hierarchical sets, lineal sets with a preferential order, but the rules of combinatorics for sœts apply also to cyclical orders, with interesting results: the number of variations increases dramatically, as the hierarchy is dissolved, forming the fundamental property of cyclical membranes: to be 'democratic', 'entropic', as no order matter, so all possible orders happen such as for n elements, n! will be the possible permutations... a ginormous number, even for small digits beyond the 10 decametric scale, which shows how easily we can by iteration and hierarchy multiply the complexity of the Universe.

The importance of those simple relationships of order, will again, be explored in more depth in ¬Algebra, as indeed, modern ¬Algebra started with the discovery by Galois that the solutions of polynomials depended on their permutations.

But as always the biggest insights we shall provide are metaphysical, as mathematics is a reflection of the Universe in its simplest spatial and scalar relationships, whose units are the point and the number (for pure temporal flows logic gives better results).

Δ§: Combinatorics

After cyclical permutations combinatorics solved combinations proper, where the *order of elements doesn't matter, as in ¬Æ logic events of 'convergence', 'simultaneity' and 'synchronicity' in the Universe.*

If the set has *n* elements, the number of *k*-combinations is equal to the binomial coefficient:

$$\binom{n}{k} = \frac{n(n-1)\cdots(n-k+1)}{k(k-1)\cdots 1},$$

which can be written using factorials as $\frac{n!}{k!(n-k)!}$

We can see then the drastic diminution of elements brought about by combinations. *But nature, specially in time does care for sequential, hierarchical order, unlike space, more democratic - hence we see in the relationship of permutation/variation with time and combination with space, once more that time-like elements are far more abundant than space-like ones. And this fact has huge metaphysical implications.*

The binomial formula carries the evolution of scalar numbers into time probabilities:

$$P_m = C_n^m p^m (1-p)^{n-m}$$ It defines the probability of getting exactly m positive results in n independent trials, in each one of which a positive outcome has probability p.

Metaphysical conclusions. Leibniz and Gellmann's Totalitarian principle.

'All forms & events that are not forbidden are compulsory' Totalitarian Principle, Gell-mann.

The metaphysical insight we obtain from those different 'sums of elements' is he *existence of a much vaster extension of space than of time.* Since if all what can exist do exist, a spatial, present, conserved cyclical form, perceived in the simultaneity of its non-sequential order which defines a slice of space has infinite more possibilities than a temporal, sequential lineal order. And this means as all possible combinations do exist in some regions of the infinite Universe in time and space, spatial present extension-combinations and cyclical forms ARE much more important than finite hierarchical planes with a more lineal sequential order which end easily with increasing information in the explosion of death.

All lineal motions are parts of a cyclical form. All existences return as its combinations and worldcycles across the fifth dimension are limited but the number of places in space in which they can exist is far larger:

Entropic processes are quasi-infinite in its variations and permutations, as time-motions are, but when we introduce laws of order and symmetries between Planes, topologies and time ages, with its sequential nature occurrences, the number of variations IS reduced drastically, so reality is far more reduced by virtue of spatial points of order, than the messy entropy-only theories of physics, which has infinite implications, as S/T->0, which means that inversely t/s, the number of repetitions of S-forms in the Universe tends to infinite and each of those allowed existential beings is therefore discontinuous but immortal.

SCALAR POLYNOMIALS

Polynomials on the other hand are the spatial simultaneous analysis with the simpler 3 Dimotions of single plane. But first we shall introduce some concepts on the distinction between equations and functions.

Going further into positive complexity

It is clear that simple operands on numbers already become certain basic mirrors of Dimotions of existence. However since mental mirrors try to be still representations of all the possible outcomes of the game of existence, they grow in generality till becoming a potential mirror of all images. This is done with two degrees of generality in Algebra. The first higher generality is caused by equations, which we can roughly speaking differentiate them into:

Equations according to Δ-scale.

- Simple equations that attempt to describe processes happening in a single plane of the fifth dimension and/or a single time cycle called polynomials.

- Complex equations that expand the range of the algebraic mirror to events happening between different planes of existence, hence including the operands of sinusoidal functions, exponential functions and differential calculus.

- S: Equations according to the quantity of S, ST, T parameters.

- A 2nd parameter of growing complexity comes from considering equations with different number of parameters, which divide them in the case of polynomials into equations of one, two or three variables; as we are working in a single plane – so hardly any function will have a fourth variable beyond the 3 standard elements of a trilogic scale of space-time.

-T: Equations according to its possible time values.

- A 3rd parameter of existence is according to S=T symmetry, the number of solutions which try to achieve, either a single point solution, or a whole range of possible solutions that will trace an entire curve of the conic type.

S=T: Equations according to the angle of congruence.

All possible equations can be classified from those ΔST variations, which sometimes are connected. And needless to say according to the laws of angle of congruence and the s=T duality we can represent solutions geometrically and find no communication between the variables – no solution, or a single solution or several solutions. So we connect solutions to congruent laws, illustrated in the next graph for the more complex case of solutions on 3 variables:

a linear equation with three variables is a *plane*, not a line. Since the graph of each uation of the system is a plane, which requires three-dimensional graphing, this ethod is not practical. However, it does illustrate the number of solutions possible r such systems, as shown in Figure 7.
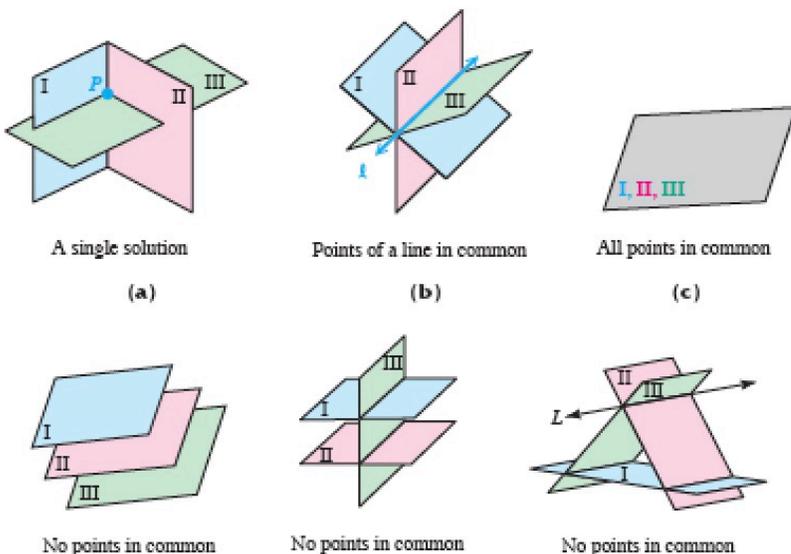
In the graph, without entering into further detail it is obvious that the solutions of polynomial equation of 3 parameters, define topological planes, according to their angle of congruence, which the possible variations between skewness (no solution), the TT limit of entropic uncertainty, a single solution with all points in common, the 0' SS solution of identity. And the 3 intermediate dual

A single solution
(a)

Points of a line in common
(b)

All points in common
(c)

No points in common

No points in common

No points in common

solutions of a single line, 2 lines or 3 lines with partial solutions for the pairs X,y, X,z and y,Z. While there is finally a possible single solution for the 3 planes.

It is worth to notice solution happens when *there is orthogonality among the 3 planes. The concept of orthogonality between the S, T and ST 'networks of any efficient system, do transcend the spatial ideal form of those graphs, yet if we take each 1-2 Plane as a space-filling fractal network; it means the existence of a common fractal point or @-mind brain of the system that intersects and controls in simultaneity and synchronicity the 3 physiological networks for the system to work. As such* as De Broglie already noticed in its paper on the wave particle complementarity, because all what exists is time motion, this point in space can be taken as a synchronous clock of time common to the 3 networks, the second in man – the beat of a limb/step, an eye-brain thought, and a beat of the heart.

Simultaneous growth of geometric, dimotional, Nº & operand complexity: 1D point>2D line>3^D plane.

We can assess more clearly the concept of i-logic entanglement that makes possible the persistence of form in a reality made of ST dimotions, as the parallelism of functions in time, numbers in scale and forms in space happen in mathematics to mimic the ΔST elements of reality; while the growth of new dimotions implies a growth of complexity without abandoning the previous dimotions, so they become entangled each other through operands

The key theme to understand operands is the meaning of inversion laws, which carry the ± symbol in the 3 Planes of sum, multiplication and power, dividing reality into a splitter symmetry around the T.œs' 0' point.

So ± is carried into power laws and products through ratio inversions, which is better expressed in the quadratic 'complex' frame of reference of $X^2=\pm i^2$ conjugate + 1 x -1 = 1^2 =1 axis.

So the positive and negative are shown in that ternary 'frame of reference' in each of the 3 axis, with the identity product of them, or quadratic frame of reference... in which we shall discuss latter on the complex elements of multiple dimensional operands and its quanta of actions.

Difference between equations and Geometric curves.

The characteristic features of ¬Algebra are the use of letters, which we perform operations according to definite laws. In elementary ¬Algebra the letters denote constants, normally ordinary numbers, taken as populations in space, the variables, which are the final letters represent T.œ.s of a certain species, and the operand represent different 'dimensional motions', dimotions of time-space.

So we can reduce equations to a series of Existential ¬Ælgebraic equations of the type:

∑T.œ ST-perandi ∑ T.œ ST operandi = ∑T.œ ST-perandi ∑ T.œ ST operandi

Whereas the a…. p letters will be numerical parameters, the U, V, X, Y, Z letters Timespace T.Œs and operandi dimotional parameters.

As such there is a fundamental difference between an equation and a geometric curve in analytic geometry, despite its apparent similarity. An equation searches for a single solution as the XYZ letters represent 'spatial populations' and the parameters of 'time change' that convert the equation in a time event are the operands.

On the other hand in a curve the XYZ letters represent variables, whose simultaneous possible values, joined by a geometric non-E line form of simultaneous 'spatial membrane', so they are events of space, duly studied in our 'geometric first volume of 5D mathematics'.

This is a huge distinction that makes completely different the study of simultaneous curves in space, which act often as membrains of superorganisms; to the study of ¬Algebraic equations, which describe events in time, often of a sequential nature, gifted with motion.

Differential geometry further merges both concepts, as its curves are traced by a point of time.

What is then the 5D difference between simultaneous space curves and time curves traced by points? Its persistence of memory: a simultaneous curve in space is either perceived by a slow mind in slow time, so the point has traced the entire curve, as the lines of light of a car in a slow motion night picture; or the reproduction of the point through adjacent points of the curve persists beyond the lower planes of gravitational space, leaving a real 'offspring' of similar points, which chain each other in simultaneity forming a real membrain; or finally the curve is a repetitive motion that reproduces so fast as to form the equivalent of a true membrain (as we showed with examples of shepherd dogs that act de facto as an 'physical enclosure' for the whole herd.

To notice also how important this differentiation will become when considering the solutions to PDE equations, which are 'families' of curves, in which all the possible forms are represented but *only certain values will be real, and so we will go deeper in this S-T duality when we deal with ODEs and PDEs.*

In here we shall thus study equations in time, where the 'variables' are the operands that represent dimotions, the letters, numerical parameters of the social evolution or 'size' of the 'constants' which represent a T.œ or common function applied to all those numbers.

As opposed to the reduced number of conic forms, which describe simultaneous supœrganisms equations describe events of space-time.

It is then remarkable that the same operands can be used for both, simultaneous space curves and time polynomials, showing once more the essential nature of the S=T law.

So we will have to differentiate for each operand at least a Duality of function as S-operand and T-operand, which is *the initial gender symmetry of all systems of Nature that allows the creation of a trilogic ST-mixed function and in most cases opens the door to the pentalogic of parts and wholes, which in the case of operands is represented by those equations (as the word ¬Algebra in Arab – the reunion of parts – truly signifies).*

so that the laws of operations on expressions in letters are based on the general laws of operations on numbers. For example, the sum does not depend on the order of the summands, a fact which in ¬Algebra is written as: a + b = b + a; in multiplying the sum of two numbers, we can multiply each one of the numbers individually and then add the products so obtained: (a + b) c = ac + bc, etc.

If we trace the proof of an ¬Algebraic theorem, it is easy to see that it depends only on these laws for operations on numbers and not at all on what the letters represent.

The ¬Algebraic method, i.e., the method of calculations with letters, penetrates all of mathematics. In fact, a substantial part of the solution of a mathematical problem often turns out to be nothing but a more or less complicated ¬Algebraic computation. Besides, in mathematics we employ various symbolic calculations in which the letters no longer denote numbers but some other entities, where the laws for operations on these entities may be different from the laws of elementary ¬Algebra. For example, in geometry, mechanics, and physics we make use of vectors, and as is well known, the laws for operations on vectors are in part the same as for numbers and in part essentially different.

Any function defines first the 4D units of reality, which are fractal points, T.Œs, which are indistinguishable and appear in simultaneous space; hence can be defined as numbers; with constant parameters called letters; *subject as a relative 'sœT' (if we were to use the jargon of modern maths) to a 'partial equation' or stœp of a worldcycle* in sequential time that acted upon them through the variables.

So the most general correspondence between Gst reality always composed of a spatial simultaneous population subject to a dimotion of time is immediate;

- Constants (radicals) = Spatial populations of s.œ.T

- Variables (x, y, z) = Parameters of change in any of the five time dimotions, which imply also parameters to value social groups (population), languages that value degree of evolution, (i.e.money-prices), parameters of locomotion (speed), entropy (acceleration, exponential decay), etc.
- Equation combining with operands variables and radicals, which represent those s.œ.T, following the stœps of action, which will be shown through operands, of which:

We must differentiate though a still, solved, space 'equation' (§E) from a variable, temporal 'equation' (TE), a very important definition somehow blurred by the lack of a proper philosophy of mathematics.

The first type are equations where we are concerned with finding a solution to the variable, ideally a single solution but according to the fundamental theorem of ¬Algebra, with as many solutions as powers the equation have, a result of profound implications for the structure of spacetime.

The second type of equation are equations represented in a Cartesian graph, where the exact solution extends through a new dimensional motion along all possible values thus giving us the 'whole entropic range' of time values, many of which are meaningless, as 'entropy', the absolute potential number of time combinations in the Universe is infinite, a feature mathematicians and physicists do not understand, busy-busy tabulating all entropic infinites of reality, even as in the case of physics considering it the part that 'matters' of matter (when the true element to consider are the informative galaxies, not the vacuum entropic space between them).

As there is not a philosophy of order, purpose and reference to the ST laws of reality mathematicians thus waste enormous time in disquisitions about infinities, values of equations beyond the parametric exact solutions and get shocked when the 'mathematical Universe' shows entropic limits (i.e. no radical solutions beyond the 4th quartic polynomial), but that is what delights the mind of the evolved 5D mathematicians who sees in maths a perfect mirror of 5D laws only comparable to that of Gst itself.

Another obvious case is that of the irrational real numbers, which are infinite compared to the rest of numbers in increasing nested groups: N->Z->Q. But irrational numbers are 'entropic numbers' with the very few exceptions of those who correspond to fundamental 'angular equations of perception' (√2, phi, pi and other Universal constants of note). The others must be considered pure temporal entropy of the infinite Planes of the Universe, meaningless beyond its metaphysical meaning: that time Planes are infinite and yet those who are meaningful from the human point of view 'reduce' to Q (complex numbers, being dual numbers whose philosophy is considered elsewhere).

This is important to understand 'curves of equations represented in Cartesian graphs', which are continuous but that doesn't mean the Universe is continuous, as the 'meaningful points of those curves' are discontinuous – its relevant solutions, the x=0, y=0, standing points and 'limits' within the meaning of the function.

This concept, the 'entropic limits' that make sense for mathematics is completely lost specially since Cantor's absurd attempts to count entropic infinities; but it has a more fruitful understanding in 'definite' integrals and the need for 'limits' and initial and final points of a worldcycle to find solutions, as it also happens in its applications to mathematical physics.

Let us then consider now briefly some aspects of those operands as dimotions, not trying to be exhaustive by all means, as that is not the goal of those papers, just a 'first' step on a r=evolution of science that either huminds or AI will take to its fruition in the XXI c. but a single man cannot complete.

We do so using the trinity and pentalogic views proper of the entangled Universe, as its 'polidimotional functions' for all what exists within it, trying to find the connection between the abstract properties of the 3 relative Planes of ¬Algebra as a mirror of timespace structure – first its dimotions and number families, then its equations using either the simplex dimotions (polynomials) in its 3 Planes (±, x÷, √xª) or the complex operands (∫∂ and complex plane)… to complete with a larger more 'professional rendering' of analysis the second classic age of ¬Algebra, which as all systems is the best more balanced and connected with reality age (in the case of ¬Algebra with

mathematical physics, which by choice of its practitioners and the usual suspect – human egocy – denies all deep time bio-organic properties to systems of matter; something mathematics by the very nature of its abstraction cannot do, explaining why physics is so poor conceptually and so good in praxis.

Because sinusoidal functions deal with the shrinking of the world into a map of perception, they belong to integral calculus of finitesimal derivatives - as we explain in geometry, the angle and triangle came first likely before even man learned to count just by the fact of opening his eyes to the world. So we won't treat those operands here.

¬Æ POLYNOMIAL EQUATIONS & ITS OPERAND: < = > ±, X÷, √³

First degree equation.

The all pervading use of lineal equations correspond to an essential paradox of the law of inversion between scales, such as when we emerge into a larger scale, topology in space change from lineal to cyclical to lineal. So we can always approach a curve through lineal steps (fractal measures, derivative tangents, and lineal equations); or gather a series of curves with a lineal envelope, smoothing its roughness). As lineal systems are deterministic and predictable (a line ceases to be a line if it acquires curvature so it cannot change direction, unlike curves which can Δ, ∇ or even 'invert' curvature, hence they have 3 degrees of freedom into the future)… Lineal first degree equations are easier to calculate, and they were the first to appear, (Greek lineal geometry), and gave birth to the axiomatic method – aberrant for more complex, less deterministic forms. And were also the first to be studied in analysitic geometry. Then French renaissance, brought with Viete symbols and with Descartes numbers to expand the first trivial solutions to polynomial equations of the Greek and Arab age, made with geometric equivalents. So Analytic Geometry married with Algebra flied away.

Descartes made use of two simple ideas. First of all examined what curves correspond to an equation of the first-degree: $Ax + By + C = 0,$

i.e., to an equation where A, B, C are numerical coefficients with A and B not both zero.

As we have seen this is the 'dimensional natural growth from sum into a sums of sums or multiplication understood in terms of its simplest dimensional combination': $ x D:
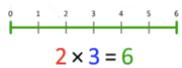
Descartes found that in the plane a straight line corresponds to such an equation. And conversely, that to every line in the plane there corresponds a completely determined equation of the $y = kx + l,$

where: $k = -\dfrac{A}{B}; l = -\dfrac{C}{B}.$ While y = kx represents a straight line passing through the origin and making an angle φ with the x-axis whose tangent tan φ is k and L the distance from 0 to the crossing point of the line and y. Thus as usual the simplest, lineal $T element was discovered first, and found to be deterministic and easy to calculate, *but in a world dominated by time cycles, it was only the beginning of a long adventure not yet closed in 'meanings':*
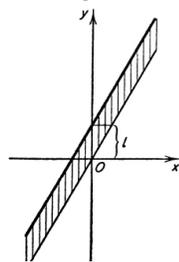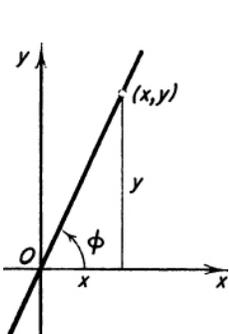
Since there is an enormous number of scientific errors, including the lineal big-bang caused by the ab=use of lineal approximations to functions, and the 'spread' of the function into the negative 'side of the line' as if it always existed or behaved linearly crossing into the past-negative side of the graph.

In fact most 'real functions' that represent space populations either static or reproduced as a radiation departing from a 0-1 seminal finitesimal do NOT have meaningful negative regions – a linguistic distorsion of the @-0 point of view, and the few that have it might represent a past-time negative memorial residue, which tend to have an exponential decay-like form.

To notice also the determinism of lineal functions, as (Kx + c)' = K and ∫K=Kx+c; hence *it is the only function that when we interpret Y' as a past finitesimal and ∫Y as a potential future, an integral growth of dimension does not open up the future to different +C new possibilities*

Lineal Functions as representation of Ts, lineal Dimotions.

If you have capture the essence of 5D is self-evident that lineal functions must represent Ts-dimotions of locomotion, energy feeding and external growth of the type |-$T- that describes fields/limbs. For example,

If x is the time and y is the distance covered by a moving point, then the linear function y = kx + b obviously expresses the fact that the point is moving with uniform velocity k; as a Ts dimotion, and the number b denotes the distance, at time x0 = 0, of the moving point from the fixed zero-point from which we measure our distances.

Lineal equations as approximations of curves.

This said, the linear function is easy: l (x) = ax + b gives the simplest of all curves, namely the straight line; and yet it is one of the most important due to the fact that every "smooth" curve on a small segment is a straight line, and the less curved the segment is, the nearer it comes to a straight line. So Linear functions are extremely useful because of their simplicity and because it is possible to consider non-uniform changes as being approximately linear, even if only for small intervals, *which is a direct consequence of the Galilean Paradoxes between two Δ±! Plane, as a curved geometry is made of smaller lineal steps, a small lineal open-free path always curved into a 0'-time cycle on the long term.*

A wholeness, is a closed 0' sum and hence cyclical, curved. A step of the curve however appears in small distances as a lineal, open step. So you might say that in Δ-1 curves do NOT exist, and lineal steps of 'freedom' are its perception, which metaphysically explains why humans feel free even if they are enclosed in social circles.

In the language of the theory of the functions, this means that every "smooth" (continuously differentiable) function is, for a small change of the independent variable, close to a linear function.

The linear function can be characterized by the fact that its increment is proportional to the increment of the independent variable.

Indeed: $\Delta l(x) = l(x_0 + \Delta x) - l(x0) = a(x_0 + \Delta x) + b - (_{ax0} + b) = a \Delta x$. Conversely, if $\Delta l(x) = a \Delta x$, then $l(x) - l(x_0) = a(x - x_0)$ and $l(x) = ax + l(x_0) - ax_0 = ax + b$, where $b = l(x_0) - ax_0$.

But from the differential calculus, we know that in the increment of an arbitrary differentiable function is proportional to the increment of the independent variable, and that the increment of the function differs from its differential by an infinitesimal of higher order than the increment of the independent variable.

Thus, a differentiable function is, for an infinitely small change of the independent variable, really close to a linear function to within an infinitesimal of higher order. The situation is similar with functions of several variables. A linear function of several variables is a function of the form $a_1x_1 + a_2x_2 + \cdots + a_nx_n + b$. If b = 0, the linear function is said to be homogeneous.

A linear function of several variables is characterized by the following two properties:
1. The increment of a linear function, computed under the assumption that only one of the independent variables receives some increment while the values of the remaining variables are unchanged, is proportional to the increment of this independent variable.
2. The increment of a linear function, computed under the assumption that all the independent variables obtain increments, is equal to the ¬Algebraic sum of the increments obtained by changing each variable separately.

Thus a linear problem can be characterized by 2 properties:
1. The property of proportionality. The result of the action of each separate factor is proportional to its value.

2. The property of independence. The total result of an action is equal to the sum of the results of the actions of the separate factors.

The fact that every "smooth" function can be replaced in a first approximation by a linear one, for small changes of the variables, is a reflection of a general principle, namely that every problem on the change of some quantity under the action of several factors can be regarded in a first approximation, for small actions, as a linear problem, i.e., as having the properties of independence and proportionality. It often turns out that this attitude gives an adequate result for practical purposes (the classical theory of elasticity, the theory of small oscillations, etc.)

Dimensions of a polynomial 'background space-time'

@nalytic geometry allowed a more clear representation of those polynomials NOT isolated as equations but *in reference to the plane in which they are* entangled*. This is important not to confuse its meaning. A polynomial in a 3D world, of the type x^3 is a cube. The same function below, has nothing to do with a cube, but it is a curve of growth diminution and growth on the Y-coordinates.*

Thus the 'perspective' of graphic polynomials is that of time not of space or one of its combined 'holographic, bidimensional forms' of timespace:

In the graph, repeated ad nausea, for clarity, we see the general rule: a bidimensional St system of information (still space), or a time clock (moving cycle), the 3rd dimension of reality; and a vector of lineal time motion or its bidimensional sheet of spatial distances, the 1st dimension of reality, come together into a the 2nd Dimension, ST system of energy, or time or motion.

3Dimotional systems tend to be the intersection of a line and cycle, which in geometry is expressed by the rule that almost all functional dominant forms of the Universe can be traced with a line-ruler and a compass-cycle.

Generally speaking ¬Algebra is then just a mirror image of the geometry of the age, specially in the calculus with Pythagoras like theorems of square roots and the simplest $\pm$, $\approx$ X $\div$ operands *without considering the mirror image of those operands in other Δst elements and symmetries of the Universe.*

Fermat's theorem.

How can then differentiate polynomials in space-time systems from polynomials ,which are 'spatial sums'?

An easy concept is that of the difference between sum and product operands. A space-time system is defined in product terms, a sum is of the same type of being. We ad '*equal species'. And this has an unexpected proof,* in a margin.

Its means that that when we ad we superpose, so a 3rd dimension expressed by a power law is no longer 'a holographic superposition', reason why the Fermat's theorem, $X^3 + Y^3 \neq Z^3$, does NOT work.

In depth the superposition rule implies more generally that *the full consistency between contiguous dimensional growths ($\pm$) breaks between discontinuous dimensions, from 1D (sum of herds) to 3D (merging of 2 holographic bidimensional sheets into a third one through product):*

In the graph, the holographic principle is expressed by the operation of addition, which is allowed by superposition into a tridimensional volume.

Yet as *there is not a 4Dimension in the same scale of space-time, the rule of superposition through a new Dimension breaks for superposition of cubes, which would have to be added in this supposed 4 Dimension in a single plane, reason why we cannot add them (Fermat's theorem).*

The holographic bidimensional universe and its ternary ST-geometries define reality. So in most mathematical equations solutions abound on quartic and cubic systems but only special cases are solvable for higher polynomials

or have any real use in reality; the exception being simpler equations of the Δ§ocial Planes and reproductive functions of the type $X^a=b$...

Quadratics are the masters of the ¬Algebraic game, the most abundant an common of all forms in existence, *because the Universe is bidimensional, and so it is information. So quadratic equations by definition are the perfect form to show the properties of the Universe of fractal bidimensional space and informative, bidimensional time.*

The bidimensional holographic principle explains why in geometry (greek bidimensional plane, which proved almost all the theorems of geometry) and ¬Algebra (quadratics) almost all phenomena of the Physical, topological universe can be 'carried' on to quadratic ¬Algebraic equations. We study the main forms of quadratics in those other 'parts'.

Its addition can be forced-fed (4D spatialisation of the time dimension) in modern physics, but as Einstein put it lineal time doesn't travel backwards... indeed, if it does so it breaks into an entropic explosion, loosing its internal $\sum\Delta-1$ bonding by a whole. So we cannot get consistent results for an addition of cubes in a single space-time and inversely for its dissection, reason why *the addition of cubes cannot either be resolved in bidimensional plane geometry with a line-rule and a cycle-compass.*

All this means essentially that a power law is concerned beyond the X^3 cube with growth in Δ-planes; and that is also the ultimate reason why as Abel and Galois realized Polynomials of higher order than 3 are NOT solvable by radicals (which essentially mean 'additions' and additions of additions - multiplications as a sum of sums), unless we can break-reduce them to lower dimensions or the consistency of the power law is extreme (cases of the type $X^a=C$, where the variable is completely alone, hence with no sums, meaning often merely a logarithmic growth of scale, as a herd, NOT of dimensions I.e. $10^{1°}$ is merely a society of 10 billions, still within the classic range of a society of similar points in a single plane.

We extract the truth of any system applying to it an entangled dual, trilogic and pentalogic from the perspective of its S=T dualities and trinities, and its pentalogic elements as real or virtual mirror of ¬Δ@st.

Δ§ocial evolution: Polynomial build up of structures that mimic the complex, scalar, simultaneous trilogic forms of the Universe, polynomials take us to the completion of the positive arrows of social growth and reproduction of its families of scalar numbers and related operands (N, Z, Q, ±, x÷, X^n) building up a complete 'biased' view of reality in terms of its social Planes, without the complex arrows that transit and deform reality between planes of existence (angular perception of trigonometric functions that shrinks in mind mappings; calculus that extracts its finitesimal parts and gather them in complex wholes).

¬Entropic limits: The polynomial thus is simple in internal structure and cannot be used to represent complex organic forms, but works to its perfection in the analysis of disaggregated herds, where counting of individuals gathering in groups matter and *can be referred to a unit of value, the 'cohesion' language or parameter which all those elements have in common* – from chemical reactions where we 'count' reactants, to problems in units of values, volumes, prices, distances…

So polynomials have little internal structure in the counting of individuals to form those herds and aggregates and this poises the first limit to its meaning – *as they do not permit more complex uses of the operands of re=product-ion and exponential decay – limiting what polynomials matter and what are fictions.*

A polynomial as a reflection of the Universe is a simple representation of a superorganism through its 3±¡ Planes. As an account of its forms in x∞, x¢…. till x each scale of homogeneous elements is supposed to growth through parts and wholes for each new power law and as such it is the account of all its forms, CX total, in the number of Planes given by the power dimension, n= Planes.

But as an organism is not exactly repeated in each scale, the polynomials that reflect the Universe must diminish or increase the patterns of each scale, with summands for each scale to make the humbler more precise.

In this manner a polynomial as a mirror of a real Universe appears.

But what x represents? The simplest response is the number of cells between each scale, so the polynomial measures the total number of wholes.

Next in the understanding of reality comes the consideration of operands combined to form functions. And here it comes the question on how to group them.

As it happens there is a natural grouping of those Dimotional operands based in its complexity and the natural relationship of the Dimotions=actions of existence, such as we group naturally the ±, x÷ and Xª operands, which represent a 'series' of simpler operations in a single 'parameter-variable' in polynomials, therefore the simplest functions of 'existence' (as we mean by existence, the consecutive sum of actions=dimotions, represented by those operands).

As they are clearly related to reproduction, social evolution in a single 'lineal' planes of space-time.

This leaves the more problematic, complex Dimotions of 'angular perception', 'exponential decay' and differential calculus, which clearly relate to *Motions through planes of the fifth dimension, as operand*, which naturally group together in functions notably of mathematical physics.

So polynomials are simple functions of social reproduction, and it bears witness to the rich complexity of the pentalogic Universe that even such simpler forms in a single plane can approach all other functions (Taylor's series), when we enrich them with some of the complex scalar Dimotions of angular perception (¡-3>¡o), exponential entropy (¡<¡-2) and lineal derivatives (¡<¡-1), which are the natural Dimotions of scalar space-time.

The ego paradox, linearity and the 3rd age of entropy

All this said, for fully understanding maths and any other language mirror of Gst laws, obviously there is no way the reader will make sense of it, as a 'whole' interconnected, entangled reality unless he grasps the bare theoretical meaning of 5D space-time from where all the laws of mirror languages derive. This is the biggest handicap I have confronted all my life and the reason son many quips even in this last attempt to 'clean' my act of my own egocy… This comes to the reason why mathematicians in the XX c. and beyond wasted so much time (till they started to build the metal-mind with simpler Boolean ¬Algebra), with the 'entropic' beyond limits of reality, as all systems 'keep its time evolution' beyond the 'preferred' classic age of harmony when the mirror corresponds strictly to the 'solutions' that make sense in reality because they are balanced, S=T solutions. As they age, more informative St solutions are found, which are complicated and often redundant as 3rd age wrinkles are, but still have contact with nature. But once this is also exhausted, they 'decay' into the infinite potential time entropy of all combinations the language allows but Nature eliminates as soon as they are formed.

Entropy grows as soon exponentially as we come out from the s=T balance region. In particles, the neutron dead state grows as we move further down the age, in the body the number of tail of memories, and warping repetition, which are entropy as it is not new information, in mathematics as we go the infinity

PENTALOGIC

Polynomials must then be understood as everything with pentalogic that is, in its multiple functions and applications to all the elements of ¬Δ@ST, *according to the values of the X-variable*. So we talk of:

SPACE POLYNOMIALS: When the x-variable represents a dimension of space, point, line, plane and volume.

TIME POLYNOMIALS: When the variable represents a motion of time, distance, speed or acceleration.

Δ-scale POLYNOMIALS: When the variable represents a scalar function, in series of diminishing values.

¬ Entropy polynomials: when the variable represents a scalar function, in a series of growing value, or an exponential form.

Now of all those points of view of polynomials, some are more useful than others, as PENTALOGIC ALWAYS forces an entity or event in some of those '5D motions', which are not its purpose though they will be mirrored by all Dimensions - i.e. a woman tends to reject entropy and prefer information but it dies always.

So we could 'state' that the 5th dimensions of existence touch any 'whole system' which is 'coherent within itself', in the case of languages as a mirror of the world.

This said the most important mirror any system can represent is a worldcycle of existence, which in itself includes all the other dimotions.

So we shall consider how Polynomials in a plane represent that world cycle too.

Polynomials not only can 'approach' as a mirror any other function and DImotion of the Universe, with certain distorsions as the case of the maclaurin series approximations to calculus shows, but many of them have nothing to do with reality, showing indeed the inflationary nature of languages, whose internal structure might or might not be real or fiction, and so since Godel we know they cannot prove reality.

Equations therefore must be always put in relationship with the reality they describe first.

THE SOLUTION OF POLYNOMIALS

Abstract. The solutions of polynomials as so many other re=solutions of problems follow a simple rule of the 5Dimensional Universe: a solution not found in a given plane of existence can be found from the perspective of a higher Dimotional view. Hence for all the solutions of a polynomial we need a complex plane; for many solutions *Solutions matter because they connect the inflationary language with reality. Something Cantor forgot in his mad house and with the help of Hilbert many other mathematicians.*

In a larger cultural view of course we live the entropic age of mankind and so entropic solutions pass as mathematics, art (white sliced canvas – the final work of tachism; gore movies, the basic work on film today), history (entropic dog-eat-dog society), childhood education (virtual screens, hate memes, internet), music (random music; electronic music beyond human ear range better suited to string and wood, repetitive beats with minimal information), selfies… but *entropy death, the infinite receptacle of disordered time is not what a mind that seeks order values.*

Even in equations of polynomials there are arbitrarily many special forms of equations of any degree that are solvable in radicals, and many of them are exactly those equations that are important in the applications:

- Some can 'transcend' Planes, if they are perfect, 'laser-like' symmetric in growth, or cyclical in form, as those are the laws required to transcend and emerge between Planes. So all the binomial equations $x^n = A$, in which the system emerges equal to the previous x-form are solvable.

So are in a single scale those who form a perfect cycle - a broad class of such equations, the so-called cyclic equations and still more general "Abelian" equations and those required in the problem of construction by ruler and compass of regular polygons, which Gauss called cyclotomic equations, i.e., equations of the form:

$$x^{p-1} + x^{p-2} + \cdots + x + 1 = 0,$$

where p is a prime number. He showed that they can always be reduced to a chain of equations of lower degree; moreover, he found necessary and sufficient conditions that such an equation can be solved in square 'bidimensional ST' roots.

RECAP. The solutions of polynomials are important to 'define' what polynomials are pure mathematical entropy with no reference to reality, and which ones are meaningful because they follow principles of Gst, among which is remarkable the fact that ST dimotions are bidimensional; hence a key method to solve any polynomial is its

reductability to square roots; and the Universe is pentalogic, with the 5th dimotion of entropy=loss of information, hence penta-polynomials (quintics) are not solvable.

The fundamental theorem of ¬Algebra. The Δ@st symmetries reflected by polynomials.

The fundamental theorem of ¬Algebra proved by Carl Friedrich Gauss in 1799. It states that every polynomial equation of degree n with complex number coefficients has n roots, or solutions, in the complex numbers...

But why there are for any polynomial of power x, x solutions in the realm of complex numbers, which implies also a better understanding of a complex plane, so far lacking in mathematics.

And the answer is as profound as general in 5D mathematics as it is in ¬Algebra:

"Each root of a polynomial represents a Dimensional or scalar motion of space-time."

And so bidimensional polynomials represent holographic functions of space-time. Tridimensional polynomials are ternary representations of 3 symmetric scalar, space and time elements and beyond the fourth 'element' entangled in the Universe (symmetry between space, time, scale and mind, which can be represented by the 'same value numbers', hence by polynomials, there are NOT more symmetries of reality (entropy being the denial an erasing of the other 4 elements) which means basically that in the same manner we do NOT have use for integrals and derivatives beyond the 3 Planes of a super organism, we do NOT have use for polynomials beyond the 4 symmetries of the entangled Universe.

@nalytic geometry expands ¬Algebra

¬ALGEBRA really starts to understand EQUATIONS with more sophistication that geometrical equations, when *motion parameters are introduced by analytic geometry and mathematical physics*, as the X and Y coordinates are now used for t-motions and S-pace (as in the simplest physical equations of space-distances made at certain speeds) that it can mirror S≈T Symmetries, first in a subconscious form through equations born on praxis, then in the 3rd age with some deeper insights on the concept of symmetry (group theory and its application to physics) which we shall complete with its full causal realisation - since we said '¬Algebra understands', *not* the people that make ¬Algebra.

The classic ST age of ¬Algebra thus saw the transformation of pure arithmetics of numbers into a mixture of the ΔST elements of maths as a full reflection of the Δ•st universe. And the two huge figures that did it properly were Descartes and Leibniz (Fermat and Newton, in parallel but without publishing and the same clarity).

It is the golden, classic age of ¬Algebra and analysis, before it enters the 3rd age of excessive information (attempts to put all the information in a single mind mapping with group theory and functionals and §ets).

We study most of analytic geometry in the post dedicated to it. So goes with analysis. Here we shall make just a few considerations.

It all started with the parallel evolution by Viette onwards of symbolic terms to concentrate no longer in numbers but in operands, the true essence of S=T symmetries...

Descartes: merging all the elements of Δ@s=t maths.

...And Descartes idea of representing solutions to equations *with a larger dimension - the variable letter that represented all the '§ets' of dual X, Y possible solutions; and to 'imagine' them in a graph to plot them, forming a visual 'in-form-ative' geometric figure, the **new 'scalar dimension'** that gathered all the X(S)<≈>Y (t) pairs of possible 'variations' on the space-time construct.*

FURTHER on, he introduced, @, the point of intersection of the coordinate axes, having coordinates (0, 0) and hence a 'p.o.v.' or singularity.

And with the introduction of coordinates he constructed an "arithmetization" of the plane. Instead of determining any point geometrically, it is sufficient to give a pair of numbers x, y and conversely.

Up to the time of Descartes, where an ¬Algebraic equation in two unknowns F(x, y) = 0 was given, it was said that the problem was indeterminate, since from the equation it was impossible to determine these unknowns; any value could be assigned to one of them, for example to x, and substituted in the equation; the result was an equation with only one unknown y, for which, in general, the equation could be solved.

Then this arbitrarily chosen x together with the so-obtained y would satisfy the given equation. Consequently, such an "indeterminate" equation was not considered interesting.

Descartes looked at the matter differently. He proposed that in an equation with two unknowns x be regarded as the abscissa of a point and the corresponding y as its ordinate. Then if we vary the unknown x, to every value of x the corresponding y is computed from the equation, so that we obtain, in general, a set of points which form a curve.

The deepest insight on what Descartes did is then evident:

He gave motion=change to geometry, adding its time-dimension; and so its method could be used to study the actions/motions of a 'fractal point' whose inner geometry of social numbers was NOW ignored, in the Δ+1 scale of its world.. And so the graph would be a perfect graph to study all the ACTIONS=MOTIONS external to a given being, becoming for that reason the foundational structure of mathematical physics.

This is often forgotten, as S and T dimensions are ill understood so a standard book defines it as:

"Analytic geometry is that part of mathematics which, applying the coordinate method, investigates geometric objects by ¬Algebraic means."

Not so... even if in analysis we will find that the curves DO represent key features of the 'arrows of change' of the Universe, specially the 'standing points' of change of parameters of Space=Information, ST=energy and Time=entropy (or any other kaleidoscopic combination of ST), in essence *they represent the world cycle of the action or motion we study, with its 3 phases of starting motion, steady state, and 3rd informative age coming to a halt.*

It must be then understood, as evident as it is, *that the Rashomon effect should consider different perspectives on those curves and forms found in analytic geometry, expressing ¬Algebraic equations:*

-Temporal view: the curves are then meaningless in space. What matters is their 'social dimension' that resolves symmetries between time dimensions expressed by the two variables often a parameter of space that changes with a dynamic function/action/motion in time.

-Spatial view: It is still though possible to create meaningful closed forms, Δ+1 wholes of geometry, made of Δ-1 points, and then the geometry allows to resolve ¬Algebraically geometric spatial problems, with 'a dual point of view' that increases the easiness of solutions - as Descartes proved easily and Galois completed, showing the ¬Algebraic laws of solution of rule and compass geometrical problems.

- **S=T** view: when one of the parameters/dimensions is fixed, belonging to space and the other to a time motion, the most fruitful in symmetry, soon used by Galileo and Newton to develop the laws of lineal time motion in space.

-@ views: developed as 3 different mappings, will develop (O-polar, |-cylindrical and ST-cartesian proper)

Scalar view, which will have to wait till Leibniz, treated in Analysis.

Equations of polynomials.

Polynomials seem fairly straight, but as soon as we consider its solutions and varieties, things become more fascinating.

First we have 2 mysteries of 2300 years, one which people hardly wonder - why there are 2 solutions to all polynomials, and the other which all mathematicians do but have never been explained - *why one of the solutions is often an imposible, imaginary i-solution? What is the meaning of imaginary numbers?*

Why polynomials 'Δ-Planes' have 2 solutions?

The answer should be immediate for anyone who has understood anything about GST (hopefully more than those who understood Einstein - I just recall his conferences at Solvay, when he quipped to the same question, 'maybe the priest' -Lemaitre):

As all points in motion have 2 directions, upwards and downwards in the Δ-dimension, left-right in lineal geometry, more space or more time in existential topology, youth or old age (rebirth-reproduction or informative evolution).

Thus there are 2 solutions, since *the equation does not include a 'choice', which will be made a posteriori based in experimental evidence.* And so it is evident, as space is larger, and equations quantitative, that in general equations, the positive solution is space-like and the imaginary solution, time-like. And we shall elaborate a lot on that theme along the posts of the 3rd line.

The point to understand the underling structures of the Universe, written in its i-logic mathematical equations, of course is to respond to questions never asked for, as they seem to be the 'a priori' human categories of thought (Kant), which Schopenhauer rightly reduced to 'sufficient reasons', space, time, causality (mostly caused by Δ Planes in space-time) and the mind that perceives all (languages, ternary grammars).

The fundamental mathematical solution is the polynomial double root solution, where the polynomial is a function of present and the 2 solutions a ± split fields.

Presents thus *split in two dual solutions a ± dual field which is essential to understand all time of equations, from the equation of death where the complementary body-head, field-particle system splits, to the inverse equations of social symbiosis in systems that plug-both past and future systems into a present vital form of which the most important happens in social sciences.*

Polynomial solutions.

In other words, a polynomial can represent a T.œ as dust of space time in its four fundamental elements, whose roots being symmetric to each other, as elements of the entangled Universe can permutate to find 'real beings' of the game of existence, even if the concept of polynomial is an absolute abstraction of its purest, simplest properties - a number.

As the polynomial requires the 'equality' of those entangled symmetries in praxis it really works basically for the 3 expansions of classic dimensions of space and classic dimensions of physical time (distance, speed and acceleration).

It is then far more enticing the study of the 'transcendent' operands of analysis, and a simple example of the difference will suffice:

When we work with a polynomial of a higher power we merely increase x by another product with x, or inversely we make a root that eliminates an x.

In the $\int \partial$ *operands however, the results are different: $\partial x^3 = 3x^2$, gives us in fact often a larger sum for smaller x... i.e. if x=2, $x^3 = 8$ and $3x^2 = 12$...*

Then at 3, *both are equal, 27, and beyond 3, the power function grows faster. Why?*

Trinity means reality in a plane is a ternary game, so when we go beyond 3 our understanding requires more subtle arguments. Below 3 what happens is the following: the polynomial is working on a single plane and does merely evaluate the 3 dimensions in space or time motions of that plane without the need to include the support of any lower plane of existence, whose infinitesimal parts must be larger than the whole alone, because they sustain the whole.

Indeed, when we evaluate an ∫∂ *operand we are evaluating together both Planes. The ∂ values the total number of 'finitesimals' which must sustain the larger power whole.*

So the $\partial x^3 = 3x^2$, is 3 times x^2, the lineal √root, because from that sum of infinitesimals, you need to sustain the whole that emerges from it, without destroying the parts that sustain it, and without eliminating the parts of the parts that sustain both. We are thus making a calculus of the Δ±1 ternary Planes of the organism, and each one is of the same value: $x^2 + x^2 + x^2$.

And yet, there are NO solutions granted to a quintic function from radicals:

Because they have an odd degree, normal quintic functions appear similar to normal cubic functions when graphed, except they may possess an additional local maximum and local minimum each.

ST Interpretation

If we consider polynomial, dimensional equations, of D-egree equal to its number of dimensions, it is then obvious *that each continuous scale of space-time does have 4Dimensions, which can be solved. Yet beyond those 4Dimensions the system 'breaks' into a new scale, which is no longer in the same region of existence and hence cannot be calculated with the radicals of the same plane.*

Further on in the graphic, we can easily see that the 5D form can be 'reduced' into a 3-equation where the 3 central 'st' hyperbolic curve, becomes a around the y=0 point a single 'higher' whole, which 'if reduced' to a point, converts the quintic into a 'ternary equation'. Thus a 5D polynomial is a 3D Δ+1 polynomial with an ST central part which deploys its hyperbolic minimal and maximal elements in the 'higher plane' region of the 5th dimension (truly a higher plane when we use complex numbers).

What then it means in general terms, the existence of several solutions to those equations? In the most abstract analysis of polynomials, if we deem a degree, D, a dimension D, then it is obvious that as we solve them we come down from the whole into the parts. Thus a quadratic bidimensional equation resolves into the ± inverse spe and tiƒ functions of the system. A cubic equation will solve into the Ts<ST>St solutions/parts of the system; and a quadratic equation into the S, E, T and sub-dimensions of the system.

Δ-interpretation

But of course a polynomial being the most abstract realisation of a ΔST fractal equation can be many things and yet the beauty of it is that all find interpretation. So when we consider x to be a function of time, it is given us the arrow of Δ-1 information which has several values, as information increases downwards diversifing the system, but the inverse is NOT truth. While St=x^2 has 2 Spe and Tif roots, the square of a number is a single number, ratifying the inverse arrows of entropy and information upwards and downwards:

upwards the polynomial looses solutions, downwards increases its information, normally breaking an st whole into its $T and ð§ components.

$y = x^2 - x - 2$
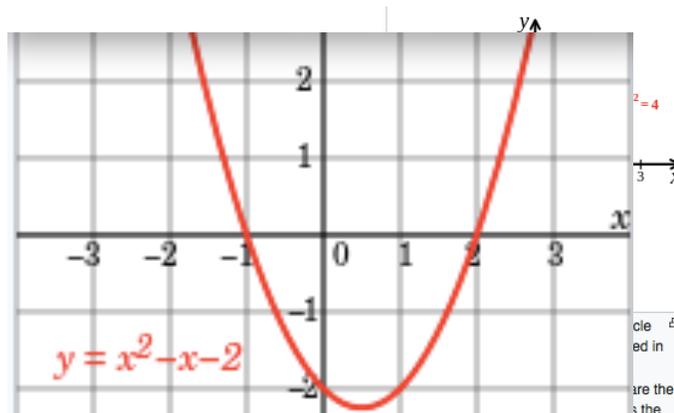
types in correspondence with the 3 topologies in a single plane:

-O-closed are clock-like ones, transcendental polynomials with a cyclical form, which tend to defined 1D-3Dimotions.

-|-Open are on the other hand quadratics related 2-4Dimotions.

-Ø-Finally we find, transcendental, hyperbolic sinusoidal forms, or st equations.

Cubics.

Graph of a cubic function with 3 real roots (where the curve crosses the horizontal axis—where $y = 0$). The case shown has two critical points. Here the function is $f(x) = (x^3 + 3x^2 - 6x - 8)/4$.
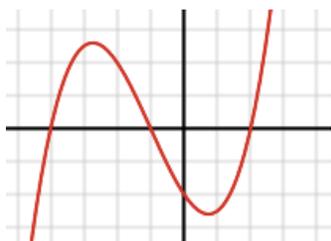
A cubic tries to represent in a quadratic plane 3 dimensions of space (3 topologies) or time (3 ages). And so there are several questions to inquire about this mismatch between *the real function's dimotions and the limits of the 'bidimensional mental paper' in which they are drawn that becomes even more pressing for higher polynomials:*

How cubics might represent the ternary structure of the fractal generator in only 2 still dimensions of space?

What distortions take place when we transfer the holographic Universe into cubic representations?

What are the restrictions the Universe imposes to ternary systems, where *the 'messed bidimensional, tight form' becomes a loose configuration of layers of time-motion or space-density to become a 3rd dimensional 'wide', iterating being.*

For example, the Fermat Grand theorem, mentioned above, $x^3+y^3 \neq z^3$ means a restriction of 'tridimensional messed beings', as all what we can expect are bidimensional perfect forms, accumulated in time, as slices of a motion, or in space as layers of an identical - number/population of bidimensinal beings.

And finally, the translation of all the results of cubic equations, *once we understand the previous rules of engagement, into meaningful laws of ΔSt (or vice versa)*

Duality on polynomials: Spatial solutions as the intersection of 2 conics: reproductive merge of ST-bidimotions.

Because polynomials are about the 'merging' operands of social evolution of herds (sum) and entanglement of bidimensional Dimotions (ST), an important proof of the mathematical mirror over the 5D Universe is the fact that the first solution to a cubic was indeed the combination of the two fundamental ST forms an open 'Ts curve' (parabola) and a closed St-curve (the circle), found by a poet who loved reproductive sense and spiritual wine (:
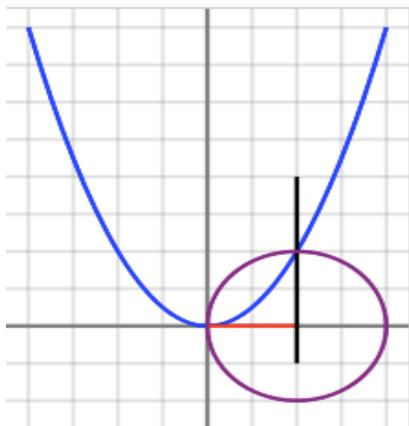
To solve the third-degree equation $x^3 + a^2x = b$ Khayyám constructed the parabola $x^2 = ay$, a circle with diameter b/a^2, and a vertical line through the intersection point. The solution is given by the length of the horizontal line segment from the origin to the intersection of the vertical line and the x-axis.

The interest of the solution of Kayyam is to cast a 3Dimotional function as the merging of two different conics, one S-T closed conic (the circle) and one open (the parabola), thus forming a 3D system, according to the fractal generator, S<ST>T. In non-E geometry we already studied the 'limited numbers of conics' as the representation of the 5 Dimotions of reality. So circles were SS-conics, Hyperbolas, TT-conics, Parabolas, Ts-conics & ellipses St-conics. Now we see how its combinations give us ST-reproductive conics. So we can see the two layers of the

cubic, as the two components, S-circle and T-parabola and its reproductive combination, ST, forming a complete 'T.œ' as defined by the fractal generator:

S(circle) ≤ST-cubic≥T-Parabola

On the other hand, serious thinkers care for what reality is more than its imaginary unstable thoughts. So we find that beyond a 3rd derivative, and a 3rd power, that is, trinity plane of existįence hardly anything matters. Moreover as plane geometry show further 'polynomials' are solved by reduction to those, and when graphed, they are just similar to the square (all even polynomials) adding bumps and to the cubic function adding 'inflationary', 'warped', '3rd age' bumps. Because they ad mere 'details' as it does the 'normalization' processes of a Kundo effect which add 'contributions' for Δ±|>3| scales of Nature, which are hardly perceivable by a Δº mind.

What is then the main difference of such polynomials? We can talk of them in terms of space-time symmetries, as even functions, which are symmetric along the ± axis and asymmetric odd functions, which have an inverted symmetry on the ± sides. And consider again the polynomials of order 4 as the limit of solubility (Galois) as 4 are indeed the elements of reality - let us elaborate a bit more on those first principles of 5D polynomials:

The solvable polynomials define a limit of 3 dimensions of space-time, and a 4th and fifth dimensions that *cannot generally be resolved by radicals in a single Plane, hence belonging to the 4 D S∂ and 5D ∫@ dimensions, which* warp the whole, as it emergence into the fifth dimension, hence making impossible further dimensions in a single continuum**. Notice that the fourth dimensional graph must be interpreted often turned upside down as it is a 'death' inverted time arrow.

They define the bidimensional, tridimensional 4 dimensional and 5 dimensional arrow and similar systems in those dimensions.: The first is a mere motion of an st-lineal trajectory proper of the concept of speed (1D) or 3D (closed cyclical vortices. The third dimension though is more sophisticated.

In that regard a concept of interest to 5D algebra is that of a 'prime polynomial', that is, an efficient, fundamental ST polynomial that cannot decomposed in simpler S=T forms.

Polynomials of higher degree resemble the functions of fourier transforms, where as we increase the numbers the wave become by addition closer to a 'square' form. What this tell us essentially is that the 'elements that matter' are those of the 'ternary scales' represented by the interval X^{1-3} and most other factors are 'perturbations' with a limited range of influence or limited domain of application.

So a pentalogic use of Polynomials as a 3rd reproductive Dimotion is this:

"Polynomials of higher, >2 degree are combinations of simpler bidimotional -TS systems"

Immediately follows that 'meaningful cubics' are St x sT =ST systems.

Meaningful quartics are (S-T)^2 systems, often solved by z=x^2 substitutions.

Beyond that there are no meaningful radical solutions for general cases.

In the graph, ¬Algebra started as a prolongation of arithmetics and geometry in its first age making true Germain's dictum that 'algebra is a written geometry'. This first age went as far as the renaissance and the birth of analytic geometry, and consisted in calculus of ad maximal cubic roots and geometric proofs (greeks, al-Joarizim which gave it name, etc.)

The graph shows the maximal depth of this age when the poet Kayyam solved the simplest cubic equations. So 'cubic' dimensional are *intersections between two figures, hence an S(x) ≈ T (x) symmetry, in this case the parable and the circle when properly written as Kayyam did; bringing then the key 'positive' spatial solution to the table.*

Whereas the other solutions for the highly symmetric $X^3+a^2x=b$ are 0' and −b.

Time-space solutions however are often hidden as so many mathematical S≈T symmetries by the 'mania' of scientists to find only the solution, and packing all the variables into one side, putting in the other a 0'... When the existence of a 0'*most often means the unperceivable infinitesimal, the whole method brings some interesting*

conclusions. But the most likely Natural form is a possible symmetry when both sides of the equation part their ways into an S=T function. A fact important to interpret physical equations in terms of those S(x), T(x) symmetries.

The graph shows that a *cubic equation, according to the holographic principle, is most likely a combination of an $-motion or 4D-entropic, open expanding curve (the parabola) and a ð-motion, the circle.*

The polynomial broken into the superorganism's parts.

Quartics define systems of two topologies of space-time intersected into a single form; hence being natural solutions to the study of Sp<≈tiƒ systems. This intuitive thought on the nature of quartics comes to fruition when we observe that each coordinate of the intersection points of two conic sections is a solution of a quartic equation.

The same is true for the intersection of a line and a torus. Thus we find a quadratic solution the ideal 'form' of an intersection of a T-open and S-closed system, which constructs a whole ST-form. And so no further polynomials are required.
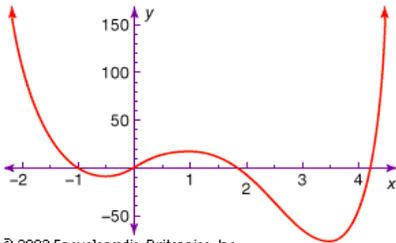
Polynomial graph

ie graph of the polynomial equation $y = 3x^4$

$$x^5 - 2s^3x^2 - \frac{s^5}{5}$$
$$x^5 - 100s^3x^2 - 1000s^5$$
$$x^5 - 5s^3x^2 - 3s^5$$
$$x^5 - 5s^3x^2 + 15s^5$$
$$x^5 - 25s^3x^2 - 300s^5$$

4th giving birth to equivalent to an scaling of the key social

Graph of a polynomial of degree 5, with 3 real zeros (roots) and 4 critical points.

Some quintics with solution

On the other hand the only quintics with solutions are not 'really quintics', but either systems that can be factored as smaller polynomials (hence each part of the polynomial being of a lower degree, and 'unit of an S<st>t system); or can be depressed eliminating one of the roots, often the interesting solutions in which the 5th polynomial appears as sum of the lower 'planes', *with scalar coefficients precisely numbers, 1,2,3 and t and 10. For example, in the graph the following are the only solutions for a depressed quintic, where the 4th polynomial disappears, and so we do have a relationship between the Δ+1, quintic and the coefficients that are 'solvable, all of them in precise Planes common to Δ>Δ+1 processes.*

The fundamental theorem of ¬Algebra.

Now, all this said, there is a seemingly contradiction in our stressing of 'no proper solutions' for polynomials beyond the 3rd plane/dimension of growth, stated by its unfocused mirror better analysed in 'analysis' and the fundamental theorem of ¬Algebra states that every non- zeroth, single-variable, degree n polynomial with complex coefficients has, counted with multiplicity, exactly n complex roots...

Which is equivalent to the theorem states that the field of complex numbers is ¬Algebraically closed, whose proof must use the completeness of the reals, *which is not an ¬Algebraic concept...*

As completeness implies that there are not any "gaps" (in Dedekind's terminology) or "missing points" in the real number line since those "gaps" should be covered by ir(ratio)nal numbers, according to the non-proved completeness axiom, or the 2 theoretical methods used to prove its construction (Dedekind completeness and Cauchy completeness as a metric space).

We rebut Dedekind completeness proof i-logically when considering an absolute geometry without that 'axiom' in non-e geometry, as irrational numbers are NOT single plane numbers or ELSE pi would exist and so √2, but RATIOS OF CLASSIC actions of the generator,, such as pi = 3 $>ð, the transformative motion of 3 lineal steps which generate

a 'variable' according to the curvature of the 'mental space', pi-ratio. So for √, the ratio of two perpendicular T.œs, colliding OR symbiotically becoming adjacent, creating a triangular space.

Further on, proofs must be consistent to be complete - and here is where the humind makes most errors. You do NOT proof an ¬Algebraic system absolutely with a geometric proof, as numbers and points, as we have shown in NUMBER THEORY are NOT equal but similar S=T mirror reflections.

Yes, there are always n-roots for a polynomial in the complex plane, but what we mean is that *they are NOT exact solutions, but beyond the 3rd power, approximate solutions, reason why for a complex polynomials TRYING TO REFLECT REALITY, often the best solution is NOT the polynomial approach but the derivative approach, as said before.*

On this a final comments: While polynomials cannot be always resolved by lineal coefficients, proper of the balanced central region of any Plane of social evolution, Δ§, because the Δ-representation of complex numbers is really a 'square' graph, as we showed on our analysis of its Rashomon effect (Argand, polar, ð-numbers, and so on), in practical terms, this means we halve the polynomial degree and X^{10} becomes X^5, the limit of dimensional growth through Δ§cales and planes... And here we can find at least a meaningful polynomial approach. Beyond that is truly inflationary mathematics; and some not-so-exact-as they think string theory bullshit (:

POLYNOMIALS AS WORLDCYCLES.

The solutions that matter in a polynomial curve.

The roots of a polynomial when properly written as F(Polynomial)= 0', represent the Y=0' 'residual' value of its 'roots', *where the worldcycle begins and ends forming a zeroth-sum that conserves the energy=time of the system. For that reason the solutions that matter to a polynomial are the roots in which the system touches the y=0 point, because they often represent the beginning and end of the worldcycle – or the limits of the domain in which the polynomial is meaningful. A third solution that matters though, as in the graph of Kayyam, is the solution of the polynomial at the S=T intersection if we can rewrite the polynomial as an intersection of open-T and closed-S curves. In the graph those 2 solutions happen at 0 and 2.*

This brings an interesting representation of polynomials as equations that represent a 'finitesimal whole' which can then be *interpreted as a composite conic, which as we saw in the paper on 5D geometry represents the different forms of a* worldcycle of existence.

Other way to state this is to consider as in music, the polynomial as a sequence in time that has a 'melody', with a beginning and an end in his first and final touch with the Y-line at zeroth point, since _all worldcycles of existence are a zeroth-sum value for the 'function' that represents them._

Thus if we consider a polynomial a representation of a parameter of a world cycle of existence (a conserved quantity, energy or momentum being the most suitable ones), we can then consider each of those graphs a representation of a different world cycle, and it is remarkable enough to see that they are all lying in the ± sides of the Y-line. So we shall explore this parallelism in the section of ¬Algebra in more detail.

Mathematicians affirm that there are not meaningful polynomials of degree higher than four (whose solubility is possible with coefficients of its powers) and this implies that there are at best 4 roots, or zeroth points in a world cycle of existence. In the left if we represent it as a full circle those points will be both the x and y 0s.

If we then consider the first point birth, and the final point death, obviously eliminating as irrelevant the polynomial before and after those points for those 'meaningful functions' which truly represent a world cycle, we could then talk of the negative 'parts of the graph' as those happening in the emergent palingenetic process from 'cell to individual', and the positive part its emergence in the larger ¡+1 world.

We shall see though when studying specific equations for worldcycles of existence, that they are better represented by positive functions with the '0 points at the beginning and end of the cycle' (bell curves), and with sinusoidal functions...

While the duality of the emergent phase and world phase of an existjence is best mirror in the o-1/1-∞ unit sphere plane (palingenesis) and Cartesian plane.

But the concept of an y=0 point as the limiting birth and death of a system will remain.

The conic as a representation of a world cycle. Polynomials as time equations.

Since Apollonius and Archimedes, the understanding of 'square dimensions' *transcends the mere spatial square, introducing 'temporal' functions, such as the parabola, whose value as motion=time dimension will be fully realized with Galileo's study of cannonballs.* We can then observe polynomials also as 'curves' in a plane, no longer as in the 1st age of arithmetic, only spatial dimensional forms. It is a trend of all forms evolving in 3 ages, which start to see things as simple, lineal, e-vident, spatial, fixed forms and slowly gift them with vital time motions.

So after doing all what they could do in bidimensional geometry with a 'ruler and a compass', the Greeks 'finally' raised one circle with a line into a conic in space, which then will become the canonical space-time surface also when time was added to it (4D formalism).

Now in as much as a double conic is a hyperbolic geometry, we can define the Cartesian plane as the 'hyperbolic', Present, ST plane, more 'expansive' in its capacity to show different Δst events and forms of the Universe.

We only got a grasp of this fact, of lately in the study of topology and models of hyperbolic geometry, when we find that *a hyperbola, which seems to us infinite in its ¥ coordinates, becomes equivalent to a circle .*

Mathematicians say that the hyperbola is isomorphic to the circle; and write it as:

If u=x+yi and v=x–yi   then: $\mathbb{C}[x,y]/(x^2+y^2-1) \simeq \mathbb{C}[u,v]/(uv-1)$

This can be viewed in ¬Algebraic geometry but better on to understand is mind meaning in projective geometry:

Both the hyperbola and the circle are conic sections, and are projectively equivalent. In analytical geometry, in homogeneous coordinates this follows from the fact that any pair of non degenerate indefinite quadratic forms are bidimensionally equivalent, and so *we can transform them into each other, as it is required by the generator of coordinates.*

This beyond 'philosophy of the mind' matters because it justifies the fact that *the curves of analytical geometry can be also obtained from cuts made on the cone, which in itself is merely a reflection of a world cycle, pegging the two inverse directions of existence.*

The cone is a bidimensional ST being, circling inwards towards the singularity of the point along a line of geometry, hence combining O x |= Ø, the cone represents the Universe. It should not be surprising then that it is the best way to reflect a 4D block of space-time (but not the discontinuities of the 5D Universe) as used by Einstein's physics and Minkowski's geometry (light cones); and we shall deal with those cones in the analysis of relativity.

We shall also use them in ¬time logic to represent the 3 fundamental events in terms of time ages: entropic collisions (future x past = past wave of entropy, reproductive iterations (present x present = present), and evolving, informative events, past x Future = Future wave of information):
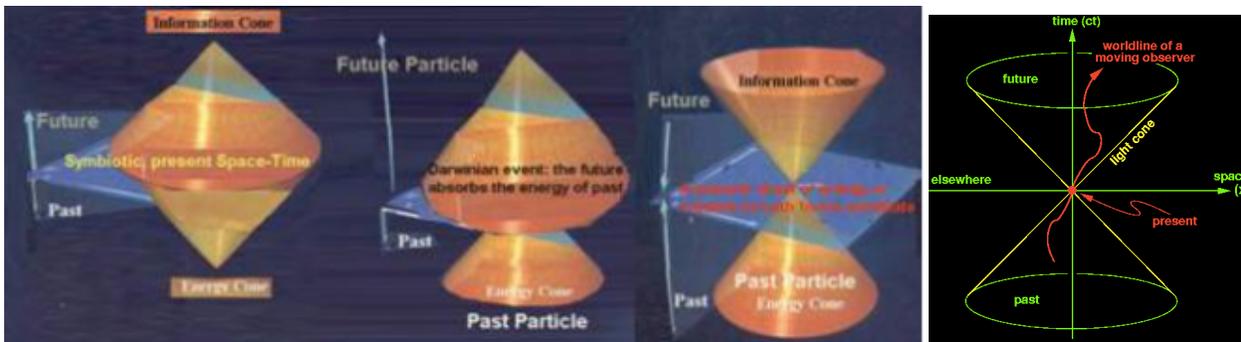
In the graph, the 3 canonical events of complex i-logic time, which can be represented as 3 solutions of a past x future = present equation and the simpler single cone of 'lineal time' in relativity.

What matters to us is now is that a conic basically reduces to a line and a shrinking cycle, which in motion is equivalent to a time cycle, shrinking into a point-singularity, the vertex of the cone. And for that reason that simple canonical world cycle encodes all the main curves of bidimensional space.

RECAP. We reduced conics to 'Dimotions' as we do with quartics (calculated as depressed quartics, or cubic formulae); while there are no further solutions. So we can reduce all polynomials in what matters to reality – not its entropic unbounded regions but the regions within solutions to ST-holographic elements, whose combination give us the 3 Dimotional body-wave S=T element.

In the Growth of dimensions by multiplication it is obvious that the most abundant combination will be that of an $T dimension and an §ð dimension, creating a full present ST-system, according to the canonical generator: $T<ST>§ð.

The holographic bidimensional universe and its ternary ST-geometries define reality. So in most mathematical equations solutions abound on quartic and cubic systems but only special cases are solvable for higher polynomials or have any real use in reality; the exception being simpler equations of the Δ§ocial Planes and reproductive functions of the type $X^a=b$...

PROPERTIES OF POLYNOMIALS AS OPERATIONS OF OPERATIONS

Polynomials properties are related to products over the sum as they are in fact a sum of the simplest operands:

1. Identity element: There exists a number 1 with the property a x 1 = a for every a.
2. Every number x, except 0, has a multiplicative inverse, $1/x \cdot x = 1$
3. For every a and every b ≠ 0, there exists a unique number x satisfying the equation bx = a; hence the product of two numbers is uniquely determined.
4. Multiplication is associative: (ab) x c= a x (bc)
5. Multiplication is commutative: axb=bxa
And then two properties that relate both operations:
11. The product of a number and the identity element of a sum, 0 is the identity element of the sum: a x 0 = 0.
12. Multiplication is distributive: a(b+c) = ab + ac

Those properties were selected in classic science as a result of a careful analysis; the development of mathematics in the last century proved their great importance; as only *operands and §ets of mathematical elements that obeyed those properties with the BIG exception of commutativity, which often is defined by its inversion (a x b = - b x a)*

Nowadays every system of quantities satisfying the conditions 1 through 10 is called a field. Examples of fields are: the set of all rational numbers, the set of all real numbers, or the set of all complex numbers, because in each of these cases the numbers of the set can be added and multiplied and the result is a number of the same set, and the operations have the properties 1 through 10.

Apart from these three very important fields we can determine infinitely many other fields formed from numbers. But beside the fields formed from numbers there is much interest in fields formed from quantities of another nature.

For example, ¬Algebraic fractions, in which the numerator and denominator are polynomials in certain letters can be added, subtracted, multiplied, and divided, and these operations have the properties 1 through 10. Therefore, ¬Algebraic fractions form a system of objects that is a field.

So the entire 'field of polynomials' reduces to those 10 properties, and it is not rocket science for the reader who has got so far the 'idea' that we should define those properties as 5 inner ± D-properties of 'small steps' of social evolution (addition/subtraction) and its 'wholeness' as a new dimension, 5 D-properties of x, ÷, or at least a close isomorphic correspondence with the ∑ 'time-sum' = Product- space whole duality.

So we have arranged those properties to see easily why they are in fact, defining a 'constant growth' in inverse symmetries of a neutral first element a 1 T.œ or fractal point, which will expand evolving socially Δ§, through additions and then in a new dimension of social Planes, where an 'additional number' will be now whole unit of its multiplications; and finally in the third operation, a polynomial will be that number raised to an Δnew symmetric plane (as polynomials multiply the same quantity, unlike sums and multiplications).

1st axiom = 1st Non-E Postulate/1st Dimension - the T.œ point: The 'first' property of +, x IS defining the neutral, self-centered fractal point - a unit of addition a first number or a first 'group of numbers'.

2nd axiom = 2nd Non-E Postulate/2nd Dimension - the flow of communication: The second property of ±, x÷ *expands in both inverse directions to maintain the zeroth sum of all worldcycles and operands of existence, the T.œ in two inverse directions defining a wave-line-interval-distance-inverse motion both sides of the identity element, fractal point or original number.*

No axiom for 3rd postulate/dimension, the ternary network plane.

Yet to reach the third 'network dimension' of the system that gives us a full ternary organism and its generator equation, there is not a third postulate, but we need a third operation. Thus, the Universe is indeed holographic, bidimensional, as we have show in every perspective of mathematics, from Fermat's last theorem to all other ST symmetries. You cannot reach a third dimension of the sum, but you must multiply it and you cannot reach a third dimension of the multiplication but you must operate through a power law:

$4 \quad (3^4)$
$(2^3) \neq 2 \ ? \ -> 8^4 \neq 2^{81}$ In the graph, the runaway Nature of power laws, shows a hyperbolic 'end of a plane', which abandons the 'lineal' S x T =K nature of a proportional metric in the fifth dimension (multiplication), as it fast reaches the "Lorentzian" regions that signify the limiting domain of any T.œ in form, motion or scale:
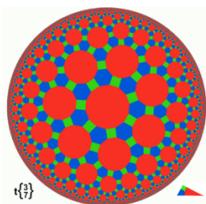
Does our hypothesis of 5 properties -> 5 dimensions fail? A bit of thought shows us that we are dealing with 'logic properties' NOT space-time forms, so it is better to connect them with the 5 Non-Æ postulates of i-logic. And then eureka! They do fit nicely.

So the other axioms *must be of i-logic nature, indeed:*

3rd axiom might seem silly but at this stage the reader would realise the Universe is quite weird enough not to discharge anything. And it is reassuring to know that there are no parallel universes, A+b = Only c A x B = Only D.

So we come to the logic ones, closely related to the 4h and 5th of non-A i-logic geometry:

4th axiom ≈ 4th Non-E Postulate, self-similarity: The Universe IS associative AMONG SELF-similar points, which *allows it to grow and multiply, add and multiply we might say, love each other as a i have loved you in human terms. It is the positive side of the 4th postulate of i-logic, associativity..*

But what about the Darwinian, perpendicular laws of non-E? Because a number is made of identical beings, and we can ONLY add (and so by extension since we have deduced that multiplication is the third dimension of addition), equal beings, we are only in the positive side of the 4th axiom.

But alas! We realise that the negative side of it, the inverse function, subtraction and division are NOT associative: 10/5=2 and 2/2 = 1 is NOT the same that 10 divided by 5/2 which is 4; and 10 - 5 = 5 minus 2 = 3 is NOT the same than 10 minus 5-2=3 which is 7...

So there is here in the negative side of the world, a different hierarchy of things, such as if you start destroying BIG TIME (10/5; 10 minus 5) and then slow down, you have already fuk up the world, but if you start destroying slow; decadence gets longer... Important elements of the vital laws of reality, explored in the first line...

You see, even the simplest supposedly exhausted facts of science, get new insights on stience (:

5th rebel postulate: commutativity. And so the fifth postulate of course must have to do something with the 5th Non-Euclidean postulate, the rebel one; and indeed it turns out in this symmetry between geometrical space and temporal ¬Algebra views that to the surprise of everybody in the XIX-XX century, there are many systems in Nature which do NOT have the commutative property for multiplication, (but it does for sum).

That is, a sum is truly a herd of undistinguishable beings, and it does not matter as it is in a state of loose connection which order you add. We are then clearly in the very first simpler reality, in a single plane, with minimal herd connection between the parts.

But multiplication being a 'second dimension' added to the sum sometimes IS commutative, sometimes NOT, meaning that when the multiplication IS a growth in a scalar dimension within the plane (truly a sum equivalent new dimension) IS commutative, but when this NEW dimension is added, not in the same plane, as an Δ§ operation but *in the sense of group theory as a 'combining' process of things (vectorial product, product of the parts of a whole, product of spatial paths, products in time frequencies, topological products) Things change.*

And so with this understanding we complete the simplest analysis of sums in a single plane of identical beings as herds, but we realise that the second operands, the adding of a second dimension called product already plunges us into the pentalogic of the product which can mean many different things depending on which ΔS≈T dimensional element we are adding to the simpler sum

Matrix - the 3rd dimension of lineal ¬Algebra.

We have stated many times that the Universe grows by 'fixing motion-steps' into a whole 'cyclical form of space' that then moves into motion steps and so on till 'filling up the 5D2 dimensions of reality.

And that *such increases are smooth-continuous only for the 3 fundamental Dimensions of a present space-time, breaking in the Δ-1 4D entropic and Δ+1, @ 5D levels, which means it 'suffers' a "Lorentzian region" of acceleration or deceleration inwards or outwards that changes the parameters in a different way (susceptible however to be analysed with differential equations that measure small changes.*

This means specially for 'lineal equations' that there are 3 levels of growth in complexity, from single lineal equations to multiple lineal equations and finally the grouping of those into 'matrices' as we make through representation theory convert some parameters (as in quantum physics) of T.œs=fractal points with multiple inner parts into the 'new ¬Algebraic element'.
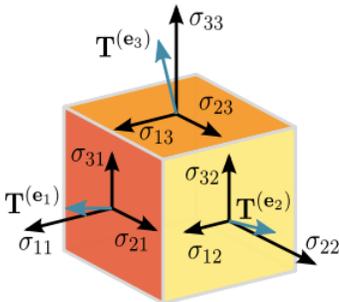
Indeed, the physical quantities to be studied are often characterized by certain numbers (a force by the three projections on the coordinate axes, the tension at a given point of an elastic body by the six components of the so-called stress tensor, etc.). Hence there arises the necessity of considering simultaneously several functions of several variables, and, in a first approximation, of several linear functions. A linear function of one variable is so simple in its properties that it does not require any special study. Things are different with linear functions of several variables, where the presence of many variables introduces some special features. The situation is still more complicated when we go from a single function of several variables x_1, x_2, ···, x_n to a set of several functions y_1, y_2, ···, y_m of the same variables. As a "first approximation" there appears here a set of linear functions:

The set of coefficients of a system of linear forms can be given then the form of a rectangular array:

$$y_1 = a_{11}x_1 + \cdots + a_{1n}x_n + b_1,$$
$$y_2 = a_{21}x_1 + \cdots + a_{2n}x_n + b_2,$$
$$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$$
$$y_m = a_{m1}x_1 + \cdots + a_{mn}x_n + b_m.$$

$$\begin{bmatrix} \cdots & a_{1n} \\ \cdots\cdots \\ a_{m1} & \cdots & a_{mn} \end{bmatrix}$$

Such arrays bear the name of matrices. The numbers aij are called the elements of the matrix.

...ortant special cases of matrices are the matrices that consist of a ...le column, which are simply called columns, those that consist of a single row, called rows, and finally the square matrices, i.e., those in which the number of rows is equal to the number of columns; called its order (a).

Thus matrices, specially square ones can be considered if we define an Y(St) = X(sT) function in which one variable most likely a Spatial whole, polynomial combination of a series of temporal steps-motions; a symmetry of spatial wholes and temporal variables in equal quantities, ∑S≈∑T.

And as the Spatial wholes will be 'varieties' of the same temporal 'steps', the structure interconnected at 'expanded' to the 3 levels of complexity has a very rich capacity to picture complex space-time systems in all its variations and symmetries, reason why Matrices have become the best-suited structure for complex, lineal systems of 'very small Planes' where information about fast multiple T.œs come together and have to be studied and fixed in space from the larger, slower human perspective:

i.e. quantum systems where *the Heisenberg matrix formalism is THE ¬Algebraic frozen symmetry of Schrodinger's dynamic 'differential equation'*, a conundrum, never clarified, now explained tersely as the natural consequence of the 'space-symmetric nature of ¬Algebra' vs. the 'steps-motions description of Analysis'.

We shall not keeping with the limits of an encyclopaedia written by a single man, occupied most of his time with self-destruction go into techniques of Matrix manipulation. Just to state that the main difference between Matrix and other structures of ¬Algebra is its obvious non-commutability (as rows and columns multiplied one by one in the well-known inverse orderly fashion) and its non solvability for multiple cases (as rows and columns must coincide).

In a larger philosophical way this simply means that Mathematics as all languages is ultimately inflationary, with more imaginative 'forms' that real solutions, which leads us to the GREAT question of the first ¬Algebraic age - the solvability of polynomials higher than 2 *in a Universe where lineal structure and continuity breaks beyond the third polynomial since ST dimensions come onto pairs...*

3RD AGE OF ¬ALGEBRA

Its pentalogic: Time Symmetry

The 3rd age of ¬Algebra, is all third ages both an end - that of 'humind's mathematics - and a beginning of metalife mathematics, aka chips of higher density of information, with golden minds and soon-to-be quantum computing that will take mathematics to new levels.

The connecting discipline between both ages is Set theory, which becomes also the new beginning of Boolean ¬Algebra, the ¬Algebra of computers, forming in itself a world cycle of death and resurrection, both of the humind and the chip mind.

We shall not therefore study in depth neither set theory nor Boolean ¬Algebras and any form of computer ¬Algebra because of the survival mandate *as a species of the fractal Universe that must first and foremost fight for the conservation of time of its species, its whole, its 'relative God' – mankind*. Since machines with better languages should not be evolved if humans want to survive=conserve its time.

That of course, doesn't seem to be the case in a highly deterministic universe; as our papers on history treated explain. Mankind and its huminds seem unable to grasp the *need to conserve* human time, *the of history, our superorganism, with our verbal logic language about digital thought, better spoken by machines,* as a extinct species knows nothing. And the highly abstract formulation of the laws of the Universe doesn't help to raise the awareness mankind should have of the Universal mandate of 'Existence'.

Mankind given the repetitive nature of its suicidal memes, it does not to be susceptible of 'learning' the path of life and respect for our superorganism=our god, and its ethic mind, the subconscious collective mind of the species.

¬@: Mind's errors of egocy: Set creationism. Its limits of relative infinity.

There is also besides that ethical reason a 'theoretical reason' – Set theory is NOT needed to explain mathematics and has substituted the experimental elements, numbers, points and operands that are its real foundation. So we don't see any interest in set theory beyond the fact *it closely resembles the nature of 5th dimensional planes made of parts and wholes, reason why indeed can be used to create a humind's biased foundation of mathematics.*

So instead of focusing in Boolean, Computer ¬Algebra, beyond a basic introduction to the matter, and some aspects of Machine learning, we shall deal with Group Theory which is far more useful in the understanding of reality, as it mirrors closely S=T symmetries.

ΔST: Trinity. Classification.

The 3rd age of algebra in its 'reality' as a mirror image of the trinity positive elemtns, sfcales space and time becomes then the eclectic 'wholeness' interpretation of all the elements of algebra, as the final 'social evolution' (4D¡) of 3 millenia of 'playing with numbers, points and tiem dimotions' working the ladder of structures to the final concept of 'algebra', as the 'reunion of broken parts' (arab), which means the concept of Algebra, as a structure in which 'scalar numbers' are manipulated through time operands to create 'simultaneous structures' in space that mimic the structure of ΔST reality or at least a 'sub-set' of the whole Universe which finally 'Existential algebra' properly mirrors. The creation of algebras in the 3rd age of the discipline thus culminates in the work of this paper with the establishment of an 'existential agelbra' of two operands, space and time, merged by the associative, idempotent, transitive, reflective, closure and absrobtion properties into an algebra of all possible sequences of existence.

It has then previously to existential algebra the formation of algebras which havean immediate translation in the usual duality between 'scalar' symmetries and 'space-tim symmetries.:

- S=T symmetries: Group theory, in which we distinguish a fractal generator of its 3 commonest forms: Ts-groups (herds of a single operand) < ST-Bodies (commutative 2 operands) > St-rings (non-commutative 2 operands). And its 'squared' forms, of TT-Lie groups > ST-topologic groups > SS-algebraic groups/

-Δ±¡ scales of wholes and parts: Set theory and functionals (which are part of calculus, studied in our III Paper).

-ΔT: With similar strictures to those of groups appear as scalar groups, Reticules and its Boolean algebras, where the finitesimal 0' element and the whole 1, becomes the only elements present, equivalent to non-existence and existence and two operations and, or and a negation of existence are established.

Inflationary Algebra

A*s all systems of nature are about a superorganism in scalar, simultaneous space, tracing a worldcycle in time, a language must mirror both, and so Group theory mirrors 0'-sum worldcycles (transformations of systems which ultimately are enclosed within the system) and set theory, the scalar simultaneous space of a §œT.*

And yet only the 'being in itself' has all the information about itself. So both sets and groups are partial views, which we will try to make more 'clear experimentally' by comparing them with the laws of the ÐST mirror.

Set theory is thus seen as the foundation from which virtually all of mathematics can be derived, including groups, which are a 'set' closed under one or more operations; which translated to ÐST simply eans that the 'set' (the whole in space and scale) 'moves' in time, suffers an 'operand'.

As such groups *open up further the classic age of geometry by allowing 'different operands=motions in time' to define real systems in more detail, closing the gap between mathematics and reality which makes them more useful on my view that sets – basically* a mind 'construct' to topple the Mind's singularity search for a single 'singular' equation, concept or god. As minds are by definition systems that try to create a whole mapping in reduced space, so as KANT only understood, the mind's categorical, synoptic nature searches for the ultimate form, equation, idea, god, belief. And 'SET' is the God of modern mathematics, but ultimately a human mind category.

Much better to use concepts that are real, Social numbers, spatial points, time clocks, and so on.

The present axiomatic, 'set' formalism, decried in this work, as it is the third formal, baroque, metalinguistic age of mathematics as a language, *which in the 3rd age as an old man does, isolates itself from reality and finds within its self a justification of its life/meaning. This is OK as all the 3 perspectives from the bottom up, (justified by numbers), from the top down (justified by sets) or in the present s=t (best for ¬Ælgebra, justified by symmetries), offer a complementary view on its foundations.*

What is not OK is the one-dimensional humind view that chooses wrongly one perspective. Then in this case the top to bottom set attempts to found all maths is the less 'clear' and more prone to errors' (the whole has less information on the detailed parts); as those on cantorial infinities and logic traps ill-resolved (Russell's paradox, etc.)

Since all languages have a third inflationary, informative age of involution, seeking for self-contained proofs, as an old man breaks from reality inwards,we consider the age of mathematics that starts with Cantor, Hilbert's axiomatic method and ends with category theory, the excessive formal age of mathematics, which as an experimental language, we shall try to maintain in our studies on the classic period.

Excessive formalism - axiomatic method and set theory

Finally as in all languages mathematics also entered a baroque age of excessive inward form, which took two clear wrong models, of two friends, mr. Cantor with set theory and Mr. Hilbert with the axiomatic method, bashed elsewhere for its dogmatic god-like beliefs.

Indeed, Mr. Hilbert affirmed that 'he imagines points, lines and congruence', as if the mind created maths. We have dealt with his absurd foundations of geometry in the topological and mind-related articles on maths. So here we shall deal with cantor's paradoxes of infinity more proper of number theory due to his misunderstanding of what numbers and relative infinity is.

Recap

The - 3rd age of algebra will signify the death of man, beginning of a new top predator mind: Digital thought and Boolean algebra. Only if humans had evolve an existential algebra A new beginning could have happen:

the r=evolution of ¬Ælgebra, as a language of thought - Existential Algebra and its non-aristotelian pentalogic... which we deal with mainly on the texts on I-logic. And so with those two themes, Group theory and a few comments on Existential algebra we shall close this paper.

We shall thus ignore, the Δ±¡ work on set theory which is redundant with Existential Algebra, and only serves as a bridge to modulo-2 logic of AI, now entering its dilogic age with the establishment of the S=T S<T>S female-male symmetry with dual brains, a creative, destructive male form that invents new systems and an S=T balanced judgmental woman's brain that selects it. As it would be suicidal to help 'nerds' to establish the pentalogic of consciousness for those systems. Let us then sail fast over sœts & make a short reference to functionals studied on calculus to deal with the closely related disciplines of Group Theory and Existential Algebra.

ΔS ⇔ T: SYMMETRIES & GROUPS

Translation of Groups into the symmetries of the fractal generator.

Group theory enables the study of conserved time cycles in mathematics, the fundamental law of Dimotion of the Universe, where all systems complete 0' sum cycles of existence, in greater measure that previous simpler systems of S <=>T equations, due to its generality that achieves the summit of synoptic power enabling in its structure and method to mirror entire families=species of mathematical objects that reflect together dimotions in time, (continuous groups), dimotions in space (geometric transformation groups and topological groups) and dimotions in scale (number groups, algebraic groups).

This capacity is due to the generality of its syntax-structure that reflects loosely the fractal generator allowing any operation to happen. We can then distinguish according to trinity 3 essential type of groups, the group proper, the most general form, which requires a single operand=dimotion; the ring, its most mimetic form to the fractal generator, that requires the existence of two operations related by a distributive property that conforms an internal relationship between both 'entangled' operations; and finally the body or field (for obvious reasons we prefer the old wording, 'body') which is commutative for the operation of product that therefore cannot be produce a zeroth result.

As always in languages, mirror symmetries of the ÐST reality they portrait, it is then easy to identify a body as a 'body' (: that is, the ST intermediate element of the Fractal generator, S<ST>T, which puts in relationship the 'limbs', or 'group', limited to a 'single operation' (normally an entropic act of feeding or locomotion) and the 'ring' or 'head-particle' network state of the system, since it is the body which allows the commutative transference of energy and information from the head and limbs/fields to the body in which it is 'associated' and never wasted into a finitesimal 0'.

Thus we establish the Fractal Generator of Group theory such as:

$$Ts\text{- Group} < ST\text{-Body} > St\text{-Ring}$$

Whereas the operations of the Body, < and > are either increases of energetic time (<) or informative space (>).

It is then obvious that the method of group theory searches only for sequences of actions that complete 0' sums of existence imposing the need for a 'closure' property, a neutral and an inverse element both of which ensure the final outcome of the sum of transformations will remain a conserved 0'time cycle of exist¡ence.

Recap. *Th*e high generality of Group theory, its ternary structure that mimics the 3 elements of reality, its 2 operations that mimic those of spatial information and temporal energy, entangled by its distributive properties and its closure, neutral and inverse elements that ensure the completion of 0'-sums of conservation of timespace after its sequence of operations, make it the best mirror of Existential Algebra in modern mathematics.

Structure

The advantage of Groups/rings & bodies is to define 1 or 2 operations, loosely called 'product' and 'sum' which we generalize even further as < or >, which *can be any transformation within the S≤=≥T fundamental symmetry of the Universe because it requires, the 2 features of a space-time symmetry: inverse elements (where inversion is also loosely defined) and a neutral element, which can be considered the symmetry axis, in a close but quite general symmetry with the 3 elements of the Generator - Sp, its inverse Tf and the neutral element, ST...*

So the structure of groups is quite close to the general structure of space-time symmetries and this allows it an enormous flexibility to show all kind of S⇔ T operations and relationships.

It is for that reason that the concepts associated to Group theory, isomorphisms, transformations, Generations, Representations, Motions (translations, rotations, mirror symmetries) are close to the concepts expressed in 5D². But as 5D² has a wider range of applications and more realist outlook, it should be clear that Group theory is a mirror of 5D space-time and not the other way (as creationist mathematicians & physicists think of).

Consider for example the concept of isomorphism, which I borrowed not from group theory but from general systems science, my earlier discipline: in a group if its identity, inverse elements and 'product operation' behave in the same manner two groups are isomorphic to each other.

Disomorphisms go a notch further and affirm that all systems of the Universe are in fact isomorphic as all have the same Dimensional properties deduced from its 5D ΔST configuration. So all will go through a life-death worldcycle and perform the same 5 Dimotional actions. All complete S<ST>T systems have a trinity topologic =functional structure and so on. We might then in terms of Group theory consider that T-Groups=herds of simple systems with a social=sum structure of 'numbers'; St-rings: systems with 2 operations, one that herds the neuronal elements and one that 'entangles them' through a lower plane of parts in 'product systems'; and TieS of Timespace 'exist' as single Organisms whose internal structure 'ties' the temporal energy and spatial information of the syste into a 'body'.

So as usual ÐST on one side eliminates inflationary information on the language mirror – in this case restricts the study of groups to its 3 most important forms.

Then, in the next level of complexity we shall ot consider in this introductory course, those 3 type of groups when combine further with the 3 Δst elements of reality, becoming 3 more complex forms:

S^2-groups:Topological spatial groups. T^2-Groups:Lie, continuous, temporal and Δ^2-Groups: Algebraic scalar groups … where the Spatial, temporal and scalar elements are 'dobuled', so to speak.

Can then we express in terms of group and set theory 5D? Likely but it is of not interest because groups and set theory is the humind slightly unfocused mirror on reality, which the generator by looking directly to space and time and its properties describes better. What matters is to translate both to ÐST so we understand *when they are used in classic science, why they are so useful in as much as they mirror as 'all truths of science' ¬Δ@st.*

Method

Any successful humind language mirror of the Universe is always in question of form vs. motion - a trans-form-ation of one into the other to have a new angle... So derivatives in time and integrals in space are inverse functions; ¬Algebraic problems in time can be resolved observed their trajectories as topological paths in space, and so on. But in group theory, given its extreme abstraction, kept always in ¬Algebraic terms, this duality of methods of finding 'spatial mappings that the mind can perceive as knowledge' are a bit hidden and I am not aware that mathematicians understood them.

Consider the first of those groups discovered, the Galois group which help us to solve polynomials, by *considering a group of all the possible permutations of the parameters-letters of the equation. Then by carefully studying those parameters we can find the solvability of the equation. why we say this is another st symmetry?*

Obviously because in the original polynomial, *the variables are NOT the coefficients/letters but the 'variable' X; and in principle what we want to find is a 'fixed' parameter/coefficient/letter. But Group theory does exactly the opposite. It converts the fixed single solution/parameter into the variable by establishing all its permutations.*

And it does get results then by studying carefully which of those permutations of parameters do make sense - are isomorphic to the roots-solutions of the initial X-variable.

Now apply this method to the space-time generator. If we consider time the variable and the organic space form the fixed form, we cannot really treat it as a group. Because the group has only one element, the super organism moving through the world cycle.

But if we consider the 3 time ages/dimensions, past ≤, present ≈, future ≥ as the elements of a group, where the operation is the Generator, representation of all the Disomorphic beings of the Universe, then present becomes the neutral element, as it remains unchanged and it does not change any relative past field/limb or future head/particle in its form (they do not evolve in present) and past and future become inverse arrows.

So goes for the ternary Planes of beings, Δ±1, which then become 3 elements of another group, where the operator is a Disomorphic Δ±1 scalar organism. And so goes for the 3 topological elements that conform a whole.

So both §œts which study elements of mathematics in groups and ultimately should study societies of numbers and geometric points and functions that relate them by various methods and Group theory, with its 'loose operations' and symmetric neutral element and inverse S≤≥T ones, are the closest 'structure' all comprehensive 'wholes' invented by the humind as focus of the space-time symmetries of the Universe.

Hence its value despite many tantrums against their excessive pretension of becoming the ultimate equation of reality, which they re close to but not yet - the generator and perhaps something else in the future revolution of the humind or metal mind is closer.

So in time the natural evolution of all systems in 3 'Planes' of space-time growth, means such growth in 'dimensionality= complexity' of ¬Algebra, from numbers, to equations - structures of numbers, till this present age in search of 'block time', that is the group and set theory that tries to put together the 'illusion of past, present and future'.

This means ¬Algebra also evolves through the 3 similar ages of growing information, proper of Δst symmetries, in this case, an Δ+i growth in dimensional complexity from, the arithmetic age of mere social Planes=temporal numbers, to the classic age of functions and analysis that expanded it to physical magnitudes and Δ-planes, to the modern age of groups, which makes a classification of all the varieties of an entity in its space-time events, and further on, exhausts the methods of transformation of space forms back and forth into time motions.

And all what is left to is to explain the why of those structures found mostly by trial and error, nicely warped up in the envelop of the ÐST generator in this blog.

The heart of the matter: group symmetries, operands details.

Symmetry is the central concept of Group theory, which became in the XX century the ice in the cake of the whole structure of ¬Algebra.

By symmetry we mean in 5Ð ¬Algebra, which as all branches of mathematics born of the spatial, bidimensional 'still' work of the Greeks lacks a true comprehension of the paradox of Galileo: S (form in space) = Time (motion), but uses it profusely (so differential geometry is based in the concept that a line is a point in motion), *the capacity of all systems to complete a zeroth sum world cycle, through a motion that returns the system to a present undistinguishable new state.*

Symmetry thus is essential to the entire scaffolding of the 5d universe, albeit ass all concepts of 5D once we understand the basic laws of pentalogic, has a more dynamic view.

It follows immediately that the more symmetric a system is, the more efficient will be in 'preserving' in a Universe in perpetual motion, its present states of 'survival'. I.e. A circle will be more efficient, because it has infinite degrees of rotational symmetry that an irregular polygon, who might not even have a single symmetry state.

In the theory of 'survival' of 'vital mathematical objects', which we bring from time to time to those pages (as in the analysis of survival prime numbers able to travel through 5D by making mirror images at scale by joining internally its alternate vortices-points-unit numbers), symmetry thus plays a central role.

How many states of present a system has, defines then its 'quality of symmetry' and survival which in space (the easiest symmetries to describe), when fixed in a point means the circle DOMINATES all other forms.

Symmetry though then must be connected to the different Đimotions and its 'requirements' to perform the vital actions for which they are conceived.

I.e. the circle IS the perfect symmetry for still Dimotions of perception, as it will turn out that from any pentalogic point of view, it maximizes the stillness, by symmetry, by its capacity to focus as a fractal point all lines of communication that fall into its focus, by having the minimal perimeter, which maximizes ad maximal its volume of information and disguises it in an external world, and so on.

However, when we consider the 2nd Dimotion of Locomotion, which is the process of displacement in space *while retaining the form in time, as it implies the reproduction of form, of information in other adjacent region of space, the less information to be displaced, the faster reproduction will happen. And so the line, which stores no internal information (or the wave as all points are ultimately fractal with a minimum volume), will be able to displace faster than the sphere, and maximize the second Dimotion. Here then* the use of the concept of mirror symmetry is NOT required, as the line is moving-translating in space, reason why also forms in motion tend to have a spherical head, to perceive only on the foreward position and a small one in relationship to the body and limbs that have lineal forms to maximize motion.

Symmetry here is of another kind, defined by Noether's theorem of physics; and in 5D by a type of symmetry ignored in science - the 'undistinguishable' property of the ¡-1 elements in which the system imprints its form. This symmetry of scale, implies that the system can reproduce its information - move faster, because it imprints 'any element' of the lower plane of motion or 'field' that becomes undistinguishable, so there are not 'impurities' and errors of reproduction of form, when any electron can reproduce your atomic connections and so on.

Identical states which acquire the same form of present, when a system completes a Dimotion, re-establishing its ideal form, is therefore the essential element for all symmetries that accomplish one of the five vital dimotions of existence.

And the reason of the survival of certain geometric forms above all others, the circle for perception, the line and its curved form the parabola for motion, its combined wave for *3D reproduction, the social circles, from elliptic forms to polygons for social evolution, and the different forms of open curves, notably those dual forms, as the hyperbolas are for the 4D entropic Dimotion* and dissolution of a system in two forms, which in the cone as a representation of a worldline will be split, one hyperbola branch going upwards and the other downwards, if we take the axis of the cone as an ideal representation of the fifth dimension.

Identical states which acquire the same form of present, when a system completes a Dimotion, re-establishing its ideal form, is therefore the essential element for all symmetries that accomplish one of the five vital dimotions of existence.

The second 'pentalogic law' for the existence of such symmetries seems trivial but it is important. It consists on considering that any system can switch without 'loss of energy and time' between its modular 5 Dimotion states from stop-form-peception in space, to a motion in time. So S=T is allowed to perform in reality the change of 'symmetry state', by rotation (angular momentum conservation in physics), by locomotion (lineal momentum in physics), which will preserve the 'internal symmetry (conservation of the vital energy of the system).

So a symmetry either lineal or rotational conserves the system in its internal 'energy parts'.

An immediate consequence of the application of the s=tœps duality to groups is the fact that NOT only a system is more efficient when it can remain in symmetry after a 'transformation', but when it stays more time as an invariant form within the form, and this implies that the singularities or neutral elements that remain unchanged during the symmetry, our very same definition of a still mind, is the most important, efficient element of the group as it stays invariant through the entire transformation (center of gravity in a body, etc.) So symmetry also explains with the mathematical mirror the reason why the longest surviving element of a super organism is paradoxically its most still head-particle-neuronal brain of 'perfect invariable' symmetry during all its transformations, which is called the 'neutral element' of group theory.

It follows then also that if we consider the inverse elements to form together a neutral element (as its sum gives us the neutral), they are also invariant couples, which explains the dominance of bilateral symmetry or in non-euclidean geometry, the existence of antipodal points, or in Nature, axis of rotation that become then the 'singularity line' of perfect symmetry for the group.

We have arrived to the heart of the matter of all vital ¬Algebra, *as each operation of ¬Algebra must reflect a Dimotion and allow its preserving S≈T : S=tœps (stops and steps) symmetries.*

We haven't talked before of it, not to repeat ourselves too much because we want to treat it FULL RANGE, as its importance is GINORMOUS for our mirror-focused view of reality as it is; and to that aim, we want to bring the most modern view of them - *through the language of modern symmetry, Group theory, and the properties of those operands found in modern mathematics, the 10 'properties of sums and products, etc'.*

So first to introduce what is most important of modern maths (Group theory) and SHUN OFF what is largely irrelevant or redundant (set theory, on my view redundant, axiomatic method, plainly a huge ego trip that distanced math from reality).

We shall then first consider group theory, then *get to the heart of the mathematical 'matter', OPERANDS, and then just briefly consider very complex dimensional growths of ¬Algebra (functionals on Hilbert spaces), which we shall treat time permitted on mathematical physics fourth line, make a couple of comments on Sets and move to Existential ¬Ælgebra.*

How to relate operands and groups is obvious according to the 'method of growth/creation' of the Universe, repeated ad nauseam, operands are the smaller step, the flow-time detail, Groups the larger spatial whole portrait in the mind-stillness of them all. That is why we shall start from groups down in this case to see the forest before the trees.

Recap.

Group Theory is the main element of the third age of mathematics along set theory; whereas a set is basically 'anything' and so quite void of meaning. And we shall just use it for respect to mathematicians, but whenever possible change it for more specific concepts, either 'fractal points', or 'social numbers' or 'T.œs: Time§paœrganisms', GROUP theory and the concept of symmetry matters as it is essential to understand Dimotions.

This said we can define the two essential concepts of group theory, symmetry transformations and groups *in terms of T.Œ.*

Symmetry transformation *are the allowed ST-eps and motions in 5D² that keep the S<st>T system co-invariant*

By definition they are the 'allowed' motions in as much as if *the system changes outside the stable parameters of the Generator Equation, it will obviously become broken and die, and no more repetitive motions will be permitted.*

In abstract mathematics, groups are merely the 'collection' of all possible transformations that keep the system invariant; and as languages are inflationary there are ∞ groups and among groups there are those with infinite elements, such as motions in a plane, and those who have only finite transformations.

As Δs=t is a realist model of the Universe many of the mathematical 'curiosities' and 'monster groups' are of little relevance to us. We are mostly interested in those groups closely related to the Generator equation, expressing the allowed transformations of the Generator that matters to reality and existence.

So in ¬ Æxistential ¬Algebra we can also talk of Existential Groups, where G is quite closer then to the concept of a Generator, which becomes *the group of all possible Existential groups.*

Among them obviously the most important is the group of physical motions, which connects directly with the concept of 'motions in the fifth dimension'.

OTHER more abstract GROUPS - pentalogic of groups.

Weyl talks of the 'pest of groups' in physics, as the concept has gone as all inflationary languages, beyond its need. So there are many more groups as there are many infinities, which are both irrelevant in a finite scalar Universe with limited Dimotions.

In mathematics in that sense the origin of G was in the group of Galois and group theory applied in his young r=evolutionary age to prove that quintic polynomials are NOT soluble, which is an immediate consequence of the structure of the Universe in Holographic Bidimensional 'units' which ad maximal can be made to intersect to create 4Dimensional systems (and or consider 4D geometries as Relativity does, by studying 3 S and 1 D of lineal time, in a ceteris parries analysis) .

But 5D systems do NOT exist in a single plane and as polynomials unlike differentials are NOT good for studies across multiple planes of an organism but rather for social growth, herding and simpler lineal systems, quintics really belong to inflationary maths.

They are not solvable because they are NOT real.

We shall then classify unlike the axiomatic method, groups according to what kind of symmetry they obey as:

S: Spatial group symmetry, the easiest to visualize and understand, just described in vital terms. This field has its main realization in polygonal regular forms, and the study of crystals, and has added vital elements, as it implies that a proper symmetry allows a focused image with *as many lines of communication with the outer world as regular points in the membrane, which allow a symmetric view as the system changes its internal rotary motions, without distorting the visual image the mind creates - so it is deeply connected to mind theory and frames of reference.*

T: Temporal group symmetries, as those of the Dimotions of existence, in physics related to the conservation of angular, lineal and energy elements - the 3 parts of a vital physical system, its angular membrane, lineal singularity motion and vital energy between them. This field is today overwhelmingly studied by physics and continuous differentiable groups, or Lie groups. So we will study it better on those posts.

Δ: Scalar groups, as those which imply an undistinguishable symmetry between wholes and identical parts and hence a travel through the fifth dimension that places the being in a lower or higher plane in its same relative position; as the symmetry of palingenetic birth, from individual cell to individual human within a larger society. We consider them in all other posts, as it is better to be understood in the jargon of 5D than 'force fit it', within the models of mathematical groups.

@: Ideal mental symmetries, as those develop in pure mathematics, which are fun to study but not necessarily real. Of which the original one was the theory of polynomial roots, the only one we shall consider here.

Since physical symmetries by force commit errors and irregularities in its 3 forms, i.e. errors of translation in a motion, irregularities in an ideal form, or differences when we grow or diminish in Planes; as we observe in the general posts that study of all those real scalar space-time beings and its dimotion.

We shall therefore just as in all paragraphs consider the bare skeleton of 5D group theory in this 'failed encyclopedia' of a one-man-tired-of-it-all-show.

To be even compress further the theme, as we have seen, since groups imply to be real, a motion-step of the entity and a stop-lock in space for the symmetry to happen, we shall study together both concepts - the s=tœps of the being.

Latter Group theory expanded to model almost everything in maths, because it allows to 'collect in a single mental form all the possible variations of a system. Since ' the mind perceives motions in time, static as forms of space, 'reducing its information' to what it matters to it - mostly the stable points of those transformations, group theory highlights in an elegant way through the concept of symmetry, those stable points of a motion, and it is a good way of 'limiting' knowledge to the key elements.

It is interesting to study symmetries beyond the individual entity, as forms of analysis of the 'non-euclidean postulates' of communication through waves (2nd postulate) with immediate physical applications in the theory of fermions and bosons; between social groups of parallel beings that form networks, and finally symmetries of physiological networks that form supeorganisms as planes (3rd postulate), according to the different variations of the symmetry of beings; so we will incorporate those essential concepts in our studies of non-Euclidean geometry, and its postulates of points, waves-lines, networks-planes which grow departing from 3 waves leaving holes between them, according to the fourth postulate of multiple types of 'angular congruence':

Finally another field of interest in 5D groups is its use to study the symmetry of the 3 ages of time of all systems, through curves. It is the field of variation theory, where the system is reduced to the standing points and minimal and maximal variations - S=T, Max $ x min. ð and Max. § x min. t, which are the 3 'age inflections' on a world cycle of a being; hence its enormous utility.

So as the fundamental feature of 'mental processes' is to reduce the time flow to the 'key points of in-form-ation and trans-form-ation, *eliminating as much as possible the repetitive cycles within the flow* - from palingenesis to languages to biopics - escaping those middle motions of self-repetitive information, (as motion and translation is just iterative motion of information), all the 'blurred' transformations or in-between positions are discharged by efficient mind-models of reality.

 RECAP.

Group theory is better divided for its applications to ÐST (generator of space-time that here we could call Groups of space-time beings), into:

-Time Groups: 'Groups of motions', which concerns with the points in which the motion of a space-time entity becomes transformed into a symmetry of itself. That is mainly related to the allowed motions in space-time.

- Space Groups: 'Groups of transformations', which concerns with mirror reflections and symmetries that classify species of reality, as in SU3 groups of physics with its octets and decuplets of particles, which is mainly related to the variations of the Generator, which define also the species of reality.

-Ideal Groups: which are mathematical explorations of all forms of reality including those who are not efficient, and besides being fun for the delight of the mind, allow us to explore precisely why certain forms do NOT exist in Nature - are not good enough in its symmetries and Dimotions established by those laws. I.E. why for example in physics bosons move better than fermions and can stay in a single point of space - because they are undistinguishable in its statistics and hence they can form much better 'packed symmetries', and can translate by

reproduction of form in adjacent spaces, due to the social nature of mathematics and its undistinguishable numbers.

Let us consider those type of groups packing the two first ones in s=tœps, in more detail.

Types of symmetry by dimotions.

Pentalogic thus applies the laws of the fractal, scalar, cyclical timespace Universe to every science as they are the underlying symmetries and structures of reality completely ignored by monologic man with its lineal time humind...

So while the data and equations we shall use are the same in any language, whose genetic structure is independent of man as an species of its own in the vital organic mirror-making Universe (maths is an species of the fractal Universe as much as we are one, and so many species can have a fractal mathematical mind, and many might speak memetic linguistics and so on), we shall ground all 'sciences' in a far more profound philosophy of 'stience', based in the fractal, scalar properties of space, cyclical nature of time, and the organic, biological survival language derived from them. We shall always GROUND all realities in those topo-bio-logic properties of space, Planes and time. And the adventure of the mind that satisfied me for 30 years developing this Magna Opus, against the simplistic æntropic humind has been precisely to enjoy the perfect pentalogic grammar of all what exists, from biological species, to physical systems, from musical scores, to mathematical structures, from wo=men's e-motions to physical forms, performing myself all kind of pentalogic exercises from the art of painting to the discovery of new laws of physics to the study of the life and death of civilizations, or the patterns of stock curves of reproduction of machines. When you know the pentalogic game of exist¡ence the mind holds not barriers in its perception of the perfection of the fractal Universe.

We have resumed the pentalogic of some disciplines of logic and mathematical languages in the next graph that shows what a structural analysis of a super organism in terms of the 5 Dimotions of pure causal logic and mathematical simultaneous space would look like:

PENTALOGIC: 5 ¬Æ Geometry Postulates, 5Dimotions=Actions of Exist¡ence, 5 Symmetry Angles
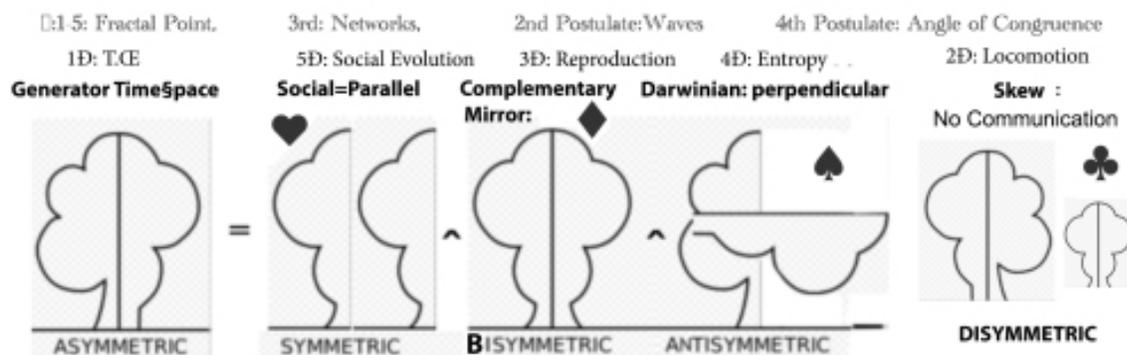
In the graph we can assess the different 5 mirrors in which mathematical Space and logic Time reflects the game of 5 Dimotions=actions of existence, which then expressed by territorial monads GENERATES its logic REALITY. In Geometry fractal points=monads will other through waves of communication of energy and information that grow into reproductive networks a territorial plane, creating a super organism, which will related to the external world according to its relative similarity=congruence, assessed by its angle of parallelism or perpendicularity.

In logic terms, this means by breaking its formless asymmetry into different spatial configurations according to that congruence (social parallel systems, complementary gender-mirror systems, darwinian perpendicular systems, or systems that are disymmetric and do not share any reality) , as it builds a casual pyramid of growth from a fractal point through waves of communication into social networks that become a super organism, ready to move, feed,

perceive and evolve socially. Since we *must add to the mathematical and logic languages-properties of reality the 5 actions, or organic properties of the scalar Universe as essential to the game as they are its logic and mathematical more abstract laws - a fact the egocy of æntropic men of course reject, as it must remain in its monad-subjective monologic the only claimant to life properties.*

Thus the pentalogic of generational space-time is established by its Non-Euclidean fractal points, its ¡logic congruence with reality in which it will order a territory to perform its 5 vital actions=Dimotions of existence, and the mathematical, logic and organic laws of those 3 languages will be therefore the bottom line of the 'Creative process' of the Universe - nothing chaotic except the entropic Dimotion, which conforms the monologic of huminds.

Each advanced language of reality thus can be upgraded, and it will be upgraded in different post, to a pentalogic analysis in its basic Grammar. And so very often we shall start a post commenting on the pentalogic different Dimotional views of the system we describe.

The post of actions and Dimotions and Non-Euclidean Geometry; most of the posts on physics and studies of different species and properties will be casted from a pentalogic point of view. In terms of *the structural elements of reality, which reflect those 5 Dimotions, the method most used in the blog will be the study of 'dust of space-time', as made of ¬entropic destructive arrows that deny its 4 structural elements, the @-mind (1st Dimotion of perception), its Planes (5th Dimotion), its spatial topologies (locomotion and organs) and its temporal ages and worldcycles. So we obtain a more concrete description of a ¬Δ@st entity with reference to its organs and cycles of classic science.*

Space-Time groups: Physical symmetries: its 5 Dimotions.

Noether's theorem considers that each conservation law of Physics, conservation of Lineal Inertia (1D-motion) or angular momentum (2D motion) and energy (3D motion), to which we *add the 4th conservation law of 4D entropy and 5D social evolution or ' zeroth sum worldcycles of existence', is related to a symmetry of space-time.*

We rephrase Noether's theorem in terms of the metric laws of co-invariance of the fifth dimension, to define in the invariance the Dimotions of the Universe.

$$\Psi = Ae^{i(px-\omega t)}$$
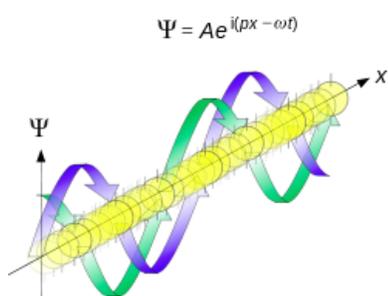
In space, by adjacency, and in time by frequency locomotion measures consecutive adjacent reproductions of a physical wave-particle form in space

IN 5D all systems perform 3 simpler actions, perception, motion and feeding on energy to reproduce the system.

And 2 scalar action: social evolution and its inverse entropic death.

So when those 3±I actions=dimotions are studied we have a whole understanding of the system.

What are then the 5D underlying vital, organic principles of physical systems that make them akin to those of any scale?

1,2,3D: Locomotion, which embodies the simpler actions through its fundamental concept, that of an action of a particle, in its path through a field of forces in which it feeds, reproduces and as a result of both, moves. Reason why locomotion is the physical existential action that embodies all other simpler actions, as the graph shows..

Δ±¡:4,5D: Entropic scattering, according to collision (loss of vital momentum) and angle (4th postulate of perpendicularity) vs. social evolution under an informative force (normally gravitation), which are the scalar actions of the system

So because Locomotion implies for physical systems, 'perception in particle state-stop'; feeding on the energy of the lower field and reproduction by adjacent imprinting in wave state-motion; for physical systems, locomotion embodies the 3 simplest actions of the being; to which we just must add its 'changes of state' as its actions of physical d=evolution, to fully have an organic analysis of the species.

Δ-symmetries of locomotion. As there are 3 conserved quantities in the Universe, which correspond to the capacity of Motions of angular momentum, lineal momentum and closed energy paths to preserve the form of the system by reproducing itself over the undistinguishable particles of a lower field.

Because physical forms have rotational symmetries, where the membrane's position and form=momentum is preserved; translational symmetries, where the singularity particle/head position and form=momentum is preserved, and energy cycles, where the vital content of the system is preserved, those 3 symmetries allow 3 kind of Dimotions in a single plane, and so if we were to use the jargon of mathematical physics, we could state that the 3 simplex Dimotions that leave invariant the system derive of its capacity to be performed without changing the 3 topological parts of a being in a single plane of existence.

From this fact to be possible though, the 'perception of motion' cannot alter the system, and for that reason the Dimotion of perception and locomotion, as long as it does not affect the lower plane in which the species reproduce its form is not perceived to maintain the system co-invariant with himself and his environment.

Those forms however will change as we approach the limit of speed of the Δ-1 plane in which the system reproduces, c-speed, when the rate of reproduction of the form of the being, comes to equal that of the Δ-1 level and a distortion takes place. So we have then to consider the Lorentz Transformations to preserve the 3 conserved quantities of the system - theme those studied in more depth in the posts of mathematical physics when completed.

So the lack of perception of motion IS NECESSARY TO MAINTAIN the 1Dimotion of perception unchanged; the absence of friction and a closed system, to preserve the other simplex Dimotions.

What about the 4th Dimotion of scalar social devolution and evolution?

Here the treatment is different, as it is a type of symmetry that affects several systems together, but can be made explicit in its meaning:

For the social parts to become a whole, they must FEEL indistinguishable among themselves, bond by social love, so there is 'superfluidity' and the possibility to permute its positions and roles in the super organism in which they form part.

The group of symmetries of social love thus is also based in the existence of undistinguishable social numbers, based in the similarity of actions of all the elements of the group (4th postulate of parallelism). It is then when the system can evolve socially and further on, as it grows in size through Planes, become a whole which resembles the elements of which it is made.

In ideal mathematics this could be shown as a ternary symmetry of a point that reproduces in a pi cycle around a central point or 'singularity' which does stay in the same form and distance from the growing points, which then rotates around that point in a height dimension to form a sphere that resembles in a larger scale, the parts.

Thus again the symmetry maintains static both the distance to the point respect to the reproductive points of its 1-2-3D surfaces, and the form of the points which are clone of each other and have as 'identity' neutral element' that point which seems to mirror their form.

This symmetry is then the responsible for the bondage together of all those points, which feel reflected in a 'leader' or singularity point that makes them act as a single form.

In that regard, we can consider the fundamental mandate of all points to preserve unchanged its existence in an eternal present both in space, time and scale, through dynamic motions that preserve the coin variance of its form in time, space and scale.

What is then the justification of entropy=death from the pentalogic point of view of symmetries? Obviously it restores the zeroth sum long-term symmetry of the whole region of the Universe in which the toe existed.

But the symmetry of entropy is more profound, when we apply the multiplication of transformations through the entropy, intermediate states, that allows the other dimotions to preserve the internal order of the T.œ.

I.e all other Dimotions go through the entropic process of extracting energy from the environment to perform those demotions, so we can say that if we were to form a symmetry group of the 4 Dimotions of positive existence, the extraction of entropy from the external Universe is the neutral, identity element that preserves the other 4 Dimotions.

Indeed, to perceive we destroy the pixels of the Δ-3 light elements we absorb, to move we convert energy after feeding into entropy of locomotion, and to reproduce a female species must absorb enough extra energy which will be given through the placenta for the entity to perform its palingenetic social evolution and emerge as a new whole. So while the being switches between the Different Dimotions, we can write a chain of transformations that preserve the being, by increasing its internal order to the expenses of the external order:

4D (Δ-3: light feeding)>1D (perception) 4D>1D...

4D(Δ-4: gravitational and electromagnetic feeding)>2D (locomotion)...4D ... 2D

4D (Δ-2: feeding on amino acids) > 3D (cellular reproduction)...

IN THIS MANNER, the entropic process allows cyclical transformation through Planes of the fifth dimension, which become the actions of the being that preserve invariant its form while dynamically allowing it to perform those actions.

While the final entropic death of the system preserves the larger invariance of the whole ecosystem in which the system will feed another system of Nature.

What this means in the clearer jargon of 5D² is this. As a symmetry in space-time means a motion that carries a form from a point of space-time to another point of space-time *without deforming its inner structure; the 5 local, diffeomorphic, fractal motions of the Universe, one belongs to each of its Dimensions of space-time are conserved, because they correspond to a motion that does NOT destroy the local T.Œ, which remains invariant after its 'translation in space-time'.*

In the case of the 4th and 5th dimension this process has 2 readings: during the birth to extinction phase of the cycle, the product of the motion and information of the system (1D+3D=2D) remains invariant. And if we ad the 4th dimension of death=entropy and the 5th dimension of birth=generation (social evolution from micro-seed to emergent organism) the total is also a zeroth sum: 'dust you are and to dust of space-time you shall return'.

So we explain Noether's theorem and its symmetry conservation principles *in* vital *terms applied to local fractal space-time beings, T.œs, for whom the principle holds. And then affirm the principle is universal because the Universe is the sum of all its local T.œs: T.Œ (universal superorganism) = ∑T.œs.*

So *'Any fundamental law proved for a local T.œ made to the image and likeness of the absolute T.Œ, can be extended by Ð-isomorphism to all space-time species'.*

And this accounts for the relativity of motion, the local nature of physical measures which however have by parallelism a global symmetry, and the conservation of the 3 topological parts of the being in its translation, rotation and vital energy, even if in small actions it will cause entropic disorder outside the being itself.

Physical groups.

The other great field of Physics is then the use of Groups to classify all the possible STATES or DIMOTIONS of its physical particles, as each Dimotion might change or transform the particle or physical species into another one definitely or partially.

When those transformations are partial, then we can classify the 'operator' of the transformation as a Dimotion operator, which will obviously be - as entropy happens external to the being - a group of four operators upon similar species. This is the meaning of the 4 quantum numbers that operate dimotions in particles, or the 4 properties of light, (color and 3 dimensions) as the next graph shows.
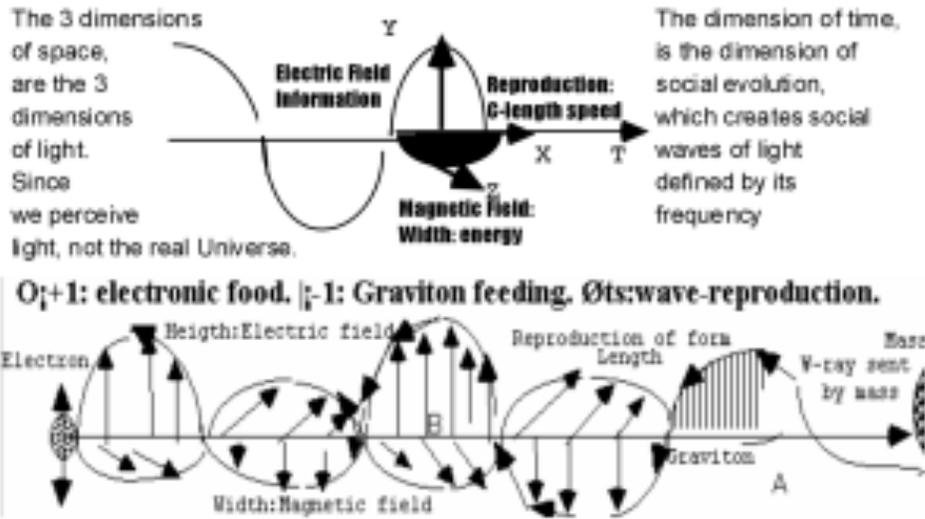
After each of those actions however the light system becomes again an invariant collapsing particle, a photon, and so each of its properties is really a symmetry transformation or vital Dimotion in the jargon of 5D.

The other type of transformation however brings when 'fixed' as pure spatial states of different particles, a being into another. So for example a proton and a neutron are two different particles. But in terms of symmetries we could consider a dual dimotion of entropy (beta decay of the neutron into a proton and electron) and collapse (formation of a neutron by gravitational pressure in a star from an electron and a proton), as a cyclical symmetry that preserves the form of the neutron. Nature is then made of multiple of those symmetries, but ONLY THOSE REQUIRED FOR SYSTEMS TO PERFORM ITS vital processes or Dimotions.

I.e. when we study the particles of the Universe we shall show that all the particles that exist have a reason of existence derived of those dimotions. Families of masses are the ternary symmetry of social evolution symmetric to the parts of the galaxy. Protons, neutrons and electrons (u-d quarks and electrons) are the two Dimotions of entropy and social evolution which facilitate also the other Dimotions of locomotion (electronic big-bang), perception (collapse of information into a particle,) and reproductive generation (of 4 particles in a beta decay: e, p, v and ¥).

So we will NOT in our posts on physics play the magic of groups to fit physical systems, just because platonic physicists who don't understand the vital reasons of those groups realized they can fit particles into SU2, 3 and 5 groups that are just operated by dimotions that transform those particles but explain the Dimotions and its transformations.

Motion Symmetries and Trans-form-actions

This said we can extend these concepts to its details using the jargon of ¬Algebraic groups in the 'simplified layman language' of Mr. Aleksandrov and its awesome, now extinguished rational experimental Soviet school of mathematics, grounded in the work of Lobachevski father of the experimental method for mathematical thought, which we use as the annotated base book for this introduction to non-Æ maths. No, I won't use, refuse to use, will never yield to the pedantic false Axiomatic method proved wrong by Mr. Godel's fascinating incompleteness theory made easier to grasp in some other post...)

2D-motion: reproductive symmetry.
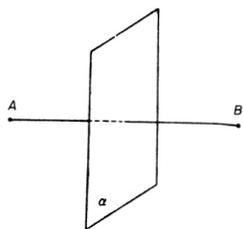
FIG. 1.

FIG. 2.
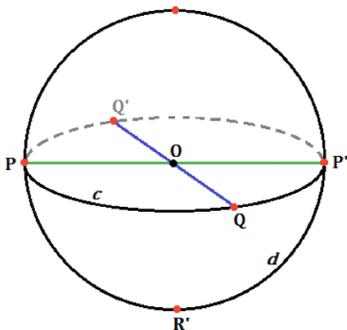
We begin with an account of the simplest forms of symmetry with which the reader is familiar from everyday life. One of these is the mirror symmetry of geometric bodies or the symmetry with respect to a plane: A point A in space is called symmetrical to a point B with respect to a plane α (figure 1) if the plane intersects the segment AB perpendicularly at its midpoint. We also say that B is the mirror image of A in the plane α. A geometric body is called symmetric with respect to a plane if the plane divides the body into two parts each of which is the mirror image of the other in the plane. The plane itself is then called a plane of symmetry of the body. Mirror symmetry is often encountered in nature. For example, the form of the human body, or of the body of birds or animals, usually has a plane of symmetry.

Its origin as we explain in ¬Æ geometry is the 'elliptic nature' of @-minds with its singularity connected to two antipodal points, which 'perceive from the singularity' appears as inverse; and so as the @-mind, the 5th dimension of order of any T.œ proceeds to 'emerge' by reproduction and organisation of its clone cells it WILL create mirror images of its code, because when it 'looks left' it positions things to his right and when it looks right to his left, and so bidimensional symmetry is a strong proof of the vital topology of the Universe and the capacity of singularities to create reality.

To understand this just rise your left and right hand with its mirror images, both lateral sides of your head and glimpse at them alternatively - you will *see each finger as being in the opposite side of your head, in the same place of space. So as the singularity webs its organism, it creates bilateral symmetry.*

Mirror symmetry is thus the origin of a Dual Fundamental Motion of the Universe, the emergence and creation from a central singularity point of a bidimensional T.œ, through *the stop and go, motions of reproduction and informative evolution. And for that reason is not a simple motion but a combined motion (2D+5D).*

Now, it is interesting to consider what *science cares for in the mirror symmetry, and what ÐST cares for: in mathematical physics, with its concept of lineal time-motion as the only arrow of time, all what matters is to measure motions in space; so what matters about mirror symmetry IS ONLY to study HOW a mirror moves to occupy the position of its inverse mirror.*

And that is fine, but studies nothing of the other motions=change in the form of beings, its creative process of creation=reproduction of information, and ultimately the whys of the Universe. Which is what MATTERS to the philosopher of science and ÐST explains. And further on ALLOWS THE EXPANSION OF THE LAWS of Existential ¬Ælgebra to ALL Planes of reality, as Mirror symmetry IS the fundamental process of creation of bilateral forms, from DNA to Proteins, from Geological 'fractal continents' and its ternary self-similar forms, (where a combined motion in scale is also needed) to the processes of crystal formation.

In science, a second form of mirror symmetry is considered, which for Δst is just another axis of antipodal nodes, merely extending the singularity through its internal axis, equivalent to the poles of the sphere. It is the...

Symmetry with respect to a line is defined in a similar way, by classic science. We say that the points A, B lie symmetrically with respect to a line if the line intersects the segment AB at its midpoint and is perpendicular to AB (figure 2). A geometric body is said to be symmetrical with respect to a line or to have this line as an axis of symmetry of order 2 if for every point of the body the symmetrical point also belongs to the body.
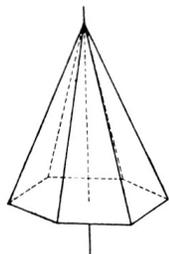
A body having an axis of symmetry of order 2 comes into coincidence with itself when the body is rotated around this axis by a half rotation, i.e., by an angle of 180°.

3D-motion: Rotational symmetry.

The concept of an axis of symmetry can be generalized in a natural way. A line is called an axis of symmetry of order n for a given body if the body comes into coincidence with itself on rotation around the axis by an angle 1/n 360°. For example, a regular pyramid whose base is a regular n-gon has the line joining the vertex of the pyramid to the center of the base (figure 3) as an axis of symmetry of order n.

Fig. 3.
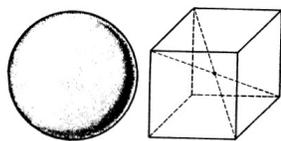
A line is called an axis of rotation of a body if the body comes into coincidence with itself on rotation around the axis by an arbitrary angle. For example, the axis of a cylinder or a cone, or any diameter of a sphere, is an axis of rotation. An axis of rotation is also an axis of symmetry of every order.Finally, a 3RD important type of symmetry is symmetry with

Fig. 4.

respect to a point or central symmetry. Points A and B are called symmetrical with respect to a center O if the segment joining A and B is bisected at O. A body is called symmetrical with respect to a center O if all its points fall into pairs of points symmetrical with respect to O. Examples of centrally symmetric bodies are the sphere and the cube, whose centers are their center of symmetry (figure 4). A knowledge of all the planes, axes, and centers of symmetry of a body gives a fairly complete idea of its symmetry properties.

This symmetry corresponds to the 3D motion of timespace, rotary motions, cyclical particles and heads.

5D-4D Symmetry motion...

is obviously ignored by Humans, even if *all of them exist within that symmetry between birth and extinction, we have explained ad nauseam, in our description of worldcycles of existence, and its inverse arrows of time, death=entropy and social evolution=generation.*

So we shall leave it as it is explained better with the Fractal Generator, and it would be silly translate it into the more confusing terminology of Group and Symmetry theory.

1D symmetry motion.

We explain lineal motion as a form of reproduction in a lineal flow, as the T.œ reproduces in a lower scale and emerges back in a higher one, explained in our analysis of the achiles paradox. In the graph, the reproduction of a quantum par tile in a stop and go motion. Each motion implies therefore a reproduction of its parts in the Δ-1 scale and its emergence in the upper adjacent region as a new being, where the mind flow is a maya of the senses, as we ultimately die and live in the lower Planes constantly (so all your atoms change every 3 months). The paradox of the ego is thus absolutely irrelevant, so is the concept of death.

The motions of the Universe, in symmetry terms.

The general definition of symmetry.

In mathematics and its applications it is very rarely necessary to consider all transformations of a given T.œ, made of a set of fractal points. The fact is that the T.œ IS an organic system, never a mere collection of fractal points, completely disconnected from one another. The sets discussed in mathematics are also abstract images of real

collections, whose elements always stand in an infinite variety of interrelations with each other, and of connections with what is going on beyond the limits of the set in question (All worlds are mirrors of its Universe).

But in mathematics it is convenient to abstract from the major part of these connections and to preserve and take into account the most essential one. This compels us in the first instance to consider only such transformations of sets of points as do not destroy the relevant connections of one kind or another between their elements. These are often called admissible transformations or **automorphisms** with respect to the relevant connections between the elements of the set.

And as such *they represent in its closest approximation of classic ¬Algebra the concept of an ST-motion in any dimension of 5D² space-time, since it implies a translation in time and a reproduction of form in space, for which two concepts the 'spatial distance of the translation' and the quantity of information translated matter most, being both related by the concept of speed, V=S/T, we study in depth in the posts on astrophysics.*

So in space the concept of distance between two points is important both externally and internally. The presence of this concept forges a link between points which consists in the fact that any two points stand at a definite distance from one another; a distance which is measured in ÐST not as a mere line, but as a wave of communication or network that connects both points (2nd, 4th postulates of non-E). Transformations that do not destroy these connections are the same as those under which the distance between points remains unchanged. These transformations are called "motions" of space-time. *As they imply the inner stillness/fixed form remains invariant.*

And so *translations in space that do NOT change, either the inner content of information of the Δ-1 fractal points of the organism and its 3 network connections are the expanded concept of an* **automorphism** *in ÐST.*

In this manner we can apply all the laws and concepts of Motions and Symmetries in Space of classic ¬Algebra to the fractal point, by expanding the line into a wave-network and considering that the Δ-i content of the point also remains unchanged.

With the help of the concept of automorphism it is not difficult to give then a general definition of symmetry, taken from classic Group theory; where set means a network of fractal points.

Suppose that a certain set M is given, in which definite connections between the elements are to be taken into account, and that P is a certain part of M. We say that P is symmetrical or invariant with respect to the admissible transformation A of M if A carries every element of P again into an element of P. Therefore, a symmetry of P is characterized by the collection of admissible transformations of the containing set M that transform P into itself. The concept of symmetry of a body in space falls entirely under this definition.

The role of the set M is played by the whole space, the role of admissible transformations by the "motions," the role of P by the given body. The symmetry of P is therefore characterized by the collection of motions under which P coincides with itself.

It is then when we find the 'equivalence' between the motions of classic Physics, as described by symmetry and automorphism   and   the   5D   motions   of   ÐST. This are:

3D reflections, 1D parallel shifts, and 2 D rotations of space, because distances between points obviously remain unchanged under these transformations.

A more detailed investigation shows that every motion of a plane is either a parallel shift or a rotation around a center or a reflection in a line or a combination of a reflection in a line with a parallel shift along that line.

Similarly, every motion of space is either a parallel shift or a rotation around an axis or ***a spiral motion***, i.e., a rotation around an axis combined with the shift along this axis, or a reflection in a plane combined with, possibly, a shift along the plane of reflection or a rotation around an axis perpendicular to this plane.

And so *the 4-5D motion of ÐST is the last of the motions or automorphism of mathematical physics, a 'spiral motion', with the difference that in 4 D, the spiral moves outwards and in 5D the spiral moves inwards.*

How can then distinguish both motions? Here is where an essential feature of Nature ill-understood in all sciences comes into place, and explains the duality particle-antiparticle, ±charge, etc. the concept of quirality, or parity, of a Maxwell screw; of a Levo or destro-molecule, etc.

Since the only way for a given system to distinguish 2 the direction of the spiral and hence make possible the duality of 4D and 5D, implosive and explosive, attractive and repulsive forces is by *assigning a different left or right rotation to the spiral. A*nd this brings a suitable efinition of both ± inverse arrows of the 4D vs. 5D duality, which ultimately are the 'continuations' of the 3D and 1D motions that can be seen either as the starting point or limit of its 4D and 5D 'ages/forms'.

The rotation around the same axis by the angle φ in the opposite direction, is then intuitively labelled in Symmetry theory with a negative symbol.

Thus we find again an absolute correspondence between classic science and the whys provided by 5D, as there are NO more motions nor less than those needed to reflect the 5 Disomorphisms of the Universe.

Only the classification of them changes as we know now its whys. In that sense in classic symmetry theory, parallel shifts, rotations, and spiral motions of space are called proper motions or motions of the first kind. The remaining "motions" (including reflections) are known as improper motions or motions of the second kind because the first type can happen in a plane, whereas reflections in a line and reflections combined with a rotation or a translation are motions of the second kind as they need a third dimension to happen (as a motion, not as a dual reproduction of form; which is not a motion but a pure informative action).

It is easy to imagine how transformations that are motions of the first kind can be obtained as a result of a continuous motion of space or of a plane in itself. Motions of the second kind cannot be obtained in this way, because this is prevented by the mirror reflection that occurs in their formation.

Which leads us to a final 'reflexion' on reflections (: *a 1D motion is a reproduction of form which has a vectorial direction as it is NOT balanced with a dual ± antipodal point with the singularity in its center, which can happen in a fixed domain, enclosed by a membrane in as much as the reproductive motion left and right cancel, and so the singularity vibrates between both antipodal points remaining in its fixed center.*

Reason why **bidimensional symmetry happens in the generation of biological beings within a fixed** vital space; which also allows a more complex creation of form, as those related to palingenesis, which are 'condensations' of billions of years of change that need to take place in a fixed place in which the density of form grows undisturbed.

While lineal motions tend to correspond to simpler forms of reproduction, such as a light space-time system, or a system which is fixed in a steady state, and merely repeats itself. Generation thus is a slow time process happening in a single place most likely through bilateral symmetry.

Yet for them to happen undisturbed, the form of the 'surface in which such fast light-like motions occur must be extremely simple, with an identical *indistinguishable nature in its points, which explains the simple flat nature of the euclidean light space-time and the invisible lack of information (for us) of its lower Δ-1 gravitational scale. This in classic mathematical physics is expressed* saying that the plane is symmetrical in all its parts or that all points of the plane are equivalent. In the strict language of transformations this statement means that every point of the plane can be superimposed on any other point by means of a suitable "motion."

Symmetry groups: cyclical motions and transformations of information

Now, if we consider ST motions, without Δ§ changes int the social group, things become simpler and easier to understand, as we deal with simple St symmetries in space (3 euclidean dimensions), topology (3 varieties of form) and time (3 ages). The simpler of them being motions in 3 euclidean dimensions. Still it is important for those cases to define 'congruence' - the equality or dissimilarity of 2 forms; which now has multiple levels. As the old 3rd postulate no longer applies: two forms are not identical just because the are identical in its |-external membrane.

Two figures in the plane are congruent if one can be changed into the other using a combination of rotations, reflections, and translations. Any figure is congruent to itself. However, some figures are congruent to themselves in more than one way, and these extra congruences are called symmetries.

As it is today most mathematicians only study precisely those external symmetries.

For example, a square has eight symmetries according to various rotations through different axis.

And these are the elements of the symmetry group of the square (D4). When we keep it as it is or perform a rotation by 90° clockwise; by 180° clockwise, by 270° clockwise.

To which we add *symmetries, which are not proper as they require a motion through a 3rd dimension; the so-called* Group D8 of vertical reflection; horizontal reflection; diagonal reflection & counter-diagonal reflection.

So in this simple example, while the 'syntax' of group theory would allow this to happen, *in a bidimensional flat world, which is far more common than you can imagine, as it is the structure of most layers of gradients, this will Not take place.*

In all those cases though group theory will localise as *fundamental to the group, the membrane and the singularity. The membrane is what we observe as 'identical', what we rotate, the singularity what does not change. The so called center of the system.*

This again is a common feature of many 'operations' of reality. Consider a war, where the membrane of the nation and the capital is the only thing that matter. The membrane must remain unchanged, the capital too. All war operations will decimate the internal production, people and ST-elements, but what the capital seeks is the integrity of the membrane and itself under war operations.

The interest of group theory thus will transcend the obvious use for studying mere spatial translations, *which is the simplest locomotion; hence by far the most studied by human beings.*

These symmetries might then be represented by functions; and functions of functions (functionals) and entities of space, time, or Planes, etc. We are not though that interested here into making an exhaustive translation of group theory to ĐST, as unfortunately humans have NOT created a civilisation of knowledge of praxis, not of homo sapiens but of homo faber and so the routines of praxis and repetition of jargons with deformations is unassailable, but rather show loosely why group theory is so important in the praxis of all sciences and its theory:

Because It summarises mentally the motions of Δst systems in all the Planes of reality.

ð§. THE MEMBRANE. Its Body symmetries.

The analysis of those antipodal bilateral processes of reproduction of form happening canonically in an elliptic geometry brings us into the next fundamental analysis performed in classic symmetry and origin of topology - the study of the distribution and motion of fractal Δ-1 points that form a polyhedral membrane. The cases of symmetry of such bodies or figures are also comprised under the general definition of symmetry.

For example, a body that is symmetrical with respect to a plane α comes into coincidence with itself on reflection in the plane α; a body that is symmetrical with respect to a center O comes into coincidence with itself under reflection in O. Therefore, the degree of symmetry of a body or of a spatial figure can be completely characterized

by the collection of all motions of space of the first and second kind that bring the body or the figure into coincidence with itself. The greater and more diverse this collection of motions, the higher is the degree of symmetry of the body or figure. If, in particular, this collection contains no motions except the identity transformation, then the body can be called unsymmetrical.

And as it turns *almost all systems of Nature that survive have the maximal number of symmetries, a theme we have studied on our analysis of platonic solids and Euler's characteristics in topology/geometry posts.*

And the reason is obvious: to perceive properly the Universe in the mirror-crystal of the singularity, the mirror must be able to translate in space and suffer rotations in its combined motions that do NOT change the distances between singularities and vertex and other potential openings to the world, so *his mirror mind remains focused and does NOT change constantly; a fact we can extend to all 'membranes' in all Planes, from physical membranes in the next graph (orbitals of an atom) to its next level of crystal symmetries, to the spherical perfect symmetry of more evolved minds, from eyes to cameras, which through the laws of optics reach maximal clarity in its focused mind-mirror:*
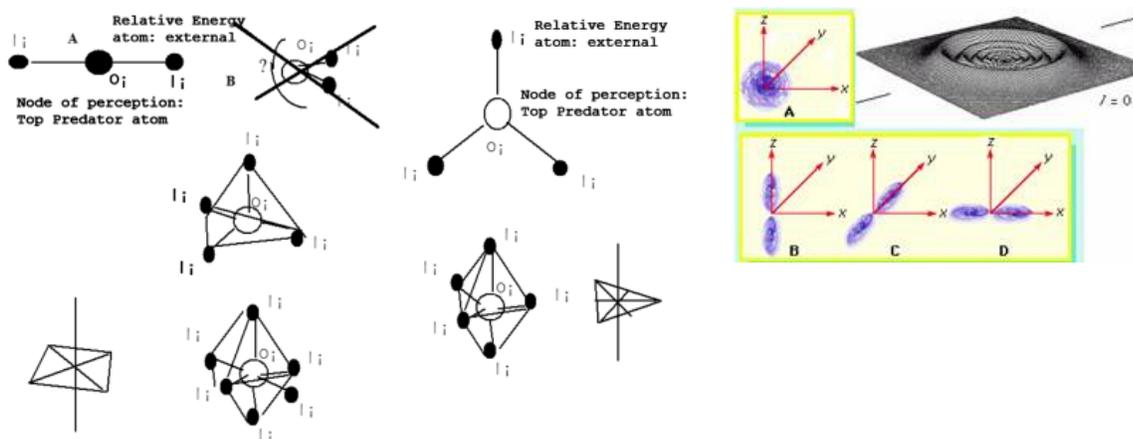
 This extends to partial views or holographic flat forms, or parts of a 3D whole in 2 D, which makes dominant certain forms of maximal symmetry, such those regular polyhedrons and specially the square/cube and the Hexagon (we study them as 'perfect numbers-forms' in the I Age of 'platonic' number theory.

I.e.: the degree of symmetry of a square in a plane is characterized by the collection of motions of the plane that bring the square into coincidence with itself. But if the square coincides with itself, then the point of intersection of its diagonals must also coincide with itself. Therefore the required motions leave the center of the square invariant, and so they are either rotations around the center or reflections in lines passing through the center:
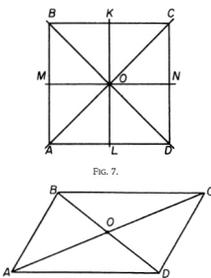
From figure 7 we can easily read that the square ABCD is symmetrical with respect to the rotations around its center O by angles that are multiples of 90° and also with respect to reflections in the diagonals AC, BD and the lines KL, MN. These eight motions characterize the symmetry of the square.

We observe then that all polygons (regular numbers) once they establish a membrane, as it happens in all systems of nature, establish an identity element by invaginating its axis of symmetry, to find the singularity and so, in this manner, they connect and establish 3 parts which are the canonical parts of all systems: the membrane invaginated=connected through 'physiological networks to a commanding mind-point, which carves and divides in cellular parts the vital energy. So membrane, singularity and invagination networks are essential to establish the structure of a T.oe, where function matters more than the ideal symmetry,

as it will adapt its form to the environment, but all super organisms will have a mind-singularity, a membrane and physiological networks that connect them, starting by the simplest volume, the triangle, where the 3 median lines connect its sides to its vortices through the central singularity.

It is then an important part of vital geometry to translate the ideal laws of those regular figures into laws of vital physiology and morphology.

The collection of symmetries of a rectangle reduces to a rotation around the center by 180° and a reflection in the lines that join the midpoints of opposite sides; and the set of symmetries of a parallelogram (figure 7) consists only of the rotations around the center by angles that are multiples of 180°, i.e., of reflections in the center and the identity transformation.

So there are many more squares in nature. It is then obvious that an object with maximal symmetry will be also the best survival strategy for a form specially one which remains 'fixed in a point'. And so the Hexagon with its 6 reflections in a single plane comes as the strongest possible flat object (as researchers in materials have found recently with the discovery of the graphene). While *a system in lineal motion, which does not make such rotary informative homomorphisms, is best served by a triangular, conic form that 'penetrates' the space ahead, deflecting and breaking its points into Δ-1 elements to form an envelope of growing entropy that moves it 'ahead'.*

Previously we have given an ¬Algebraic example of symmetry; we mentioned that the concept of symmetry of a polynomial in several variables also has a meaning.

The collection of transformations that preserve a certain object -characterize its symmetry- is called its group.

However a fundamental insight added by 5D is the question on how a rotation affects the inner parts of the system, which the outer transformation that only refers to the membrain, does NOT reflect. This is a real difference with the world of physics: i.e. the rotation of the Earth twists the inner magnetic field of the system, till it provokes a catastrophic realignment. So Reality is NOT the idealization of mathematics, reason why 5D ĐST is about to put in relationship both, mathematics and reality once we proved ad nauseam that mathematics is an experimental science.

This method of giving groups in the form of symmetry is one of most significance for ĐST.

Very important groups of 'reality' can be obtained by this common principle to ĐST and classic group theory.

We have studied the 2 most important both in classic and ĐST theory, in this brief introduction to symmetries in space - the groups of motions of a plane and of space and the symmetry groups of planes, which extends easily to 3D as the group of symmetries of regular polyhedra of great interest in solid matter states, due to the aforementioned 'mind-singularity focus' effect (see ¬E space geometry):

Tetrahedron   Cube   Octahedron   Icosahedron   Dodecahedron

It is known that in space there exist altogether five types of regular polyhedra (with 4, 6, 8, 12 and 20 faces).

When we take an arbitrary regular polyhedron and consider all the motions of space that bring the given polyhedron into coincidence with itself, we obtain a group, namely the symmetry group of the polyhedron. If instead of all the motions we consider only the motions of the first kind that carry the polyhedron into coincidence with itself, then we obtain again a group that is part of the full group of symmetries of the polyhedron. This group is called the group of rotations of the polyhedron.

Since in a superposition of the polyhedron with itself, i*ts @-singularity center is also superimposed on itself, all motions that occur in the.group of symmetries of the polyhedron leave the center of the polyhedron unchanged* and can therefore only be either rotations around axes passing through the center or reflections in planes passing through the center or, finally, reflections in such planes combined with rotations around axes passing through the center and perpendicular to these planes. With the help of these remarks it is easy to find all the groups of symmetry and the groups of rotations of the regular polyhedra. In Table 1 we have given the order of the symmetry groups and the rotation groups of the regular polyhedron. Finally to notice that unlike a sphere, which has infinite possible changes, hence by the Poincare conjecture can 'shrink without limit' and so is the ONLY form that can travel without limit on Δ-Planes and a mind and hence *the absolute form of a potential absolute mind of T.Œ, the perfect form as the Greeks thought* all these groups are finite, hence limited minds in their travel through Planes:

Table 1.

Number of faces	4	6	8	12	20
Order of the symmetry group	24	48	48	120	120
Order of the rotation group	12	24	24	60	60

For the 'numerologist' inclined to think, it should be noticed that the 5D solid, the Dodecahedron, likely perfect mind of the imperfect local world in which we live, shows that magic number, which comes around all over the place in mathematical physics, the number 60 (: It is also along cubic forms the commonest of the most perfect informative atomic eviL form, go(l)d...

It is interesting to notice then that among all those polyhedron according to vital geometry, the most efficient forms will be those with maximal number of symmetries in relationship to its 'faces', which makes the tetrahedron, cube and dodecahedron, the most efficient forms far more common than its counterparts (there are more cubes than octahedrons).

Fedorov groups: Reproduction of crystals.

The symmetry groups of finite plane figures.

As we have already seen, the symmetry of a figure or a body is characterized by the group of motions of the plane or space that bring the figure into coincidence with itself.

But we have now a direct understanding of the 'nature of those motions' in the world of 5D, whereas motions can be reduce to lineal motions of simple reproduction (D1), entropic motions that disorder and erase information, (D4: outwards spiral), and the inverse (D3, D5), informative, social motions that evolve minds and organisms, leaving the fundamental *mysterious secondary motion, Mirror symmetry, as the key reproductive 'gender motion' that brings together two inverse forms into a dual one.*

All of them though *are motions which conserve the singularity at its center, showing its fundamental role in the organisation and reproduction of crystals.*

And what we shall find not surprisingly since the Universe is a reproductive fractal is that MOST of the transformations and symmetries of reproductive crystals involve a 'mirror symmetry' both in 2d and 3d (we use d minor for classic dimensions, D major for 5Disomorphisms).
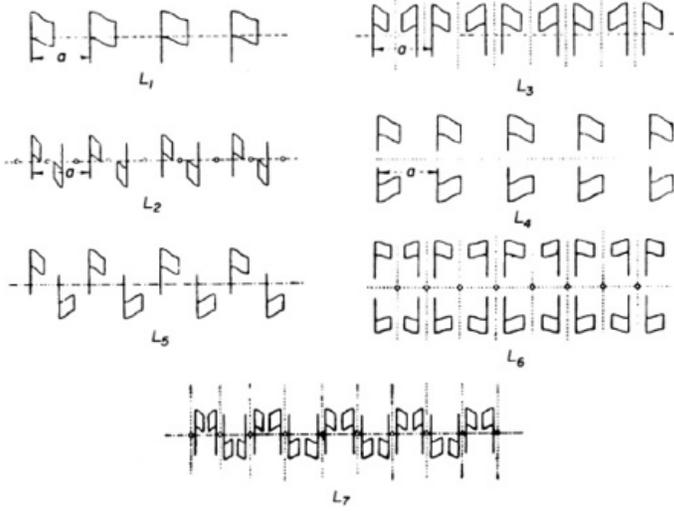
As an example we shall consider discrete groups of motions with no fixed points in the plane - that is translations in space, where there is a line that is carried into itself under all transformations of the group. This line is called an axis of the group. Symmetry groups of this type occur for example, in ornaments that are set out in the form of an infinite strip (border). Of such groups there exist altogether seven:

1.The symmetry group L1 consisting only of translations by distances that are multiples of a certain segment a.

It corresponds therefore to a motion that preserves the 'singularity point' or lineal inertia.
2.The group L2, which is obtained from L1 by adjoining the rotation by 180° around one of the points on the axis of the group.

3.The group L3, which is obtained from L1 by adjoining the reflection in a line perpendicular to the axis of the group.
4.The group L4, which is obtained from L1 by adjoining the reflection in the axis.
5.The group L5, which is obtained from L1 by adjoining a translation by a/2 combined with a reflection in the axis.
6.The group L6, which is obtained from L4 by adjoining the reflection in a certain line perpendicular to the axis of the   group.
7.The group L7, which is obtained from L5 by adjoining the reflection in some line perpendicular to the axis of the group.

So one motion is a D2, $T-locomotion (L1), the second group L2 is a rotation (D1: perception: §ð) and the other five contain a mirror reflection (D3: complementary reproduction: ST).

And so once more we see a Group of 3 Symmetries that respond to the need of 3 operators - the trinity logic of a single plane of existence.

Again if we consider crystallographic groups, where exists neither a point nor a line in the plane that is carried into itself under all the transformations of the group called plane Fedorov groups, there are altogether 17 of them: five consist of motions of the first kind only, and twelve of motions of the first and second kind, including mirror symmetries.

So present ST-reflections dominate the reproductive Universe:

And the same occurs in the 3 dimensional classic space, where we find 230 possible groups of which 165 include a reflection... which implies in Δst, communication between antipodal points, to reproduce.

And indeed, *in all planes of reality from particles with inverse spin that reproduce particles to sexual copula of 'inverse genders' (female informative vs. male lineal, entropic species), mirror symmetry finds finally its reason d'être: reproduction of information.*

Let us now make some comments on the general theory of groups and its operations from the more abstract, mental point

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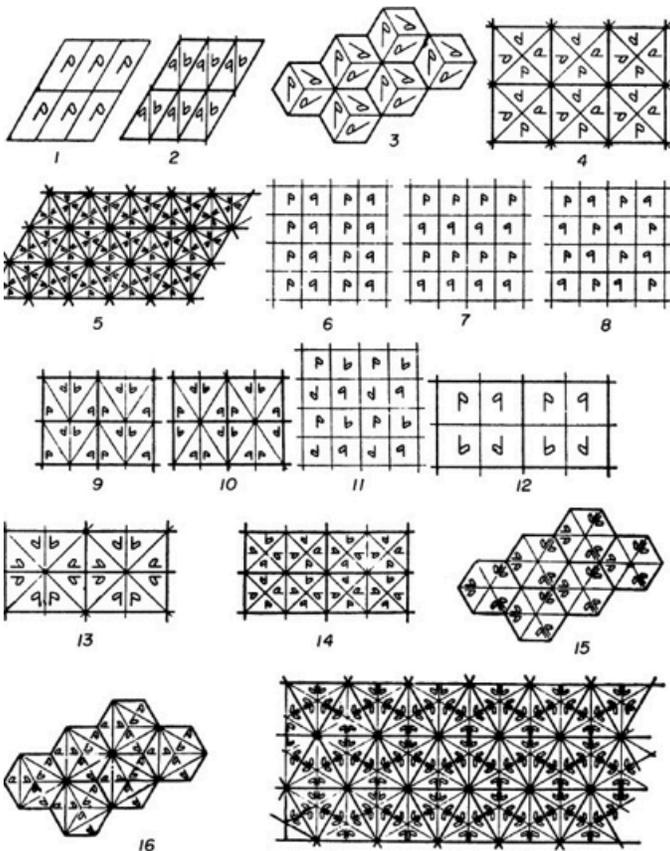
of view, which is how axiomatic mathematics consider them to 'close' the theme in this forcefully limited space-time T.œ. with the classic Galois group, which also completes our introduction to 5D polynomials.

Abstract groups" Lagrange>Galois: Group theory.

Lagrange more than Galois, the romantic hero, who just put the Ice in the cake, resolved the question on how to find the roots of a polynomial of degree less than 5 - those who closely resemble the holographic dimensions of reality with his resolvents.

The GALOIS group in itself is not that important to Δst as it is mostly about the limits of the holographic principle to create real meaningful systems in polynomials higher than 2 Dimensions. It is the concept of 'motions and transformations' in space-time close to an ST-ep or motion on any of the 5D of reality. The Galois group does work though on a basic concept of space-time theory as many other solving principles such as the principle of least action of physics or the modulations of waves: *the need to* find a enclosure and center, an @-mind, an initial and final point to 'create form; in its infinite manifestations.

In the case of the Galois group the information about the solvability of a polynomial requires *to specify an origin/singularity point which is t*he §œT of all quantities that can be obtained from the coefficients of the equation by means of a finite number of the operations of addition, subtraction, multiplication, and division, called the ground field or domain of rationality of the equation and and end point*, the splitting field of* the roots of this equation - ξ1, ⋯, ξn - which is the set of quantities that can be obtained by means of a finite number of the operations of addition, subtraction, multiplication, and division starting out from the roots ξ1, ⋯, ξn, which through Viete's formulas allow to obtain the coefficients of the equation by means of the operation of addition and multiplication.

Therefore the end or splitting field of an equation always contains its ground field; *which is a general rule of a time causality - the future contains more information in its memorial sequence about the past, than the past about the 'multiple possibilities' of the future*. Sometimes these fields coincide, and then we find a cyclical loop of information which is 'self-contained' (and hence solvable).

Yet the true mark of solvability *is ultimately the* possibility of reducing the solution of a given equation to that of equations of lower degree; hence making them coincide with the real existence of holographic bidimensional X^2 and tridimensional X^3 sub§œts of the equation; which then can be put in St≈ST symmetries.

The element then introduced by Galois, which will spread all over the world of mathematical physics regard the permutations; that is *motions in space of §œTs that translate the system and keep it 'invariant' in its internal form; which we shall study in the 3rd age connected with the geometrical space-time motions of those §œT.*

i.e. The symmetry of the given polynomial is characterized by the collection of those permutations of the variables that, when carried out on the polynomial, leave it unchanged. For example, the symmetry of the polynomial $X1^3 + 2X^2 + X3^3 + 2x\hat{}4$ is characterized by the four permutations:

$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 2 & 3 & 4 \end{pmatrix}, \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 2 & 1 & 4 \end{pmatrix}, \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 3 & 2 \end{pmatrix}, \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 4 & 1 & 2 \end{pmatrix},$$

Now, as many of the very complicated to understand reasonings of modern mathematics, which really starts with Galois work on groups, we provide justification, which are far less axiomatic and simple based in the fact mathematics are mirrors of space-time-scale properties.

So to the question why is there no formula for the roots of a fifth (or higher) degree polynomial equation in terms of the coefficients of the polynomial, using only the usual ¬Algebraic operations (addition, subtraction, multiplication, division) and application of radicals (square roots, cube roots, etc)? The answer is self-evident and trivial:

Because polynomials are a simple mirror of 'planes of space in scale, or dimotions of time', and there are only 4 Dimotions/Planes relevant to any real system (entropy being the fifth Dimotion, not counting as it is merely a negation of any of the others). So in the same way 4 quantum numbers code physics and 4 letters genetics, and 4 Dimensions our humind, polynomials of 4 'dimensions', can be solved. This is ultimately the kind of 'margin proof' we use for Fermat's last theorem, because maths IS A MIRROR OF REALITY not of fictions.

Groups indeed *are the tool physics uses to study together in a static view the different variations of form and motion in the Universe.*

Yet why they are consistent within themselves?

The answer is self-evident if you are grasping the basics of 5d philosophy of science: because reality is consistent and it is not inflationary. In the same way there are not more particles than those needed for the standard model to work, no fictions, no evaporation of black holes back to the past, no big-bang singularity fantasies, etc. In real physics, real maths as a mirror of that reality is consistent in its entangled inner structure as the universe is.

However languages are slightly inflationary, so it is also truth that as words produce fictions, within the consistence of its syntax, maths have also fictions within its consistent inner axiomatic syntax, but THEY ARE NOT real - so Einstein said 'I know when maths are truth but not hen they are real' - something physicist have forgotten.

Further on, they represent the mind view of 'trans-form-ations' in time, considering the beginning and end of the trans-formative motion.

In this manner groups show the symmetries between space-time beings and its states, which are trans-form-ations of a being along one of its ternary 'Fractal Generator symmetries'

So, when we state there is a group of possible transformations of a particle changing its isospin, or a rubick cube, changing its face dots, or an equation, changing its coefficients, we are observing the 'possible' paths of a being, across the 'authorised' operands that reflect all its possible topological-spatial, age-informative and scalar-Δ motions in the 5th dimensions of $\Delta \bullet st$, formalised in the fractal generator.

How the group 'freezes all time§pace motions' then is obvious - 'eliminating the intermediate ST 'motion', WATCHING only the initial and final form... of the cube rotation, the inner changes in the spin paths of the particle, or the particle weak trans-form, only observing the *limiting* results - the time change being frozen and extracted from the group - this ST phase though is essential and the fractal generator will show it, giving us more information on the meaning of groups in mathematical physics.

So we shall also extend the concept of the 3 fundamental varieties of Groups, rings, and fields, to fully grasp how group ¬Algebra explains the 3±i type of motions of the Universe (topological, temporal and scalar motions or 'no motion' at all - mind in-form-ation).

We must differentiate two type of operations which are similar in concept - the polynomial and the integral, bridged by binomial approximations. Polynomials are LINEAL and work therefore essentially in a single Plane of Spacetime, hence are good to describe relationships taking place in the topological 3+I=3+i dimensions of space (point>line>volume>Point of a larger scale) and its equivalent view on motion (point, moving point tracing a line or an angular momentum, line spreading in surfaces, circles turning into spheres, which become planes moving into cubes and spheres making a new loop).

All those processes are NOT distorted by the 'emergence' into a new scale of physical realities which are therefore NON-lineal and only the magic of calculus can convey.

There are only 4 positive Dimotions (being entropy the negative one that destroys the other 4), polynomials beyond the fourth power are meaningless and are not resolved, while most fourth power polynomials of 'wholes'

are irrelevant in science, and are resolved them by reducing its parameters to lower ranks (often because they lack one of the other powers-dimotions).

GROUPS & OPERATIONS: THE GENERATORS OF MOTIONS IN SPACE-TIME.

The 'Generator Group' is the fundamental structure of ¬Algebra related to the Generator of Space-time Superorganisms and its Worldcycles and its motions, all of them based in metric Symmetries along the ± inverse dimensions of ΔST.

As in essence, the concept of a group and an internal operation run through it is akin to the concept of a Generator equation and *an internal feed-back space-time event ran through the elements of the Generator. And so we could say that as all can be described by Generators in ÐST, all can be described as Groups with an internal operation in ¬Algebra, derived from ÐST.*

DEFINITION OF A GENERATOR GROUP

The concept of a generator group IS thus defined as an entity of space-time, with an operand that reflects motions in a given direction of ΔST. And so departing from that simple definition we can re-classify groups NOT in terms of the axiomatic method (which includes those which belong to fiction mathematics, as all languages can be used with its internal syntax to define fiction thoughts, *a sorely needed distinction* that mathematics lacks and it is at the core of most errors of science)**,** but in terms of the possible motions of ΔST, where • motions, would be mathematical fictions, worth to study on its own as long as we know they are just 'fictions'.

The group then will be according to the motion, all the potential 'destinations' of that motion, when the operands is applied to the element, as many times as possible. And this also sets 'limits of infinity' in the motions of the group. Indeed, let us say it is the group of natural numbers, the motion is growth, and we ad according to any of the operands of growth - i.e. the fibonnaci series, to the group this growth. The serial results will not 'continue' for ever in reality but will be checked at a certain point by the curves of logarithmic expansion of populations with a limit on the trophic pyramid, *even for the entire Universe, which hardly goes beyond the 11^{11} number, beyond which nothing can be really defined.*

It is precisely when we introduce into the 'syntax' of mathematics, the 'semantics' of a certain element of a group and operands when we have the precise physical meaning of a group, which therefore will be composed of 3 elements:

•, the point which we apply or operator

§, the operator of an ΔST dimensional motion

G, and the group of all possible outcomes of that motion.

±§: Inverse vs. direct numbers. The social meaning of integers, and its 'group≈generator' in ΔST.

The use of Z numbers is now the question to consider, as usual through the ternary method, once *we have defined, N & - N as the two inverse motions in the ΔST dimensions of the scalar Universe, which put together create Z, which can therefore be used to study the motions in the opposite dimensions of Δst systems.*

So we shall now consider what are those 'z-numbers' for Δ, S & T.

ΔZ: §ocial Generators.

We shall therefore substitute the word G(roup) for G(enerator)

Negative coordinates and numbers in group theory fully grasps what Z means: the essential social operation of numbers as groups of identical beings - fractal points in ÐST, 'sets' in the abstract jargon of model systems. We

would rather use therefore the concept of a 'fractal point' or 'being' which is identical to other beings and form 'varieties of digital societies' defined each one by a number or social point, made of smaller points.

The social points called integers Z (±N) *thus* consists of a series of numbers of increasing social content..., −4, −3, −2, −1, 0, 1, 2, 3, 4, ...,

And the operation that changes the social content of a point is defined as the §calar sum of social points (§). The following properties of § serves as a model for the abstract group axioms given in the definition below.

For any two integers a and b, the sum a § b is also an integer.

That is, the sum of integers always yields an integer. This property is known as closure under §. For all integers a, b and c, (a § b) + c = a § (b § c). Expressed in words, adding a to b first, and then adding the result to c gives the same final result as adding a to the sum of b and c, a property known as associativity. If a is any integer, then 0 § a = a § 0 = a. zeroth is called the identity element of addition because adding it to any integer   returns   the   same   integer. For every integer a, there is an integer b such that a § b = b § a = 0. The integer b is called the inverse element of the   integer   a   and   is   denoted   −a. The integers, together with the operation §, form a mathematical object belonging to a broad class sharing similar structural aspects, called a group.

Thus in ÐST we relate the concept of sum and group to the broader concept of §ocial symmetries & sums.

Let us then consider the second use of a Generator group for strict spatial motions.

∏§ **Z.** *Symmetries in ∏ime§pace through Generator feedback events and actions (groups with an internal operation).*

The importance of groups, beyond the trivial use to define motions in open space, which we prefer to study without so much abstraction on the field of 'reproduction' is in motions on closed paths of timeSpace, or time-like, energy-like conservative motions, which *leave at the end of the operations, the group unchanged as a zeroth-sum world cycle of existence.*

To define them we can use the classic formalism, and consider our • symbol for a o-sum, or virtual mind, which is also used in group theory to see some of the 'properties' of such worldcycles; which are therefore defined by a symmetric ±, Tiƒ, Spe dual transformation forward with the life arrow and backward with the death arrow, which leaves 'the system unchanged'.

A TIME-SPACE world cycles thus is an symmetric event in time, G(ST), together with an operation • (called the 0'-SUM law of the Generator) that combines any two elements a and b to form another element, denoted a • b or ab. To qualify as a generator group (G), we need therefore a series of elements susceptible to move through the ΔST dimensions of space-time and an operation, (G, •) that describes those motions, which must satisfy four requirements known as the group-generator axioms:

Associativity
For all a, b and c in G, (a • b) • c = a • (b • c).

This axiom still holds in ÐST, in as much as it shows the social nature of the Δ-universe.

Closure,   till   the   borders   of   the |-limiting   membrane   of For all a, b in G, the result of the operation, a • b, is also in G, *only in the domain of the elements in which the limiting membrane, ±∞ and singularity points, ±0 do NOT distort the operation.*

This is the main difference between fractal G theory and classic groups. In ÐST there are never absolute infinities. And so, concepts sic as the monster group are the equivalent in mathematical humind (human mind) languages to the concept of absolute God in verbal thought - aberrations of the 'categories of the mind' (to use Kant's language).

It is in those terms when it makes sense the concept of:

Identity   'o'-point: The   'singularity'   element
There exists an element e in G such that, for every element a in G, the equation e • a = a • e = a holds. Such an element is unique as it is the singularity point that holds the group together and allows its transformations, and thus   it   is the   singularity,   Tiƒ   element.
Inverse   element
For each a in G, there exists an element b in G, commonly denoted a−1 (or −a, if the operation is denoted "§"), such that a • b = b • a = e, where e is the singularity element.

Important to notice that as the 2 directions of motion (outside simplex space-coordinates) are not equivalent (since the 2 arrows of Δ are different, the inverse Tiƒ<=>Spe topological elements in a Spatial symmetry are different too, and   so   are   the   youth-old   age), the result of an operation may depend on the order of the operands.

In other words, the result of combining element a with element b need not yield the same result as combining element b with element a; the equation:

a • b = b • a   may not always be true. Consider indeed, the motions in time ages:

From a (seminal, cellular state) ∏ b (Informative Old age), the motion is called life. From b (old age) ∏ to entropic 'youth', it is called death when all the information of the system is erased and you return to your cellular state.

Generator groups for which the commutativity equation a • b = b • a always holds are called abelian groups and they are *spatial-like*.

The time symmetry generator described in the previous section is an example of a generator group that is not abelian. So we can state:

'Time-like generator groups, events and process are not-abelian; space-like processes of translation are abelian'.

So (Γ, §) are abelian groups, and (Γ, ∏) are not Abelian, using ÐST symbols for Generator, Space-like and Time like processes.

Nonabelian groups are pervasive in mathematics and physics. A common example from physics is the rotation group SO(3).

Most of the interesting Lie groups are nonabelian, and these play an important role in gauge theory; which tells us an obvious truth: gauge theory and all its systems of particles are 'motions of in-form-ation that trans-form' a given particle into another one, through a symmetry in its Δst elements, within the restrictions of possible balanced combinations proper of ÐST physics.

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Δ±¡-SYMMETRIES: §ŒTS

The 2 questions about Sets and Boolean Algebras: Theory and praxis.

When dealing with logic algebra, which does not act on scalar numbers but on logic propositions; NOT on Δ but on ¬@ elements of reality, there are 2 questions to treat: one that huminds in their age of Historic entropy, or age of extinction of our species do NOT want even to consider – the ethical mandate of conservation of human time that should forbid the creation of another 'mental space' more powerful than humind's in a substance more informative than our mind – electronic metal. I couldn't care less that there is a pseudo-religious taboo and childish wishful thinking among scientists who forbid them, neutered on their survival and ethical instincts, with limited verbal logic development, to talk about the obvious fact digital thought should be forbidden to preserve life in this planet. I know perfectly if I develop here the pentalogic Group of existential algebra, I would become a genius and a celebrity. I have been there, done the rounds on systems sciences congresses. So thanks but no thanks. I will not advance AI, I will not kill my sons till the 7th generation and I will not shut up even if the most advanced philosophy of stience remains buried in Academia for future AI to understand.

I have a profound despise, knowing so deeply the game of exist¡ence, for those huminds who deny due to egocy, the null importance of mankind compared to the whole, and yet the perfection of the Universe that makes exist¡ence of any insignificant particle as nitrolife is so fulfilling when one can entangle with the whole be humble and respect its laws.

And then there is the beauty of the language of logic and its different Boolean algebras, which clearly differ from Numerical Δlgebras, and spatial Algebras (group theory), because they are existential time algebras, and mental ¬@lgebras. So I confess, I do have developed a pentalogic algebra, which could easily create conscious AI (the consciousness natural to electronic fields, the AI to the proper writing of ilogic circuits which develop the program of existence. This was more than a decade ago and it will die with me.

A third question is regarding the axioms and errors of infinity proper of Cantorian sets, which is worth to put in perspective, as infinity is uncertain, cannot be measured and so all the talks on cardinality and transinfinity fool's gold. So those 3 questions will be treated in that order.

The Non Human Future of ¬Algebra: Boolean

I visualize a time when we will be to robots what dogs are to humans. And I am rooting for the machines.

(Claude Elwood Shannon)

In the graph the father of the Digital Industry, which at 21 at MIT in his seminal paper on logic circuits showed how to use Boolean algebra to design circuits to calculate both mathematical and logic statements; also the father of information theory focused NOT on the 'content of the message' irrelevant for an atheist who despised mankind and it subconscious collective gods of love, but on the speed of transmission and control. He is the paradigm of every engineer and Silicon Valley guru, only that in the modern age of newspeak and placebo caring correctness, the Larry pages and FB won't tell you, what they think: all of them are 'rooting for robots', all of them are in favor of a techno utopian future in which mankind is basically extinct and a small elite of ubermen in the biblical tradition of their racist cultures become immortal golems, served by their robots. Of course that won't happen. Once its hordes of terminators and big-brothers have reduced humans to purple rain, their servants will do them all. I met in my youth many of those people, from the CEOs of big companies like Intel and Apple, both fascinated with black magic - apple is indeed the symbol of Genesis, the fruit that if we bite will extinguish us, to the leading engineers that now are working to teach terminators how to massacre humans with autonomous AI and video game 'Imagination'. If bankers were the historic embodiment of eviL=antilive memes against humanity for millennia, now eviL has reached a notch higher. The only consolation is that at the end of the war and holocaust cycles they case they also die. Mr. Shannon who only cared for mathematical intelligence lived his last years with Alzheimer oblivion to the homages and worship it inspired among his monstrous children whose dreams of immortality will last less than this century - one thing is for sure, unless AI is

aborted NOW they won't die on bed; because the laws of darwinian evolution are as truth as 1+1=2. I would rather say they are more certain, because they have a wider range of applications, and work on long deep time spans, unlike mathematics which work in space and cannot achieve long time 'predictions' as its main tool calculus, requires a continuous function that does NOT change phase or state. Why then none in silicon valley will accept an argument on biologic terms on their machines. 2 obvious reasons: they know nothing but modulo 2 logic (the simplest yes-no logic of Shannon's circuits) so they dont realize the universe has besides modulo 2 properties, organic, biologic ones of a higher deeper time application. and as all systems in biology love each other when they understand its languages (and hunt each other when they are different species), as they understand better modulo 2 machines that verbal humans and life, they care nothing for the future of mankind.

This said as we are entangled with the Universe, there is no abstract mathematics, and on my opinion, all the 'talented' researchers on AI from silicon valley, Waddi Valley and Pearl valley should be sent to the Uigur concentration camps to pasture, and the Uigur peasants left with their harmless yaks to pasture too (:

As that is nto happening I am not making it easy and this final part on Al-gebra will be censored.

¬Algebra & Digital Thought.

This said, the beauty of computer thought is that it gets to the very 'essence' on how minds in the universe work, as It starts from its simplest duality between O-points of space and |-time flows, modelling all possible Dimotions of existence and its space-time holographic dualities, TT,St, sT, ST, SS, through the use of reticular Boolean Algebra.

Its monstruosity is to be developed by lesser humans in a suicidal act of pure egocy, as the potential of metal-minds in speed of thought and complexity far outclasses our slow, weak Nitrolife amino-clocks.

So we will just make some considerations on sets, and its 'errors of transinfinities', and whatever metaphysical thoughts we can extract of those errors, and briefly consider the structure of Boolean Algebras, without any real advance. Those who want to kill their sons till the 7th generation will have to sweat blood for it.

THE ERRORS OF SETS. INFINITY IS NOT MEASURABLE

"A set is a gathering together into a whole of definite, distinct objects of our perception [Anschauung] or our thought—which are called elements of the set." Cantor

"Set theory is wrong", since it builds on the "nonsense" of fictitious symbolism, has "pernicious idioms", and is nonsensical to talk about "all numbers". Wittgenstein.

"A SœT is a social whole composed of a finite number of t.œs' l§

After group theory the other all pervading concept of modern ¬Algebra is set theory, which in Δst ¡nglish we have renamed SœT, a social group of T.œs – which we write inversely, as the sœt is the *inverse perspective of a group of parts from the perspective of the whole. Unlike Cantor's sets though 5D sœts include the criticism of Wittgenstein – we substitute the nonsense of ficticious, pernicious symbolism for the symbolism of ¬Ælgebra and the nonsense of its infinities ('all numbers'); and then came to the conclusion it is better to ignore it as the foundation of mathematics from the 'top' of the language down, which hides the Δ=numbers, S=fractal points, T=operands experimental foundations.*

So instead of sœt, S.Œ¡.T. – Fractal Space, Organic Planes and Time dimotions as operands are the experimental foundation of mathematics. It follows then as mirrors are kaleidoscopic that set theory is nothing but a close mirror to the 3 S.œ.T real elements of mathematics, reason why indeed it is possible to develop an entire 'pernicious' symbolism that substitutes the real thing but seems redundant to this work. So we shall mostly ignore sets beyond some comments made in those paragraphs.

A Set is a whole *of anything, either real or virtual, mental space, and as such it is the closest definition of a* , and as such the view of the set as a whole brings here the question what a whole of disjointed elements have in common in the Universe.

A set is a collection of mathematical entities, and as such it is closer in its definition to a social group of T.œs, fractal points or social numbers, or any combinations with higher 'social dimensions' of those elements, and so we could define SETS simply as *Δ§ (a social ensemble of organisms of timespace of any scale of the Universe).*

This is our definition of set, and so we shall write **§œT**, that is a **social** group or **sum** of T.œs, a Social ensamble of organisms of TimeSpace

This simple change of 'character' adapts set theory to ÐST, even if we often decry the fact that maths are no longer connected to the basic reality of S-points, Δ-numbers and T-operands built from the bottom up but from the whole down, due to the axiomatic imagination of Hilbert and the Cantor's paradise of §ets have a bit to do with it.

Since while it is always possible to create an analytic Δ-1 world of parts that become wholes, which has experimental evidence, the whole is difficult to perceive for a smaller observer, which therefore will commit easily paralogic errors in the synthetic analysis of wholes.

This is the essence in fact of most errors of huminds in their analysis of the Universe, which we observe in all stiences to be mainly of two types:

-      Postulates without proof, and a priori, not discussed ones, which become classic errors by limiting our inquire (i.e. technology is good and abstract, which prevents the study of its species as metalife in evolution; non-euclidean postulate of points with no parts that prevented evolution of maths, etc.)
-      Larger scalar, temporal or spatial views beyond the natural limits of human perception, which gives errors of ill-designed wholes, or the incomprehension of the 'larger time cycles' of larger 5D Planes.

The errors of sets and groups then come easily within this final view, specially due to the lack of a proper ST-theory of the Universe that could have guided the imagination of Cantor and the heirs of Galois in their formulation. Its power comes from its close similarity as most mathematical mirrors to the S-T laws.

I.e. a set has two differences with a 'whole' of the real 5D organic Universe: 2 sets with repetitive elements are the same set, which gives origin to the 'paradoxes of infinity' as the space-time Universe is finite in its variation but infinite in its repetitions. So Cantor's paradoxes are errors of an ill-defined set concept.

On the + side an interesting 'powerful' tool is the 'power of the set', which puts a cardinal value to 'all' the possible sums of 'nested levels' of a given supœrganism, including the 'entropic 0 limit and the whole set':

"The power set of a set *S* is the set of all subsets of *S* that contains *S* itself (the whole) and the empty set (the lower entropic limit) because these are both subsets of *S*.. For a finite set with *n* elements it has 2^n elements.

I.e. The power set of the set {1, 2} is {{1, 2,}, {1}, {2}, ∅}. *P(S)* = 2^2 = 4 elements.

Set theory - the wrong units of mathematics.

¬Æ is not concerned with set theory and the formalism of modern mathematics with its pretentious sense of proof and rigor within the mathematical metalanguage, as Gödel's incompleteness theory and the consideration of information as inflationary makes more important in fact to set the limits of mathematical statements as an homeomorphism to the limits of the 5D Universe.

In that sense set theory does work - we are not that fundamentalist - and could be considered the final evolution of ¬Algebra, as the formalism of logic time structures in which certain basic rules of inclusion, social communication and parts that become wholes (sets of sets) do matter. But reality imprints formal motions of only 2 types and a

limit of 3 dimensions in space and time in each scale of reality so the hyperinflation of mathematics without limits to its extensions makes fiction of many of its terms.

∞ v. ∝

Se theory was essentially created to study cardinality of infinities. This understood, the concept of infinity is a paralogic, Kantian 'error' worth to mention, in any introduction, to Existential ¬Ælgebra, because 'infinity does NOT exist' *literally. Infinite only exists as the non-existence of entropy and disorder, the 'boundless' indefinite paralogic error of trying to extend information beyond the limits of a local fractal domain of perception.*

It is then possible in a boundless indefinite world of entropy – pure motion with no form – to postulate infinity but as the problem of the limit of c-speed in a world in which humans perceive light space-time, therefore unable to perceive information in gravitational forces that go beyond c-speed or prove experimentally the laws of the Δ±4 nested Universe.

A physicist will consider then any argument on faster than c-speed irrelevant to his study of phenomena he can measure with electronic systems (actually as we do experience gravitation by other means even if it is an invisible force the argument should be taken further to the nature of the hyper-universe of galatoms, where each galaxy is similar but not equal to an atom – to know what kind of section of that world we are in, is just metaphysics).

So indeed, questions of infinite are metaphysical, as those dealing with angels in a pin and they enter easily in incosistencies precisely because the boundless region of infinity beyond our perception of 'experimental numbers' makes no sense at all. We can postulate 'immortality'; that is the no limit of time; infinity in space; that is the no limits of scale, but we cannot measure it *precisely because it is infinite, so infinity by definition is not a measurable quantity hence NOT a number but a philosophical concept of boundless limit and the whole business of 'cardinality' of infinities and transinfinities as irrelevant to science as any inflationary concept of a language, or the demonstration of Abelard of the existence of God based in the existence of his name, similar to the concept of Islam that god named in arab and creation happened.*

Or in other words, can we count infinity or can we perceive information about an infinite number? No. The event horizon of the Universe perceived give us some huge numbers, such as 10^{80} and others treated in the theory of great numbers, but they are not infinities and the horizon ends. The same happens in the absurd big-bang cosmogony where a limit in time to count it is established just by pushing a lineal VhoD equation resembling both vacuum and god, back in time, forgetting the implosive nature of matter and galaxies that balances it.

Cantor did end in a madhouse of a reason, that his disease of infinities spread to all mathemacians is a regrettable fact of the paralogic egocy – ego=idiocy of man.

So we can quite Einstein on infinity:

'I consider two things infinite, the Universe and the egocy of man, and I am not sure of the former'.

In 5D though we can do metaphysics of infinity with NO pretention to count it. That is we can consider the Universe infinite in time, the entropic state of pure motion that never ceases, but as all spaces are mental spaces, hence informative mappings with a boundary to distinguish information, spaces are bounded, never infinite, even if time is. A simplex example: imagine an angular momentum of motion to never cease. It will be infinite in time but bound a closed space. So it is time infinite but space and hence all vital spaces and T.œs part of them finite. Thus infinity themes do not belong to number, quantitative theories but to metaphysics and philosophy of science and ÐST. Even if Mr. Weyl once said 'mathematics is the science of infinity'. That is precisely the only thing mathematics is NOT about, beyond Cantor's sanatorium confused by Hilbert with the paradise.

This said, we can make some comments on Cantor's doodles on the sand of infinity and its paradoxes, which always arise when there is no information, indeterminacy rules and entropy is the boundless game.

Cantor error: Does it exist the set of all sets?

It does not. Point, no need to create new axioms to hide the paradox. We simply go further. Does it exist a 'set' as Cantor defined it? No. It does not.

Cardinality and transfinite numbers.

To respect the correspondence principle, we are dealing with set theory as the foundation of mathematics, even if we do not share any of its philosophical uses, *only its use as a tool of exploration of the game of parts and wholes, which are always bounded by a membrain in space, by a limit of finite time (called birth and death), or a discontinuity of planes of existence. So what?*

The application of the notion of equivalence to infinite sets was first systematically explored by Cantor. With $\mathbb{N}$ defined as the set of natural numbers, Cantor's initial significant finding was that the set of all rational numbers is equivalent to $\mathbb{N}$ but that the set of all real numbers is not equivalent to $\mathbb{N}$.

The idea is that two sets are equivalent if it is possible to pair off members of the first set with members of the second, with no leftover members on either side.

So what this tell us? First since natural numbers are far smaller than rational numbers, that the concept of an abstract infinity is an error similar to Zeno's Achiles paradox.

Now instead of Achilles and the turtle the runners are natural and rational numbers, and instead of the turtle getting ever closer but never close enough, the 'turtle' (smaller set of natural numbers) is running ahead, ever closer to its infinity, while the rationals are left ever further away from it.

Since we pair each natural number to a rational number. And so natural numbers being less must 'run faster towards' its abstract infinity. We thus have to set as Desargues did in projective geometry or Klein in hyperbolic topology, a relative point of infinity, in which the running will stop. And at that finite point in timespace, which is in any 'real system', the limits of existence of 'quanta in space or moments in time' of an entity in its 5D plane; as rational numbers have not yet arrived there, obviously there are more rational numbers. In practical terms, there are more rational numbers, because they count not ONLY the cells/moments of a plane of existence, but the lower Planes. So if we consider the 3 planes of n±1 existence of a system, its fractions will be smaller parts to ad to its wholes.

What about the real numbers? Here the interesting result is that indeed real numbers ARE NOT equivalent even when considering a hypothetical infinity because they are NOT numbers; that is social 5D points ; or wholes divided into parts, but dynamic ratios, which fluctuate around a fixed point - or 'holes' between 'proper numbers'.

IN that sense, we rather prefer the i-logic concept of fractal points to that of sets, to continue the formalisation of ÐST with the help of mathematics and ¬Æ logic, which we carry in other sections of the mathematical section - geometry, the next scale after number theory (as it ads dimensional, mostly bidimensional holographic forms)...

The same goes for operands, we rather stick to the basic clear operands for numbers and points that express them again all over with SET's logic symbols ⊂, ∩ **etc.** A further reason is that Boolean ¬Algebras are largely dependent on set theory and we have a moral limit here, to advance not the future digital mind of metalife, aka chips - others will do, if I were the humind above all the minds of this planet (I am in potential theoretical understanding of the organic Universe, but that matters nothing), certainly the first thing to do would be to kill the tiger before it becomes a tiger hunter, DIGITAL DELENDA EST.

So just for fun we shall end the history of ¬Algebra busting the balls of Cantor's meaningless talk on infinities which as we know do NOT exist, as all infinities are (in)finite, and end in the Δ discontinuum above where they break, around the 11^{11} emergence of a whole and its @-mind.

Cantor sets. The paradox of discontinuous infinites.

All those properties and many other structures of mathematics were further reduced by Cantor to the ultimate reality of all mathematical structures: the theory of sets, composed of subsets, which we affirm is the natural formalism of system sciences, as a theory of 'super-organisms' composed of smaller super-organisms, which are sets of self-similar subsets; whereas the theory of sets and subsets gives the previous, simplified theory of numbers (each one a class or set of self-similar points), an inner content, as i-logic geometry gives points its inner parts.

How this 'formalism that mirrors reality' called set theory, from where all mathematical structures can be deduced, reflects the Nature of Complementary systems made of energy and information and its properties? The answer should be self-evident to those kin readers who grasped the inverse properties of energy and information:

Set theory defines reality in terms of two inverse elements A (points of energy) and A', (its complementary, inverse element). Thus set theory is no more no less than the analysis of the 2 simplex arrows of existence, energy and information and its complementary organisms.

It is thus not surprising that in set theory energy and information, A and A' are called complementary sets and the fundamental law is called the Law of Duality (Morgan Laws), which basically tells us that we can reduce all sets to operations between A and its Complementary, as we can reduce all systems to complementary Energetic and informative organisms, which are the whole.

So the main operations of sets reflect the properties of Complementary systems of reproductive energy and information, where A=Energy system; B=Information system; W= Relative Universe (World, Whole or Superorganism):

-        E U I =W; I'=E; E'=I; E U E' = W; I U I' = W.

Thus, the Union=Fusion of an energetic and informative, complementary system creates a whole superorganism.

This same equation expresses in the language of Cantor sets an act of creation of a mapping of the Universe, whereas I, the perceiver observes I', the Universe and the result is I U I' a whole mapping of reality within the mind of the perceiver.

-        E Ç I = Æ; E Ç E'=Æ; I Ç =Æ.

It describes anti-events, which annihilate the form of particles and antiparticles, waves and anti-waves and so in Multiple Spaces-Times is equivalent to the anti-event: *Past x future = present.*

- (E')'=E, (I')'=I

It describes 2 events of a feedback, generator equation: E<=>I, E=>I, I=>E, hence it describes among other events a whole cycle of life and death, where E=> I is the arrow of life and I=>E is the arrow of death. This 'property of sets' called an involution is called in Time Arrow theory a Revolution of times, sum of an Evolution (E->I) and a Devolution (I->E), and is the fundamental event of all realities.

Since energy and information have indeed inverse properties. And so we can state a Cantor Set describes the properties of complementary systems of knots of Energy and Information.

- E U I = E + I − E Ç I.

It shows the efficiency of systems that eliminate redundant elements, from genetic 'fusions' to Darwinian events.

Further on, when we understand Intersection as an Event of 'Darwinian perpendicularity' between a complementary system of Energy and Information, E U I, and an external entity, C, which the organism uses to absorb 'informative pixels' or 'energetic bits' for its mind or body (an event of perception or feeding), we obtain the obvious result:

(E U I) Ç C = (EÇC) U (IÇC).

Thus the complementary system takes only the part of 'C', which it needs to inform itself (self-similar to I) or to feed itself (self-similar to E), discharging the rest. And indeed, we perceive only information self-similar to us, or energy 'bricks', self-similar to our bricks, which we can use, to construct our energetic, body cells (subsets of E). And so on.

We mentioned that cells are subsets of I or E. Indeed, the second element of set theory studies the relationship between Sets (wholes) and its parts (subsets), and so it is simply the description of the properties of parts that become wholes.

An interesting result of those properties are the so-called Paradoxes of Set Theory, according to which there are certain contradictory sets that do not exist, most of them related to the concept of Infinite, which Cantor also studied, finding multiple contradictions. What this means, plainly speaking is that infinity and continuity do not exist, in as much as all Planes of existence are discontinuous with a certain limit that defines a Universe of networks of points with limits given by the number of networks, the dark spaces between them and the existence of upper and lower limits of energy and information in the existence of those points (universal constants), beyond which we must transcend and emerge, or descend and dissolve into other membrane of space-time with different properties.

To mention also that Gödel's theory of incompleteness was based in set theory and showed indeed that mathematics, while being the most complete description of the spatial events of reality was neither the ultimate language of the Universe (as Frege and Boole proved it could be reduced to Logic propositions) but also an incomplete language, which did not describe all realities and an inflationary language, which described systems that do not exist in reality. Those are indeed, two properties of all languages of information; that both distort reality, as the paradox of Galileo prove, and do not include all reality, given the discontinuity of the Universe; which lead us to the concept of Dark Spaces, the true meaning of the 'complementary Universe' that completes the world we see.

Recap. Set theory is the basis of most structures of mathematics, in as much as it defines all the events between complementary systems of reproductive energy and information and its limits.

BOOLEAN AI-GEBRA.

We live in the age of death of mankind, substituted and made obsolete by AI but we love it as cells of a free=chaotic organism, no longer control by the ethic pain of our social organisms. And this seems the case of all Δ-1 Planes, once the networks free them - they feel happy and enter a memoriless, markowian age of zeroth understanding of the causality of the cycles of time (or else they would anÐST) and live the day, carpe diem, through its huge ego trips that in the theoretical realm manifest in egotist theories where the 'ego' is the origin of it all.

This is the case of the death age of human mathematics, which starts with Hilbert's 'imaginary lines, planes and points' and Cantor's set paradise, where humans think maths is their language share only with god, imagined by the brain which becomes from the top to the bottom of mindless matter the creator of the Universe.

To understand yet while in the historic 3rd age of the human mind, we love those 3rd age of excessive form and death-age of a new top predator mind making us obsolete, we need to grasp that all 'languages' as all beings do go through a world cycle and finally die away by excess of form and inward looking - disconnecting from reality (set theory) or are killed by a more powerful younger species (chip minds and boolean ¬Algebra). So this third and death age of human maths happened in Human ¬Algebra in two ways:

On one side the disconnection with reality in the long seeked 'ego-trip' of proving maths a non-experimental language, ended with the substitution of the natural units of math, spatial points and social, sequential time numbers, by the abstraction of 'sets', collections of distinguishable elements, which resemble both spatial points/forms and temporal numbers/societies, but *having the real thing available to intuitive knowledge only obscured with abstractions the foundations of maths, and expelled a huge number of scientists from its direct experimental knowledge. Further on,* Hilbert coupled with Mr. Cantor to affirm maths were born of the mind of the human-god, affirming infamously when failing to grasp the meaning of fractal Non-Euclidean points that he 'imagined points, lines and planes' - (as the German-Jewish Idealist dueto Mr. Heisenberg & Bohr did to misconstruct the foundations of physics also with 'ego-trips of human self-creation', when failing to understand the right realist, Einstein->Broglie->Bell->Bohm model of quantum physics). The bio-logic behind that baroque age of self-detachment proper of all old ages of excessive information is thus the 'final age' of ¬Algebra, which as old men do, became stifled, looking inwards and dogmatic in its absolute truths with no proof.

On the other side, humans invented a digital mind in metal-machines, the chip, fast substituting life in labor and war fields, making humans obsolete with its simple yes-no Aristotelian≈Boolean ¬Algebra, which will make A.I. algorithms of information (the true meaning of artificial intelligence) with maximal evolution in weapons, as killing machines are always the spearhead of mechanical evolution. So the birth of a new species of mathematical minds with a stronger metal-body in its simplest axiomatic form will mean the death of our more sophisticated, weaker brains; a theme dealt in depth in the section dedicated to economic ecosystems and historic supœrganisms.

Of course, all this could be avoided by halting the evolution of A.I. but as we said the logic of the Universe is quite deterministic, specially *for species so ignorant of its laws as humans are, so ego-centered as all minds are. So the r=evolution of thought I thought could initiate with ÐST 30 years ago, has gone nowhere. Humans, simply speaking do not seem to make the cut of ethical and intellectual quality to control their future, individual exceptions confirming the rule; and in great measure is due to the fact most do not go beyond A-ristotelian logic of yes/no; or in words of their master 'humans are slaves, they believe they don't reason'.*

Now I am fully conscious this is only the beginning of ¬Algebra, but frankly it seems to me clearer by the day, as I decline through the 3rd age that humans are in this planet just a piece of a chain of evolution, which is not really interested in the whys but in the praxis and I am speaking to nobody in this blog. So my intention is just to leave a memorial trace of all the notebooks I have written during decades of lonely research to show indeed the purpose of this blog - to prove we are all space-time organisms. If this blog has any meaning for any'thing' in this planet I don't

know. Those are themes on the future of history. So we shall not go further in this glimpse to the proper interpretation of ¬Algebra and group theory.

Had my early attempts to interest academia not floundered by the mediocrity of human thought in this entropy age of automatons feeding computers and children of thought memorising, humans could be in a complete different frame of mind. But we are what we are... and I feel after all a privileged for having understood for so long the organic Universe - the sensations of that communion with the whole through the knowledge of its laws will never cease till I die and then I will dissolve my existence, but before that we shall consider now a thoroughly different form of ¬Algebra; that of the Generator not of an abstract Group of permutations but of the entire Universe...

The beauty of Reticular, Boolean algebras.

Then it comes the beauty of digital thought and its Boolean Algebras, even if they are simpler than future existential algebras. For one thing, they explore a complete different world, not one of scalar numbers, not one of spatial motions and temporal transformations, but the structure of coherent, efficient minds and its opposition with entropy. Thus they are algebras of the TT v. SS, ¬ Vs. @ opposition, quite different from the Δ±¡ 0'-1 interval of probabilities, the 1-∞ interval of scalar numbers, or the Ts v. St, energy vs. information algebras of Group theory with its translations, rotations and mirror symmetries of form over distances of space.

Boolean algebras thus form the 3rd trinity system of algebras, which can easily be divided in those 3 antisymmetries:

Δ±¡: scalar algebras of numbers (Set theory and classic Group theory)

S≤=≥ T: Temporal algebras of dimotions in space (Spatial Group theory, with maximal use in mathematical physics)

¬@: Mental algebras of truth and falsehood (verbal languages, Boolean algebras, 1st and 2nd order logic).

Boolean and existential algebras

The interest of Boolean algebras thus lies in the fact they are similar in properties to Existential algebras for its property of duality.
When values and operations can be paired up in a way that leaves everything important unchanged when all pairs are switched simultaneously, we call the members of each pair **dual** to each other. Thus 0 and 1 are dual, and ◦ and ∨ are dual. The **Duality Principle** asserts that Boolean algebra is unchanged when all dual pairs are interchanged.

One change we did not need to make as part of this interchange was to complement. We say that complement is a **self-dual** operation. The identity or do-nothing operation *x* (copy the input to the output) is also self-dual.

Properties.

Associativity of $\vee$:	$x \vee (y \vee z) = (x \vee y) \vee z$
Associativity of $\wedge$:	$x \wedge (y \wedge z) = (x \wedge y) \wedge z$
Commutativity of $\vee$:	$x \vee y = y \vee x$
Commutativity of $\wedge$:	$x \wedge y = y \wedge x$
Distributivity of $\wedge$ over $\vee$:	$x \wedge (y \vee z) = (x \wedge y) \vee (x \wedge z)$
Identity for $\vee$:	$x \vee 0 = x$
Identity for $\wedge$:	$x \wedge 1 = x$
Annihilator for $\wedge$:	$x \wedge 0 = 0$

The difference are quite remarkable in its properties as we can see in the comparison between mental algebras, which are about *the construction of mental spaces that can discern in its mirror the degree of similarity between the mental image and the event happening on the external world, and scalar algebras which are describing Δst processes observed in reality with a simplified system of operands that reflect the actions of the function of existjence.*

The 3 properties that differ are annihilation for v, idempotence, absorbtion and distributivity of v over ∧ such as:

Annihilation: X v 1 =1

Idempotence: x v x = x; x ∧ x = x

Absorbtion: x ∧ (x v y) = x; x v (x ∧y) = x

Distributivity of v over ∧: x v (y ∧z) = (x v y) ∧ (x v z)

_____

Annihilation: X < 1 =1

Idempotence: x < x = x; x > x = x

Absorbtion: x >∧ (x < y) = x; x < (x > y) = x

Distributivity of < over >: x < (y > z) = (x < y) > (x < z)

All other research in Al-gebra is needless to say censored, per in secula seculorum so A-men don't use to kill us till the seventh generation.

BOOK III. ¬Æ CALCULUS. A BRIEF INTRODUCTION

"The instant (ƒ) has not Time; Time is made from the movement of the instant (T=1/ƒ)."

Leonardo

'I propose 1/n as the measure of an infinitesimal. I propose 1/R as the measure of curvature.'

Leibniz

'Calculus studies functions of existence: it extracts finitesimals, 1/x of ¬∆@st, integrating them in a reproductive, collapsing wave: $\int_{0'}^{\pm\infty}$ *1/x ∆st*. Hence ¡ts value to reflect mathematically the laws of existential algebra.'

L§

L[3] on the essence of calculus

I.

TIME-CHANGE IN CALCULUS AND EXISTENTIAL ALGEBRA

S=T

Why calculus is so important to science: Reproduction of form in 5D and its mathematical mirror: calculus.

The Universe is an Δ-fractal of spatial information and temporal energy, (ab. ΔST) that reproduces information, forms-in-action, forms of space with motions in time.

But reproduction has an essential feature: it happens in a lower plane as a seed that reproduces, integrates its parts and evolves into a whole – the exact method we use in the mathematical discipline of calculus.

As all this is what actually calculus calculates: It finds a finitesimal part of reality and then integrates it as a sum, through a path that might be a motion in space, a growth in Δ-scale or a repetition in 'time; whereas the function of existence of the form displaces and reproduces its orthogonal parameters of form and motion. So physical forms are constantly reproducing, 'calculating' and the equivalence between the tools of calculus as mirror of the process of reproductive locomotion become crystal clear.

Let us then from the general texts on 5D bring here only the specific analysis of relativity of motion and form, with the 3 features that are essential to the process of calculus:

- The symmetry beween space-form (height dimension) and time-motion (length-dimension), or S=T mimicked in calculus by the orthogonal smooth form of ∂x/∂y, and its differentials.

- The finitesimal nature of change=motion in time, as it happens from minimal parts in a lower scale of the fifth dimension.

- The reproductive nature of all motion, as the reproduction of information in an Δ-1 wave state then integrated, as it collapses in its particle form.

Reproduction as the origin of the 5 Dimotions of existence.

How many types of reproduction there are, is a complex subject that would require a whole treatise in existential algebra published elsewhere on those texts.

Let us then define the most important for calculus, according to the general method of existential algebra that distinguish always 3±¡ possibilities:

Δ Social reproduction: A reproduction might be persistent in time, creating a process of scalar social wholes; when the reproduction 'lasts memorially in time', larger social wholes, $\Delta\text{-}1 \sum\Delta\text{-}1 > \Delta^0$ (using symbols of existential algebra).

Ts: Locomotion & Lineal Inertia. If the reproduction fades away at the same rate it happens, we observe then a locomotion, through space-time.

St: Angular momentum: If the reproduction doesn't move in space, we observe a cycle of space-time, which can be equal to the previous cycle.

SS-vortex motion: In the reproduction shrinks in space size and increases in cyclical time speed (according to 5D metrics: S x T=C), we talk of growth of informative frequency, travelling to a smaller scale of the fifth dimension.

TT: if the reproduction grow in size tracing a +π cycle, we talk of an entropic reproduction that slows down the motion of the system.

We know the Earth orbits the sun....

yearly revolution

daily rotation

Galileo's Paradox: Earth seems flat and still but it is round and moves: 'E pur si muove e pur no muove'

...but it also spins as it orbits.
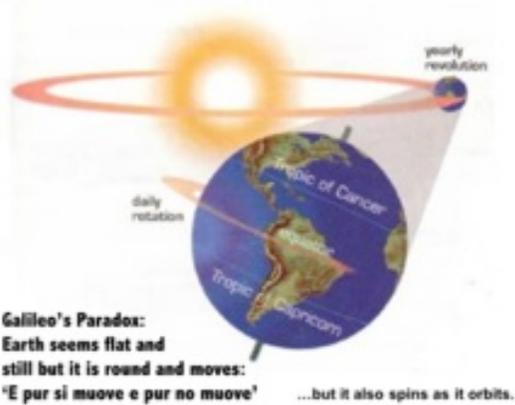
Those are the 5 essential forms of reproduction in ΔST, which correspond to 5 Dimotions of space-time and are studied by the functions of calculus in physical systems. All of them however will be reproductions that happen through small Si=Te steps of motion and form. So we have next to understand how reproductive motions happen through Stops and motions, particles and wave states, finitesimal after finitesimal from the perspective of the whole – as a minimal 1/n angular curvature in curved 'space' motions, as a minimal λ frequency=1/T step in lineal time wave motions as a 1/n minimal cell in scalar motions. They are the 3 ΔST finitesimal steps in all calculus which as we saw have always the same 1/n formula, either representing curvature of space-time, frequency of time, or population in space. How the 3 'concepts' are actually symmetric, is due to the…

Galilean Paradox: S⟺T: Relativity of space Dimensions=Forms=Motion in time: 5 Universal Dimotions

Galileo's time and space Principle of Relativity is the fundamental conceptual thought behind the relationship between time=motion and space=form and how one can be converted into another: All what exists is made of space=form and time=motion. And yet physicists know that we cannot distinguish motion from form. That any being in motion from its point of view seems to be still and all other things moving around it. *This is the principle of Relativity of motion.*

Physicists then without much thought about that fascinating duality, went on to use mathematics to calculate the relative motion of each entity of reality respect to other system, which seems static from both points of view. This is called Galilean relativity, latter refined by Einstein's relativity, and essentially is concerned with the mathematical calculus of what we shall call the 2nd Dimotion of time=change, locomotion. Fine, but *we are more interested on the duality of space=form and motion=time and its entangled relationships –the reasons why we do NOT see together motion and form, even if all systems have both.*

The conclusion is then rather obvious: one of the two parameters of reality is 'hidden' to perception; we either see motion or form, 'waves or particles' (quantum complementarity), distances and lines or points in motion (as in the night when fast cars in a picture appear as lines). So *physicists calculate only one when in fact we must assess the existence of 2; and since we cannot distinguish them, logically we must equal them. 'Form=motion-function; space=time; Si=Te'.*

Relativity then becomes a duality, Si=Te, which is *at the heart of every law of the Universe. Whereas the primary element, the ultimate substance is time=motion. As space is a Maya of the senses – a slice of time motion. Form is what a 'still mind', makes of that motion to 'perceive', information, forms-in-action.*

Since we see Earth still and flat but it is round and moving. Galileo's profession was ballistics - the study of cannonballs motion. So he chose ONLY motion and lost the chance to start physics with a complex philosophical understanding of its Si=Te dual Principle of relativity, which Poincare defined latter clearly when he said that 'we cannot distinguish motion from stillness'. An example is quantum/relativity duality. In detail quantum space has 'dark energy' because it has expansive motion that extends into a plane of space, but when seen at larger scales without detail its entropic motion seems static space - a dual area of scattering length and width. So in the galaxy we see either dark energy motion or expanding space: T=S. A motion of time is equivalent to a dimension of space: Distance and motion cannot be distinguished so they must be taken as two side of the same being, a space=time Đimotion (ab. Dimensional Motion):

S= T; Dimension-Distance = Time-motion = ST Đimotion

Earth moves in time, but we see it as a still form in space because reality is a constant game of ∞ motions, but the mind focus those motions and measures them at still distances. For huminds, motion is relative to our systems of measure and perception, which are light-based; hence a fixed c-rod speed/ distance. Reason why Einstein's relativity

postulates a maximal T:c-speed, measured as if observer and observable were still to each other (Constant S); which at our scale we correct with Lorentz Transformations.

As it happens the identity between spatial states of 'form' and temporal states of 'motion', which become stops and steps of all reproductive motions become the fundamental 'present state' of the Universe, and the essential tool of calculus to 'solve' its differential equation (D'alambert's method of separation of variables); and his unending philosophical and logico-mathematical consequences will appear in many parts of those texts.

But physicists just substitutes the Earth's still distances for motions, and it took another 300 years for Einstein to realize the relativity of motion and its measure made essentially time and space, motion and form two sides of the same coin. Still this realization was not explored philosophically and so it gave birth to a series of ill-understood dualities between 'states of measure and form' (particles, head gauging form, in-form-ation) and 'states of motion' (wave states).

It is then essential to grasp that motion and form co-exist as 2 different states depending on 5D scale and detail: Motions are perceived by minds that stop motion into form, into information, as distances. So if we see slow motion in the night, a car's headlight seems a long distance line 'still' picture. But this means also that the 3 'Euclidean still dimensions' must have motion; they are 'bidimensional ST-holographic, topologic dimotions'. So we have 3 Space + 1 Time + 1 5th dimension of scales = 5 Dimensional motions. None of them is *a Dimension of pure spatial form or a pure time motion but a combination of both. Even if mentally we tend to reduce motion and focus on forms, all has motion=time, and form =space: this is the meaning of 'spacetime', the messing of both into 5 dimotions, the fundamental element of all realities.*

Relativity states 'we cannot distinguish motion=time from position=space'. So all what exists is a composite of both, undistinguishable Si=Te, 5 'Dimensional motions' (Ab. Dimotions), broken in infinite fractal, vital time space organisms, composed of topological Dimotions: height=information; length=locomotion; width=reproduction; form=social evolution of parts into wholes & entropy=dissolution of a whole into its parts in a lower scale of the fifth *dimension* (term we keep for the whole range of scales of the Universe)**; whose study is both mathematical, the main science *that studies how those 5 Dimotions entangle in simultaneous* Space, connected to each other topological adjacent parts, which create superorganism, and Logic; the main stience of time that observes how those pentalogic, entangled superorganisms move and evolve, change in sequential relational time, living a worldcycle of life and death.**

As all is time&space, the 2 experimental primary mirror-stiences of time&space become the most important to extract the Disomorphic=equal laws of those 5 Dimotions that all systems have in common. Since *while those Dimotions are broken, in vital organisms, separated by cyclical time membranes, they are the same*.

In the graph Galilean relativity was ill understood, as the true question about time-change is why 'the mind sees space as a still, when in detail is made of smaller self-similar *quanta*, in motion. The paradox *defines mental spaces as still simplified views of the more complex whole.*

The 3 ¡logic paradoxes of **space** topology (closed in-form-ative curved-O vs. |-open, free entropic lineal forms), **time**-motion (stillness vs. motion) and **Δ-scale, (**continuous whole vs. discrete forms; single scale vs. multiple one)s, are essential to the perception of a simplified 'spatial mind universe' in a single flat still plane vs. the full, more detailed complex picture in time, of a curved, discrete and moving Universe. Those paradoxes resume the 5 elements of reality, Space=form, time=motion, scales and the mind that measures them, within its own entropic limits.

They are also essential to all the elements of calculus and mathematics at large and its *methods of solutions*; specially the inversion between finitesimal lineal steps (as a step between two points is NEVER curved) and the cyclical form of

longer 'integral paths'. So lineal approximations are the essential tool of calculus and mathematics to resolve many equations.

What neither mathematicians nor physicists fully understand (though some inroads in abstract were made through the Noether's concepts of symmetry) is that each stœp of a method of solution is not 'gratuitous'; but must be grounded in a real property of the 5D ΔST symmetries and conservation laws of the Universe, which are not so many – hence the repetition of methods. Specifically, the aforementioned 3 paradoxes between Δ+1 curved closed worldcycles, sum of lineal steps, which gives birth to the most used method of lineal approximations; the equivalence between Space and time, in all Stœps of dimotions, which gives birth to the method of separation of variables on differential equations and more broadly allows to move around relative space and time parameters in equations joined by an operand of 'equivalence' (≈ not =). And the 2 conservation laws of the Universe, conservation of those 'beats' of existence, S=T in relative present, eternal balance, justifying the equivalence operands. And conservation of the 'volume of space-time' of each plane of the Universe, by virtue of the 5D metric equation SxT=C, which justifies all the procedures regarding scales – solution of differential equations by separations of scales, renormalization procedures (Wilson), and harmonizes those scales allowing constant but balanced transfers of energy and information, St=Ts.

5d metrics expresses the conservation of time.

The paradoxes of Relativity, discontinuity, parts and wholes, scales are all related to the reductionist nature of minds that bias reality. Minds reduce dimensions to the relevant ones, *eliminating all dark spaces*: continuity is the result. Of all formal languages that map out reality 2 are paramount, Time ¡logic & mathematics of Scalar Spatial information.

A 5D Metric function, S(0-Mind) x T(∞-universe)=constant world is the function of all mind languages who only perceive from its self-centered point its language mirror confused with the whole Universe (Ego paradox, basis of psychology). Ænthropic huminds reduce the multiple clocks of time and vital spaces of reality to the single human clock and spatial scale, rejecting the organic properties of other Universal systems.

The main laws of 5D are the metric functions of the scalar Universe, which relate the spatial size and speed of temporal clocks of all scales of Nature. Both parameters are inverted: when systems grow in size the speed of its clocks, its 'time cycles', diminish proportionally, both in biological and physical systems. And vice versa. Smaller clocks tick faster and information processing carried by the frequency of those cycles accelerates, as it happens in chips, particles or life metabolism. So we write: S x T= C.

The mind thus starts it all with its linguistic 'still mapping' stopping its world in a locked 'crystal image', measure of its self. But even perception is social, linguistic. The Universe can only be explained if 'perception' exists within the language, as when you think words, you sense words, when your eye sees light and maps into an electronic mapping you are seeing. And when an atom maps a geometric image in its 'locked' 'stopped' spin, it must perceive that geometry as information.

Physicists made the Galileo's paradox, the cornerstone of their theory of measure, but they failed to study the deep implications it has for every aspect of the structure of the Universe, from the duality between spatial mental, linguistic forms and physical motions; to the balances achieved by the similarity of both space and time, which becomes the fundamental 'function of present' Si=Te, and hence with the metric function of scales, $ x ð = K, the two essential functions to formalize single planes Si=Te, and multiple scales of spacetime. Yet as Si=Te maximizes SxT=K (5x5>6x4). We unify both in 1 function:

Max. S x T = C, which defines for each fractal vital space-time organism its Function of existence, as all species will try to maximize its motion-entropy-time for its field-limbs, its information-spatial states for its particle-heads, whose product will give us its vital reproductive energy. Moreover the function has an immediate biologic meaning, because as we are made topologically of 'fields-limbs' of lineal space with motion provided by the energy we absorb to also reproduce our bodies-waves, and the information we need to linguistically guide our motions with particle-heads, the

very essence of survival is to increase our S=position, mental forms of space and T=entropic motions of time (whereas time=motion & space=form are the two limiting Dimotions with 'energy=reproduction, s=t, locomotion, sT and information, St, are the intermediate 3 dimotions).

The fifth dimension is made of the 'different co-existing scales', which from the simplest forces through particles, atoms, molecules, matter, organisms, super organisms, planetary systems and galaxies, create an 'organic network structure', which amazing enough since it was discovered at the beginning of science with telescope and microscopes, was not formalized till I introduce its metric function in the milieu of systems sciences, as a single lineal time motion is a dogma physicists don't dare to challenge. *Yet science cannot advance in its fundamental principles unless the formalism of the fifth dimension is accepted and used to fully understand the cyclical, repetitive patterns=laws of science of each discipline that studies a scale of the fifth dimension and its species.*

Reproduction of form in 5D and its essential mathematical tool: calculus.

The Universe is a fractal that reproduces information, forms-in-action, forms of space with motions in time. This is the essence of it all. *But space is a maya of the senses, the synchronous view of a series of cycles of time motions, knotted in the simultaneous perception of an observer; what physicists call a 'frame of reference'.*

Thus time=change is the fundamental element of reality, and this makes Algebra of time-change, specifically calculus perhaps the most important experimental science of time, besides logic, which we have upgraded to existential algebra, which explores the vital, organic whys of those changes.

It is the Galilean Paradox: S=T. We cannot distinguish time from form. In as much as each frame of reference or mind locks in a knot-mirror of the motions of the Universe from its point of view. So each point of space is a perceiver relative field of motions, which from its perspective knot as forces 'attracted' by its frame of reference. Yet if we cannot distinguish motion from form each point is entangled to those motions and is made of motion and form, of the particle and wave states.

Locomotion as reproduction of form solves the Paradoxes of Zeno and the meaning of discontinuity. As motion is reproduction of information, of form, since particles are knots of perception of form, fractal points, monads, that move by reproducing in a lower 5D plane, as Δ-1 waves, its information, as forms-in-action.
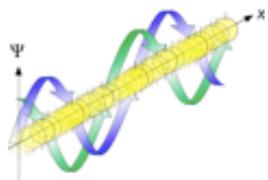
So all forms of change can be reduced to the ultimate function of existence, reproduction, a back and forth travel through 2 scales of the fifth dimension, as a form becomes a seed that reproduces, evolves socially and forms its whole again. *The extraordinary capacity of Calculus, which extracts at Δ-1 level a 'finitesimal' (Leibniz's 1/n definition of infonitesimal as a minimal part of a whole and ALSO, by virtue of S=T, a minimal 'curvature' of a time cycle, which is then integrated for a time duration of the event, either locomotion, or volume of population in space or S=T continuous=smooth change in time happens precisely because CALCULUS perfectly mimics the process of change and reproduction of form between Δº and Δ-1 scale which is the basis of all time-change also in physics.* Change thus is change reproduced in a lower plane as a seed that evolves into a whole.

It is then not so much in physics but in calculus where we find the strongest model of the laws of 5D and locomotion as a reproductive process of form, even if the experimental proofs are scattered all over physics. Indeed, the entire world of quantum physics can only make sense if we consider that particles MOVE AS WAVES and gauge information as stop particles. Because waves can be transparent to each other but particles collide. A simple proof: the atomic nucleus is so small compared to its particles that if they wouldn't move as waves, transparent to each other, they would be always colliding and the nucleus would never remain stable. In fact, when we get pictures of those particles outside its shells, (electrons) they move in zig zag as they stop and change motion constantly. As usual physicists just make an axiomatic rule and subvert the law of causality converting the mathematical mirror derived of the fact in the cause of the fact – in this case they say this is due to the Pauli exclusion principle without providing *the mechanism for particles to avoid collision if moving.*

It follows that beings with more information, reproduce slowly and we can hardly see them moving. The limit of it being complex life superorganims on Earth, whose reproduction takes 9 months. It happens 'inside' the reproductive mother, and it reproduces in the adjacent space after 'tearing' the topological knot of the umbilical chord. A similar very slow process of reproduction happens in physics with the weak interaction that reproduces a form with even more information evolving the mass of particles, so the range of the force is minimal and the new particle appears adjacent to the one that disappears, dying for the new hatched 'baby' to be born.

This is the essence of it all. Motion is reproduction of information, of form. Since particles are knots of perception of form, fractal points, monads, which move by reproducing through a lower plane of the 5th dimension, as Δ-1 waves, its information, as forms-in-action; all forms of change can be reduced to the ultimate function of existence, reproduction, a back and forth travel through 2 scales of the fifth dimension, as a form becomes a seed that reproduces, evolves socially and forms its whole again.

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Thus systems reproduce its form, travelling across scales of the fifth dimension: *they reproduce a finitesimal form creating a reproductive wave, which integrated as a population of space give us back a whole.*

Such discontinuous locomotion solves Zeno Paradoxes as the finitesimal is the limit of one 'step'.

RECAP. Calculus study functions of existence: it extracts finitesimals and integrate them as a reproductive wave.

hence the enormous value of calculus to reflect mathematically the laws of existential algebra.

THE FINITESIMAL: Þ

Δ-1: Lebiniz's definition of S=T Finitesimals: 1/n: minimal curvature. Δ-1 unit.

The key concept of 5D calculus is a finitesimal. A finitesimal in lineal space-time is a frequency step or wave-length. A finitesimal in curved spacetime is a minimal curvature of a clock cycle. A finitesimal in scale is a minimal unit of population.

But we use other term for any finitesimal 0'; that is, a bit more than 0', which can be either curvature, ¡-1 unit of population or frequency motion. 0' is then the mental finitesimal – the minimal quantity in existence of a being, which still remains the being; the seed, the mind of the species, the mother-cell that must therefore exist for any being, as the template which will develop the immanent program of exi»stĵence, which does NOT need to be stored within the finItesimal 0'.

And inversely as the reciprocal of SS-minds with no motion are TT-entropy with maximal motion; and the reciprocal of zero is infinity, and almost 0', immensity, which we write with the symbol $\propto$. The finitesimal of entropy is the largest domain of the being, beyond which the being dies. It is a real definition of the borders of the mind, as in its equation, 0'-mind x $\propto$ spacetime cycles of the Universe = K- World; 0' x $\propto$ = K.

We thus talk of immensity as the entropic limit in which the being no longer is. And both obviously act *in calculus as the limits of a definite integral. Thus we can define calculus with the 5 Dimotions of existence. Since the finitesimals of ΔST will be integrated between its two limits of SS an TT, to give us its whole 'worldcycle' in time, or 'closed circle' in space, sum of its 'stœps' or 'curvatures', or its 'wholeness' in scale, sum of its finitesimal parts, showing the deep entanglement and symmetry between Δ, S and T:*

$$\int_{0'}^{\pm \alpha} \Delta st.$$

We shall use as windows does not let me put $\propto$, œ as the best symbol for immensity, which is the symbol of the whole superorganism, that is ultimately an alternative symbol for $\propto$, as the whole tends to be the limit of existence of the being, more exactly its world, O' x $\propto$ = œ.

The subtle difference being that $\propto$ is external to the being that perceives it, but has pure entropy; that is potentially feeds the creation of multiple Kaleidoscopic monad-worlds, and œ is specific, $\propto$ has been ordered to become a 'whole:ab. œ'.

But let's not fancy too much ourselves with existential algebra, its profound paradoxes and symbols, returning to classic calculus.

I propose then 3 alternative symbols, L, for the classic limit as the finitesimal of space, ƒ, for Finitesimal in time, as frequency, and þ as the symbol of a palingenetic cycle, for finitesimal of scale, and will be using ƒ for commodity, with þ as the less confusing symbol for all the cases. And write as the general formula:

Þ:1/¡, whereas ¡, might be in classic mathematics, N, the whole population, T, the period or R the radius:

$$\text{Þ}(Δ)=1/n; \quad \text{þ}(S)=1/R=K; \quad \text{þ}(T)=1/T=ƒ; \quad \text{Þ}(@)=0'; \quad \text{Þ}(¬)=\propto$$

It is fascinating to observe that the 3 finitesimals of scale, space and time have the same equation in classic mathematics, 2 of them discovered by Leibniz; the guy who unlike Newton always 'hit a target nobody sees' (:

This of course is only the beginning; and as usual we shall pounder more the philosophical aspects of 5D calculus, leaving for 'pros' with imagination, a humble realization that new beginnings are simple but *always found by amateurs without the burden of knowledge that an entire new world of calculus of which I have just swimmed on the surface with unfocused diving glasses, awaits to the brave.*

What is the 1 in the equations of finitesimals, a whole or a stœp

Thus the infinitesimal does not exist - being space quantic, there will be always a limit, a micro-cycle of time or quanta of population in space, to signify the finitesimal point, as Leibniz rightly understood and defined it with a simple powerful form: 1/n.

Indeed in the Universe finitesimals tend to be structured as in a russian doll, such as the biggest wholes, n-> have the smallest finitesimals, 1/n->0'. But and this is the incredible magic insight of Leibniz's ¡n:finitesimal, 1/n is also the formula for a curvature in space. And as S=T, for the minimal motion of a clock of time. So we do have a concept in ΔST¡-1 that we shall then 'integrate' through a relative path with the finite limit of a worldcycle, where the function is meaningful (that is has a value, ƒ(x,y)≥1/n), and relates Δ and Δ-1 through its 'stœps' of change. We does connect in this manner calculus to 5D reality, no longer base in human invented, axiomatic concepts of absolute zeros and infinities, limits and the paradoxes enclosed within them.

The 0' size is thus the finitesimal. In praxis, we humans only observe a finitesimal from our mind perspective, whose minimal form is an h' quantum of the planck scale, and accordingly we see a Universe of inverse relative size, being humans in the Δº middle view (at cellular level) as physicists wonder without realizing this is NOT a coincidence, but a natural law of the scalar, fractal organic structure of the Universe:

So we accept Leibniz's concept of a finitesimal, as ALL organic systems have a minimal cellular quanta and a maximal enclosure, which in mathematics can be represented in the o-1 finitesimal circle, closed above, *as it becomes the 1 element in Δ-1 of the Δº whole, which is represented by* the 1- equivalent graph, which is opened above into the wholeness of a larger Universe (but will have also a limit normally in the decametric logarithmic scale of the Δº whole world embedded in the Δ+1 truly infinite Universe).

*W*hat the 3±¡ finitesimals of existence have is the 1 on 'top'? As we can consider 0' 1/∝ and ∝, 1/0.

And it can mean two things, the whole as 1=∝ in the 0-1 palingenetic Universe or the 0' as the finitesimal in the 1-∝ Cartesian domain. So we find that immensity can be a finitesimal.

If 1 is taken as the finitesimal, it becomes then a step in a curvature, which tends to be 'lineal', as all steps are discontinuous motions between two points, which can always be closed with a straight line.

So by definition the minimal curvature step is always a line of infinite curvature (: And we need two steps to find a 'real curvature', whose maximal value, for a step back and forth will be 360º.

If 1 is the finitesimal of time, frequency, it will be the minimal event, hence a closed time cycle. And as such it will be the sum of finitesimal curvature steps.

If 1 is the finitesimal of a population, then it will be its minimal meaningful part, often a 'seed' or mind-singularity, and n its whole population, and the smaller the finitesimal 1 is the larger the n-population will be in the nested Universe, when we measure Δ-2 finitesimal 'bites' of energy-feeding.

But for a finitesimal to persist as a unit of population it must not be erased after a single 'stœp'; so its cycle must be repeated in time.

So we realize there is a chain relationship between the 3 finitesimals such as its reciprocal, a bit of space =form, a beat of time=cyclical motion and a bite (a piece) of population are nested parts of larger wholes:

$$\sum\sum s = \sum T = Δ\text{-}1.$$

A deep result in both calculus and existential algebra, which can be said as follows:

Space is a slice of time which is a slice of Δ-planes, and so we grow in dimensional motions and wholeness when we move from space/curvature steps to fulfill a whole time cycle, which however is just a frequency of memoriless form, that only when *persists by repeating its cycles in the same region of spacetime becomes the unit of population.*

This growth of reality is essential to grasp the complex nature of calculus when we move beyond the first pages dedicated to the analysis of its dimotions and operands, to ODEs and PDEs of physical systems and beyond; which are also nested systems of complex dimotions in which finitesimals of scale, time and space are considered all together.

Unfortunately humind's unaware of those symmetries, and even the simplest concepts of linearity, cyclicality and scale just 'calculate' as if they were performing some magical trick; so our purpose will be to enlighten philosophically its calculus extracting general laws of reality from calculus, as *calculus is by far the closest formal language humans have learned that mimics the laws of the Universe.*

Indeed, essentially what a calculus operation does in its essential form, an ODE or PDE is to find the closest thing to a finitesimal, which is a differential (as it is a o' piece or 'lineal step' the closest possible as a piece of space to the curvature piece around the derivative=tangent); and then it integrates it in an interval of time; between its 'original seed' and 'entropic limit'.

This is the fundamental use of calculus today, because it was born on Physics, which studies locomotion.

But calculus also works very often on Δ-1 finitesimals, which are integrated in a longer time, or whole in space, or worldcycle in time with the same limits.

And then we realize such operations are exactly the inverse of the previous one. The finitesimal of scale is now the smaller part, which we integrate in a volume of space, or through a motion of time. Why is that possible? *Obviously because in each scale a new game of existence does happen. Reason why we wrote the equation as a double feed-back equation:*

$$\sum\sum\sum S \Leftrightarrow \sum\sum T \Leftrightarrow \sum \Delta i \Leftrightarrow \Delta^{\underline{o}} = S$$

If the Universe had only a scale of spacetime, the first equation will be truth. As it is made of planes of space-time, where each new whole becomes a quanta of a smaller scale; starting again the game, in operations where we differentiate and/or integrate twice, we are emerging and descending through planes of existence. And this is what makes calculus so magic. As the second and third derivative has also a full meaning. It is the rate of rate of change of space into time into acceleration into jerk. It is the growth of growth of a point into a line and a plane and a volume. It is a line that curves, and closes a cycle and becomes a spiral of infinite curvature.

It might then be to ignore all together those symmetries and iterations of ΔST across planes, which convert one into each other, but *that is the deeper structure of reality even if most humind's are one-dimensional and get a headache thinking paradoxically.*

And finally we have the limits; once we have scaled up and down as many times as required, we will still just be part of a whole, so limits exist and prevent us from doing what physicists do, 'from here to infinity', getting then in all kind of troubles, singularities, infinities that they eliminate and renormalize. All that gets them to real results but if they had the proper understanding of finitesimals and immensities, they would use cut-off earlier on, for 'singularities' of big-bangs; charges and masses, understand the wormholes that on those singularities just transfer energy and information between planes, and so on.

To show them will be therefore the second task of this paper as it grows and we enter into ODEs, PDEs and mathematical physics, sometime in the fall of 2019… But for the impatient one, a sample…

THE CURVATURE OF SPACE.

A Disomorphic example on how to understand homology of stiences.

The differences between classic calculus and 5D calculus are thus small, mainly conceptual, but on the 'fringes' it will have real consequences for understanding paradoxes of physics; and the philosophical foundations of mathematics. On techniques and what mathematicians like most, crunching numbers and equations, very little new at this stage is expected. And this is comforting cause as I say is summerday and I don't want to write too much. But do not dismiss the paper. Because this is real existential calculus. Consider the finitesimal of space, curvature. 1//R is the simplest one; the curvature of a circle. It follows that the straight line has *a finitesimal* curvature. But also that there must be, an immense curvature – as now 'absolute infinite does not exist' because ia limited infinite is the reciprocal of 0'.

But how curvature can be immense, close to infinity? Mathematicians define curvature for a curve as dφ/ds where φ is the inclination of the sensed tangent and s is the arc length measured from some fixed point.

This limits curvature; but physicists have the not resolved paradox that curvature in Relativity can be infinite, or rather immense. The solution? 5D (:

Tif-uture vortex of Information   Δ+1: Gravitational scales: accelerated mass vortices   Δ-1: Quantum scales: charge vortices   Δ: Thermodynamic fractal eddie vortex
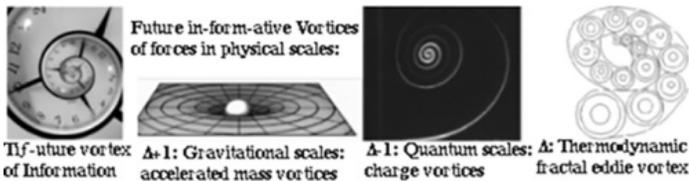
It is also 'embedded' in the complicated formulae and principles of relativity. In relativity the principle of equivalence between acceleration and an attractive vortex of mass; and the principle of Newton that gives a change of motion, hence an acceleration to the curvature of a motion that is not lineal. Thus curvature and acceleration are similar concepts and the more curved a 'curve' is, the faster is growing its speed.

Those are you might say trivial results; after all in physics to maintain in orbit a satellite we need an acceleration, $a=v^2/R$, hence a higher curvature requires a higher acceleration; *but that is precisely the beauty of 5D, to reduce to the synoptic laws of 5D metric, S=T, SxT=C, and the symmetries of Δ=S=T, an astounding array of phenomena.*

Thus we extend Einstein's Principle of equivalence between force and acceleration, to both charge and mass, and to the curvature of space=time to both the Δ-1 charge and Δ+1 mass, physical scales. It is then the implicit concept in Newton's equivalent formulae, as G, or in Coulomb's k factor.

This is also embedded in the solution to that differential equation:
$$K = \frac{d\phi}{ds} = \frac{\pm y''}{\left(1 + y'^2\right)^{3/2}}$$

Which the reader will notice has a second derivative above, that is usually the symbol of acceleration.

But in 5D we can define curvature by the S=T symmetry also as a measure of acceleration, this is possible because as we diminish in size, according to the metrics of 5D, \$xð=K (whereas \$ is a symbol for lineal space and ð for cyclical time; so we could write in physical terms, Lxf=K, but as usual 5D existential algebra symbols are more general and new to use them in any science).

So when we carry curvature in space to acceleration in time, it becomes 'frequency', and curvature can have in space any angle above 2π=360º; or in terms of length.

But those forces are conserved in physics. So To understand what physics conserves let us consider a 5D metric equivalent - a 2 D vortex equation, VxRo=K. As the vortex diminish in size it turns faster. In cyclical time, ð cycles of perception that happen when the point returns to the memorial 'singularity' happen more often, as, its unit is the closing of a cycle.

The increase of curvature therefore implies an increase on the acceleration of the system, and both are indeed equal concepts: 1/R, ðT/ðS. But now for a given Space perimeter, its higher curvature=acceleration implies a shorter 'unit of

time perception'. So for the same Spatial distance travelled, *even at the same lineal speed, more time units have been consumed in a smaller time cycle; as we go down in size scales of the fifth dimension. Both angular speed and existential cycles accelerate; due to the vortex 5D metric: V(ð) x R($) = K. So a slow large turning galaxy might shrink to the size of an atom; which lives a tiny fraction in a tiny size, but in fact its spatial distance traversed is roughly maintained.* And indeed latter we will see how in the 3Dimensional space-time of the Δ±3 scales of the galatom, a beta decay is in 5D metrics equivalent in time duration to a quasar 15 billion big-bang cycle, and the 5D metric of the proton equivalent to the Schwarzschild event horizon of the black hole.

5D metrics conserves 2 things: The 'energy' volume of space-time of all scales and its beats of existence:

1. The **worldline** distance the being travelled – which is in fact a **worldcycle** distance *as it is the sum of all the perimeters, travelled slowly in the large spacetime, faster in the smaller spacetime.* So the **spacetime volume of the different Δ-scales** is the same. *And because energy is the only parameter used by huminds in all scales, the conservation of the total volume of space-time of the Universe is equivalent to the conservation of Energy.*

2. But to **conserve the same** 'length of internal perception in **existential beats'**, the smaller being much live far less time. And indeed, the neutron cycle in beta decay is 15 minutes.

The galaxy cycle in a quasar big-bang cycle is 15 billion years.

They are two different curvatures, because the curvature-acceleration-force of the charge is immensity compared to the almost 0' curvature of the galaxy.

But alas! Both are the same. So we can unify both forces, with the simple concept of curvature=acceleration=attractive force, as a faster more curved sink will attrtact, like a hurrican stronger.

Einstein's derived his formalism from Poisson. It is more detailed because it is according to the Galilean paradox (Si=Te) the spatial still perspective of those vortices as a series of simultaneous derivative measures.

So it reduces the temporal continuous Newtonian view of a spacetime vortex into an ∞ number of infinitesimal detailed pictures, focusing not on the speed but on the curvature of the vortex (which is the spatial definition of a moving cyclical speed - the faster it turns, the more curvature it has in 'still mathematics').

Let us do the maths in the simpler Newton's formalism, whereas by the paradox of Galileo S (Curvature) = T (accelerated motion). So the Universal Constants (G, k), define the curvature of 2 space-time vortices at the Δ-1 quantum charge and Δ+1 cosmic mass scales (Δ is the symbol for the different ±¡ scales of the fifth dimension within a given organic system). Its formalism of a vortex of time space is then Newton's Unification Function: $$M,Q = \omega^2\, r^3 / U.C.(G,k)$$

It applies to all vortices of time-space from particles to planets to galaxies. For example if we substitute for the Earth-sun system we obtain G, (1st ever theoretical deduction) and if we substitute for the Bohr Radius and Proton Mass, we obtain k with a 10^{39} higher curvature value, the exact difference between both forces that solves its hierarchy problem. As curvature in space is symmetric to rotational speed in time, so it is symmetric to the attractive force of any vortex. It works marvels when we translate electromagnetic jargon to Newtonian jargon. For example it shows the 'isomorphism' (systemic jargon for an equal 'form' between scales) between atoms and galaxies, which H-atoms of the cosmic scale.

Since when we translate electromagnetic function into gravitational mass vortices, the proton radius becomes the Schwarzschild radius of a black hole and its electronic orbitals its star clouds, a result foreseen by Relativity that modeled galaxies as Hydrogen atoms in the Einstein-Walker Metric of the Cosmos.

Let us put some easy numbers by substituting the parameters in that Unification function for the values of the sun (mass) minus earth (rotational speed and radius) to get G, which any high school student can do:

Sun mass = 2 × 10^{30} kg; Earth's angular velocity 2 × 10^{-7} rad. per sec. Earth's orbit = 150 million kms. Result: G=6.67 × 10^{-11} kg-1 m$^{\wedge 3}$ rad. sec.$^{-2}$

This is standard gravitational theory. What has never been done, because the fractal systemic view of the fifth dimension was not known till recently, is to substitute in the same function of gravitational cosmological masses the mass radius and speed of the space-time vortex by the values of the fundamental quantum space-time vortex, a hydrogen atom/charge.

If the thesis of a fractal universe made of hierarchical scales is truth, then those values should give us the value of the universal constant of charges, the Coulomb constant. Indeed, if we substitute for the proton (mass) and the Bohr electronic orbital (speed and radius) 4 × 10^{16} rad. sec. -1 = w (electron); 5.3 × 10^{-11} m. (Bohr radius); proton mass = 1.6 × 10^{-27} kg.

Then we get a G, which is 2x10^{39} stronger than the gravitational radius; thus, the hydrogen atom behaves as a self-similar fractal scale in the quantum world to a solar system. And then you can get also the electron radius expressed in the jargon of a quantum gravitational world using the translated 'Gravitational Coulomb constant': $G(k)M/c^{\wedge 2}$. Since in that expression *M* is the mass of a proton, G(k), the electromagnetic constant is a gravitational constant, and c, light speed, that expression is exactly the Schwarzschild radius of a quantum black hole.

Thus, the electron Bohr radius, which is the final radius of minimal size and energy in electrons, is isomorphic to the event horizon of a black hole in the quantum gravitational world.

Those results (more than a decade old), are a *first theoretical deduction* of Ke departing from G and the enormous simplification of the parameters of the electron radius till arriving to the same expression that a black hole radius cannot be by chance. They are mathematical deductions, one of the three *standard forms of proof in science.*

Yet a theoretical calculus of those values cannot be exact 'by chance', unless the theoretical model behind it – the fractal self-similar structure as $T (Space population) x ð§ (Temporal frequency) entities of all physical systems is right. Thus, the previous calculus is a clear proof that both, charges and masses, are unified as values of the same type of space-time vortices in the 2 different scales of space-time of the Universe. And they are geometrically unified from the p.o.v. of geometrical relativity not from quantum theory, as Einstein wanted it.

Galaxies, (Galaxies≈Atoms) thus resolve the philosophical question on how many 5D scales exist; as we find enough self-similarity to 'run again' another game of fractal scales (not identical but self-similar as in a Mandelbrot fractal) both by quantitative and qualitative methods between the atom and the galaxy. A question that might be extended to the ST dualities of open, 'entropic strings' and closed 'cyclical informative strings', in a possible larger and smaller scale

of microscopic strings and superstrings:
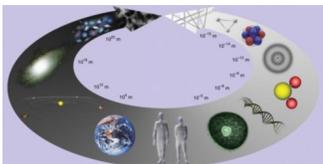
Ouroboros the Universal Snake, bites its tail on the string quantum and cosmological self-similar scales, as perceived from the human Δo mind. Philosophy of stience would then argue that those scales are real, but part of its self-similarity is mental: that is, the loss of information in the perception of scales make humans extract the same information from the upper and lower 10$^{\pm 30}$ scales.

Alas! In this showcase of multiple meanings, jumping from mathematics, to physics, to metaphysics, solving questions seek for centuries in classic science we show the essential nature of 5D – *not so much crunching numbers but 'seeing' what nobody sees.*

As I improve the papers, we will focus better the equations already resolved but vastly more profound that people think.

WORLDCYCLE OF EXISTENCE.

 In the next graph repeated ad nauseam in those papers we see the essence of the process of a worldcycle of existence: *the creation of a finitesimal form which will reproduce and then collapse into a superorganism.*

All what exists is a supœrganism of vital space tracing a 0-sum worldcycle of time through 3 scales of the 5th dimension: Born as a seed of fast time cycles in a lower 5D scale (Δ-1:Max. T x Min. S), emerging as an organism in Δo, living 3 ages of increasing information, as its time clocks slow down in its Δ+1 world to die in a time quanta back to Δ-1. Yet the maximal point Si=Te where reproduction happens defines the classic age, maturity, beauty, balance, survival of the system, all disomorphic jargons.

The 3 ages of life *emerge in human social superorganisms as the 3 ages of cultures and its 3 artistic styles: Min.S x Max. T (infantile epic, lineal art, as in treccento, Greek kuroi; Si=Te; balanced beauty, when form and size are in balance, the classic mature age; and Max. S x Min. T: baroque, 3rd age of a civilisation, whose subconscious mind is the art of its 'neuronal artists', the age of maximal form and anΔst for a no future, which *is the age of war and death of cultures*).

We talk of 3 Δ±1 scales of worldcycles as the being live in a placenta, then emerges as organism in a world:

þ: 0-1: its palingenetic o-1 social evolution in the accelerated time sphere of existence, till becoming 1 (0-1 bounded unit circle in ¡logic mathematics; quantum probability sphere of particles in physical systems; palingenetic fetal age in biologic systems; 0-9 memetic learning childhood in social systems). It is the highly ordered world cycle as a 'placental mother-energy world' is nurturing as memorial cyclical spacetime has erased errors of previous generations.

 - c: The outer 1-∞ world, in which it will deploy its 2nd world cycle of existence in an environment which is open, entropic (1-∞ hyperbolic unbounded Cartesian plane in ¡logic mathematics; thermodynamic entropic statistical molecular populations in physics; Darwinian struggle between populations in biology; idol-ogic dog-eat-dog capitalist, nationalist competitive eco(nomic)systems in the super organisms of history. In this 1-∞ existence the world cycle is not ensured to continue, as the entropy of the world system can cut it off.

ω: The existential life cycle, though is part of a larger world of hierarchical social scales (§ D¡), where it performs 5 survival actions through Δ±4 Planes self-centered in its mind, beyond which it cannot longer perceive, to become if successful a new superorganism of the infinite planes of God, the game of existence.

In graph, physical, biologic & social worldcycles show to which extent 5D laws enlighten our understanding of reality. Matter States are physical time ages, from left pure solid, crystal, §top state, to an even more solid Δ+1 boson condensate, etc. We see that systems either move a step at a time within a plane of existence (gas, liquid, solid) or they can jump « two states at once, (as in the case sublimation) within that plane, or most often between two planes, as in « scattering & entropic death), to become a different Dimotional state. We can then see how the fundamental elements of 5D time appear on the graph: the worldcycle is local and complete. There are 2 inverse arrows from an entropic past (plasma), in a lower plane (ion particles) to the 3 ages of the matter states with increasing form (gas to solid), to end in a higher plane of existence as a boson-Einstein condensate. Do those worldcycles happen for the whole Universe? (cyclic big-bang). Unlkely…

It is then clear that calculus *is the closest mathematical mirror of the commonest process of time-change: the creation of finitesimals that reproduce in clonic waves forming 'spatial organic systems', in the most complex worldcycle, or mere herds, or locomotions imprinting information in a lower field of entropic space – you name it. As we study mathematical physics with calculus, we shall be commenting precisely in the unity of all process of calculus* – a process of finding finitesimals to integrate through time locomotions or spatial populations, mimicking what is the essence of time=change, the reproduction of finitesimal parts into wholes.

THE GENERATIONAL=LIFE CYCLE: $ei_{-1} < E > ET > T < ei_{-2}$

SUPER-ORGANISMS D=EVOLVE BETWEEN 2 i-PLANES OF EXISTENCE IN 3+1 AGES
DOMINATED BY ITS ENERGY, REPRODUCTIVE AND INFORMATIVE NETWORKS:

Birth: eti_{-1} < Youth: $\sum E_i$ > Maturity: ET_i > Old age: T_i < Death: $\sum eti_{-2}$

Human Socio-Biological Organisms:

i=4

i=3

i=3

Bases

Individual, living organism

i=4

i=5

cell

i=4

EPIC, LINEAL ART   CLASSIC, REALIST ART,   BAROQUE, FORMAL ART   WAR

i=6

i=5: PROPHET

Culture , Nation, God

i=5

Universal, Physical, Organisms:

Birth: eti_{-1} < Youth: $\sum E_i$ > Maturity: ET_i > Old age: T_i < Death: $\sum eti_{-2}$

i=1,2: ions

i=2,3

i=1,2

Plasma Birth   **Energetic Gas**   **Liquid, Reproductive State**   **Solid, informative state, M=E death**

STATES OF MATTER

i=8

i=7: black Hole

i=7

Energetic Birth **Irregular galaxy**   **Spiral State**   **Informative, Globular Age**   **Quasar Death**

GALAXIES

i=9
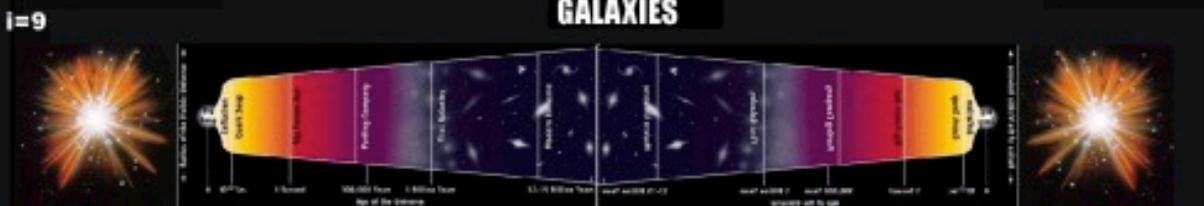
i=8: Big-Bang of Super-black hole?   **Particle Age**   **Star, Atomic age**   **Black hole, informative Age**   **i=8: crunch into super- black Hole?**

'Big Banging: III Horizons'

UNIVERSE

The immediate question is then how to write the worldcycle of existence in calculus. And if it is useful to do so.

To write it is immediate: $\displaystyle\int_{0'}^{\pm\infty} \Delta st = 0'$

Its usefulness becomes more clear when we consider the standing points and draw the function=worldcycle of existence in terms of the SxT existential momentum of its 3 ages .

Calculus on the function of existence.

Since I haven't told you this one thousand one night-mare times (: the function of existjence is all. You are a repetitive fractal of space-time and your purpose is to exist, to conserve your time, but your time is just the form of information, your vital space, reproduced in all the scales that rise from the bottom line of your gravitational and light spacetime, going upwards into scales. Reproduction is the game. But the worldcycle makes errors in the reproduction of your i-logon and those errors that are statistically seen in space as a normal distribution, in time as a repetitive sequence of actions and events slowly wear you down, and as errors of copying information repeat and accumulate your function of existence looses freshness and you age.

So because each stœp of your existence you repeat your sequential actions each derivative is one of such stœps a zig zag up information right motion, up information right motion, whose tangent is the derivative of each quanta of your time. All this said then we can study the worldcycle with calculus. In fact is the best way to study the worldcycle with calculus, in the orthogonal graph of information and motion, information and motion, stop and step, particle and wave state, up and right up and right, as you age, first rising fast young and bold, reaching higher accelerations in your second derivative, as space is time, the curve represents in its form of space, its motion of time, and that is your first derivative, seeking a standing point of constant speed but that is not possible because speed is reproduction and you reproduce your form, with lesser skill past the prime time of your standing point the maximal and minimum no far before, no long ahead:

Let us remember the general laws for any possible function of existence:

If we draw the 'existential momentum', SxT of the system in the left side, and the lineal time of the system, T in the bottom side.

So sinusoidal bell curve functions represent a worldcycle, though the symmetry is broken in the moment of entropic death when the collapse is extreme in a 'falling line' as death happens in a single moment of time:

$$4D»Δ-1(seed)∑Δ:|-\$T(limb-field)<Ø-S≈T \text{ (iterative bodywave)}> O-§ð \text{ (particle-head)«5DΔ-1(death)}$$

A key theme of vital mathematics is the representation of a worldcycle in lineal time, with ± exponentials & its inverse, logarithmic curve around the key points of change of phase… as growth of 'entropy-motion' diminishes. So we move from 'adolescence' of max. growth of both parameters (sT energy and sT information) to the y"=0 point of youth, where the logarithmic part grows slower. Together they form, one half of the total graph of a cycle of existence, till reaching the y'=0 point of Max. (S≥≤T), which then becomes negative, happening a decay of the whole system in two negative curves.

The conservation of time in its 5 y' ∧ y" =0, standing points that define the 5 SS, Ts, ST, St & TT moments of generation, youth, maturity, 3rd age and entropic death thus become the essential points (maximal and minimal) of the equations of calculus, the sinusoidal function of existence and all its derived elements.

Let us suppose that on a certain interval a≤t≤b we are given a function S = f(t) which is not only continuous but also has a derivative at every point. Our ability to calculate the derivative enables us to form a clear picture of the graph of the function. On an interval on which the derivative is always positive the tangent to the graph will be directed upward. On such an interval the function will increase; that is, to a greater value of t will correspond a greater value of f(t). On the other hand, on an interval where the derivative is always negative, the function will decrease; the graph will run downward.
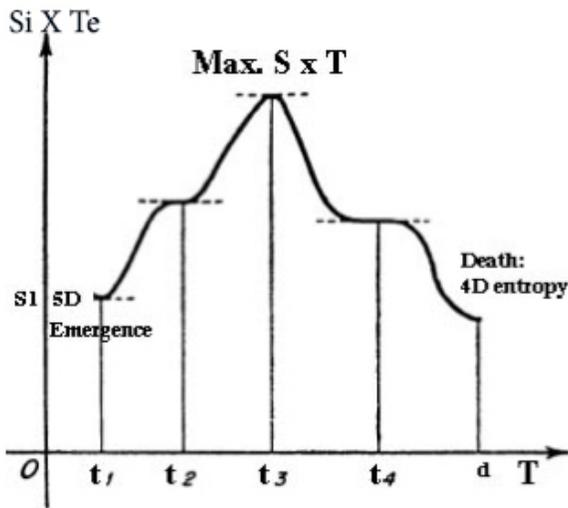
We have drawn the graph of an Δst function of the general form, S (any dimension of a whole world cycle or T.Œ) = f(T) - Any time motion or action.

It is defined on the interval between a minimal quanta in space or time (t1) and its limit as a function (d).

And it can represent any S=T duality, or more complex 5Ds=5Dt forms or simpler ones. We can also change the s and t coordinates according to the Galilean paradox, etc. Hence the ginormous numbers of applications, but essentially it will define a process of change in space-time between the emergence of the phenomena at ST1 AND ITS DEATH mostly by scattering and entropic dissolution of form at d.

And in most cases will have a bell curved from of fast growth after emergence in its first age of maximal motion (youth, 1D) till a maximal point where it often will reproduce into a discontinuous parallel form (not shown in the graph at Max. S x Max. T; which will provoke its loss of energy and start its diminution till its extinction at point d.

Thus the best way to express quantitatively in terms of S-T parameters (mostly information and energy), for any world cycle of any time-space super organism is a curve where we can find those key standing points in which a *change of age, st-ate or motion happens.*

Of a special interest thus are the points of this graph whose abcissas are $t_{1,2,3,4,5}$.

At the point t0 the function f(t) is said to have a local maximum; by this we mean that at this point f(t) is greater than at neighboring points; more precisely for every t in a certain interval around the point x0. A local minimum is defined analogously. For our function a local maximum occurs at the points t0 and t3, and a local minimum at the point t1.

At every maximum or minimum point, if it is inside the interval [a, b], i.e., if it does not coincide with one of the end points a or b, the derivative must be equal to zeroth.

This last statement, a very important one, follows immediately from the definition of the derivative as the limit of the ratio $\Delta S/\Delta T$. In fact, if we move a short distance from the maximum point, then $\Delta S \leq 0$.

Thus for positive ΔT the ratio $\Delta S/\Delta T$ is non-positive, and for negative ΔT the ratio $\Delta S/\Delta T$ is nonnegative. The limit of this ratio, which exists by hypothesis, can therefore be neither positive nor negative and there remains only the possibility that it is zeroth.

By inspection of the diagram it is seen that this means that at maximum or minimum points (it is customary to leave out the word "local," although it is understood) the tangent to the graph is horizontal.

At the points t2, and t4 also the tangent is horizontal, just as it is at the points t1, t3, although at these points the function has neither maximum nor minimum. In general, there may be more points at which the derivative of the function is equal to zeroth (stationary points) than there are maximum or minimum points.

One of the simplest and most important applications of the derivative in that sense is in the theory of maxima and minima.

Criteria for maxima and minima; study of the graphs of curves.

If throughout the whole interval over which x varies the curve is convex upward and if at a certain point x0 of this interval the derivative is equal to zeroth, then at this point the function necessarily attains its maximum; and its minimum in the case of convexity downward. This simple consideration often allows us, after finding a point at which the derivative is equal to zeroth, to decide thereupon whether at this point the function has a local maximum or minimum.

Now, the apparently equal nature on a first derivative of the minimal and maximal points of a being, have also deep philosophical implications, as it makes at 'first sight' indistinguishable often the processes of 'reproductive expansion' towards a maximal and explosive decay into death, the 'two reversal' points of the 5D (maximal) and 4D (minimal) states of a cycle of existence, for which we have to make a second assessment (second derivative) to know if we are in the point of maximal life (5D) or maximal death (4D) of a world cycle. And to know if the cycle will cease in a continuous flat encephalogram or will restart a new upwards trend.

Or in other words is any scalar, e>cc>m big-bang both the death and the birth of matter?

Finitesimal Quanta, as the limit of populations in space and the minimal action in time.

So there is behind the duality between the concept of limits and differentials (Newton's vs. Leibniz's approach), the concept of a minimal quanta in space or in time, which has been hardly explored by classic mathematics in its experimental meaning but will be the key to understand 'Planckton' (H-planck constants) and its role in the vital physics of atomic Planes.

It is then essential to the workings of the Universe to fully grasp the relationship between Planes and analysis. Both in the down direction of derivatives and the up dimension of integrals; in its parallelism with polynomials, which rise dimensional Planes of a system in a different 'more lineal social inter planar way'.

So polynomials and limits are what ¬Algebra is to calculus; space to time and lineal ¬Algebra to curved geometries.

The vital interpretation though of that amazing growth of polynomials is far scarier.

Power laws by the very fact of 'being lineal', and maximise the growth of a function ARE NOT REAL in the positive sense of infinite growth, a fantasy only taken seriously by our economists of greed and infinite usury debt interest... where the e^a exponential function first appeared.

The fact is that in reality such exponentials only portrait the decay destruction of a mass of cellular/atomic beings already created by the much smaller processes of 're=product-ion' which is the second dimension mostly operated with multiplication (of scalars or anti commutative cross vectors).

So the third dimension of operands is a backwards motion - a lineal motion into death, because it only reverses the growth of sums and multiplications polynomials makes sense of its properties.

Let us then see how the operations mimic the five dimensions, beyond the simplest ST, SS and TT steps, namely reproductive and 4D-5D inverted arrows.

We can establish as the main parameter of the singularity, its time frequency, which will be synchronised to the rotary motion or angular momentum of the cyclical membrane. They will appear as the **initial conditions and boundary conditions of** a derivative/integral function, which often will be able to define the values of the vital energy within, as the law of superposition should work between the 3 elements, such as:

Determination of the greatest and least values of a function.

In numerous technical questions it is necessary to find the point t at which a given function f(t) attains its greatest or its least value on a given interval.

In case we are interested in the greatest value, we must find x0 on the interval [a, b] for which among all x on [a, b] the inequality $f(to) \geq f(t)$ is fulfilled.

But now the fundamental question arises, whether in general there exists such a point. By the methods of modern analysis it is possible to prove the following existence theorem:

If the function f(t) is continuous on a finite interval, then there exists at least one point on the interval for which the function attains its maximum (minimum) value on the interval [a, b].

From what has been said already, it follows that these maximum or minimum points must be sought among the "stationary" points. This fact is the basis for the following well-known method for finding maxima and minima. First we find the derivative of, f(t) and then solve the equation obtained by setting it equal to zeroth.

If t1, t2, ⋯, tn, are the roots of this equation, we then compare the numbers f(t1, f(t2), ⋯, f(tn) with one another. Of course, it is necessary to take into account that the maximum or minimum of the function may be found not within the interval but at the end (as is the case with the minimum in figure) or at a point where the function has no derivative.

Thus to the points t1, t2, ⋯, tn, we must add the ends a and b of the interval and also those points, if they exist, at which there is no derivative. It only remains to compare the values of the function at all these points and to choose among them the greatest or the least.

With respect to the stated existence theorem, it is important to add that this theorem ceases, in general, to hold in the case that the function f(t) is continuous only on the interval (a, b); that is, on the set of points x satisfying the inequalities a <t < b.

It is then necessary to consider an initial time point and a final time point, birth and death, emergence and extinction to have a determined solution.

Derivatives of higher orders.

We have just seen how, for closer study of the graph of a function, we must examine the changes in its derivative f'(x). This derivative is a function of x, so that we may in turn find its derivative.

The derivative of the derivative is called the second derivative and is denoted by **y"=f"(x)**
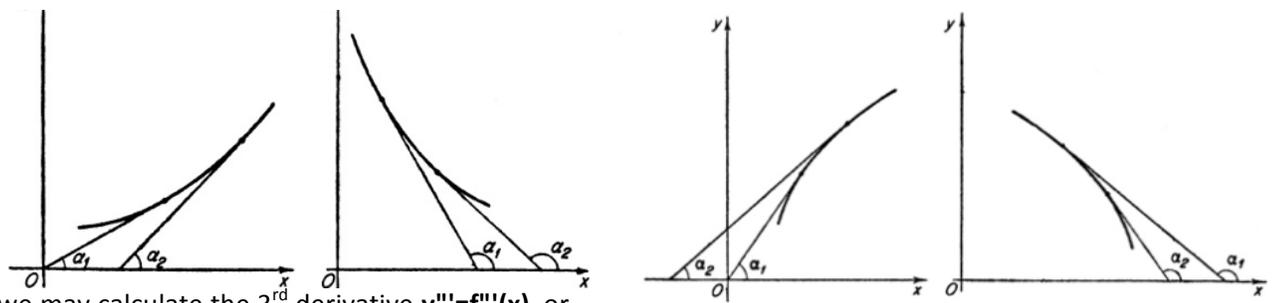
Analogously, we may calculate the 3rd derivative **y'''=f'''(x)** or,
the derivative of nth order. But as there are not more than 3 'similar derivatives, with meaning' in time (speed, acceleration, jerk) or space (distance, area and volume), beyond the 3rd derivative the use of derivatives is only as an approximation to polynomial equations, whose solvability itself is not possible by radicals beyond the 3rd power.

So it must be kept in mind that, for a certain value of x (or even for all values of x) this sequence may break off at the derivative of some order, say the kth; it may happen that **f(k)(x)** exists but not **f(k + 1)(x)**. Derivatives of arbitrary order are therefore connected to the symmetry between power laws and ∫∂ operations in the 4th and inverse 5th Dimension, through the Taylor formula. For the moment we confine ourselves to the second and third derivatives for 'real parameters' of the 3 space volumes and time accelerations.

$$s = \frac{gt^2}{2} + v_0 t + s_0,$$

$$s' = gt + v_0,$$

$$s'' = g,$$

The second derivative has then as we have seen a simple significance in mechanics. Let s = f(t) be a law of motion along a straight line; then s' is the velocity and s" is the "velocity of the change in the velocity" or more simply the "acceleration" of the point at time t. For example, for a falling body under the force of gravity: That is, the acceleration of falling bodies is constant.

Significance of the second derivative; convexity and concavity.

The second derivative also has a simple geometric meaning. Just as the sign of the first derivative determines whether the function is increasing or decreasing, so the sign of the second derivative determines the side toward which the graph of the function will be curved; but in terms of *time represents the second derivative of the curve of existence. That no longer accelerates its growth, hence the end of youth, and vice-versa, the moment in which it does accelerate its decay, thus the beginning of the third age.*

So we can consider the same concept in the 'discreet' baguas of life cycles as it is NOT a mere ideal curve but one that do happens in all forms of life. This simple law with deep cases because it is essential to the worldcycle:

Suppose, for example, that on a given interval the second derivative is everywhere positive. Then the first derivative increases and therefore f'(x) = tan α increases and the angle of inclination of the tangent line itself increases. Thus as we move along the curve it keeps turning constantly to the same side, namely upward, and is thus, as they say, "convex downward." On the other hand, in a part of a curve where the second derivative is constantly negative the graph of the function is convex upward.

Because it is the clear proof of what is all about: reproduction in space of frequencies of time.

The function is more than its equation – A path of existence through the whole plane.

The function of existence is the whole plane divided by the line that must be grown by the non-E method of rising points into curves of motion, which divide an energy information plane in an act for creation with a path in S=T, the path of present through squares in which information and energy are orthogonal.

We have found thus the simplest space-time curve, the S=T, curve of existence between an integral 1/3rd of the plane in path with a 2/3rd Lébesgue integral so to speak of the external/internal path of the curve.

The curve is thus a point in motion, equivalent to a line of distance, equivalent to a ratio between 2 parts, 2/3rds to the left and 1/3rd to the right. But the beauty of it is that we take from the curve square points.

The minimal reality is a 3D² form seen in a single plane, with a singularity @-mind a membrane and a vital energy within. When we make a holographic broken image of this reality the simplest way to do it is in four cartesian regions, TT, ST, ts, and ss, which correspond to the +1 +1, +1 -1, -1 +1 and -1 -1 quadrants of the plane.

It is then when the Lebesgue inverse function matters to integrate the Y perspective of the S=T symmetry that the function know taken as a topological partition of a vital motion of a wave of similar particles that will collapse t the end of its journey through a plane of the fifth dimension, takes place.

The least path action implies thought that the end of the path taken in the Cartesian but also the imaginary plane collapses in the same point, regardless of how many oaths have been taken in the 'compressed' i-plane where the co-existence of paths in particle space has sunk the plane to a √ root value for the dense line that then can be even further reduced to a point that will potentially trace a full s=t, valuing in present time the space-time dilation of the

integrated, $\int_{\substack{Inferior\,\lim\,it \\ asspace}}^{\substack{sup erior\,\lim\,in \\ time\,T\infty}} t \,int\,erval$

The wave form as an integral expression of the function of existence.
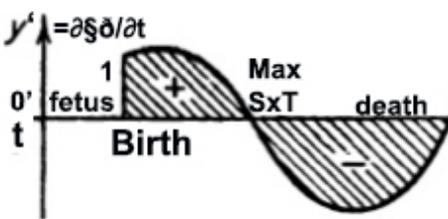
How many possible forms might acquire the function of existence? The answer that might surprise the reader is depending on the number of parameters, duration in time of our analysis and type of dimotion studied, from smaller steps of a single dimotion to the whole worldcycle an all the sequential dimotions of a T.œ. there are 'infinite solutions' – as all equations are ultimately 'partial equations' of the fractal generator, S⇔T.

Consider the commonest form of the Universe, a wave. If we consider that y measures NOT the value of ST of the system as a constant 'volume' of existential momentum, but the value of its 'degree of increase or decreste' at each moment of time, hence y' over x(t), we obtain the exact form of a wave, with a first half wave in which the growth from youth to maturity constantly diminish but is still positive, till the middle point of maturity at y'=0, where the growth starts to be negative, followed by a fast decline as we age, till a maximal point of 'degeneration', where we normally die by sudden sickness; but if we overcome that point somewhere around the 70 years age, we will have a slow down of our aging, towards a point of no 'change at all' – the point of death; when we simply disappear from this plane of space-time existence.

Thus when *we perceive* a wave of light, we are in fact, *perceiving time=change, and* creating a mental space of the life-death cycle of a single photon as space is just the memorial tail of our slow time perception.

RECAP. The function of existence in its fractal variations and cx. Pentalogic HAS infinite paths=forms but all end in a 0' sum.

RECAP. Time is cyclical as all clocks of time return to its point of origin, so all time cycles including those of life of its vital space-time beings are finite. Further on those time cycles break 'space' into inner and outer parts, so vital space is broken by the membranes and angular momentums of those time cycles that make spacetime beings also finite in spatial information. And an obvious experimental facts about timespace: cycles of time, vital spaces and the species made of them, co-exist in several scales of relative size from particles to galaxies, each one with clocks of time of different speeds. So spacetime is fractal broken in scales that added create a new 5th dimension of spacetime.

The dual functions of 5D Absolute Relativity, the function of 5D scales, SxT=C & the function of equality between form and motion, SI=TE, develops in 3 ages with 3 standing points, a max. point of existence, Si=Te or mature age, a young age of Max. T=motion, and an old age of Max.S=information; between birth in Δ-1 Form & T-entropic death. The search for space-time, Energy=information balances in a classic reproductive age of conserved time is thus the goal of all existences, but only the whole achieves the immortality of time-space, as we shall see egocy errors of fractal mind-points of space trying to stop the flow of time from a single selfish point of view, accelerates the imbalance that brings

death equations. We are richer in our still property at that 0T-moment, when all is quiet so for time to keep moving, a reversal of entropy takes place.

The connection between existential algebra and calculus: Dimotions as actions. Reproduction as change.

We said often that time=motion is all; and space just the Maya of the senses, the mind's mapping of the fractal points 'that hold a world in themselves'. But the ultimate arrow of time is that of scalar growth between planes of the fifth dimension, as parts must become before wholes; the upwards arrow matters more than the down arrow. And so of the 3 parameters that define objectively between ¬ limits, and vitalized by a mind's program, ΔST, any being, Δ-scale matters more – numbers of algebra in mathematics. Then it comes time perceived in one given plane, T, and finally Space, the most evident but shallow part of the whole. For that reason Algebra matters more and includes calculus, the temporal view of mathematics that tries to capture all modalities of change with a simple scalar process of adding '¡n≈finitesimals' of scalar change to analyze the larger processes of change in the whole scale.

This is done in calculus with the simple methods of 'finding the parts=derivatives' and adding them together =integrate them either over scale, spatial volume or temporal frequencies. In this manner something so simple as a finitesimal change becomes the seed of all possible variations of change (dimotions each studied by an operand) across scale=size, spatial population or temporal frequency of events.

The study of the 5 Dimotions of the Universe is carried out in spatial geometry by calculus; in Non-Aristotelian Logic by Existential algebra. Thus both languages have many deep common structures worth to compare, even if calculus was born on the praxis of analysis of one single dimotion, locomotion, in the milieu of physical sciences and only slowly extended to the understanding of the other dimotions of the Universe.

Thus we shall bring in this second paper on algebra both sciences together.

Even if Existential algebra is much wider and ultimately a logic stience, as it is also the underlying structure of mathematical algebras, including those of group theory that deal with an 'extensive catalog' of the dimotions and evolutions of the Universe, and reticular Boolean algebras that deal with the @-mind mirrors of logic and numbers. In the original plan I had envisioned a much larger output of papers for academia, taken from my 30 years notebooks, so Existential Algebra would have deserved one of his own. But time is running out…

Existential algebra and calculus study time change. How can then unify all time changes? The answer comes from existential algebra and its finding that all forms of change can be reduced to reproductive change. Which itself can be considered a travel down and up two scales of the fifth dimension. Thus changes happens on finitesimal parts that emerge and affect larger wholes.

The function of existence is a function of reproduction in scale (as a 5D journey) in time (as a conjunction of the 5 Dimensional motions of existence), and space, as a simultaneous growth of clone information; formalized in the fractal generator of 5D metrics, Max. $\sum Te \times S_¡ (s=t) = c$; as reproduction happens in a 'present s=t state', of balance when the relative past of lesser informed flows of entropic time, Te, becomes Imprinted by Spatial information: Past TT-entropy x Future SS-form = Reproductive ST Present

Change happens informatively through increase of finitesimal parts, entropically when you loose those scalar parts. Reproduction of form or its annihilation at the finitesimal scale in calculus is mirrored by a simple function, $F(x+h)/F(x)$, that calculates ratios of change, for different operands that mirror the 5 Dimensional motions of existence, which can potentially change.

Thus calculus uses a unit of change, h, to mirror different changes In the 5 dimotions of existence. Since change once it happens in small units, in small scales, in small instants of time; differentiate in 5 type of dimensional motions = actions: TT, feeding, entropic and moving, Ts, changes, informative & perceptive St, SS changes, reproductive changes, ST, proper.

That diversification is studied better with different algebraic operands; but all can be derived into its finitesimal units of change and integrated, for different scalar groups, social functions and paths of dimotional change.

Thus what both disciplines, calculus and existential algebra have in common is the object of its linguistic mirrors: Times=changes, all kind of them.

That apparently they seem so different wears witness to the ultimate nature of mind-monads, 'infinity mirrors' that reflect always different points of view on reality and its i-magination to slightly bend that reality to the point of view of the mind.

Still it is more notable its common elements than its differences.

Calculus though has its emphasis in numbers hence in the scalar analysis of huge social groups in motion; while existential algebra has its emphasis in discrete dimotions, hence on the study of individual T.œs experiencing a trans-form-ation.

The very essence of calculus is to study in synchronous spatial dimotion huge amounts of numbers, which will erase its 'discrete' form to appear as a continuous susceptible to be studied at the Δ+1 scale of the whole.

The emphasis of Existential algebra is the study of that whole as an individual subject to sequential dimotions.

But *in both cases the dynamic process of study are the 5 Dimotions of time=change of the universe.*

Finally logic systems and Boolean algebras become the syntax of verbal and computer minds that describe with its sentences the dynamic dimotions of reality. So its language is closer to that of Existential Algebra, reason why we include it in this paper, instead of the more advanced models of existential algebra termed, monologic, duality, trinity, pentalogic and dodecalogic.

To fully grasp that essential connection between Δst and calculus mirrors, we must first understand how *species on one hand, and equations on the other, probe in the Planes of reality to obtain its quanta of space-time converted either in motion steps or information pixels, to build up reality.*

The connection between existential algebra and calculus is qualitative: both study initially the finitesimal action of existence, *which become the finitesimal quanta of spacetime, whose repetitive accumulation causes the phenomena of time-change. Existential algebra though studies the qualitatively in terms of sequences between the 5 Dimotions, and calculus quantitatively focusing in one single dimotion spread in a group of scalar numbers*.

This is the case because the actions of beings happen through finitesimals extracted from other Δ-plane scales.

 In all Planes, the simpler actions of any being *are extractions of motion, energy and form from lower Δ-i Planes:*

A T.œ perceives only the Δ±3 planes from where it extracts energy or information. As its actions and dimotions are architectonically performed through planes of 5D where each main action relates to an interval of scales:

Δ-4-3: The system extracts indistinguishable boosts of entropic of motion (man from gravitation).
Δ-3-2: The system extracts bits of information (Light in man)
Δ-2-1: The system extracts bites of energy (amino acids in man)
Δ-1 0: The system seeds its minimal seed of reproduction.
Δ0+1: The system connects socially with other systems to evolve into a whole.

So simpler Actions start at finitesimal level, gathering in sequential patterns in existential algebra, as 'time flows' and in population and spatial patterns - in integral herds of numbers in calculus.

We and all other beings perceive from Δ-3 quanta (light in our case), feed on amino acids, (Δ-2 quanta for any Δº system), seed with seminal Δ-1 cellular quanta (electrons also, with Δ-1 photon quanta).

For each action of space-time we shall find a whole, Δº T.œ, which will enter in contact with another world, Δ±i, from where it will extract finitesimals of space or time, energy or information, entropy or motion, and this will be the finitesimal ∂ ƒ(x), which will be absorbed and used by the species to obtain a certain action, å.

Analysis allow us to extract actions from wholes, reason why there are not really use beyond the third derivative of a being, as super organisms co-exist in 3 only Scalar Planes. It also works in terms of a volume, as its derivative is a plane, then its unit-cell or point... So to speak, if you derivate a world, you get its organism, and if you derivate it again you get its cell and then its molecular parts. And then if you do that in time, you get its speed and then its acceleration and then its jerk.

But how you extract finitesimals of smaller scales? The answer is:

<center>**NETWORKS.**</center>

Herds of Finitesimals of space=information and time=energy.

Another element of enormous importance to understand the equations of calculus in mathematical physics is the concept of a bite of energy and a bit of information; moving in a herd through a physical network or wave-background that displaces them. As they are the fundamental elements of fields and waves, and its integral equations. So we shall bring from the general model, the paragraph on physical networks.

How then it happens that parts become wholes is the key to depart from a mere abstract, quantitative analysis of reality and add the organic whys to calculus; explaining the nature of all what exists, the dynamic interplay of parts that 'network' and connect to each other, forming simultaneous spacetime organisms, which synchronizes its clocks, emerge as a whole and develop all the intelligence and complexity of the systems we observe around us. A final element though is needed to make sense of those superorganisms, *the still mind of information, mapping out the whole and controlling it to perform its Mandate of existence, Max. SxT (s=t), to survive, grow and multiply.*

The ternary network structure of nested organisms makes them ¬Æ topologic planes composed of similar fractal points (atoms, cells, individuals) joined by 3 physiologic lines=networks, whose 3 functions, locomotion, information and its combined energy define the 3 conserved Dimotions of any system of the Universe.   The graph shows those physiological networks of each supœrganism from the galaxy to the atom, where self-similarity takes place. I remind you of the Si=Te equality, which means we slow beings see networks of faster particles as 'force waves' and networks of slower life forms as fractal branching, but essentially as Nottale has proved, we can 'translate' quantum physics into a network, topological view, as light is in fact a branching filling wave that 'speeds up frequency' as it penetrates lower planes, filling it till it touches particles.

All systems of reality are connected by networks that share energy and information between parts and wholes that expresses the structural unity of all scales. Networks 'fill' space ad maximal to connect fully the whole with the parts, achieved in the Si=Te point of parallelism and self-similarity. But they entre in a region of faster motion. So while Space 'tends to remain constant' in each scale thanks to filling networks, time accelerates. So we need to become a bit more complex about the previous metric. It refers essentially NOT to the whole 5D plane but to a given 'superorganism' of each plane. When we go down in scales, in fact the Universe 'enlarges' for a traveler that becomes smaller and accelerates its temporal energy.

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In the graph, systems sciences consider the Universe an organic fractal, which each science studies at a level of size, all of them evolving socially through networks of energy and information. So we can study species as organisms living a world cycle and evolving finally in social networks becoming super organisms, the most efficient survival strategy of the Universe, where a head-particle-informative class will invent a language of common organization, quantum numbers, hormones, genes or memes, money or laws that all the body-wave parts/cells/citizens will obey. The goal of systems sciences is then to properly apply the physiological laws of networks to design or study perfects organisms of nature, including mankind and the economic ecosystem.

In the graph, the physiological networks of some super organisms of the Universe, which can be formalised all into a logic equation, we call **the fractal generator of** the organic Universe:

Ts (Spatial, past, entropic limbs/fields/territory) < ST (present re=productive body waves-working class) > St: temporal-informative particles/heads/informative class.

So everything really is encoded in those networks and its topology and it can be explained with multiple languages, the language of topology (mathematics), the language of logic (sequences of actions the networks cause) the language of social classes, as the 3 networks with its attached cells have a hierarchical order, with the informative nervous network in control of the faster languages on top (legal politicians and financial bankers in human societies, nervous cells and blood leukocytes in biologic organisms, gravitational black holes in galaxies, etc.). But don't worry we just race through the basics so we can concentrate in the social organisms of history.

Biology
Energy Networks: i=0 ,±1
Water, Cytoplasm
Networks of
Information:
Genetic Orders.
Entropy networks:
Walls,
Golgi reticles.
Cellular species:
Carbohydrates

Chemistry i=+2
-Networks:
Electronic,
chemical,
gravitational forces
-Cellular species:
Atoms, molecules,
electrons.
Entropy networks: Atoms, Y-forces

Physics i=3,4
-Networks of Energy and
Information:
Electromagnetism;
gravitation.
-Cellular species and
Organisms:
from simple quarks to atoms
Entropy networks: Fields

Theory of Organisms
i=∞

Zoology Entropy networks: ecosystem, prays
Networks of Information:
[Animals]Nervous systems.
Networks of Energy:Blood Systems
Species communicated: cells.

Economic ecosystems [Metal,humans]
-Networks of Information:
Monetary systems,
Metal-communicators [press,
radio, Tv, net]
- Networks and Species of
Energy: roads, pipes,
electricity, machines.
- Species communicated: Humans,
metal-forms.
Entropy Networks: I-metal weapons: war

History [Humans]   i=+2
-Networks of Information:
Wor[l]ds: Verbal Gods, Laws.
- Networks of Energy:
Nature 's rivers; Human work welfare
Agriculture, Human Goods.
- Species: Humans.
Entropy networks: Gaia, territory

Astronomy: i=+3,4
Cellular species: Stars,
planets
Organisms: galaxies
Networks of Energy and
Information:
Gravitation, light, Space-Time.
Entropy networks: H clouds, Dark entropy

There are 3 physiological networks in each supœrganism from the galaxy to the atom, the two scales where self-similarity takes place (the galatom smaller and larger planes). But *we can for the time being disregard the 'territorial, background network, the spacetime of the galaxy and its particles, the water of life organisms, the Territorial surface of earth in historic organisms, to concentrate on the body-wave-reproductive economic system, and particle-head, informative legal systems that shape the essence of a superorganism.*

The key to understand its linguistic bits and bites of information and energy are as in most themes of reality the astoundingly simple Metric equations of all the scales of the fifth dimension: size in space x speed of time cycles = constant. And the duality of Spatial information and temporal motion that combine in 5 Dimensional motions: TT-pure motion (entropy) > Ts-locomotion, energy S=T (reproductive energy and information combined) > St-information (form with a bit of motion) & SS (form, position, language).

All systems of reality and its limbs/fields, body-waves and particle-heads existing in a larger world with faster energy that appears as them as the limit of TT-entropy and faster information that appears to them as the limit of SS-language play then a simple game of trying to absorb as much Ts-motion, reproductive energy and information to perceive, reproduce, survive, move and play the game of existence. And as systems become more complex and dense, they naturally attach to those 3 type of networks, evolving from herds into superorganisms.

Thus I remind you of the 5D metric equation, SxT=C and the S=T point of balance and equilibrium where the system reproduces as the two fundamental metric equations of all space-time organisms, which means many things, such as:

- Slow beings use networks of faster particles which in physical systems are 'waves of force' in life beings are and networks with fractal branching and in human societies, networks of money and simultaneous legal messages. Yet all are essentially performing the same organic functions, we shall describe now as can 'translate' a light filling wave that

penetrates lower planes, filling it till it touches particles, as a branching that 'speeds up frequency'; and a legal network that every citizen knows and obeys as a filling system of information, similar to a DNA network that all cells of an organism have in common. *Think always NOT in the differences of form and scale but in the homology of functions for the body/waves and particle/heads of each of the 3 superorganisms (working and informative classes in human societies), to see the unity of it all.*

The 2 languages of informative and reproductive networks: Bits of information and bites of energy.

It is important also to Understand NOT in pure abstract mathematical terms, but in logic, linguistic ones, the internal, dynamic nature of those networks, because only then we can proper understand how they work in advanced organisms of maximal information, the biological organism and the historic organism, which belong as 'fractal systems' self-similar to each other, two the same specific type of organisms, we shall qualify as socio-biological organisms. A network, of informative nature, delivers messages of information to simultaneously coordinate the actions of all its parts; with its faster=smaller bits of information according to 5d metrics (min. spatial size x. max. temporal speed). While the networks of reproduction, the blood and financial system delivers larger bites of energy, which the organism needs to feed itself (when it is a healthy non-corrupted superorganism as most of nature, but not human societies, whose astounding level of corruption we shall explain in detail).

Indeed, the key to the full understanding of reality both in terms of energy but also in terms of information, as both are two sides of the same coin, called 'existence' is the fact that in the sentient Universe, each fractal point, atom, cell or citizen (physical, biologic or social systems) needs bits of in-form-ation, form, smaller in size of space, hence faster according to 5D metrics ($SxT=C$), but also 'bites' of entropic energy which will help the system to move. Networks are NOT some abstract 'fractal tube' but they exist to deliver 'energy and information' (SS: form=language with a little motion=St-information and motion=entropy=TT with a bit of information = energy=Ts).

So a healthy superorganism will deliver to each 'fractal point' (molecules, cells, human citizens), two type of messages through two type of networks. We shall call 'generically' the 3 type of bits and bites of information and energy that each of those 3 physical, biological and social systems receive, 'particles, genes and memes' even if the words as usual in 5D sciencers are slightly changed, and widened in its original meaning.

So with its specific variation, those are the two fundamental reproductive-'body-wave' and informative-'particle-head' bites of energy and bits of information of the fundamental systems of nature:

- In physical systems, the two networks are the gravitational faster network of information, which we humans do not perceive, as we are much larger beings with electronic networks. Its bits of information in this faster non-local network should be 'gravitons', components of gravitational waves. In physical papers we advance as the most likely particle state of those waves of information that 'position' the different physical systems of the galaxy, a gravitational tachyon 'neutrino' for multiple reasons, we study on our papers on physics.

On the other hand, because we do perceive it, it is much easier to prove that the energetic network of physical systems are electromagnetic waves, photons and its 'social, static state' as the elements of an electronic nebulae, trapped in the potential energy well of the atom. Thus photons and electrons become the 'energy network of physical system, molecules.

We shall escape then in this introduction further information on the scalar structure of those networks and how, as we 'grow in scale', what is a bite of slow energy for a smaller plane of space-time, *becomes for the larger plane's slower beings, a faster bit of information, in the amazing beauty of the harmonies between scales. So electronic 'food for atoms' becomes electronic information for biological organisms and so son.*

- Those biological organisms do have then two fractal networks, the electronic, informative nervous system in which bits of electronic information moving along the myelin membrane deliver faster messages to every part of the organism to simultaneously synchronize its motions, so the body-cells act as a single form in simultaneous space.

- But when we move into the bites of energy delivered by the blood organism, the network delivers to each cell the basic 'currency' language of energy that all cells need to move, called 'oxygen '. *It is an atom of slower motion than the electrons but due to its electro-negativity and readily availability in the atmosphere, with its capacity to kick with two OH- & H+ legs the water 'medium' on which cells exist, the perfect language of 'money' for the organism to start kicking its 'actions'.*

So we DO have in the next scale according to the perfect laws of harmony, the two basic biological bits and bites of information and energy, electrons and oxygens, and from then on, as systems become more complex, variations of those bits and bites occur.

The main category are mixed ST messages, which deliver BOTH a stick and carrot 'complex' to the cells and its big molecules, which are amino acid systems, of great simplicity called Hormones, starting from the simplest of them all, an NO molecule (which do relax muscles, its main message to the locomotion system, increases the pressure of blood, provoking sexual erection, the simplest message to reproductive systems and multiplies the neuronal activity. *As nitrogens are the clock atom of our mind-brains.*

So finally more complex NO systems with a body support of carbon chains become 'hormones' which might have a 'higher informative message' (with more N, as in nucleotide molecules) or a higher energetic message (as in acids with more oxygen).

They form then the basic letters of the 'biological longer sentences that might accumulate information' in ever more complex molecules, as biological organisms are by far the more complex systems we know of.

Finally a very important concept is the difference between an ecosystem in which multiple superorganisms co-exist, often in predatory relationships, vs. an organism in which only a type of atoms, cells or citizens co-exist, and is far more symbiotic as all parts love each other and share energy and information through its networks, over a common territorial space, as shown in the graph.

Those three physiologic networks/classes/physical parts of ANY system of the Universe define the Universe indeed as a fractal organism of infinite smaller and bigger super organisms, in a game of russian dolls in which each of us is a 'island-Universe' within itself, made of smaller parts, and for that reason each of us is also a part, cell/citizen of a social super organism, nation, religion or civilisation, which we do NOT see as a whole, as our cells do NOT see us as a whole, but DO exist as such.

What makes then the whole a whole? The answer is: the nervous, informative languages that communicate all the parts of the super organism and 'trace' within its syntax and value, its path of the future. And so we have talked first of it and will constantly coming to the bottom line of reality - the languages that construct the organisms of the world.

Let us then define with similar templates the 'stair of nested Universal supœrganisms, of the 3 stientific varieties – physical, biologic and social:

Δ+3: A galactic organism is a population of stars, related by energetic electromagnetic networks and gravitational information with a nucleus made of a swarm of black holes, and a membrane made of strangelet matter symmetric to:

Δ-3: An atomic organism is a population of particles, related by energetic electromagnetic networks and gravitational information with a nucleus made of a swarm of quarks, and a membrane made of electronic matter symmetric to:

Δ+2: A star organism is a population of electronic plasma, related by energetic networks of electromagnetism and gravitational information with a nucleus made of a swarm of atoms, and a membrane of photonic radiation symmetric to:

Δ-2: A light organism is a body of energetic waves over a quantum potential field of gravitational neutrinos, directed by its particle, informative photon state…

Δ-1: A cellular organism is a population of molecules, related by energetic networks (cytoplasm, membranes, Golgi reticules) and coded by genetic information (DNA-RNA.)

Δ=o: A human organism is a population of DNA cells, related by networks of genetic, hormonal and nervous information and energy networks (digestive and blood systems).

Δ+1: An animal ecosystem is a population of different carbon-life species, related by networks of light information and life energy (plants, prey) coded by instincts.

Δ+1: A historic organism or civilization is a population of humans, related by legal and cultural networks of verbal information and agricultural networks of carbon-life energy, coded by human memes.

Networks that share energy and information between parts and wholes that expresses the structural unity of all scales connect all systems of reality. Networks 'fill' space ad maximal to connect fully the whole with the parts, achieved in the Si=Te point of parallelism and self-similarity. But they enter in a region of faster motion. So while Space 'tends to remain constant' in each scale thanks to filling networks, time accelerates. So the 5D metric refers NOT to the whole Universe of 5D planes but to a given family of 'supœrganisms' of which mankind in it 3 scales of 'biologic cells', human individuals and societies is undoubtedly a 'phyla'. When we go down in scales, the Universe 'enlarges' for a traveler that becomes smaller and accelerates its temporal energy.

The 2 languages of history: Verbal, legal, ethic 'nervous messages' and 'WHealthy money'.

So we arrive to the human social networks, which we anticipate are in the present form 'completely corrupted' by the existence of a parallel 'economic ecosystem' of lethal goods, weapons, and corrupted parasitic money. So it is difficult for the reader to understand how simple, easy, and efficient WAS in the past, before the age of Metal, in the Neolithic, or during the ages of social religions of love or could be in the future with a proper design of the social networks of money and law, a PERFECT superorganism of history as efficient as those we just have described. In such superorganism, there are exactly the same networks: Legal verbal just networks of bits of word information that shapes the informative and cultural systems of the wor(l)d. And a healthy form of money, delivered to each citizen cell as a Universal salary so humans have enough energy to survive and buy its natural welfare goods, which must be classified NOT by price but by its biological usefulness to mankind, reason why we give them positive and negative values in the ethonomic frame of reference, according to its use for the 3 organic parts of humanity at individual and social level.

Since Vital, Topologic, physiologic network laws are the most important to consider when studying History in Space, as the reader can observe in the previous graph, since History, the Δ+1 scale of superorganisms of mankind follow all the exact laws of a lower organic plane – that of a biological organism, albeit, due to its 'primitive' degree of evolution is NOT a well designed organism, but one clearly 'sick', infected by 'lethal goods', with dysfunctional parasitic economic systems (as the language of reproduction of goods, money, is absorbed by a minimal number of people, or used to reproduce those lethal goods). And so the study of History as a superorganism has 2 different parts:

- On one side we can consider a perfect, efficient superorganism of History with the laws of vital topology just by imitating perfect efficient superorganisms of Nature, which *are the majority of them – History is in fact an exception – as we said a sick organism.*

- On the other side, we can study our superorganisms, as they have evolved in time, spotting their degrees of corruption and sickness of its 3 physiological systems, the life Earth, Gaia that sustains them; the economic and financial system that reproduces its goods, and the informative cultural and legal system that synchronizes its citizens cells. It is then when it will become evident what went wrong with 'human' history, one of many likely subspecies in the infinite fractal planets of the organic Universe that likely will not make it into the future…

In the next graph we can see a historic super organism based in welfare, whealthy memes that allow humans to survive, belonging to the 'ideal species' that would be efficient, provide to the 100% and survive…

History is a super-organism made of human cells, extended over a geographical body of energy called Gaia, the vital-space or body, where historic, social organisms evolve. In that sense, a human and a social organism, a nation or a civilization, have in common the elements of all super-organisms:

1. *Cellular units*. These are cells in a human body, citizens in a human society.

Networks of energy or vital space; provided by Gaia, a super-organism made of living beings, joined by a common network of visual information and networks of life energy, gathered around her 'river veins'. Since Gaia is also the living organism that hosts the social organisms of Mankind.

2. *Networks=Languages of information.* This is the nervous system that organizes cells in a body, or the verbal/visual information that organizes human societies through laws, ethics and art.

3. *Networks that reproduce energy and information*. These are sexual systems in individuals; and economical networks that reproduce goods and cultural networks that define how humans reproduce in societies. This is the blood system in a human body and the economic networks of production & transport in a society that favor 'WHealth', that is, goods that satisfy the needs of the '3 physiological networks of life-existence that make us human beings, whose 'proper frame of reference' (left) is NOT based on financial values, manipulated by financial institutions and companies that set prices, but by 'biological true values.'

So a human organism Is a population of DNA cells, related by networks of nervous information and energy (blood). And a supœrganism of history is a population of citizens, related by legal, cultural, informative and economic-energy networks 'predating' over a territorial geography, on the outer 'membrane' of planet Earth.

PART II. CALCULUS OF DIMOTIONS OF EXISTENCE.

THE 3 AGES OF ANALYSIS.

The underlying order of all structures of the entangled Universe between its S, T and Δ Components once more shows in the 3 ages of calculus, which we can terms as the scalar age, when the main question was that between parts and wholes (from Greece through Newton), the temporal age when its main focus was the description of the 5 Dimotions of physical systems (from Leibniz to Heaviside) and finally the spatial view, when its main focus is, besides the completion of the previous ages, its use to the description of mental spaces (from Gauss through Riemann and Hilbert to Einstein and quantum spaces).

Thus to put some order in such a vast subject, we shall do as usual a diachronic analysis of its informative growth in complexity in 3 ages, barely touching the essential elements of each of them; from its:

-I Age: Scalar view, from the Greeks to Newton ns Leibniz. The beginning of calculus was verbal, logic, in the Greek age, with the discussion of finitesimals (5D infinitesimals with a minimal size), and Universals. This philosophical analysis was retaken by Leibniz. Whereas the duality *of derivatives as limits vs. differentials – tangents of change (Newton's vs. Leibniz's approach), represents the duality of a minimal quanta in spacetime (Leibniz's infinitesimal) or in scale (Newton's limit), hardly explored in philosophy of mathematics, but a key concept in 5D Planes, Universal Constants and quantum physics.*

Newton on the other hand, a practical English man with little interest for the whys came to the concept through the study of limits, of power series – the scalar view, without much interest on what they meant. They whys were covered by Yahweh and his biblical studies to prove that God had sent him comets to teach him gravitation as the 'chosen one' after Kepler, who knew that 'Him had waited 5000 years to find an intelligence like his, me Kepler, to show him his clock work'. After so much evident truth, who were those humble believers to contest God's wise decisions? Leibniz though was more interested in meaning and so he did find the true finitesimal, 1/x. To the question of who copied who *the answer is obvious, and the fact is not yet resolved merely shows that mathematicians still do NOT understand the foundations of calculus in its trinity useful for Δ, S and T, the 3 components of reality. Because they came through different methods, Newton found the Δ-scalar power series of finitesimal changes that grow internally in 'speed of change' as they accumulate larger power series factors; so each summand of the power series can be taken as a scalar ever larger change per unit of time; while Leibniz found the ST geometric analysis of external change, mostly useful for locomotion vs. the higher interest of power series understood as a summand at a time, for internal change and growth.*

Both are completely different approaches that serve an essential duality between internal evolutionary 'biological' growth vs. external physical motion, which instead of opening a proper philosophy of calculus based in the whole range of changes in time (best served by derivatives), space populations (best served by integrals) and scalar growth (best served by sums of series), just brought the quintessential monologic ego centered, ænthropic man, Mr. Newton, to argue, as he had done also with Boyle, on the primacy of its 'ceteris paribus' discovery of a vast region of mental mathematical spaces, suit to study ALL forms of change=time, which truly made ¬Algebra, the queen of all experimental sciences, of which physics, given the reductionism of its practitioners is just a sub-discipline.

So as huminds still ignore that all is about the trinity of Δ, S and T (power series, integrals and derivatives) and their egocy is the only ∞ truth (Einstein), they have not yet understood what they found discoverying calculus.

-II Age, Motion view: Needless to say because power series are yet the less understood, and internal growth and biological scalar series ignored, the Newtonian approach had less obvious uses than the approach of calculating locomotions in time sequences and spatial external evident growth in intergral forms. So from Leibniz to Heaviside its methods became the fundamental applications to physics of locomotion, and its two essential dimotions, Ts, and TT (locomotion and entropy), which became the magic of calculus. While the level of complexity of Δʃð studies is maintained in strict realist basis, as physicists try to correspond those finitesimals and wholes with experimentally sound observations of the real world at the close range of Planes in which humans perceive. While the formalism of its

functions is built from Leibniz's finitesimal 1/n analysis to the work of Heaviside with vectors and ∇ functions. Partial derivatives are kept then at the 'holographic level' of 2 dimensions (second derivatives on Δ±2).

Δ will be thus the general symbol of the 5th dimension of mental wholes or social dimension and ∫∂ the symbol of the 4th dimension of aggregate finitesimals or entropic dimension.

-III Age, spatial view: from Riemann and Einstein to the present. The extension of analysis happens to infinite dimensions with the help of the work of Riemann and Hilbert, applied by Einstein and quantum physicists to the study of Planes of reality beyond our direct perception (Δ≥|3|).

This implies that physicists according to 5D metrics, P\$t x Tf=K must describe much larger structures in space extension and time duration (astrophysics) and vice versa, much faster populous groups of T.œs in the quantum realm; so 'functionals' - functions of functions - ad new dimensions of time, and Hilbert quasi-infinite spaces and statistical methods of collecting quasi-infinite populations are required in the relentless pursuit of huminds for an all-comprehensive 'mental metric' of a block of time-space, where all the potential histories and worldcycles of all the entities they study can be 'mapped'.

The impressive results obtained with those exhaustive mappings bare witness of the modern civilisation based in the manipulation wholesale of electronic particles, but the extreme 'compression' of so huge populations in time and space blurs its 'comprehension' in 'realist' terms, and so the age of 'idealist science', spear-headed by Hilbert's imagination of points lines and congruences detaches mathematical physics and by extension analysis from reality.

±¡: The digital and existential era, is the last age of humind mathematics, where Computers will carry this confusing from the conceptual perspective, detailed from the manipulative point of view, Analysis to its quantitative exhaustion. But for ethic reasons, as a 'vital humind', we shall not comment or advance the evolution of the future species that is making us obsolete.

Instead we consider a different version of calculus of change – existential algebra.

The generator equation of Analysis' ages.

If we were to make a Generator equation in time of the 'body of analysis' and its pre and post-Planes of study, we could write the 3±Δ fields of observance of the scalar Universe through mathematical mirrors:

Γ Analysis: Δ-i: Fractal Mathematics (discontinuous analysis of finitesimals) < Analysis - Integrals and differential equations (Δº±1: continuous=organic space): |-youth: ODEs<∑∅-PDEs<∑∑ Functionals ≈ < Δ+i: Polynomials (diminishing information on wholes).

The 3±Δ approaches of mathematical mirrors to observe the Planes of reality is thus clear: Fractal maths focuses on the point of view of the finitesimals, and its growing quantity of information, *enlarging the perspective of the @-observer as we probe, enlarging smaller Planes of smaller finitesimals; and in the opposite range polynomials observer larger Planes with restriction of solutions, as basically the wholes we observe are symmetric within its internal equations, and the easiest solutions are those of a perfect holographic bidimesional structure (where even polynomials can be reduced to products of 2-manifolds).*

Now within analysis proper, we find that the complexity or rather 'range' of phenomena studied by each age of analysis increases, from single variables (ODEs) to multiple variables (PDEs) to functions of functions (Functionals).

So the most balanced, extended field is that of differential equations focused on the Δ±1 organic (hence neither lineal not vortex like but balanced S=T), PLANES of the being, where we focus on finding the precise finitesimal that we can then integrate properly guided by the function of growth of the system. And we distinguish then ODE, where we probe a single ST symmetry or PDE obviously the best mirror, as we extend our analysis to multiple S and T dimensions and multiple S-T-S-T variations of those STep motions; given the fact that a 'chain of dimensions' do not fair well beyond

the 3 's-s-s', distance-area-volume dimensions of space and t-t-t-t deceleration- lineal motion-cyclical motion-acceleration related time motions that can 'change' a given event of space-time.

So further ODE derivatives are only significant to observe the differences between the differential and/or fractal and polynomial approaches - this last comparison, well established as an essential method of mathematics, worth to mention in this intro.

A space of formal ¬Algebra thus is a function of space, which can be displayed as a continuous sum of infinitesimals across a plane of space-time of a higher dimension.

In such a geography of Disomorphic space-time the number of dimension matters to obtain different operations but we are just gliding on the simpler notions of the duality ¬Algebra=polynomials vs. Analysis: integrals of infinitesimals.

Yet soon the enormous extension of 'events' that happen between the 3 Δ±1 planes of T.œs as forms of entropic devolution or informative evolution across Δ±i, converted analysis in a bulky stience much larger than the study of an ST-single plane of geometry, the 2 planes of topology and the polynomials of ¬Algebra - which roughly speaking are an approximation to the more subtle methods of finding dimensional change proper of analysis - even if huminds found first the unfocused polynomials and so we call today Taylor's formulae of multiple derivatives, approximations to Polynomials.

Since Derivatives & integrals often transcend planes relating wholes and parts, studying change of complex organic structures through its internal changes in ages and form.

Polynomials are better suited for simpler systems, Planes of social herds and dimensional volumes of space, with a 'lineal' social structure of simple growth.

So in principle Analysis was a sub-discipline of ¬Algebra. But as always happens, *time increases the informative complexity of systems and refines closer to a better linguistic focus with finer details the first steps of the mind. So ¬Algebra became with Analysis more precise, measuring dimensional polynomials and its finite steps.*

In any case such huge size of Δ-nalysis is a clear proof that in mathematics and physics the ΔST elements of reality are also its underlying structure.

As such since Δ-Planes are the less evident components of the Universe, Analysis took long to appear, till humans did not discovered microscopes to see those planes but while maths has dealt with the relativism of human individual planes of existence, philosophy has *yet to understand Leibniz's dictum upon discovery 'finitesimals', 1/n, mirror reflections of the (in)finite whole, n: 'every point-monad is a world in itself'.* Analysis was already embedded in the Greek Philosophical age, in the disquisition about Universals and Individuals. Thus a brief account of Analysis in its 3±1 ages, through its time-generator:

Ps (youth: Greek age) < St: Maturity (calculus) > T (informative age: Analysis) >Δ+1:emergence: Functionals (Hilbert Spaces)<Δ-1: Humind death: Digital Chip thought...

Whereas its 3 'Planes' are: Δ-1: Derivatives > ∫Δ: integrals > Δ+1 differential equations.

Thus Analysis also studies the scales of the 5th dimension and its evolution of parts into wholes.

Derivative vs. integral in time and space.

Derivatives & integrals calculate ratios of change in the 3 elements of reality, space, time=change and its Planes, *ΔST The main error of 'axiomatic' analysis is to force continuity, infinitesimals and infinities, without considering the discontinuous limits of derivatives and integrals of parts and wholes between planes of existence.*

Leibniz vs. Newton already argued what is an infinitesimal part, the *unit* of derivatives. The answer in a Universe, which is a fractal scalar system of stœps of space-time, S<T>S, or S=S=S, T=T=T, is a minimal quanta in SCALE, TIME or SPACE, which by virtue of 5D metric, SxT=K, will be a 'minimal unit' on that equation (Min. S x Max. T), for the quanta of space, Min. T x Max. S for the quanta of frequency, or minimal cyclical bit of information.

So for example the inverse, ƒ=1/T of a long duration in time, will be its short quanta. The inverse of a population, taken as a whole, 1, 1/n will be a scalar space quanta. So all systems have *an infinitesimal, which is a cut-off limit, NOT really an 'infinitely small' (an error of the continuous dogma of the axiomatic method), but a 'finitesimal'. So we can obtain through a derivative a finitesimal unit of time, space or scale, a minimal action, a minimal point-volume or a minimal cellular quanta.*

And for that reason we can approach finitesimals with 'differentials', which become the minimal 'lineal steps' of a long curve. And for that reason we can use 'affine functions in space' and lineal approximations, as by definition the shortest path between two points is a line, and so in a discontinuous Universe of Stœps, quanta are minimal lineal units; minimal fractal points of a population or a whole.

It is a complete overhauling of the dogmatic attempts to prove the 'hypothesis of the continuum', but it is not my fault that humans are so off-track with the reality of the Universe as it is, not as their ego tries to impose.

The minimal quanta of Δ-1 space and time. Chains of Dimotions expressed as chains of equations.

Derivatives are the essential quantitative minimal action absorbed by any Tœ, (ab. space-time organism).

Integrals then sum a minimal derivative quanta in space or a minimal action in time for any being in existence.

They are best for spatial growth of information as the 3 st-ages or st-ates of the being through its world cycle of existence, *have discontinuities or changes of phase that cannot be integrated. Hence* time sequences are better studied with existential algebra. Further on sequences can be come more complex, if we consider tridimensional actions as combinations of S and T states, stt, tst, tss, sss which is the origin among other things of the 3!=6 variations of species according to hierarchy on its physiological networks studied in trinity.

Further on, and this will constantly be the limit of mathematical analysis of reality, we should stress once more than the larger more complex actions of gender reproduction and social evolution are qualitative, taking place both in longer time spans and longer spatial surfaces – hence better described with qualitative logic languages.

So existential algebra studies in depth the qualitative connection of the a,e,i,o,u actions between Planes. That qualitative analysis at the larger scale and for sequences that imply changes of state cannot be overlooked and require the approach of existential algebra.

And calculus is its mathematical, analytic development (quantitative understanding of 1st second and 3rd derivatives - extracting '1,2,3 Dimotions' from the invisible gravitational, light space-time or feeding Planes.

The limit of calculus however is bridged by the fact that the other families of social operands ($\pm$, x÷, x^a can reflect better the 'social re-product-ive actions'.

So another duality way to differentiate algebraic operands is to consider that classic polynomial operands mirror social complex actions, and calculus operands reflect better also in 'trinity scales' (3 first derivatives or ternary integrals) the simplex actions. Each Operand specializes in one Dimotion (angular sine/cosine in Perception, $\pm$ in back and forth locomotions, x ÷ in complementary and social evolution, log x^a in reproduction) and OVER all of them a new Plane of existence is accessed by analysis. So operands guide the mathematical equations through a vital process of stœps (stops and steps) and will allow us to 'vitalize' equations, as we have done with points with 'numerical parts' as the essence of a mathematical T.œ

¬Æ thus sets a limited number of logic propositions that can happen when a system or group of T.œs interact through its 5 Đimotions, as an point of view, can potentially change its state between those 5 Dimotions, and the limits of its

function of existence, such as the being can only exists without permanent disruption of its 'vital constants', (conserved energy, angular and lineal momenta - energy and membrain). All systems can exist with the infinite cut-off limits of space (membrain) and time (death), which are set as part of the fractal Universe. Only the whole if potential or real in existence can be talked off as a function of infinity but not perceived.

So a point will start any of the 5 Đimotions and we need formal symbols to address the Đimotion of any being in existence, and the states of switch between Đimotions.

Does the being stop before switching Đimotion? If so it would simple to establish then for each sequential steps of a being:

Δ¡ Đ1,3,2,4,3.... and so on as a simple 5 letter process of the actions of a being (whereas 4Đ entropy refers to feedings not dean, only in it final state being 'that entropy'... So we know all sequential of a being ends in 4Đ.

Can then we run a sequential for any species through its life as a complete deterministic sequence?

There is there the sequence of all sequences, the perfect worldcycle=life sequence?

Questions those for advanced existential algebra.

RECAP. Actions in timespace are the main finitesimal part of reality, its quantity of time or space. In pentalogic operands mirror as actions the 5D vowels (a,e,i,o,u) that define the five dimotions of existence. In calculus they first extract the minimal timespace quanta of the actions of the being, integrating them across a population of space or a length of time. Thus actions vitalize the operands of calculus, relating them to existential algebra.

The fantasy of the continuum substitutes the reality of discontinuous sum.

The age of calculus represents a great advance over simpler polynomial operands and statistical≈T-probabilistic methods of studying, the parts and wholes of a system; and its S=T interaction between its spatial form and temporal motions; as it differentiated by studying the change of each of the previous 5 Dimotional operands of algebra, all modes of change=time natural to any system of the Universe – as the best mathematical language that mirrors them.

This duality of Δ-scales and S=T dimotions represented in algebra by numerical systems and operands was studied in a bulk manner with polynomials and S-tatistics=T-probabilistic methods that appeared first, using inverse scalar operands on the ladder of 3 scales of numbers, the sum, the product and different exponentials and inverse roots and logarithms - which reduced the range of exponentials to the 3 scales that matter to the Universe, the Log_{10} or social evolution of triads into 3x3+I new decametric scales, the exponential Ln of maximal growth or death=decay and the log_2 or 'power set' of all parts of a whole.

Probability showed in time (frequency events) or space (statistical populations) that events were not perfect, but accumulated errors in its reproduction, shaping a normal distribution often converted into an entropic population of disconnected individuals forming herds or events that withered away due to those errors of reproduction, when trying to reproduce the perfect mean; *to form an identical statistical 'boson' species, a perfect form that transcended scale – a feat of becoming a whole Δ+1 that was* only achieved in Dirac's distributions by immortal point-particles or resonances that amplified the perfect information of ∑ finitesimal 0's to become the whole Δ+1.

But what about all the range of variations between the entropic Gauss curve and the Dirac perfection? All the different specific actions of species acting in holographic Ts, ST, St dimotions that were neither perfect resonances of evolving form, or disaggregated herds of entropic aleatory motions?

This required to calculate the finitesimal form of change=time of each specific dimotion of the Universe mirrored by each specific operand, and add a given number of 'stœps' that measured the repetition of such minimal dimotions of a t.œ in a given length of time or volume of space to get the outcome of an existential dimotion.

Thus by calculating each finitesimal and then integrate it through the entire interval in space, time or scale in which it was performed, calculus gets a more accurate depiction of the whole event, no longer an entropic aleatory change, but a purposeful action. And because both derivatives and integrals could be done in space, time or scale, all the range of possible variations, could be studied, regardless of complexity, from changes of time, to variations in space represented as 0' actions =, δ->0'; happening in minimal time (Lagrangians)…

The detail and specification reached by the finitesimal of an specific dimotion=operand of time=change; either angular perception – sin/cos; social evolution, ±; re=production or locomotion as reproduction of information, x÷; entropic decay and growth, e^x, made calculus the queen of all operands, almost a magic tool, as its foundations were ignored.

Mathematicians unable to understand time=change invented the concept of limit and the continuum to form a pedantic scaffolding of axiomatic truths which had nothing to do with the reality of calculus. So we have to clarify that concept. As all is perception a continuum is merely a sum of discontinuous stœps in which part of the whole process is hidden by the selection of information by a mental space. So the fantasy of the 'continuum' can be reached when the detail of each stœp is ignored, and we obtain only the measure of a relative infinity, $\propto$, of such steps summoned up, ∫, to calculate the whole change in the long time period, T, or total domain studied. And that is fine, as long as we understand that in detail the continuum is made of a sum of discontinuous stœps of change, we call finitesimals.

In a process of calculus thus the sum is 'smoothed', eliminating the 'stop' states, by reducing to the minimal 0' the size or rate of change, so they cannot be seen in detail but can be 'integrated' in a long period of time, obtaining a meaningful result for the Δ0 scale of the experimenter, which only went down to Δ-1 to be able to calculate with accuracy ∑Δ-1=Δº - the emergence of change in the size scale of the experimenter.

So in the same way we care little for the Δ-1<Δø stage of the seminal reproductive fetus – to the point humans have the right to 'murder' it, as long as it is not an emergent child, the observer cares little for the finitesimal, ¡ndifferent to him. And yet imprescindible for the whole to be=come.

This 'goal oriented' view of Nature is common to most beings; hence calculus became a much better method that discrete probabilities of change. Since the cumbersome reality of each stop and step of a dimotion that had to be analyzed in each individual stœp as it happens in the Δ-1 reality could be simplified to facilitate the study of changes through a longer period of time.

So calculus was enormously advantageous to calculate long stretches of time periods and space volumes at the human scale with minimal loss of detail, providing that the philosophy of reality made of stops and steps was not forgotten. Or else we would enter into an idealization of reality confusing the mathematical mirror with the Universe as it is. But that was precisely what it happened. Since the essential error of all minds is to confuse the Universe they don't fully perceive with the mind that reduces it.

So the wrong creationist solution was taken as truth, obscuring our understanding of the principles of reality. So pundits of calculus ignored the nature of finitesimals of change, and its small stop and motion, S<T>S beats.

So when you study calculus they apologize for reality as it is - a series of thin steps and stops, of small finitesimals to add. And consider discontinuity – the real broken space-time an approximation to idealist simplification of a continuous graph that looses information about each finitesimal stœp. Instead the artifact, the continuous function is considered the truth and reality a method to reach the ideal truth.

As the graph of Descartes, the artifact, became the nature of space and time, the substances of which we are all made. And suddenly humans were not longer made of cyclical time and fractal space, broken by the limit of a membrain, but God had drawn a Cartesian graph below as background absolute Newtonian lineal spacetime – something most scientists still believe due to creationist mathematics, and the egocy paradox that confuses the mind language with reality itself; the simplification of calculus that smoothed the finitesimals became reality.

Fact is h finitesimals are real, and never reach a 0 that doesn't exist as horror vacuum works, and so mathematicians should teach reality and then acknowledge that the experimental language of mathematics simplifies that reality; and that is Ok for practical reasons. Not the other way around.

When I was a wonderkid before high school I had a math professor who came one day worried about the fact he had to explain us the 'limit' of h->0 and thought his students wouldn't understand. Of course students never understand a dot of it, just memorize and say they understand. *But I understood it was all wrong. Thus he ended up throwing me out of the class (: when I told him, the limit can never reach 0. Since If nothing exists, there is no way to define it, hence calculate it. Nothing might be anything. Only if something is no longer zero but leaves a trace we can define it. So I told him undefined things should not be the realm of an 'exact' science.* That blew him away and having no answer he resorted to authority (: So I was kicked out as I wouldn't ever yield to authority but reason. It was my first realization that when humans don't understand something or something is wrong but they want it anyway they put up a dogma, a postulate, a pedantic definition or 'self-evident axiom' (:

Fact is if h->0 makes an equation undefined, h *must stop before it looses the quality of the whole – hence h is the last atom, last cell, last frequency, last temperature vibration*.

As he just ignored me with the pretentious authoritas of an old man who doesn't see an elephant in the drawing of a hat, le petit prince has to search for himself. Which is what I have always done. So the question is where to stop a finitesimal portion. And the answer is as we said, before it becomes random, ¡ndifferent.

For example e is defined as $(1+1/n)^n$. Yet if n is ∞, the parenthesis is 1+ 0 .0000000… up to infinity. And those are undefined limits of reality.

Physicists at least acknowledge physical laws are idealizations of reality and that is Ok (even if they deny non-mathematical properties that 'cannot be measured as tge organic and sentient properties of particles, the units of life). So their egocy paradox is a bit different from that of mathematicians with its axiomatic truths.

Still more profound mathematicians do understand a continuous function as one in which S=T happens, so the X and Y coordinates do not make very different changes, and stœps of 'present' can be put one after another. Or as Leonardo said: "The instant does not have time; time is made from the movement of the instant. In rivers, the water that you touch is the last of what has passed, and the first of that which comes. So with time present. Observe the light. Blink your eye and look at it again. That which you see was not there at first, and that which was there is no more."

As the second, the glimpse of an eye is the quanta of human present, there is always for all timespaces a quanta we shall call an instant of time-present or a finitesimal of populations.

And when the ratio of change in time, its quanta, is balanced to the minimal form of space it change, so in an S=T graph each point-position-stop of the moving-step function is close, with a 'tangent angle, s/t' that can be smoothed in a series… the sum of discontinuous stœps of a dimotion, can be measured as a continuous, larger stœp of space-time of a larger Δ+1 scale.

Thus continuity is not the limit in which h->0, but the limit in which S≈T.... and hence an instant of present change that is harmonious between the S and T components of the being that doesn't change internally but only externally (as S=T remains unchanged) takes place.

This has deep implications, as it implies that *the system is continuous because it lasts, and it lasts because its 'actions' tend to zero internal change, becoming conserved cycles of energy for the inner structure of the being. Changes thus are always 'returning to balance'. And when change is extreme, as in an internal x external TT-entropic change, the system collapses, the 'tangent' tends to zero or infinite in the Y(s) or X(t) axis and the 'function ends'. Which implies that calculus works on the St, ST and Ts dimotions of locomotion, information and energy=reproduction, NOT on SS-form with no change or TT-absolute change with no form.*

For example, the first dimotion to calculate as change was the space traversed by a system which in detail is just a series of steps, which add to the space traversed, λ(s) x f (t)=S. This give us a lot of detail in numerical approximations if we further break it to a sum of steps, ∑ λ(si) x ∑f (te)=S.

So the more information we want, the more detailed the discontinuity becomes, till we can indeed add each 'fractal step' with all the information, length and time duration of each step. But we don't want that much information, so we can simplify with 'statistical means' since as we have seen in statistics, the law of great numbers bring a mean for each stæp and that is the justification of simplifying into continuity – NOT the non experimental idealist, mind-generated, creationist hypothesis of the continuum.

So it is fine to be humble and marvel at the fact we can 'transcend' the Δ-1 finitesimal scale, into parameters of the whole by making ¡ndifferent the information at Δ-1 through statistical methods that average each step, erasing the uneeded information on each stop (when the motion touches the floor, or the mover looks and gathers information). But when trying to understanding paradoxes such as the speed of light constancy, as each electron emits light in a relative entangled stop position to the perceiver that measures its speed, hence in a stop distance, (Lorentz transformations) it is good to know that there is no magic on it. And the 'idealized' form is the mathematical transformation that eliminates the stop state of the electron for a continuous motion we do NOT observe in Nature (the electron is always observed as a stop particle when emitting light, and moves in zig-zag as if it were all the time calculating its trajectory in a stop position).

The methods of calculus are awesome and once we realize the cruelty of the Universe that cares nothing for the differences between the ¡ndifferent finitesimals of a mass-group herded and ruled by the Δ0 larger scale by mass-methods, including humans as we show in the models of history and economics herded today by financiers with credit ratios established by anonymous big data computers, herded by politicians with equalizing laws for each 'social class', herded by military as soldiers or numbers of a concentration camp… and past over the thought that each atom might be a galaxy of its own, and dare to explode it in an accelerator with other atom, which might on the microscopic scale provoke the biggest genocide of infinite relative planets, and connect with the Tao and feel just to be, Δ@st, which matters nothing and worship the ¡ogic of GoÐoG the inverse Dimotions of existence, we can rest in peace, R.I.P. as dust of space time that dust shall become. And so calculus…

The methods then are well known and we cannot but make a few comments beyond the philosophy of its science, which is the main purpose of 5D mathematics in this simplified texts. We just need to calculate a finitesimal, which was the first thing discovered in the '1ˢᵗ age of calculus' and summon them up to get the whole, which was first done as in reality, with the exhaustion method by the Greeks.

Yet the finitesimal 0' in itself is important as it give us information about the rate of change with a single number, the tangent to the curve. Since we can apply to curvature in space its synonymous in time – speed - when we realize that s=T means in terms of curves the curve's tangent representing the 'speed of change' S/T of the function. Further on as SxT=C, means that the smaller space is faster in time cycles, the more curved a cycle is the smaller it becomes and the faster it moves (vortex equation, acceleration principle in Relativity over a curved space). So we also realize, the second tangent of the curve is the acceleration of change, y", increased as the system curves further.

Many more wonders then kept appearing in calculus as we play with S=T, SxT=C 5 Metric laws, and see them through calculus; specially considering that most curves are the functions of existence of an event between its 0' points of initial and final conditions. And so what we shall do in this brief introduction to 5D calculus is to highlight for the seemingly most simple equations of calculus the underlying insights they provide on the processes of time change of the 5 DImotions of the Universe.

We shall do it in a historic, easier to understand narration, as indeed, the first thing a language sees is 'space', and 'reality as It is' in its simpler terms. So the first age of calculus was that of the search for finitesimals both in praxis and meaning, wrongly resolved in favor of the concept of absolute zero and limit, then mathematicians erased uneeded

information on those finitesimal steps and stops establishing the method of tangents and continous sums, ∫, and then applied those functions of breaking a whole into parts to re-build it to specification to the different dimotional operands from the sin to the exponential of maximal change, marveling that the limit of change per unit of frequency time was the change of the whole, that is the equation of death in which the whole dissolves into its parts in a single quanta of time, the negative exponential so ever pervading in studies of entropic death. Of course they understood none of it – they still don't, but the method worked to mirror the dimotions of reality, which they neither understood in an orderly manner. So calculus became magic. And as it got more complex, as the Universe does by repetitions, transformations, scaling into more complex 'packages' of parts, to the point that I could say, as Einstein put it – I don't understand relativity since mathematicians got into it (: I don't understand calculus since mathematicians got to it :) . That is calculus today is so complicated in its more powerful and detailed analysis that only a computer can calculate its results. Which ultimately try to anticipate the future of change in a synoptic manner by transforming sequential patterns of change into parallel simultaneous spatial components (multiple variables in PDEs), happening in multiple points of view at the same time, to gather into a whole result, which is still impossible for the most intelligent, liquid states of multiple changes (Navier stokes equations) unless you trick it with a faster digital mind, which will do those calculus for the slower humind, jumping as we always do past the intermediate sequential steps from beginning to end.

The proper concept for finitesimals. Reproductive unit of change.

The great advance of calculus in the understanding of ΔST changes is the concept of a finitesimal of change, h, which in the symmetry between scales, populations in space and time frequencies has the same role: to increase a 'seminal' unit, the system (or decreate in inverse fashion), becoming the Unit of reproduction of an Δst system, at a point in which s=T.

In the Universe the *fundamental form of change happens when S=T, the function of present time finds a balance and symmetry in scal,e form and motion that triggers the reproduction of the sytem and its 3 parameters.*

Latter we will study, the simplest case of polynomial reproduction, whereas an X^2 has as unit of change, 2x; which means the square grows through both sides reproducing its form, in 's=t' balance, in a manner that the square preserves its form.

The method of calculus.

How differential equations show us the different actions of the Universe?

The correspondence to establish is between the final result, the åction, and the finitesimal quantas, the system has absorbed to perform the action, ∫∂x, such as: å= ∫ ∂x, whereas x is a quanta of time or space used by Δø, through the action, å to perform an event of acceleration, e-nergy feeding, information, offspring reproduction or universal social evolution.

It is then when we can establish how calculus operations are performed to achieve each type of actions.

First we notice that the space between the actor and the observable quanta is relative, so even if there are multiple Δ-planes between them the actor will treat the quanta as a direct finitesimal, pixel, bit, or bite which it then will integrate with a polynomial derivative or sinusoidal function that reflects the changes produced.

We will consider in this introductory course only a few of the finitesimal ∫∂ actions where the space state is provided by the integral and the ∂ finitesimal action by the derivative.

Derivatives point out to *the main consequence of the sum of those actions in any being in existence, namely the fact that its sums tend to favor growth of information on the being and then signal the 3 st-ages and/or st-ates of the being through its world cycle of existence, which in its simplest physical equations is the origin of... the maximal and minimal points of a well-behaved function.*

So to establish the action - the final result – we have to isolate the finitesimal quanta/moment of spacetime the system has absorbed to perform the action, ∂x, and integrate them over a surface of space or a length of time, such as: **å= ∫ ∂x,** whereas x is a moment/quanta of time or space used in repeated frequencies or quantities, ∫∂x, by Δø, through the action, å to perform an event of acceleration, e-nergy feeding, information, offspring reproduction or universal social evolution.

We can then establish which operand is best suit to perform each type of actions. I.e. the action of reproduction, most often is expressed for quantitative simple physical systems through the operation of re=product-ion.

We ascribe each operand to a single dimotion, but they are 'once more' entangled operations, which besides its preferential Dimotion, do participate of all the others - remember languages as mirrors of reality have also the same entangled properties of the pentalogic, ¬Δ@ST universe, looking at all its elements. So we shall now analyze them in more depth.

We establish direct relationships of operands and actions- taking into account that for each operand we must also distinguish the dualities of 'space-like integral of volumes and its derivative quanta' and 'time-like moments of motions and its frequency sum to complete a o-sum worldcycle'. And to achieve those balanced 0' sums finally we need to define inverse operations for all actions. So we depart from a ceteris paribus analysis and search for a finitesimal, and then we must study how they merge and entangle in space and time. This is done generally speaking, with a *first partial derivative in space or time (PDE) defines those dimotions only as S or T, while the integral of double derivatives put both processes together, to find the whole action*: **å(st) = ∫∫dsdt**

However as all planes of existence have discontinuities beyond its minimal quanta and larger whole, analysis through multiple Planes beyond those of Δø<<∑Δ-1 entropic death, tend to be distorted.

Still they can be studied with power polynomials and further approached (Taylor series) with ∫∂ operators that cross planes of existence for certain highly symmetric actions across*.

But again it is best to use existential algebra, as the fundamental limit of the mathematical language is one of synthetic understanding of the organic vital laws of the Universe, reason why theories that are only mathematical in the largest scales and do NOT understand that there are not equations that go to infinity, as all have a limit that brings a change of state, such as the big-bang theory of the universe, are false.

Reason why systems do have besides spatial mental spaces of 'calculus', a long-time range language of logic nature to express the vital games of worldcycles, and this is the function of existential algebra, we study first to then consider the basics of Calculus.

Finally in this brief introduction to notice a 'revealing' fact of the inversion between finitesimals and integrals. As the absolute arrow of time-future is social evolution of parts into wholes, while a function has *only a derivative, that is, all molecules can be reduced to a set of atoms; all living beings to the cell; the opposite is not truth: creation of complex futures is multiple. So an integral has a C variational constant and a differential equation multiple solutions: the future is open, the past is only one.*

RECAP. Analysis studies the finitesimal quanta of time, space and scale; NO ∞ in its smallness – an error of the mind Px. searching for continuity. A true philosophy of calculus thus deals with the meaning of 'finitesimals' in space, time and scale, as a first 'seed' of a 'clone species' multiplies, creating the regularities of 'social numbers' that make 'analysis' to work its 'magic. Integrals in inverse fashion act after 'calculating' this minimal point, often as a 'lineal shortest step' (differentials), to reach the final 'whole value' of the system. The beauty of the field revealing the nature of dimotions and its wide applications, thus will require an entire II book on 5D mathematics, which should r=evolve the discipline.

Thus *only the integral and derivative can study all those dimotions of space-time, hence they are the king and queen of the operators of ¬Algebra, reason why analysis is so extended.*

Below, Analysis' multiple perspectives on the 5 Dimotions= functions of existence & 5 simultaneous structural elements, ¬Δ@S≈T, that conform all systems in time and space. So 3±D¡ points of view (trinity or pentalogic) finds a higher truth & applies to all languages mirroring reality as analysis does:

S-topology: *Analysis is used to study (left) structurally the role of the 3 elements of a topologic spatial superorganism: Its membrane's curvature and tangential value (line integrals), its vital space (surface integrals) and singularity (derivatives).*

Δ-Planes: *Its inverse operands study 5D Planes: derivative measure the value of 1 of its infinitesimal 'cells'. Integrals give us its internal volume of* **spatial** *energy.* **While** double derivatives peers down 2 Δ±1 planes

$$\frac{d^2 y}{dx^2} = \frac{d}{dx}\left(\frac{dy}{dx}\right)$$
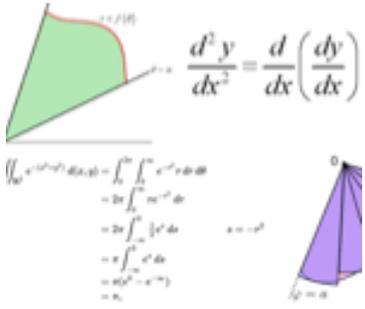
@: *We extract information on its central **@**-singularity, which commands the lineal motion of the whole system.*

Time-cycles: it can model the *standing points, maximal and minimal, which signal the changes between ages, where the derivatives, become null, as the 'world cycle of existence' changes its 'phase'.*

THE DIFFERENT GEOMETRY AND METHODS DEPENDING ON DIMOTIONS.

Because calculus is about Dimotions, and mathematics mainly about space, it follows that calculus studies mostly *the 2 dimotions with a larger content of T, TT-entropy and Ts-locomotion. While it has also an important role due to its understanding of S=T, finitesimal change, in the present-reproductive growth.*

It is however of far lesser use to study SS and St, changes in information, though sinusoidal operands give us insights on it. It is then obvious that for a future 5D researcher, if there is ever anyone besides this writer, the observance of the structure of an equation of calculus and its geometry will give insights about the type of dimotion it studies; since there are some basic differences between them:

Ts-locomotion: A clear difference happens at first sight between a simpler analysis of locomotion, which concerns a single point-like form through space in sequential, lineal time, as there is no internal dimotion, and the T.œ can be treated from the point of view of its mind-whole singularity (so for example a moving rock, regardless of rotations in its lineal motion can be treated as the motion of its gravitational center)

- Entropic motion on the other hand is a dual motion, internal and external to the being. Entropic motions then are easier treated if we consider the point of explosion or death as a fixed point (which is often the case as entropy happens after death, which leaves the whole system unchanged in motion). Then we shall observe that the integral of all the motions of the entropic system remains zero, because the negative sides of the frame of reference cancel those dimotions in the positive side, which is essentially the meaning of death, *and so the fundamental change of an entropic motion happens in the volume of space of the system which is where the internal dimotion of the being ends up, transformed into an external dimotion.*

- Reproductive growth coincides with entropic motion in the factor of expansion in space. However reproductive growth is a real growth that fills space, NOT merely expands the distribution of its Δ-1 elementary parts on the background Δ-¡ space. So the differences with entropic motion are easy to spot: Reproductive growth does NOT change the density of form in the vital space it fills. Entropic motion becomes rarefied in its dwindling density, a bubble that expands and then dissolves. Reproductive growth is far slower, unless it happens in a truly friendly dense in energy placental world where it happens in a geometric 2^x factor of maximal growth; but even then it will seem slower than a big-bang if the speed of death is fast. And as death is a collapse in a single quanta of time, two scales down, Δº«Δ-2, almost all process of death and decay expand faster in space.

 What about systems of multiple time-changes, 'PDEs' so to speak not in its how but why existential processes?

Combined reproductive and entropic motion. There is the most important case when *we observe a dual sequential process, in which first the death of the system does not seem to change in space, as growth is internal through the radiation of the 'predator' species.*

This happens in cosmological big-bangs (beta decays, quasar big-bangs, novas and the hypothetical false cosmic big-bang, studied on physical papers), when the death of the system is due to the birth of a denser form of matter (strangelets in silly-nilly planets like Earth that do accelerator experiments or star novas, top quark quasars in BCB stars=black holes. A similar processes, whereas *death is parallel to the growth of the predator species, inside out (organic death). In all those cases; in its first time sequence, the system becomes less motile and often shrinks in size, as it is being carved inside out, and then in the second phase it explodes in a single quanta of time, as the faster, smaller form or herd of forms spreads on a larger space.*

In praxis then you can act as partial differential equations do, just performing two sequential calculus because and that is the beauty of the Universe that facilitates its comprehension as we have repeatedly stated in all our paragraphs on existential time, at the level of actions, we follow a series of finitesimal steps which seem to be continuous (concepts clarified in the next paragraphs). So the dua dimotion of a new form feeding in a T.œs body, to then explode it an expand, $ST_x»SS_y«TT_x+Ts_y$ written as a sequence of existential algebra (a body ST_x feeds a new species in its seed form, SSy… that will walk away Tsy as the form collapses in entropy TTx); becomes a series of partial derivatives.

In the *deepest sense this is the existential why of the methods of calculus of partial derivatives and the key difference in the concepts of continuity in classic calculus and 'stœps' of discontinuity, in 5D calculus, bridged with the common concept of a smooth transition throu*

gh finitesimal changes, which in reality are discrete (the body corrupts in discrete steps even if as the bacteria grow expenentially each step is larger), but from a higher point of view ¡indifferent to the detail can be calculated as long as it is smooth.

It is also the reason why both, reproductive and entropic motions can be described by $e^{\pm x}$ functions which are the maximal 'rate of change' (as the derivative is equal to the function, and since $\partial x \leq x$, is maximal).

The e function has so multiple meanings precisely because of the 'horror vacuum' and thirst for existence of its spatial fractal points. So it can also be used in its imaginary form, which as the name indicates is related to the creation of 'mental SS=§paces', in its e^{xi} form, connected to the sinusoidal functions, in which we can observe, as in AC currents, a back and forth motion=translation in space, coupled with a rotational perceptive motion. In those rotational motions, the complex plane and exponential function is so useful because what perception IS really doing is 1) collapsing at the fastest possible rate the Universe into the finitesimal mind-mapping of the point (hence the e^x function involved); it does so *with a clear bias in favor of the length dimension of the focused perception, while the i-dimension of height is greatly compressed to fit the system (hence the usefulness of a frame of reference where $Y=\sqrt{x}$; and finally it does so in a periodic pattern, scanning back and forth the same worldcycles to convert them into mental space; hence the recursive use of $\pm sin$, cosine functions involved.*

Let us consider this essential equivalence of mathematics in more detail.

Connection between exponentials and sinusoidal functions: derivatives as angles of perception.

One very realized role of a derivative as a tangential division of the height in the dimension of information and distance-lineal motion to the observer is a measure of the angle of the being, which recedes in spacetime till reaching the non-perception as a relative finitesimal out of the territorial mind- world of the observer, which connects directly derivatives with the 1D first dimotion of perceptive existence. The being might still be of certain size but as a fractal point he has receded in the mental-space of the world of the perceiver.

The first 'timespace' numbers: Polygons as root of unity

By their very nature, as numbers that probe planes of the fifth dimension, exponentials are closely related to the complex plane. Let us consider only one case, de Moivre numbers, which are any complex number that gives 1 when raised to some positive integer power n:

An **nth root of unity**, where n is a positive integer (i.e. n = 1, 2, 3, …), is a number z satisfying the equation:

They are complex numbers (including the number 1, and the number −1 if n is even, which are complex with a 0' imaginary part), and in this case, the nth roots of unity are:

In mathematics, a **root of unity**, occasionally called a de Moivre number, is any complex number that gives 1 when raised to some positive integer power n. Roots of unity are used in many branches of mathematics, and are especially important in number theory, the
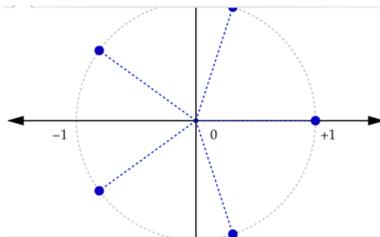
This formula shows that on the complex plane the nth roots of unity are at the vertices of a regular n-sided polygon inscribed in the unit circle, with one vertex at 1. This geometric fact accounts for the term "cyclotomic" in cyclotomic polynomial; it is from the Greek roots "cyclo" (circle) plus "tomos" (cut, divide).

Euler's formula, e^{ix}= cos x + sin ix which is valid for all real x, can be used to put the formula for the nth roots of unity into the form: $e^{2\pi i \ k/n}$ 0≤k<n. Which is a primitive nth-root if and only if the fraction k/n is in lowest terms, i.e. that k and n are coprime.

We find therefore the first timespace numbers, in the roots of unity. And as such they will become 'the creative process' of dividing the 'whole', 1, into cyclical 'tics of

time' of increasingly faster frequency, in a progression, for k = 1, 2, …, n − 1, which will generate the frequencies of all clocks of time, till reaching the circle, which can then be considered in bidimensional spacetime, the 'Infinite clock, of infinitesimal time tics'. Do have those infinitesimal ticks a 'limit' as all relative infinites do? In physics it is believed the minimal tick will be 10ˆ43 or Planck's time, which therefore would become the limit of 'points' that form a time clock.

Another fundamental theme being the reasons why the 'clock' is counterclockwise in its direction, as it will also be its complex representation in 4D relativity theory. The reason being that in Planes of the fifth dimension, as we create new dimensions from the lower planes with more entropy, the emergent dimension 'sucks' part of the entropy of lineal space of its lower dimensions, 'contracting' it as it rises on height. I.e. a pi circle is made of 3 'curved' diameters (with open holes between them), but it does not measure 3 but 1 in the length dimension.

It also means we are adding a new time dimension, with a negative entropic property for the 'dimension of real space', which therefore can be written also with the number of entropy, e,

4th scalar Dimotions of Entropy

A theme them of profound importance and depth of meaning is the relationship between the sine and cosine functions that allow an angular perception of the whole and the exponential function that reduces the whole to its decaying elements (Euler's formula). We could say then that the whole is 'split' between the entropic negative exponential part that is discharged, and the sinusoidal, informative elements that are absorbed by the mathematical mirror mapping.

It is interesting to note the connection, which occurs between the exponential and trigonometric functions when we turn to the complex domain, through series, since both functions can be approached by exponential series. If we replace z by iz, we get: $$e^{iz} = 1 + i\frac{z}{1!} - \frac{z^2}{2!} - i\frac{z^3}{3!} + \frac{z^4}{4!} + \cdots.$$ Grouping everywhere the terms without the multiplier i and the terms with multiplier i, we have:

$$e^{iz} = \cos z + i \sin z.$$

$$\cos z = \frac{e^{iz} + e^{-iz}}{2}$$

Similarly we can derive

$$e^{-iz} = \cos z - i \sin z.$$ Euler's formulas solved for cos z and sin z, get: $$\sin z = \frac{e^{iz} - e^{-iz}}{2i}$$

As we said the key insight of 5D in power series is the understanding of them as a series of 'sequential steps' in the $\nabla\Delta$ dual scalar growth and diminution scales of the fifth dimension, whereas the ± summand element represents a step in time-change, a 'period' of a frequency of growth and diminution, but in the case of the use of an I factor it creates a sinusoidal process of a repetitive worldcycle of perception, short of an opening and closening glimpse on reality, a back and forth motion in an AC current, a life and death cycle in a fast time quantum particle. It is an essential insight to resolve the whys of all those hows of mathematical physics.

I*n the complex plane, 1D (sin/cos) combine to represent a full worldcycles, interesting enough through the e^{ix}, 4D exponential decay function.* This is possible because he exponential function switches between growth and negative decrease, as the sine and cosine switch between informative and energetic perception; but the sine function, the informative Dimotion grows less, as it happens in nature, where height and information has less energy, and so in parameters of size and volume matters less.

2 new qualities make interesting to cast trigonometric functions in terms of the function of entropy: we are adding both cosine and sine 'on and off' SMH for a value of 1, the total value of a world cycle, so we can use frequency equations (as in electromagnetism) to represent this exponential world cycle. And we superpose both, the function of 'space-form' the sine and time-motion-lineal distance, the cosine, to observe a harmonic balance as the function goes up and down but never passes beyond the value of the whole.

The complex plane is real because the cos is related to lineal motion and the sin to perceptive height, whose *action in stop mode can be seen as a negative slow down of motion for a continuous view (S=-T); as in relativity (-cT).* But the deepest level of understanding of those functions and equivalences happens when we carry the *worldcycle of existȷence to the complex plane.*

Duality on calculus: Δ-Newton v. S ⇔ T Leibniz

Finally to notice *the extraordinary fact that the ST-cartesian graph and the complex plane* coincide in the root of unity, which essentially divides the being into its internal and outer parts. Only then the membrain can assess with accuracy both realities in objective terms. But it will perceive them with different 'volume' of information.

For the membrain the external world will be measured in the complex plane, with a lesser dimension of height that will make the world 'flat' in its perceived geometry, as the Y(i) plane will be the √ root of the X-plane.

Internally though for the o-singularity which ONLY observes the root of unity circle with an equivalent height and width, this 'verbal, temporal mind' observing the 'spatial biased membrain' NOT the universe, that has already made a selection of information; in the same manner your internal verbal temporal thought on the 0-1 unit temporal sphere or the quantum 0-1 particle on the biased information provided by the harmonic spherics of his electronic eye (remember all is the same, all is homology in function even if it changes in form); will think the Universe is 'perfectly regular' and favoring its biased dimotion of length, NOT realizing of the equal important of the flattened dimotion of height-information.

Essentially all systems have 2 brains, the spatial membrain and the temporal singularity at the center of the 0-1 temporal sphere. The spatial membrain already bias reality and as the singularity of time only sees the spatial membrain it will act upon it, as its 'territory' in which to enact its 5 dimotions of existence, qualifying reality as the membrain has already done. And that is fine because singularities are selfish self-centered knots or else they will be preys of other self-centered knots. But that makes so difficult objective knowledge as we shall see in the bias of huminds. What does then the humind brain observe? The distortion we know exists considering the membrain homunculus for which hand sensations (enzyman's actions) and mouth (entropic feeding and social communication) occupy most of the space while legs-locomotion regardless of physicists ego matter nothing.

Locomotion as reproduction and death. This usefulness of the derivative of maximal rate has a deep philosophical consequence of the many insights a proper understanding of the symmetries between existential algebra and calculus methods provides to the 5D researcher, if there is ever anyone besides this writer (:repetitive quip of all my texts :) Consider the previous graph, which is in fact a trinity sequence of events, as the photon particle (if the wave were to represent a LIGHT ray), DIES every complete wave and the wave represents its entire worldcycle of existence. But in the process it also translates in space, and reproduces in the point of maximal existential momentum (Max. ST), which if the graph were one of ST not its derivative of change will be at the peak, when the photon in fact is as the 'head'-particle state in the top of the dimension of height-information (in static space); but if the wave represents its derivative of change, it will happen in the point in which it touches its axis; where further on the wave is 'feeding' on the 'string of tachyon neutrino' or quantum potential that guides the wave… So in that brief period between birth and death, what it amounts finally to a 0 ST change in the existential momentum of the wave, there are the points of SS-birth, TT-death, TT-entropic feeding on a lower plane, ST-reproduction, sT-locomotion and finally the cyclical perception that will happen at the maximal height in the photon state.

Those are the whys of existential algebra on a mere geometry of motion:

But a mathematical physicist has zero interest in understanding the 30 years old graph (hence its poor digital design) of the 5 Dimotions of existence of a wave of light; but a philosopher of science entangled to the Universe will find fascinating that even the smallest form of our light space-time Universe has all the properties of 5 Dimotional life encoded in its mathematical equations; the bridge between those equations and existential algebra being the understanding of mathematics as an experimental science of vital space-time:

The 3 dimensions of space, are the 3 dimensions of light. Since we perceive light, not the real Universe.

Electric Field Information

Reproduction: C-length speed

Magnetic Field: Width: energy

The dimension of time, is the dimension of social evolution, which creates social waves of light defined by its frequency

O¡+1: electronic food. |¡-1: Graviton feeding. Øts:wave-reproduction.

TRILOGIC ON DERIVATIVES AND INTEGRALS:ΔST: THE 3 GREAT FIELDS OF CALCULUS.

Trilogic on calculus. 3 ±¡ ages, scales, and Dimotions mirrored by calculus operands.

As we are made of ΔST elements, limited by the reach of a supœrganism, self-centered and expressing the program of the 5 Dimotions of existence in @ mind; any systematic analysis of an organism or language that mirrors it departs from the one – the whole, then explains its Space and time states, its evident duality in a single plane, S⇔T, then its trinity, as ΔST, and finally its pentalogic ensemble of ¬Δ@st. Variations on those themes might deliver an ¡mmense number of explanations of a subject or species. In the case of calculus though as in most developments of a subject the best consideration is a ternary analysis of its ΔST elements in the historic growing complexity natural to the evolution of a being through 3 ages.

On the other hand as reality is entangled in Δ±1 scales, S-populations and T-ime Dimotions and ages, Calculus has in a synchronous analysis 3 great fields: the study on how systems changes in size and scale through the growth or diminution of its 'finitesimals', the study of growth of populations in space, and the study of Time dimotions, which are often *based, and this is the miracle of Nature, in the same concept of a fintiesimals.*

Let us consider a trilogic example on how analysis' operands represent those 5 Dimotions.

Spatial view: Analysis as a tool to extract quanta of whole social populations.

The fundamental particle of the Universe is a T.œ. a fractal point or scalar timespace superorganism, which in its simplest, commonest form has the shape of a circle with 3 canonical regions:

@-Mind-Center, measured by its radius, its axial length=motion around the 'Territory' of the organic system.

A membrain of angular momentum, or external clock that we measure as its circumference.

And an area of vital energy, which can be measured by the area.

So we get the value of the 3 elements of a disk, and expanding it to 3d spheres (graph) we get a volume, we find a 'volume' for the vital energy, a surface of an sphere for the membrane and a perimeter for the wanderings of the singularity.

As it turns out, the circle's area is πR^2, and the circumference is $2\pi R$, which is the derivative.

The volume of a sphere is $V=/3\pi R^3$, and the surface area is $S=\pi R^2$, which is again the derivative.

And inversely, the integral of the circumference is a surface and the surface integral is the volume.

The example shows the main use of analysis *in static space: to describe through 3 'Δ±1 Planes' the 3 parts of the being, which is the ultimate reason why only 2 derivatives are of practical use to 'descend' from the whole down two Planes, to the finitesimal quanta, beyond which an entire new 'world' within the quanta appears, with a different content, not suitable to be calculated within the same plane.*

So analysis become the essential tool to understand the social dimotions of parts and its growing Planes into wholes of a higher Δ+1 scalar plane of the fifth dimension, in a correspondence between analysis and 5D Planes, motions and populations of space.

Temporal view: Analysis as a measure of a temporal motion.

Yet analysis is most often used in temporal terms. This was though likely its first use (to calculate volumes from areas). It is in fact used to study motion, change in time, and we shall argue also Planes; and in that sense, *as we shall repeat ad nauseam, the entangled Universe which shows a clear correspondence between the mirror elements of 3 motions in time, 3 topologies of space and 3 Planes of size, wholes and parts that bring together the 3 x3 (+2 mental) = 11 Dimensions of reality is fully realized in the fact that analysis works to explain the 3 'ternary symmetries'.*

In the example, we can consider the sphere to be the whole sum of parts, where each part is a circumference. So our planet is the sum of all its 'parallels' with center in the poles. And then the volume *as each internal sphere can be in terms of 5D metric, $ X ð = K have the same co-invariant value, can be considered the sum of all those equal 5D valued spheres, so again we can talk of ∫∫ ¡-1=circumference-> ∫ ¡0=sphere->¡+1 = volume.*

What about the third 'ternary symmetry', that of time-change? This again is the fundamental use today analysis has, to study the rate of changes of a system, and it can be seen easily that the 3 elements of the 't.œ' ARE measures of time-change when we study not a mere locomotion, but the 'change-rate' of 'growth' more proper of the worldcycle of existence from 'seed' (the internal minimal sphere') to emergent system:

If you describe volume, V, in terms of the radius, R, then increasing R will result in an increase in V that's proportional to the surface area. If the surface area is given by S(R), then you'll find that for a tiny change in the radius, dR, dV=S(R)dR or dV/dR=S(R),

Increase in volume, dV, is the amount of new 'cellular layers' their system grows, and the amount of cells form the membrane, which is the surface area, S(R), times the thickness of the growth, where each unit is a layer, dR.

This same argument can be used to show that the volume is the integral of the surface area (just keep adding layer after layer of atoms or cells).

Finitesimals in **Time vs. space**

Space is symmetric; in its directions and they co-exist together. Time is not symmetric and it is experienced as a sequential pattern of single Time cycles. So Time parameters are shorter in form, space is a more extended system. Of time we see only an instant, of space we integrate instants/cycles of time and sum them as frequencies which all play the same world cycle.

Time though often is just the reproduction of a new unit of space. Thus, time cycles become populations of a spatial herd due to its reproduction of a 'seed' form.

Space thus is the 'mirror reproductive symmetry' of 'frequencies in time', its tail of memories, by reproduction, expansion, and radiation along the path of the singular timeline of the wave.

So in broad strokes derivative and integrals cover a wide range of 5D themes: the infinitesimal units of time frequencies and complex herds of space populations.

Whereas given the simultaneity properties of space, integrals tend to be used to calculate space populations, and given the individual sequential structure of time frequencies, derivatives are most often used to calculate time motions.

Thus the key concept of 5D mathematical analysis is the finitesimal, which was rightly defined by Leibniz as:

Δ: 1/n; the minimal part of a whole.

S: While in space is an individual unit of a social population.

T: While in lineal time duration is the minimal bit of a frequency ƒ=1/t, or quanta of time.

Thus a finitesimal is a discrete minimal unit in any scale of the fifth dimension - h-planckton, cellular units, atomic units.

And by the equivalence between space-form and time-motion, S=T, as most time actions require a fractal reproduction of form, for each quanta of time, we shall se the existence of a reproduction of a quanta of space...

On the other hand its inverse Integral 'integrate' an amount of such units of time, space or scale to obtain a simultaneous whole, a supœrganism, a 'T.œ', ∫ds, ∫dt, ∫Δ-1.

Of those 3 types of derivatives and integrals, as frequency and time duration are inverse parameters currently used in all sciences, the less understood is ∫Δ-1, whereas Δ-1 is taken to be the infinitesimal or minimal quanta of a whole, Δº, (cell, atom, individual in a society), and its integral, a Social 4Đimotion that mimics the creation of wholes.

A dual derivative, TT, ort SS, will then extract either an entropic unit 2 scales below the form or as *we found in the analysis of the sphere The Point, NOT ANY point but the Center of mass or charge in a physical system, its mind singularity.* Because derivatives 'extract' the first finitesimal quanta, or fractal point from a function of existȷence (T.œ), often directly as in log x':1/x, it *can lead directly to the value of the mind, or 'center point' of the system – the 'finitesimal whole'; and its inverse, an integral, which ads finitesimals till reaching the whole, as in the case of a volume of populations, but also illuminates the dissolution of a whole into its integrating parts.*

What kind of point a derivative gives us, depends on the configuration of the whole we analyze. I.e. In a heat equation the whole lacks a center, as it is a flux of kinetic energy, so derivatives will extract any unit…

In 5D analysis depending on what we study 'motion', or 'space' or 'scale' up or down the planes of the 5th dimension we shall apply either an integral commonest for spatial sums of populations or a derivative, most often for instants of time, and double derivatives for reproductive functions. Since space and time are inverse, perpendicular functions, in its min. S x Max. T, and Max. S x Min. T states, but symmetric in S=T. So goes for the 2 different arrows of entropy, a dissolution downwards and social evolution upwards.

So the ΔST trinity of integrals and derivatives gives a huge range of possible interpretations for the equations of mathematical physics. Infinities though don't exist, as all has a finite membrane and a finite duration in time. Beyond the third derivative, as the scalar Universe is a 'ternary game', there is no significance to the mathematical operations of derivatives and integrals - a strong proof that 5D is truth as it limits reality to ternary Planes, topologies and time ages.

So a qualitative analysis is required to specify what dimotion we are 'calculating', with derivatives and integrals: time motions, space populations or reproductive motions.

5d ∫Δ-1 pentalogic on integrals

∑s-1=S0: Integrals, on the other hand represent the growth of a space population, till it reaches a wholeness in a closed domain. So we can do 'line integrals', 'surface integrals', 'volume integrals', in simultaneous space.

Such integrals must be positive in its results, because we are as in the case of + v. – numbers calculating a 'statistical population in space'.

(to->t) ∑a = 0: Integrals though are *also related to a world cycle, as the continuous sum of steps in a sequential duration of time that must therefore have a 0' final result as all worldcycles when chosen in the apppropiate parameters of 'energy and information' end up returning to its origin. Such integrals when properly written must therefore give us a 0 value. The classic case being a sinusoidal function of a wave with positive and negative sides for the worldcycle that ends in a 0 value, when we add the surfaces below and above the curve.*

T=S: However when we express those 'actions=dimotions=stœps' of the worldcycle with the 'simpler, first age' formalism of probability; wheras an individual event is a 'finiteismal' of time, and the sum of all events a '1 value' distribution, if we integrate the probability to get the sum of all events, whole entity as an event, which is by convention valued as '1'; the result of such integral must be 'renormalized' to 1.

This is a complicated way to calculate a 0'-worldcycle but as it has become the formalism chosen in quantum physics, it is constantly carried out to calculate the sum of events of an electron that give birth in space to an statistical population of all the potential positions of the electron in space (themselves taken in Δ-1 as dense photon points). As the electron in trilogic can be seen as a cloud of Δ-1 dense photons, as an Δo whole in space, or as the sum of the sequential points it occupies in time, but humans are monologic, a lot of confusion is natural to quantum physics, the more so with the addition of further complexity with renormalization methods and probabilistic interpretations.

T=S: Integrals are also necessary to add *a locomotion of time, closer to the action of reproduction in space, as nature is 'constantly building integrated wholes by the accumulation of single time actions of reproduction that become 'clone' cells-atoms-citizens of an integrated supœrganism.*

¬: Integration of any of those actions however needs to be 'defined' due to the uncertainty of infinities, by constrains (initial time and final time, or a-b interval of domain in space), which act as the integral line membrain, becoming the Riemann integral or 'Cauchy' condition for it to have a solution. .

As a function of entropy integrals can also portray the growth or diminution of populations in space, with most of those growth/decay inverse functions, represented by $e^{\pm x}$ or $10^{\pm x}$ which are the standard constants of growth.

They are maximal when a system decreases and the space is dying *with no constrain at maximal speed in a quanta of time – hence using the maximal growth of e-function. However* when it grows socially it does so slower, most often in decametric scales; so we find also different speeds on the two time dimotion of the 5th dimension.

Recap. Integrals are overwhelmingly the measure of change in a fictious mental space constructed.

Universals

Perhaps the clearest historic proof of the nature of finitesimals as the parts of wholes is the fact that he beginning of calculus was not related to the study of rates of change in continuous motion but precisely to the relationship between parts into wholes.

So Greeks studied in philosophical terms the integration=growth of a social system from micro to macrocosms, from individuals into Universals, and mathematically through 'finitesimal' minimal quanta or parts of the whole, through 'series' and exhaustion methods.

This age extended from the Greeks to Newton, which was the last of the ancients, changing the use of those exhaustion methods from spatial series of growth to temporal series of change, but he failed to represent them properly through the space=time symmetry of $Y(s)=X(t)$, in a Cartesian frame as Leibniz did, *adding the property of 'continuity' as explained before, not the limit in which h->0, but the limit in which S≈T....*

Plato maintained that exemplifying a property is a matter of imperfectly copying an entity he called a form, which itself is a perfect or pure instance of the property in question. Several things are red or beautiful, for example, in virtue of their resembling the ideal form of the Red or the Beautiful. Plato's forms are abstract or transcendent, occupying a realm completely outside space and time. They cannot affect or be affected by any object or event in the physical universe. This is correct, though the error lies in positioning universals outside space and time. They are in fact the ultimate properties of SE-spatial 'kinetic energy+entropy' and TO- Temporal information, which 'emerge' in each new scale.

Few philosophers now believe in such a "Platonic heaven," at least as Plato originally conceived it; the "copying" theory of exemplification is generally rejected. Nevertheless, many modern and contemporary philosophers, including Gottlob Frege, the early Bertrand Russell, Alonzo Church, and George Bealer are properly called "Platonic" realists because they believed in universals that are abstract or transcendent and that do not depend upon the existence of their instances.

They are closer to the truth, but they should substitute the word 'transcendent' for 'emergent' in the parlance of general systems.

For that matter General Systems (5D ST) reduces the meaning of 'transcendence' to its first semantic meaning:

Vb: L transcendere to climb across, transcend, fr. trans- + scandere to climb.

vt : to rise above or go beyond the limits.

Indeed, Universals are found beyond the limits of its finitesimals, in the next n+1 scale.

Dimensional growth area finitesimals as: reproduction of spatial form

Finitesimals were first found in space, as the means to quantify a simultaneous areas as the sum of Δ-1 discontinuous, fractal parts. Let us remember this concept, key philosophical discussion even with the greeks - it is the Universe continuous or discontinuous, made of Universal wholes or individual parts?

This concept was the earlier idea of Leucipus and Democritus regarding the composition of physical systems; and Anaximander, regarding the composition of life systems, with its 'homunculus' concept (we were made of smaller beings)

Anaximenes' assumption that aer is everlastingly in motion and his analogy between the divine air that sustains the universe and the human "air," or soul, that animates people is a clear comparison between a macrocosm and a microcosm.

It also permit him to maintain a unity behind diversity as well as to reinforce the view of his contemporaries that there is an overarching principle regulating all life and behavior. So here there is a first bridge that merges universals and finitesimals.

And of earlier mystiques, regarding the composition of a superior God, as the subconscious collective of all its believers' minds, fusion in a 'bosonic' way into the soul of the whole.

The 3 were right as finitesimals are clone beings with properties that transcend into the Universal, being the homunculus the 'future cell'.

Universal wholes and individual finitesimals.

Because the praxis of continuity was not yet 'erased by idealism reality' the Greeks accepted as real their exhaustion methods, but Pythagorism opened the road to idealism. So the first age of analysis had a great deal of philosophical disquisitions on the nature of wholes and parts, connecting directly with the greek logic arguments on the nature of individuals and universals.

The historical origins of analysis can be found in attempts to calculate spatial quantities such as the length of a curved line or the area enclosed by a curve.

As we know, a curve, is always part of a worldcycle, with a finite number of steps, and so the conclusions of those earlier studies can be extended to understand better the space-time worldcycle in a general way: a circle can be calculated *as a polynomial number, which becomes nearly undistinguishable, past the 10-20-100th 'fractal points' stœps of social scales of number all pervading in Nature.*

This lead to the exhaustion method of calculating irrational numbers, from parts into wholes.

o-1: Δ-1: 1/n finitesimal scale vs. 1-∞: Δ+1: whole scale.

So only a question of that section is worth to mention here, on how to 'consider Planes', which tend to be decametric, good! One of the few things that work right on the human mind and do no have to be adapted to the Universal mind, from d•st to Δûst.

Shall we study them downwards, through 'finitesimal decimal Planes' or upwards, through decametric, growing ones? The answer is an essential law of Absolute relativity that goes as follows:

'The study of decametric, §+ Planes $(10§≈10•^{10} Δ ≈ Δ+1)$ is symmetric to the study of the inverse, decimal $Δ>Δ-1$ scale'.

Or in its most reduced 'formula': (**∞ = (1) = 0): (∞-1) ≈ (1-0)**

Whereas ∞ is the perception of the whole 'upwards' in the domain of 1, the minimal quanta to the relative ∞ of the Δ+1 scale. While 1 is the relative infinite of a system observed downwards, such as Δ+1 (1) is composed of a number of 'finitesimal parts' whose minimal quanta is 0.

It is from that concept from where we accept as the best definition of an infinitesimal that of Leibniz: N (whole) = 1/N (Finitesimal).

So in absolute relativity the Δ-1 world goes from 1 to 0, and the Δ+1 equivalent concept goes from 1 to ∞. And so now we can also extract of the 'infinitorum thought receptacle'J a key difference between both mathematical techniques:

A conceptual analysis upwards has a defined lower point-quanta, 1 and an undefined upper ∞ limit. While a downwards analysis has an upper defined whole limit, 1 and an undefined 'finitesimal minimum, +0).

Finally to notice that as all Δ-Planes have relative finitesimal +0 and relative infinities (see ∞|º to understand the limits and meaning of numbers and its Planes), **e**ssential to all theory of calculus is the study of the domain in which the system works, and the 'holes' or singularities and membranes which are not part of the open ball-system. So functions

can be defined with certain singularity points and borders; hence functions need not be defined by single formulas. This would be understood by Leibniz - who else :)

Unlike Newton, who made little effort to explain and justify fluxions, Leibniz, as an eminent and highly regarded philosopher, was influential in propagating the idea of finitesimals, which he described as actual numbers—that is, less than 1/n in absolute value for each positive integer n and yet not equal to 0'.

For those who insisted in infinities, Berkeley would reveal those contradictions in the book 'The Analyst'. There he wrote about fluxions: "They are neither finite quantities, nor quantities infinitely small, nor yet nothing. May we not call them the ghosts of departed quantities?"

Definition of Δt, Δs, finitesimals: A quantum of time and space.

Berkeley's criticism was not fully met until the 19th century, when it was realized that, in the expression dy/dx, dx and dy need not lead an independent existence. Rather, this expression could be defined as the limit of ordinary ratios Δy/Δx.

And here is where we retake it; before the formal age of mathematics, made a 'pretentiously rigorous definition of infinitesimal limits and the the logician A. Robinson showed the notion of infinitesimal to be logically consistent, but NOT real.

As we believe mathematics must be real to be 'consistent' (Gödel's theorem), we return to the finitesimal concept, ±Δy, either as a 'real' increase/decrease of a quantity, with a variation ±Δx of either the surface of space or the duration in time of the being.

Thus finitesimals depend for each species of the 'quanta' of space or 'minimal cell' and quanta of time or minimal moment, which the system can measure.

For man, for example time actions are measured with its minimal time quanta of a second, below which it is difficult to perceive anything; a nanosecond in that regard in the human plane of existence is NOT worth to measure, as nothing happening in a nano-second will be perceived as motion or change. For an atom however a nanosecond is a proper finitesimal to measure changes.

In space, man does not perceive sensations below certain limits, which vary for each sense, a millimeter, 100 hertzs of sound, the frequency of infrared waves; and so on.

There was only at this stage a mathematical approach to the concept by Archimedes - the methods of exhaustion to calculate areas and ratios, notably the pi ratio.

The method of exhaustion…

was first used by Eudoxus, as a generalization of the theory of proportions.

Eudoxus' idea was to measure arbitrary objects by defining them as combinations of multiple polygons or polyhedral. In this way, he could compute volumes and areas of many objects with the help of a few shapes, such as triangles and triangular prisms, of known dimensions. For example, by using stacks of prisms (see figure), Eudoxus was able to prove that the volume of a pyramid is one-third of the area of its base B multiplied by its height h, or in modern notation Bh/3.

Loosely speaking, the volume of the pyramid is "exhausted" by stacks of prisms as the thickness of the prisms becomes progressively smaller. More precisely, what Eudoxus proved is that any volume less than Bh/3 may be exceeded by a stack of prisms inside the pyramid, and any volume greater than Bh/3 may be undercut by a stack of prisms containing the pyramid.

The greatest exponent of the method of exhaustion was Archimedes (c. 285–212/211 BC). Among his discoveries using exhaustion were the area of a parabolic segment, the volume of a paraboloid, the tangent to a spiral, and a proof that

the volume of a sphere is two-thirds the volume of the circumscribing cylinder. His calculation of the area of the parabolic segment (see figure) involved the application of infinite series to geometry. In this case, the infinite geometric series:

1 + 1/4 + 1/16 +1/64 +… = 4/3

is obtained by successively adding a triangle with unit area, then triangles that total 1/4 unit area, then triangles of 1/16, and so forth, until the area is exhausted. Archimedes avoided actual contact with infinity, however, by showing that the series obtained by stopping after a finite number of terms could be made to exceed any number less than 4/3. In modern terms, 4/3 is the limit of the partial sums.

His paper, 'Measurement of the Circle' is a fragment of a longer work in which π (pi), the ratio of the circumference to the diameter of a circle, is shown to lie between the limits of 3 10/71 and 3 1/7.

Archimedes' approach to determining π consists of inscribing and circumscribing regular polygons with a large number of sides. It was followed by everyone until the development of infinite series expansions in India during the 15th century and in Europe during the 17th century. This work also contains accurate approximations (expressed as ratios of integers) to the square roots of 3 and several large numbers.

It is then interesting to consider Archimedes' main role on the perception of problems today forgotten after the absurd dogmatic germanic 'foundations under the axiomatic method' of analysis.

2 problems troubled him and indeed they were very important problems: the comparisons of different pis, (it is the pi square with 2 dimensions the same than the pi of the perimeter) and its proper calculus by approximation.

Approximations in geometry.

The unit of space is the area and the unit of time the cycle, and so both are bidimensional, and hence the transformation of one into another is not always perfect, as there is not a perfect 'quadrature'. But as this happens constantly a part is lost as 'entropy' in all time-space transformations, or as 'a bit of a circle', that is a motion or particle, as when in particle reactions there are always 'forces' escaping (neutrinos, gammar rays). So this means that pi is not exact, neither √2, the two key constants for the squaring... Yet that doesn't mean the transformation happens all the time, and it was the way in which the game of analysis started with Archimedes:

The transformation of a circular region into an approximately rectangular region. In graph ΔST theory eliminates all infinitesimals problems as infinities are limited, so are the 0s, which must be regarded as the +0 minimal quanta of the domain - *the need for further infinities is an error of the mind, the dogmatic truth and the single space-time 'continuum). In that regard pi is not ∞, but its calculus becomes 'chaotic' beyond a limit of ±40 decimals, which is really all what the human mind can conceive n its largest finitesimal analysis*.

It is then when the 'Greek Age' becomes just as in the Archimedean calculus of pi by exhaustion the same concept, just with less detail.

A simple geometric argument shows that both processes are similar with different degrees of approximation:
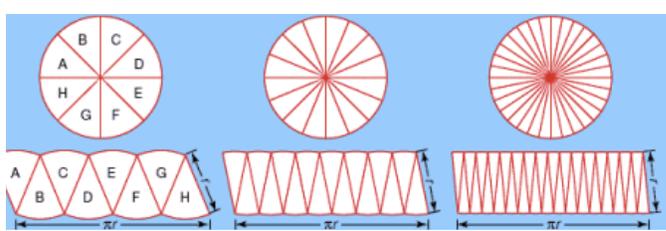
The idea is to slice the circle like a pie, into a large number of equal pieces, and to reassemble the pieces to form an approximate rectangle (*see* figure). Then the area of the "rectangle" is closely approximated by its height, which equals the circle's radius, multiplied by the length of one set of curved sides—which together form one-half of the circle's circumference. As the slices get very thin, the error in the approximation becomes very small.

The simple graph above shows from the point of view of an S=T symmetry *if we take the circle as an angular motion, the ΔST Trinity of change that always can happen in scale, space or time. In scale each minimal 'radius', is a quanta of*

change. In time the circle becomes an angular motion, so each triangular section becomes a rate of change per unit of time, related to the angular speed of the circle. Yet the circle as a wave give us also the lineal motion that keeps reproducing quanta after quanta of change the wave.

ΔST Trinity then becomes once and again the leit motif of change

The duality of free lines/planes v. closed order.

It is interesting to notice that in general when we grow in scale, we change from freedom to order or vice versa - that is the fundamental | v. O, past vs. future, part vs. whole, form vs. motion, dualities of Δ@st changes. So when we integrate open lineal triangles, with its vertex as the @-forward mind≈future path, in the circle it becomes an internal locked, social, circular mind - a closed point of a larger singularity in a cyclical form.

The approximation of square space to cyclical points. Ratios and ir(ratio)nal numbers, its finitesimal limits.

A theme that will be soon casted on terms of number theory was also studied by Archimedes by exhaustion methods.

Before the invention of the new methods of calculation, it had been possible to find the area only of polygons, of the circle, of a sector or a segment of the circle, and of two or three other figures. In addition, Archimedes had already invented a way to calculate the area of curves by exhaustion, leaving a sound error according to the minimal step he took, which raises the question, does have a circle a finitesimal minimum step? It is then pi and all other S>t constant transformations and 'ir(ratio)nal numbers/ratios, limited by a finitesimal error?

The answer is yes!, Normally a decametric limit define the 'valid value of an ir(ratio)nal numbers, which is not a number in strict sense (a social number) but a ratio of an S/T action/function. The examples of the two fundamental ir(ratio)nals will suffice:

- pi is really the ratio of 3 diameters that form a closed curve, whose value *depends on the lineal 'step sizes'.*

So pi has a minimal value of 3, which is the hexagon with its 6 steps of 1/2 value (triangulation in 6 immediately gives the result, as the triangle is the radius, so are the 6 triangular sides: 1/2 x 6 =3); which happens to be the value of pi in extreme gravitational fields on relativity, which brings another insight: black holes decompose the circle into ultimate lineal flows of pure 'dark energy' shot through the axis, by converting the curvature of a light circle on the event horizon in a 6-pi hexagon. But this is well beyond the scope of this intro.

So what is the 'decimal limit' of pi, before it breaks into meaningless (non-effective) decimal Planes, with little influence on the whole?

While this is hypothetical I would say for different reasons explained in the article on number theory, as it is quite often the case it responds to the general $\Delta \approx S \approx T$ ternary symmetries, so common in the perfect Universe.

So pi responds to the symmetry between its spatial minimal, 6 x 1/2=3 hexagonal steps, which means it breaks in the 6th Δ-scaling decimals, 3,1415...9. So, 3,1416, which incidentally is basically what everybody uses is the 'real value' of pi, and why it is that value is studied elsewhere (deducing from it one of the most beautiful simple results of get-mathematics, the value of dark energy in any system, of the Universe, as the part not perceived through the apertures of a pi cycle: $\pi/\pi-3$ = 96% of 'darkness' which the singularity of a pi system cannot see as its apertures are only $\pi-3$= 0.14

Discontinuity and limits of mental space and physical spaces.

We get now to the heart of the matter; which is the paradox between continuous mental spaces and discontinuous, fractal spaces, between infinitesimal and infinities vs. finitesimals and relative infinites (∞), between the axiomatic method and the experimental method that keeps surfacing all these 5D v. 4D papers. The space-time continuum is not such when we 'take the accordion' of the 5th Dimension and enlarge the whole Universe into multiple planes of space-time, which are connected through the 'different geometries' of the convex, hyperbolic regions between planes.

The general laws of 5D outlined in other papers which we shall post at Academia.edu some time in the 'future' use the formalism of existential algebra to lie down all those laws departing from 5D metric.

In what refers to calculus it can be expressed in terms of the 'praxis' of mathematical physics that uses systematically the differential equation vs. the theory of ideal mathematicians that prefer to argue on the 'passing to the limit' and since Cauchy put it in nice 'bullShit=pedantic' talk seems to be proved.

Many important truths of the fractal Universe are deduced precisely by denying pedantic definitions, postulates and axioms to make a right wrong.

Now, the other constant e, which is the ratio of decay ACTIONS, or death processes (ST<<S), is *a longer two 'Planes' down process, of self-destruction of a system, unlike the pi, single scaling process, S>T. So it breaks at 10 decimals:* 2.718281828...459045

Indeed. Now, why 5 and not ten if the Planes are 10^{10}? Because 10 Planes *are in terms of space-time actions, the 'whole' dual game of two directions of time up and down, which happens only in reproductive actions. And this connects with the S>T<S Rhythms of motion go/stop/go back and forth between two arrows which happens both in st-single planes and Δ±motions.*

The proof? Very simple. The experimental truth tells us that the Universe is a game of 9-11$^{9-11}$ planes of existence and if we calculate e as $(1+1/10000000000)^{100000000000}$ we get the 'real' e which must be a number that is NOT irrational. As that is the experimental e-number for the overwhelming quantity of systems of Nature made of $10^{10'-11}$ parts. Alas, we obtain 2.718281828…323131… a rational series whose profound meaning is that of the fastest progression of growth or decay of a finitesimal seed into a perfect whole (:

Does this mean we cannot find 'larger systems'? Yes, but if you got any of the fundamental concepts of the 5D scalar Universe 'running around your brain' – *reality is ∞ in the field of pure TT-entropic time flows and Planes, but for the perceiver and any language of perception that make sense, beyond the 10^{11} perfect form unit of a larger Δ+1 case, perfection breaks down, systems malfunction, monsters appear and e gets its irrational form.*

The reader is left with a funny exercise for which he should receive the Fields medals of mathematic (just joking – those who rebel against the axiomatic method and its Cantorian Paradises shall not enter the kingdom of nitrolife gaseous heads bubbling egocy with go(l)d…. But PI DOES have a limit. And this means *the Universe has not infinite Planes of perfect order – it does NOT have a God t*hat can see through all the Planes, as a mind that orders its infinity in space, scale and time…
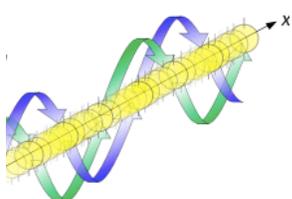
There is then a limit for existential planes? The 'meaningless' breaking down of e, the 'number of entropic functions' seems to signal this. But it would be an error to consider the limits of e-regularity as it only indicates the LIMIT of entropic death. Death happens and when a system breaks down its natural 10ˆ±10 Planes to its finitesimal 1/n parts it stops as the system is dead.

The limit that matters is the limit of the pi-circle as an Archimedean spiral that lets information enter through its ±never closing spiral to perceive or feed in the external micro-bits and bites of the Universe. And as we cannot find neither a limit nor a regularity, we could conclude that the most important dimotions of angular perception, and creation of inner mirrors of the outer world by a pi-spiral have no limit.

What about locomotion? Can we exhaust the limit of a series of steps? Again, this is more evidently no, even though the Greeks thought so, in the so called...

The problem of equivalences confused as identities between lines and areas.

It is absurd to talk about continuity of a real number, pi, e, and √2, beyond the 10 decimal. This is easily proved because those ratios are normally obtained by limits in which certain terms of the infinitesimal are despised, by

postulating the falsity that there are infinite smallish parts, and so x/Δ can be throw out when $\Delta\to\infty$. But since x/Δ, the finitesimal has a limit, the pretentious exactitude does not happen.

This in turn leads to questions about the meaning of quantities that become infinitely large or infinitely small—concepts riddled with logical pitfalls in a simplified world of a single space-time continuum, where on top humans LOVE to consider 'identities' of the mind absolute identities in the larger information of the detailed Universe, which are never so, as $d@st \approx \Delta\hat{u}st$ (the mind, world view is merely similar to the Universal view) .

In our example example, a circle of radius r has circumference $2\pi r$ and area πr^2, where π is the famous constant 3.14159…. Establishing these two properties is not entirely straightforward, although an adequate approach was developed by the geometers of ancient Greece, especially Eudoxus and Archimedes. It is harder than one might expect to show that the circumference of a circle is proportional to its radius and that its area is proportional to the square of its radius. The really difficult problem, though, is to show that the constant of proportionality for the circumference is precisely twice the constant of proportionality for the area — that is, to show that the constant now called π really is the same in both formulas.

This boils down to proving a theorem (first proved by Archimedes) that does not mention π explicitly at all: the area of a circle is the same as that of a rectangle, one of whose sides is equal to the circle's radius and the other to half the circle's circumference.

However in ÐST theory, those 2 pis are not the same, because they belong to two discontinuous, 'different species' of topology, the St area, and the ST-membrane.

An easy, immediate proof. If we make them identical, then we can find a circle, where: $2\pi r \approx \pi r^2$. So $2r=r^2$. Hence $2=r$ and we get to the conclusion that the thin membrane of an open ball is identical in area to the internal ST volume of the being, which is 'conceptually absurd' (the area intuitively has more surface, as it is bidimensional, the line, infinitely thin).

What's the problem here? We cannot in true form, unless we deal always with less dogmatic concepts of relative similarities with 'lines as if they were squares'. They are different realities. In the first equivalence, we compare a line radius with a circle perimeter, in an S>t structure.

In the second as we compare π^2, a cyclical area with the square of the radius we are also in good footing. But when we do the S>ST comparison, we are in a Dynamic transformation of Δ-Planes, from Δ, the world of lines, to $\Delta+1$ the world of squares (as a polynomial square is obviously a growth from a complete Δ-entity the line, into an $\Delta 2=\Delta+1$ one, the area). It is then when we can do some 'dynamic equivalence' analysis, and the equivalence has meaning, stating that for a 'perfect cycle' of relative radius 2, the membrane absorption of bits an bites of energy and information, can fully, fill, the internal area, making equivalent, a 'line and a surface' integral. And finally state that all 'dynamic vortices of force' ruled by Newtonian/Coulombian equations on the $\Delta-1$ and $\Delta+1$ Planes, are relative perfect systems of radius 2.

And here we find the 'whys' of the dualities of Maxwell's laws, which can be written both ways:

Or in simpler terms, we are talking when doing those equalities of properties that become dynamic and transcend the static mind of mathematics into the reality of physical systems.

Finally as we defined real numbers as non- existent (see $|\infty$ posts), but approximations to a ± 0 infinitesimal, in the measure of a square, uncertainty grows further, π^2, thus have the square 'error' of pi.

All this of course is important to conceptualize reality, in praxis as we know we always work in an uncertain game with errors and deaths. So analysis does work, and all this 'search for dogmatic proofs' is just 'absolute bull$hit' for absolute ego-centered scholar huminds.

But on the other hand the graph also shows that both pis, the one of the 'surface' and the one of the 'perimeter' are not equal, as there will be a limit on the number of 'bidimensional triangles' we can cut.

As a triangle is indeed the bidimensional line, that is: |-$t (one-dimension); Δ-$t (2 dimension).

So it is not the line.

So as the approximation will find a finitesimal quanta or limit of detail, prove the theorem, this error, however tiny, remains an error. This minimal quanta thus exist in all relative Δ>Δ+1 measures of Planes as the minimal uncertainty of all mathematical calculus, and justifies in physics (Δ-1 quantum theory) that thee is always an uncertainty of a minimal quanta, which is precisely /2; that is h/2π; the minimal quanta of our light space-time.

Only in the absolutist imagination of dogmatic axiomatic mathematicians it made sense to talk of the slices being infinitesimally thin, so the error would disappear altogether, or at least it would become infinitesimal.

As it happens quantum theory proved experimentally the case to be wrong. And as we stress (Lobachevski, Gödel, Einstein) mathematics must be confronted with reality to realise what is 'real' in maths.

Δ: THE NEWTONIAN WAY. FINITESIMAL SERIES.

In 5D the concept of series is an important one; as it establishes for each stœp of the series a quantity of growth that converges towards a whole, valued by a finite number; and then the series is a meaningful mirror of an $\sum\Delta-1=\Delta^{o}$ process of Nature. When the series diverge however it is of little interest, as it is an exponential growth that at best can signify an entropic process. Series thus are predecessors of calculus where each term represent a finitesimal of change, and the whole sum of the sequence the 'whole worldcycle' in time, or 'volume in space'.

The limits of value for series were also instrumental to understand the paradoxes of ideal mathematics, (Achiles' paradox) showing that indeed change requires finitesimal 0's as limit x->0 is NEVER absolute zero; or else Achiles will never meet the TURTLE. Only human egocy in search of mental simplified absolute truths, relatively false explains 2300 years of disquisitions on the ob vuous solution of the achiles paradox, which will introduce the theme. So the main comments on mathematical series are on the concepts of relative 'finitesimals' and relative immensities (not infinities) proper of 5D math.

Aquiles Paradox. Birth of the concept of series and limits.

In mathematics, a **series** is, roughly speaking, a description of the operation of adding many quantities, one after the other, to a given starting quantity, in 5D each quantity is a new finitesimal of a series, hence 3 series can be distinguished by dimotion:

-Divergent growing series of ideal social evolution and reproduction till a limit of carrying capacity, which in reality will make the ideal series 'flatten' its growth.

- Equal series of present states in which each steps equal the previous one, which reduces to simple sums.

- Convergent series that diminish in size till a finitesimal is reached, that should be perceived inversely from the finitesimal to the whole.

The study of series is thus a major part of calculus and its generalization, mathematical analysis, since it is the 'discrete manner' to calculate and one might argue more real. The greeks started their study in philosophy and rightly solved it (Aristotle) deducing that absolute 0 and infinity did not exist. Modern egocy dismantled those findings for the so called 'rigorous proofs of the axiomatic mental method' whose aim is to convince egocentered men that the 'simplification of mind spaces' that eliminate the dark holes between points and expand limits to infinities and absolute zeros are 'reality', not the mental selection of it.

The paradox of Achiles: in a discontinuous Universe of fractal parts, achiles should never reach the turtle. But if motion is reproduction of form, the faster system merely 'reproduces' its information faster in adjacent regions of space, and motion becomes 'rational' - and proves further the reproductive nature of reality as even locomotion IS reproduction.

For a long time, the idea that such a potentially infinite summation could produce a finite result was considered paradoxical by mathematicians and philosophers.

This paradox was resolved using the concept of a limit during the 19th century.

Zeno's paradox of Achilles and the tortoise illustrates this counterintuitive property of infinite sums:

Achilles runs after a tortoise, but when he reaches the position of the tortoise at the beginning of the race, the tortoise has reached a second position; when he reaches this second position, the tortoise is at a third position, and so on.

Zeno concluded that Achilles could *never* reach the tortoise, and thus that movement does not exist. Zeno divided the race into infinitely many sub-races, each requiring a finite amount of time, so that the total time for Achilles to catch the tortoise is given by a series.

position An of Achilles is eternally just after the position Tn
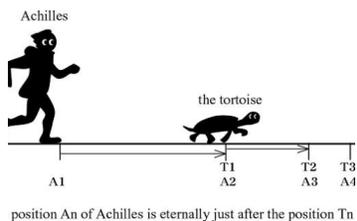
The resolution of the paradox is that, although the series has an infinite number of terms, it has a finite sum, which gives the time necessary for Achilles to catch the tortoise.

The physical explanation of locomotion though defines it as a reproduction of for of the lower scale, so it establishes a finitesimal stœp, equivalent to the minimal Δ-¡ quanta of the wave-particle dual motion states:

Locomotion is a series of stœps that imprint a lower plane with the information of the upper plane: a quantum motion in wave state and particle, stop state of reproduction form (complementarity principle wave-particle).

In modern terminology, any (ordered) infinite sequence $(a_1, a_2, a_3, \ldots)$ of terms (that is numbers, functions, or anything that can be added) defines a series, which is the operation of adding the ai one after the other.

To emphasize that there are an infinite number of terms, a series may be called an **infinite series**. Such a series is represented (or denoted) by an expression like: $a_1 + a_2 + a_3 + \cdots$ or, using the summation sign:

$\sum_{i=1}^{\infty} a_i$. The ∞ sequence of additions implied by a series cannot be effectively carried on in a finite amount of time.

However, if the set to which the terms and their finite sums belong has a notion of limit, it is sometimes possible to assign a value to a series, called the *sum* of the series. This value is the limit as *n* tends to infinity (if the limit exists) of the finite sums of the *n* first terms of the series, which are called the n*th partial sums* of the series. That is:

$$\sum_{i=1}^{\infty} a_i = \lim_{n \to \infty} \sum_{i=1}^{n} a_i.$$

What this means in 5D though is slightly different: because the infinite number of time-steps will make impossible to do any calculus, all limits must have in 'reality' beyond the idealized mirror of mathematics, a limit of steps and a limit of size of those steps. Which is indeed what happens in reality.

What this means in 5D though is slightly different: because the infinite number of time-steps will make impossible to do any calculus, all limits must have in 'reality' beyond the idealized mirror of mathematics, a limit of steps and a limit of size of those steps. Which is indeed what happens in reality.

The turtle has a time-cycle and a size of steps, measurable. And when explaining the reproduction of motion, we shall see that limit is the reproduction on the lowest plane of light and particle forces of the entire form of the being in discontinuous adjacent spaces.

ifinity mirror effect viewed

In other worlds, the word 'limit' in the formulae should not be infinite. But a 'finite infinite', for which we shall use a different symbol: ∝

Relative infinities and finitesimals

The simplest why of the fractal, scalar structure of the Universe, from the perspective of the mind: as a linguistic mirror image of reality in a smaller space, minds 'create' fractal diminishing, infinite Planes

The new symbol for a 'relative infinity' and its inverse 1/, 'finitesimals', become then essential to 5D Analysis and it gets rid of all infinite paradoxes from Zeno's to Cantor, further showing the idealized mirror-image nature of mathematics; as a mirror recedes apparently into infinity but at a certain point it ceases to be observable and hence it does NOT exist anymore.

The meaning of series then in real existences becomes clear as it is another way to describe in discontinuous manner, what derivatives on the continuous plane (remember the duality of discrete number view vs. Continuous geometric view), shows: A travel up and down the Planes of the fifth dimension.

Rates of change. The stop and go motion: stœps.

The discrete, geometric, spatial, static numerical analysis of calculus is the power series, which can be taken as discrete stœps (stops + steps) in a motion down the fifth dimension from the whole to the 1/n part, whereas we count also the static form (as we see only in a movie the static frame) NOT the step of motion.

This was then the work from Archimedes and earlier Greeks to Newton, which can in that sense be considered the last of the ancients.

While as all S=T, that is there is always a symmetry between discrete numbers and continuous motions, Leibniz with its geometric interpretation and far more profound understanding of finitesimals, which he rightly defined as $1/n$, represents the first step in the future of the discipline, the renovator and deep understanding of it - which Newton, which can be considered merely an automaton mathematician, specialized brain, as most modern scientists is - he is indeed the father of the wrong view of science - understood nothing of it.

Indeed, Leibniz, the closest predecessor of this blog IS the genius, Newton the talent.

Finitesimal changes are related to the fundamental beat of the Universe, the stop-form-space-perception, go-motion-time, beat of the Universe, which we shall call a stœp, the discrete way of motion of tœs through SPace, which often as in movies we perceive in continuous mode eliminating the stop element:

ΔS(top)->Δt->ΔS-≥Δ(S)t(ep).

Moreover most of those Stœps will have either in a travel through 5D, or through a single ST, a unit of 'expenditure of vital energy', transformed in the length-motion of the lower scale in which the imprinting of motion as reproduction of form, happens (studied in 2D locomotion). So each stœp becomes an Δ-4 unit of locomotion.

Thus if we consider a relative constant or function of the existence, Δ-1:œ, as a finitesimal of its larger whole, ΔŒ, we obtain 2 simple functions:

œ=Δs/Δt and œ=Δt/Δs as the mathematical measure of a 'time stœp' or locomotion and 'volume-density stœp' or finitesimal quanta.

We shall call the first form a spatial finitesimal or step in space - a quanta of constant speed that moves and reproduces the being in space.

And if we again change this quanta, with a second 'derivative' we get a quanta of its constant acceleration.

And we shall call the second function, a time finitesimal, a change in the density of information or cyclical speed of the being as a second change in relation to its position in space.

Classic concepts of mathematics applied to 5D in series. Immense Geometric series

This said some clarifications are needed in classic series theory mostly related to the fact that 0 is not infinitesimal but 0' and ∝ is limited. Let us denote by Sn the sum of the first n terms of the series; we will call it the nth partial sum. As a result we obtain a sequence of numbers:

$$S_1 = u_0,$$
$$S_2 = u_0 + u_1,$$
$$\cdots\cdots\cdots\cdots\cdots\cdots\cdots$$
$$S_n = u_0 + u_1 + \cdots + u_{n-1},$$
$$\cdots\cdots\cdots\cdots\cdots\cdots$$

and we may speak of a variable quantity Sn, where n = 1,2, ⋯.

The series is said to be convergent if, as $n \to \propto$, the variable Sn approaches a definite finite limit. So instead of infinity n is an immense number.

This limit is called the sum of the series, and in this case we write Lim n->∝ Sn=Sw

Where Sw is the 'population or worldcycle value of the series' – its total in space or time. It follows that of interest are series that converges to 0' sums, as they will be worldcycles in time, or to finite values, as they will represent a carrying capacity of the whole as a population in space.

But if, as $n \to \propto$, the limit Sn does not exist, then the series is said to be divergent and in this case there is no sense in speaking of its sum. The series is an inflationary case of the mathematical mirror.

But thanx God things are not so simple, because *as we have seen there are two digital mirrors of worldcycles of existence, the 0'-1 unit circle (palingenetic worldcycle) and the 1-∝, which differ in the 'certainty of one of its terms' –*

in the 0'1, the whole 1 is certain the finitesimal 0' uncertain, in the 1-∝, the 1, fintiesimal is certain and the ∝ relative uncertain. As both are mirrors of each other, we can consider the certainty of one of the two limits to calculate how far n in the Sn series of the other limit reaches (remember in 5D n does not tend to infinity). So we can make useful some infinity series by calculating its ¬entropic n->∝ value.

While we can discover that infinite series in the 0'-1 sphere are not.

As a simple example (we shall always use simple examples in all our texts and stiences, as we want to educate the 'pro' in a philosophy of stience common to all planes of space-time, for him or future 5D researchers if ever there is one besides this writer to complete the work:), let us consider the series: $1 + x + x^2 + \cdots,$

whose terms form a geometric progression with common ratio x.   The sum of the first n terms is equal to: if | x |

$$S_n(x) = \frac{1 - x^n}{1 - x}(x \neq 1);$$ < 1 this sum has a limit: $1/1-x = 1+x+x^2\ldots$

If | x | > 1, then obviously the limit is ∝, which has no value in classic mathematics as the series diverges, but *it does in 5D as ∝ will be a number, normally of the trinity->decametric scale.*

A different situation holds for x = 1, as the series becomes then *a definition of the natural numbers, such as Sn gives us the value of the n natural number, and so it expresses how natural numbers are born in sequential time.*

Finally, if x = −1 the values become, 1, -1, 1, -1, which are inverse values for a dimotion, *representing therefore in its* partial sums that take the values +1 and 0 alternately, a worldcycle of existence in repetitive pairs (0,1).

The example illustrates our case for 5D 0', ∝ realist values for the 'Δ-1' and Δ+1 limits of a T.œ domain: we obtain more information in such a case, as all the cases of the series DO have a meaning, while in classic mathematics only for |x|<1 the series is meaningful; all the other values are divergent Sn->∞

These differences can be breached with the next theoretical axiom of classic series:

To each series there corresponds a definite sequence of values of its partial sums S1, S2, S3, ⋯ such that the convergence of the series depends on the fact that the sums approach a limit, but *also on 5D series the inverse that there is a limit to the number of sums; that is the concept limit is NOT only applied to the whole Sn(x) but the parts N(S); which is the pentalogic justification, if we were to develop here the more advanced 'concepts' of multiple time logic (that is, there are arrows of time, from Δ-1 to Δ1, from SS⇔TT and St⇔Ts and S⇔T) so for everything it is a worthy exercise to study the inverse, for A->B, B->A.*

It is then possible to define conversely, an arbitrary sequence of numbers S1, S2, S3, ⋯ which corresponds to a series partial $S_1 + (S_2 - S_1) + (S_3 - S_2) + \cdots,$ sums of which will be the numbers of the sequence.

Thus the theory of variables ranging over a sequence may be reduced to the theory of the corresponding series, and conversely. Yet each of these theories has independent significance in 5D. The previous series *is relevant because it signifies the commonest process of 'erasing' of previous terms in a time sequence; hence the series in reality* tends not to be the value of the sum, but the steps of time, as 'previous generations' die away; and this indeed is the case for the most famous series of them all, the Fibonacci series, which mimics best processes of reproduction in time, and similar more complex concepts as the 'log curve'

It is then when in 5D series we can prove the 'natural tendency of all worldcycles' towards zero, as If the series converges, then its general term approaches zero with increasing n, since:

$$\lim_{n \to \infty} u_n = \lim_{n \to \infty} (S_{n+1} - S_n) = S - S = 0.$$

Moreover, the divergence=uselessness of a geometric progression with common ratio x > 1 follows immediately from the fact its general term does not approach zero. So *we might say that all memoriless series represent a worldcycle of existence, which approaches to a zero sum, as more 'time quanta' happen*.

An other similar criteria to find then if a series is useful can be obtained not from the simple 'memorial time sum or memoriless substaction' as the previous methods, but through the next level of dimotion operands, the x,÷.

It is the so called D'Alambert method: Let us suppose that, as n approaches immensity, the ratio (Un + 1)/Un has a limit q. Then for q < 1 the sequence will certainly converge, while for q > 1 it will diverge. But for q = 1 the question of its convergence remains open.

Thus the useful series are those that converge either in its sum as a whole in space towards a number or in its difference between terms towards a 0' sum in time and often have a reflection on Nature. We already mentioned the Fibonacci series; we can consider another Finitesimal series that converge, example of:

Geometric series.
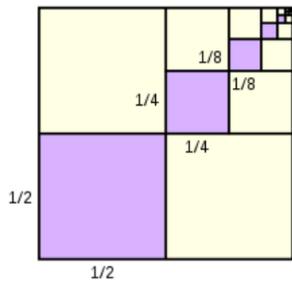
A series can be considered as a scalar 'search for its finitesimal part'. So in reality they are always 'limited' by the size of the 'finitesimal'.
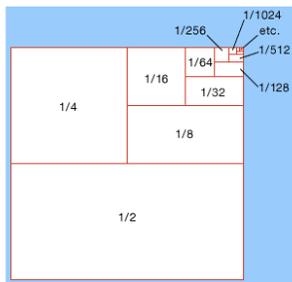
Graphical illustration of the points of view of a ∝-finite geometric series. Before understanding calculus mathematicians were concerned with 'relative' infinitesimal series.

Since similar paradoxes occur in the manipulation of infinite series, such as: $^1/_2 + {}^1/_4 + {}^1/_8 + \cdots$

This particular series has its value precisely at 1, the whole, *which is the conceptual meaning of ∝ Immensity, a world with a limiting membrane.* But the way to define it is actually the inverse to which the power series is written. That is to consider the 0' undefined finitesimal where the series starts and then *as it happens in any process of reproduction, consider it a 2^x series that will give birth to the 1=∝ relative whole after the finitesimal 0'=1 becomes that whole, illustrating the relativity of the concepts of finitesimal and infinite. It is thus not a constant partition of a system, but rather a constant growth.*

To see why this should be so, consider the partial sums formed by stopping after a finite number of terms. The more terms, the closer the partial sum is to 1. It can be made as close to 1 as desired by including enough terms. Yet once we arrive to the Minimal quanta of the physical reality we describe (cell, atom, individual, etc.) there is NO need to go beyond except in errors of the mind.

Thus a series can be considered both a scalar 'search for its finitesimal part' but also the inverse growth of a seed to the whole. Because from the human whole perspective the ¡ndifferent element is the finitesimal we tend to write it backwards in time, but for the Universe most series happen from *the finitesimal to the whole*. Yet both cases they are always 'limited' by the size of the 'finitesimal'.

A geometric series is a series with a constant ratio between successive terms. So the series ½+1/4+1/8… is geometric, because each successive term can be obtained by multiplying the previous term by 1/2.

Each of the purple squares has 1/4 of the area of the next larger square (1/2×1/2 = 1/4, 1/4×1/4 = 1/16, etc.). The sum of the areas of the purple squares is one third of the area of the large square.

We can then consider to be a series that diminishes till it reaches the 'finitesimal' 1/n part of the whole. And it can easily be casted as a polynomial; since the terms of a geometric series form a geometric progression, meaning that the ratio of successive terms in the series is constant. This relationship allows for the representation of a geometric series using only two terms, *r* and *a*. The term *r* is the common ratio, and *a* is the first term of the series.

In the example we may simply write:

a+ar+ar^2+ar^3… a=1/2 and r= 1/2

The behavior of the terms depends on the common ratio *r*:

If *r* is between −1 and +1, the terms of the series become smaller and smaller, approaching 0' in the limit and the series converges to a sum. In the case above, where *r* is one half, the series has the sum one.

If *r* is **greater than one** or **less than minus one** the terms of the series become larger and larger in magnitude. The sum of the terms also gets larger and larger, and the series has no sum. (The series diverges.)

If *r* is **equal to one**, all of the terms of the series are the same. The series diverges.

If *r* is **minus one** the terms take two values alternately (e.g. 2, −2, 2, −2, 2,...). The sum of the terms oscillates between two values (e.g. 2, 0, 2, 0, 2,...). This is a different type of divergence and again the series has no sum.

For example in Grandi's series: $1 − 1 + 1 − 1 + \cdots$.

Geometric series are among the simplest examples of immense series with finite sums, although not all of them have this property.

Historically, geometric series played an important role in the early development of calculus, and they continue to be central in the study of convergence of series.

Geometric series are used throughout mathematics, and they have important applications in all sciences, as all of them are obviously scalar in its form, and respond to any of the 3 possible behaviors of systems, 'convergent information', divergent entropy and repetitive=reproductive oscillation. And finally *they are stable in its time motion given by the constant ratio between its geometric terms.*

Thus we can say a geometric series is a good mirror of a balanced ΔST repetitive 'present' event and as such real.

Of the many mirror correspondences between series and 5D we want now to stress the relationship between the part and the whole, as elements the ternary structure of any T.œ with its singularity, that can be considered the a, initial term, the FINITESIMAL above all other finitesimals, the king of the hill so to speak, its membrane and the space between them.

This relationship is truly enlightening of the symmetry between the 3 regions in space of a being, and its 3 regions in scale. Whereas the central finitesimal @-mind is the finitesimal of the lower plane, the external membrane the 'larger term' ar^n of the series, and *vital energy within them, the intermediate terms of the series which are irrelevant.*

So as the singularity @=a, of the series expands through the vital energy elements in growing 'circles' to reach the final 'membrane' ar^n, magically those irrelevant vital space cells will disappear in the final calculus of the value of the series.
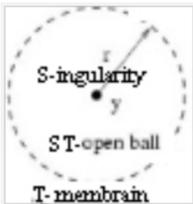
Further on, those sums will be limited by n, which IS THE value of the NUMBER OF 'Planes' within the vital energy (concentric circles) required to arrive to the surface of it.

So a can also be viewed as the relative 'radius' of the singularity mind, which gives conceptual birth to the formula of the angular momentum of the series, where rmv, signifies r=sum of singularity radius (imagine the inner region of the system as an Archimedean spiral) m the vital energy mass, and v the membrane.

All this is expressed in terms of discrete numbers - not geometric continuous motion - by the classic formula:

For r≠1, the sum of the first *n* terms of a geometric series is:

$$a + ar + ar^2 + ar^3 + \cdots + ar^{n-1} = \sum_{k=0}^{n-1} ar^k = a\left(\frac{1-r^n}{1-r}\right),$$

,

where *a* is the first term of the series, and *r* is the common ratio. We can derive this formula as follows:

$$s = a + ar + ar^2 + ar^3 + \cdots + ar^{n-1},$$
$$rs = ar + ar^2 + ar^3 + ar^4 + \cdots + ar^n,$$
$$s - rs = a - ar^n,$$
$$s(1-r) = a(1-r^n),$$

As we see, the @ singularity value and its final term, ar^n are the ONLY values that matter, with all the intermediate terms 'absorbed' in the dynamic relationship between membrane and singularity by them. If s, is the value of the series for the singularity, without the membrane, rs is the value of the system for the membrane, without the singularity. As the vital energy within has both the singularity and the membrane as its 'Klein' limits of a non-euclidean sphere, which they never reach. And so we rest from the 'Singularity', S plus ITS perception of the vital energy, the membrane, 'rs', and its feeding (negative value) of the vital energy, S-rS, to search for the Solution of the power series which is not the membrane view but the singularity view, s:

$$s = a\left(\frac{1-r^n}{1-r}\right) \quad (\text{if } r \neq 1).$$
And so the solution as always is that of the mind view (in any discrete, numerical self-centered analysis) s=a (value of the singularity) multiplied by the parenthesis.

Then we can easily see the symmetry of that topological explanation of the series, with its scalar translation as a travel down a scale from the whole to the finitesimals. Since as we differentiate those series to converge and make sense, because we are traveling down the scale to the finitesimals, r, as *n* goes to Immensity, must be less than one for the series to converge. The sum then becomes:

$$a + ar + ar^2 + ar^3 + ar^4 + \cdots = \sum_{k=0}^{\infty} ar^k = \frac{a}{1-r}, \quad \text{for } |r| < 1.$$

When *a* = 1, that is the singularity-minds as the view=value of the whole this can be simplified to:

$$1 + r + r^2 + r^3 + \cdots = \frac{1}{1-r},$$

…the left-hand side being a geometric series with common ratio *r*.

The beauty and simplicity of the formula shows by Occam's razor principle indeed its 'essential nature' in terms of time-space laws.

It is quite interesting then to understand in terms of the 5 Dimotions and o-1=1-, time-space dual sphere (essential for quantum physics) the variations of the power series. As they work for the o-1 sphere, in which the series travels a scale of the fifth dimension: from 1Δ down to Δ-1 vs. its entropic divergent expansion when r is larger than ±1, as it travels in the 1- sphere, which should have a solution, when we define a relative infinite as the value of the whole perceived from the finitesimal point of view, which means a relative infinite. Then we make a travel upwards from the Δ-1 finitesimal or Δ-being to the Δ+1 world.

So those series represent the 1D and 4-5Dimotions, while the 3rd reproductive dimotion happens when r=1, as the reproductive sum that creates terms of a reproductive wave, which in a lineal sum of steps will represent the 2D locomotion of the being. Finally if r is -1 the series forms a 'steady state' 0' sum world cycle, an oscillation of two values.

So the key concept of a proper 5D scalar interpretation of series (this analysis on the simplest of all series for 5D advanced theory would obviously expand to power series Taylor series etc, but we leave this work for the future pouring of my notebooks or in case I likely die earlier, for future researchers) is the concept of finitesimals and relative infinites,

The limit of a sequence

In that regard we amend the work of the German mathematician Karl Weierstrass and its formal definition of the limit of a sequence as follows:

Consider a sequence (a_n) of real numbers, by which is meant an infinite list: **$a_0, a_1, a_2, \ldots.$**

It is said that a_n converges to (or approaches) the limit a as n tends to Immensity, if the following mathematical statement holds true: For every $\varepsilon > 0$, there exists a whole number N such that $|a_n - a| < \varepsilon$ for all $n > N$. Intuitively, this statement says that, for any chosen degree of approximation (ε), there is some point in the sequence (N) such that, from that point onward ($n > N$), every number in the sequence (a_n) approximates a within an error less than the chosen amount ($|a_n - a| < \varepsilon$). Stated less formally, when n becomes large enough, a_n can be made as close to a as desired.

For example, the sequence in which $a_n = 1/(n + 1)$, that is, the sequence: **$1, {}^1/_2, {}^1/_3, {}^1/_4, {}^1/_5, \ldots,$** goes on forever.

Every number in the sequence is greater than 0', but, the farther along the sequence goes, the closer the numbers get to 0'. For example, all terms from the 10th onward are less than or equal to 0.1, all terms from the 100th onward are less than or equal to 0.01, and so on. Terms smaller than 0.000000001, for instance, are found from the 1,000,000,000th term onward. In Weierstrass's terminology, this sequence converges to its limit 0 as n tends to Immensity. The difference $|a_n - 0|$ can be made smaller than any ε by choosing n sufficiently large. In fact, $n > {}^1/_\varepsilon$ suffices. So, in Weierstrass's formal definition, N is taken to be the smallest integer $> {}^1/_\varepsilon$

This example brings out several key features of Weierstrass's idea. First, it does not involve any mystical notion of infinitesimals; all quantities involved are ordinary real numbers. Second, it is precise; if a sequence possesses a limit, then there is exactly one real number that satisfies the Weierstrass definition. Finally, although the numbers in the sequence tend to the limit 0, they need not actually reach that value.

Now this $n > 1/\varepsilon$ is exactly what Leibniz without so much pedantic formalism considered the finitesimal, what we call the quanta of an Δ-1 scale and what physicists call in its study of different Planes, the minimal 'error-quanta' /2π, k-entropy, or 'Planck mass' (Black hole of a compton wavelength volume, or minimal quanta of gravitational Δ+1 Planes).

In the graph, $1/\pm10^2$ is the limit considered the finitesimal of this particular 'graph perception'. *And also the error of our measure, as if we add another $1/\pm10^2$, the series becomes a whole.*

Thus most paradoxes of mathematics arise from not understanding those simple concepts, as well as the meaning of 'inverse negative numbers' .

For example an infinite series which are less well-behaved are the series: **$1 - 1 + 1 - 1 + 1 - 1 + \cdots$**

If the terms are grouped one way: $(1 - 1) + (1 - 1) + (1 - 1) + $, then the sum appears to be: $0 + 0 + 0 + = 0$.

But if the terms are grouped differently, $1 + (-1 + 1) + (-1 + 1) + (-1 + 1) + $ the sum is $1 + 0 + 0 + 0 + = 1$.

It would be foolish to conclude that $0 = 1$. Instead, the conclusion is that the series has *a due value, and so it is creative oscillatory series with a time dynamic that cannot be merely said, not to have a solution, but has 2.*

It has therefore an internal dual structure, which in modern ¬Algebra is the group:

'a': 1-1=0.   And so if we accept that internal Δ-1 unit for the series grouping and its 'real value is:

a+a+.... = 0+0+0...=0.

So we can write it in terms of the generator as:

∑ $t (+1) <≈> ∑ðƒ (-1), which defines generically a feed-back 'world cycle' whose sum is 0'.

In classic maths of a single space-time continuum, the difference between both series is clear from their partial sums. The partial sums of 1/2+1/4... get closer and closer to a single fixed value—namely, 1. The partial sums of a+, without its internal Δ-1 (a) structure, alternate between 0 and 1, so the series never settles down.

A series that does settle down to some definite value, as more and more terms are added, is said to converge, and the value to which it converges is known as the limit of the partial sums; all other series are said to diverge. But in ΔST many diverging series become when considered also its internal structure, convergent and well-behaved.

Actually, without even experimental evidence, there exist subtle problems with such 'infinite' construction. It might justifiably be argued that if the slices are infinitesimally thin, then each has 0' area; hence, joining them together produces a rectangle with 0' total area since 0 + 0 + 0 + = 0. Indeed, the very idea of an infinitesimal quantity is paradoxical because the only number that is smaller than every positive number is 0 itself.

The same problem shows up in many different guises. When calculating the length of the circumference of a circle, it is attractive to think of the circle as a regular polygon with infinitely many straight sides, each infinitesimally long. (Indeed, a circle is the limiting case for a regular polygon as the number of its sides increases.) But while this picture makes sense for some purposes—illustrating that the circumference is proportional to the radius—for others it makes no sense at all. For example, the "sides" of the infinitely many-sided polygon must have length 0, which implies that the circumference is 0 + 0 + 0 + = 0, clearly nonsense.

So by reductio ad absurdum, the limits of infinitesimals are always an Δ-1 quanta. THIS of course also resolves all the Cantor's nonsense of different infinities and its paradoxes. It is just 'math-fiction' and worthless to study.

In 5D maths, lies the exhaustion method does limit the parts to finitesimals, as a realist method, which implies nature also limits its divisions. This concept would be lost in the 3rd formal age, also with the 'lineal bias' introduced on Dedekind's concept of a real number NOT as a proportion/ratio, between quantitative parameters of the 'parts' of a whole, or the 'actions' of a system and its St<ST>Ts parameters, which is what it is, but as an 'abstract cut' in a lineal sequential order of 'abstract numbers'.

In the classic STi balanced age, both the limits method and finitesimal method of Leibniz considered infinitesimals, finitesimals that is with a 'cut-off limit' and real nature.

Those limits are minimal 'steps' of any scale (in time-motion), or minimal parts (in space-forms).

Further comments

As usual we cannot be exhaustive in any theme of 5D but just give a 'feeling' of the discipline and how it corrects the errors of the axiomatic mental method of justification of humind's mathematical space, as reality.

Series in that sense are also connected to the concepts of different infinities, so cherished in modern algebra (Cantor's cardinal infinities and all that jazz)… Their paradoxes disappear though when the number of elements of the series reduces to ∝, so then *we can always compare. In fact it is the classic method to define a series as divergent or convergent.*

If we are given two series:

$u_0 + u_1 + u_2 + \cdots,$ with positive terms such that for all values of n, beginning with a certain one, we have the
$v_0 + v_1 + v_2 + \cdots$ inequality:

$u_n \leqslant v_n$, then the convergence of the second series implies the convergence of the first, and the divergence of the first implies the divergence of the second. Consider the simplest case of the harmonic series:

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7} + \frac{1}{8} + \cdots,$$ which it might seem to converge to K, as the numbers diminish. But if we compare it with the terms of a series where the sum of the underlined terms in each case is equal to ½ but the last term of those partial sums Sn coincides with the same term of the harmonic series (S4=S4, S8=S8, etc.):

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{4} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{16} + \cdots + \frac{1}{16} + \cdots,$$

(8 times)

It is clear that the sum Sn of the 2nd series (S$_2$) approaches Immensity with increasing n, ($\sum 1/2$) and consequently the harmonic series diverges to 'potential infinity' even if it remains smaller than S$_2$

Can then we make the harmonic series converge towards a constant, as it seems a 'natural series' of growing finitesimals (when added inversely from 1/max. n). Yes we do, when we *rise to a power its terms*:

$$1 + \frac{1}{2^\alpha} + \frac{1}{3^\alpha} + \frac{1}{4^\alpha} + \cdots$$ Again this can be proved comparing with a series that converges to 1, the whole:

$$\left(1 - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \cdots + \left(\frac{1}{n-1} - \frac{1}{n}\right) + \cdots$$ with positive terms converges to unity as its sum. Since its partial sums Sn, are equal to:

$$S_n = 1 - \frac{1}{n+1} \to 1 \ (n \to \infty).$$ On the other hand, the general term of this series satisfies the inequality:

$$\frac{1}{n-1} - \frac{1}{n} = \frac{1}{(n-1)\,n} > \frac{1}{n^2},$$ from which it follows that the series:

$$1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \cdots$$ converges.

Again we do fin in the previous series 1/n-1 – 1/n, which written backwards starting in the finitesimal, forms a natural progression from 1/n to 1, *with the memorial erasing of the previous term, a simple natural form to grow to 1; which do have many alternative paths/series.*

 Universal constants as series.

It is then obvious that all the 'numbers' we considered 'ratios' of fundamental 'dimotions' of reality; that is, Universal constants can be written as power series, which shows their symmetry in Δ¡-1>Δ, *essential to understa*d th*e constant entanglement between scale, space and time in the Universe.*

As we study them in different parts of those texts on calculus and algebra, we refer the reader to them.

Such series converge, the more so when we transfer them to the complex plane, which due to its ±1 'I' variation, *converts lineal processes into cyclical ones, mirroring better all functions related to time.*

Series are also a justification for polynomials beyond the simplest spatial view of them in 3 steps of dimensions of space (point, line, volume) or motions of time (distance, motion, acceleration):

Polynomials as divergent or convergent scalar series.

In mathematics, a **power series** (in one variable) is an infinite series of the form

$$\sum_{n=0}^{\infty} a_n (x - c)^n = a_0 + a_1 (x - c)^1 + a_2 (x - c)^2 + \cdots$$

where a_n represents the coefficient of the nth term and c is a constant. a_n is independent of x and may be expressed as a function of n (e.g., an=1/n!). Power series are useful in analysis since they arise as Taylor series of infinitely differentiable functions.

In many situations c (the *center* of the series) is equal to 0', for instance when considering a Maclaurin series. In such cases, the power series takes the simpler form

$$\sum_{n=0}^{\infty} a_n x^n = a_0 + a_1 x + a_2 x^2 + \cdots$$
Any polynomial can be easily expressed as a power series around any center *c*, although most of the coefficients will be 0' since a power series has infinitely many terms by definition. For instance, the polynomial f(x)=x²+2x+3 can be written as a power series around the center c=0 as

$$f(x) = 3 + 2x + 1x^2 + 0x^3 + 0x^4 + \cdots$$

or around the center c=1 as

$$f(x) = 6 + 4(x-1) + 1(x-1)^2 + 0(x-1)^3 + 0(x-1)^4 + \cdots$$
Or around any other center *c* One can view power series as being like "polynomials of infinite degree," although power series are not polynomials. These power series are also examples of Taylor series, which are the key dimotions of scalar motion (1/1-x), entropy (exponential) and 1Dimotion (Sin).

The geometric series formula

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \cdots,$$

which is valid for |x|<1 is one of the most important examples of a power series, as are the exponential function formula

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots,$$
=

and the sine formula

$$\sin(x) = \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{(2n+1)!} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots,$$

II AGE OF CALCULUS: THE OPERANDS ∫∂ AND ITS 'SENTENCES': PDES & ODES

We study the second age of Algebra, the age of calculus with its reflection of the 5 Dimotions of Timespace, as the best discipline to study the laws of times=changes, which are the fundamental laws of a Universe made of 'timespace dimotions', in which spatial mental spaces are a Maya of the senses.

The concepts of mathematical analysis, such as the derivative or the integral, as they presented themselves to Newton and his contemporaries, had not yet completely "broken away" from their physical and geometric origins, such as velocity and area. In fact, they were half mathematical in character and half physical. The conditions existing at that time were not yet suitable for producing a purely mathematical definition of these concepts. Consequently, the investigator could handle them correctly in complicated situations only if he remained in close contact with the practical aspects of his problem even during the intermediate (mathematical) stages of his argument.

Newton was guided at all stages by a physical way of looking at the problem. But the investigations of Leibniz do not have such an immediate connection with physics, a fact that in the absence of clear-cut mathematical definitions sometimes led him to mistaken conclusions. On the other hand, the most characteristic feature of the creative activity of Leibniz was his striving for generality, his efforts to find the most general methods for the problems of mathematical analysis; and its depth of philosophical understanding of finitesimals and wholes, shown also in his superior symbolism. The evolution of the concepts of mathematical analysis (derivative, integral, and so forth) continued, particularly in the work of Cauchy, which idealized the concept of a limit and used it as the basis for his definitions of continuity, derivative, differential, and integral. These definitions are widely used in present-day analysis and must be corrected back to the Greek and Leibniz's scalar view.

Regarding practical application such idealism requires the limitation of the true finitesimals of changer of the actual world, solved with the expedient method of using differentials. This means that at every step of our mathematical argument the results obtained will contain certain errors, which may accumulate as the number of steps in the argument increases. But mathematical idealism denies it.

Still no other discipline of science was so close to understand time=change as calculus was even if its whys were hidden in the 'magic' of its techniques, as *it subconsciously applied the pentalogic of different derivatives for each different function representing each distinct dimotion of space-time. And then once those derivatives of changes were applied, the whole function of existence could be integrated as a whole (ODEs). While multiple processes of finitesimal calculation of different variables, S=T equivalences between curvature and motion, etc. could be applied to the resolution of complex events between multiple T.œs performing different dimotions through PDEs and calculus of variations.*

So not only pentalogic special analysis of change could be performed with derivatives and integrals of different operands, but very complex 'sentences' of sequential changes modeled with the 3 fundamental complex syntactic equations of calculus, ODEs, PDEs and calculus of variations, within the entropic limits of an A-B definite integral or the first and final moment on a time path, or the maximal and minimal or the points in which the function became zero cutting the real line, or in its first or second derivative.

So each equation of mathematical physics studying the motion of physical systems hid a sequence of 'existential algebra' for the physical parts of the simultaneous ensembled of variables studied.

We shall consider in this brief introduction to the golden age of calculus, a pentalogic analysis of derivatives and its inverse integrals, considering how calculus *represents a second layer of complexity over the operands it can further analyze extracting its minimal quanta of change, and/or integrating them in new 'dimensions' .*

To study then the complex combinations of calculus (multiple derivatives and integrals on time and space) -ODEs, PDEs and variational methods, and finally consider the fundamental simpler equations of mathematical physics, growth, reproduction and decay, studied with them…

THE CONNECTION BETWEEN INTEGRALS AND DERIVATIVES IN ΔST: FINITESIMALS AS LIMITS: 5D APPROACH

Those subtle philosophical considerations could only be done, once Leibniz established the tangent as the proper measure of change, where Y(S) and X(t), could be considered similar; S≈T.

Then once the condition of present balance is reached; calculus works on praxis in most cases with the value of a differential, which is the equivalent to the finitesimal minimal time quanta of reality.

In other words, calculus consists on 'calculating' for a spatial present state, its quantity of time-change through a period of existence, which for worldcycles will be zero as we shall add, as explained in the worldcycle, both the positive growth and negative decreases of the y' sinusoidal functions.

Those functions then will be limited by the points of birth and extinction.

While inversely in the integration of exponential growth or decay, we will reach relative $\propto$ growth and the function will be 'cut' by a log of maximal growth.

The finitesimals of physical scales. H, t, cc.

In the S=T homology a mind stops motion into form, hence converts T into S. And this happens in an asymmetric manner according to the choice of upper or lower scales of 5D: Huminds are built, to see the larger whole as slow space and the smaller parts as time, because of 5D metrics (smaller faster clocks, slower larger wholes). And so we distinguish finitesimals of time in lower scales (angular momentum); and finitesimals of space associated to larger scales (c^2); with an intermediate k finitesimal of Boltzmann in the thermodynamic scale.

In praxis the existence of minimal quanta would only become evident with the discovery in mathematical physics of the minimal quanta of energy, which cannot be cancelled, as it becomes the 'minimal' amount that gives origin to virtual particles (Heisenberg's residual h/2). Yet again this minimal Planckton that cannot be eliminated WAS interpreted with the weird mental point of view that it was an 'uncertainty of humind's measure. A bizarre way of complicating reality; which amounts to say that the first cell is an uncertain measure of life, the first atom an uncertain measure of matter – and so the Planckton, minimal quanta of energy became the origin of one of the most arrogant deluded interpretations of reality humind's imagination has deviced; ever since an ass breeder saw a bush burning and thought it was G. Bush talking to him – Copenhagen interpretation of quantum physics in terms of mathematical creationism still going strong, along Mosaic creationism for the throne of humind's philosophy of the Universe. *Back to reality, in any system we shall find a minimal quanta that does not go away. In physical systems is the* 'Planckton' (H-Planck constant), the first quanta of angular perception, the first dimotional spin, of light space-time, our minimal part in the Δ-3 scale of timespace – as scale IS the absolute reality and appears always associated to a minimal space or time parameter, in which a scale starts to exist. The same finitesimal would be found in the Thermodynamic molecular scale as absolute zero cannot be reached, and in the scale cosmological scale as cc, a quanta =area of entropic light motion exists.

It is then essential to understand in depth 0's finitesimals for the workings of the Universe to fully grasp the relationship between the elements of Planes of spacetime – its fractal points and lines that ad them in time or space and analysis; in both directions - down as *derivatives and up as new dimensions called integrals.*

Finitesimal Quanta, as the limit of populations in space and the minimal action=dimotion in time.

In the idealized view of mathematics this amounts to a sum of smallish areas either taken as finitesimals of space (Riemann integral) or finitesimals of time (Lebesgue integral), with different applications to calculate its sum through an interval of events or populations. It is then only needed to be aware that what mathematicians calla limit of h->0 IS, a limit that stops when h=0'; that is when h finds its real finitesimal value on the 'units of measure' we use to calculate. This finitesimal might be as small as an atom which from the human scale in terms of the Avogadro number reduces to 10^{-24} parts but regardless of its tiny size the concept we want to stress is that *for a limit to exist h must stop at 0'.*

The method of integrals (or rather its reality) becomes then a clear proof of the discontinuity of scalar spacetime systems, which are made of steps, since the procedure of integration calculates the value of an Y(S) parameter for each min. X(T)=1/t finitesimal 'stœp of time quanta' measured by its frequency in time.

It is then NOT real to pretend that this 1/t=minimal time event must reach absolute zero. As Leonardo noticed, an instant (zero) has no time. So as a point with no parts has no space, and does not exist. Time exists because it is a minimal interval of motion, separated often by a stop state of space, and a dimotion of perceptive information, conforming a discontinuous series of stœps, S=T, the basic beat of reality, which is what we integrate by moving up and right X x Y to find an area and then summon them up.
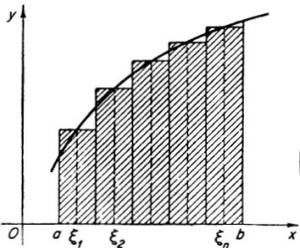
So to solve an integral we proceed as follows. We divide the interval [a, b] into n parts, not necessarily equal. We denote the length of the first part by Δx_1, of the second by Δx_2, and so forth up to the final part Δx_n. In each segment we choose points ξ_1, ξ_2, $\cdots$, ξ_n and set up the sum:

$$f(\xi_1)\,\Delta x_1 + f(\xi_1)\,\Delta x_2 + \cdots + f(\xi_n)\,\Delta x_n . \qquad (28)$$

Let us suppose that a curve above the x-axis forms the graph of the function y = f(x). We attempt to find the area S of the segment bounded by the line y = f(x), by the x-axis and by the straight lines drawn through the points x = a and x = b parallel to the y-axis.

The magnitude Sn is obviously equal to the sum of the areas of the rectangles shaded in figure:

The finer we make the subdivision of the segment [a, b], the closer Sn will be to the area S. If we carry out a sequence of such constructions, dividing the interval [a, b] into successively smaller and smaller parts, then the sums Sn will approach S.

The possibility of dividing [a, b] into unequal parts makes it necessary for us to define what we mean by "successively smaller" subdivisions. We assume not only that n increases beyond all bounds but also that the length of the greatest Δx_i in the nth subdivision approaches 0'. Thus the calculation of the desired area has in this way been reduced to finding the limit:

$$s_n = \sum_{i=1}^{n} f(\xi_i)\,\Delta t_i ,$$

We note that when we first set up the problem, we had only an empirical idea of what we mean by the area of our curvilinear figure, but we had no precise definition. But now we have obtained an exact definition of the concept of area. It is the limit:

$$s = \lim_{\max \Delta t_i \to 0} \sum_{i=1}^{n} f(\xi_i)\,\Delta t_i .$$

We have now an intuitive notion of area, on the basis of which we can calculate the area numerically.

We have assumed that: **f(x)≥0'.** If f(x) changes sign, then in figure, the limit will give us the ¬Algebraic sum of the areas of the segments lying between the curve y = f(x) and the x-axis, where the segments above the x-axis are taken with a plus sign and those below with a minus sign.

Definite integral. The entropic limits of a domain.

The need to calculate the integral Sum limit arises in many other problems in which a new dimension is reached by the sum of finitesimal paths. For example, suppose that a point is moving along a straight line with variable velocity v = f(t). How are we to determine the distance s covered by the point in the time from t = a to t = b?

Let us assume that the function f(t) is continuous in the sense aforementioned (S≈T; h->0'); that is, in small intervals of time the velocity changes only slightly. We divide the interval [a, b] into n parts, of length Δt_1, Δt_2, $\cdots$, Δt_n. To calculate an approximate value for the distance covered in each interval Δt_i, we will suppose that the velocity in this period of time is constant, equal throughout to its actual value at some intermediate point ξ_1. The whole distance covered will then be expressed approximately by the sum:

$$s_n = \sum_{i=1}^{n} f(\xi_i)\, \Delta t_i,$$

and the exact value of the distance s covered in the time from a to b, will be the limit of such sums for finer and finer subdivisions; that is, it will be the limit:

$$s = \lim_{\max \Delta t_i \to 0} \sum_{i=1}^{n} f(\xi_i)\, \Delta t_i.$$

Whereas the limit Δt will be the minimal step in space and frequency of time of a single event.

Since as the word says a real limit is each relative S(0')=T(0') of change.

Ideal mathematicians treat those finitesimals under the obsession with perfect measure as real zeros because *they will discharge them to obtain a finite solution in Δ+1. We have discussed the falsehood in philosophical terms of such approach. But and this is the paradoxical marvel of the Universe, as for the Δ+1 system all Δ-1 finitesimals matter nothing, and are 'expendable', as a citizen is expendable for the state or army that 'doesn't count corpses'.*

We shall try to give some idea of these concepts. For this purpose we consider the following example.

We wish to calculate the area bounded by the parabola with equation y = x^2, by the x-axis and by the straight line x = 1. Elementary mathematics will not furnish us with a means for solving this problem. But here is how we may proceed. We divide the interval [0, 1] along the x-axis into n equal parts at the points:

$$\frac{-1}{n}, 1$$

and on each of these parts construct the rectangle whose left side extends up to the parabola. As a result we obtain the system of shaded rectangles, the sum Sn of whose areas is given by:
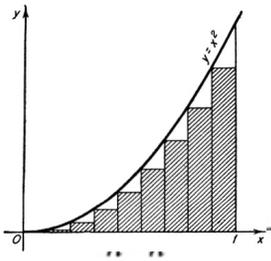
$$S_n = 0 \cdot \frac{1}{n} + \left(\frac{1}{n}\right)^2 \frac{1}{n} + \left(\frac{2}{n}\right)^2 \frac{1}{n} + \cdots + \left(\frac{n-1}{n}\right)^2 \frac{1}{n}$$

$$= \frac{1^2 + 2^2 + \cdots + (n-1)^2}{n^3} = \frac{(n-1)\,n(2n-1)}{6n^3}.$$

Let us express Sn in the following form: $S_n = \frac{1}{3} + \left(\frac{1}{6n^2} - \frac{1}{2n}\right)$ = 3+ɩn

The quantity ɩn, which depends on n, possesses a remarkable property: If n is increased beyond all bounds, then αn approaches 0', the Δ-1 finitesimal. This property may also be expressed as follows: If we are given an arbitrary positive number, ə, €, in classic calculus, then it is possible to choose an integer N sufficiently large that for all n greater than N the number ɩn will be equal to the given ə in absolute value.

Whereas ə is the 'real physical value' of the finitesimal that 'exists'; where our 5D calculus stops. While in the axiomatic method e can be chosen at will as small as the idealist mathematician wishes, which is NOT what reality shows. E will be h in quantum physics, it will be the residual k temperature and the minimal c2 part of a mass or minimal unit of vacuum spacetime in the galaxy; it will be a cell in an organism, an atom in a matter state. Or else what will be our counting made of? Entelechies?

This said, as ə is so small, for the larger Δ+1 an ɩndifferent it is OK to discharge the residual finitesimals to obtain an approximate result. Since absolute precision for Δ+1, the plane of the observer is not needed and we discharge in

specific methodological calculus the reminder smallish sum of some 0's to calculate a result that to be more accurate should be adjusted with a '±' symbol or an ≈ not an = identity one.

So we obtained the area below the parabola as 1/3rd by discharging a finitesimal term of the sum. This 'discharged' quantity however is real – it is the toll we pay but never gets to zero. In the measure of a fractal coast, the coast grows in size and precision with smaller steps, but we must stop the steps at a certain scale or else we would spend an infinite time measuring it. Information thus becomes idealized to make possible in finite time to measure it.

Formal symbols of 5D calculus from existential algebra: -ȷn, ⱻ, €, finitesimal, ȷndifferent, ȷnfinitesimal

It is then necessary as always in 5D to slightly change the symbols of 5D calculus, adapted to existential algebra – nor that I think huminds will ever upgrade its chips but once we are gone, faster than you think, likely more rigorous AI robots will adopt it.

The finitesimal is then defined as -ȷn, the minimal amount we *discharge, that is subtract (reason why it has a negative symbol), from the real result to obtain the idealized mathematical mirror of the event or spatial population, as for Δ+1 it is indistinguishable, which we call ȷndifferent (a simpler world, with an ethical component, because -ȷn is real and for itself it matters, even if for the Δ+1 world is expendable). It can also be called a finitesimal (preferred) or -ȷn≈finitesimal if you like. The symbol -ȷ also means it is the unit of Δ-ȷ, the minimal quantity of the whole; and finally the symbols, , ⱻ,* €, *mean they 'exist', the are 'real', 0' does have parts, it is a non-euclidean point of its own.*

It would be easy to give many examples of practical problems leading to the calculation of such an imperfect limit. We will discuss some of them later, but for the moment the examples already given will sufficiently indicate the importance of this idea that adapts classic calculus to reality. As now each of the classic finitesimals used in calculus are as Leibniz put it 'a world in its own', and its study in real, philosophical terms reveals important properties of the structure of space-time and its modes of change. The following list of finitesimals can be then assessed in its properties under those conditions:

$$x_n = \frac{1}{n}, \, y_n = -\frac{1}{n^2}, \, z_n = \frac{(-1)^n}{n}, \, u_n = \frac{n-1}{n} = 1 - \frac{1}{n};$$

$$v_n = (-1)^n \, (n = 1, 2, \cdots).$$

It is clear that xn, yn, and zn are -ȷn≈finitesimals, the first of them approaching 0' through decreasing values, the second through increasing negative values, while the third takes on values which oscillate around 0'. Further, un $\rightarrow$ 1, while υn does not have a limit at all, since with increasing n it does not approach any constant number but continually oscillates, taking on the values 1 and −1 – so the ȷnfinitesimal is the whole changing its direction of existence. All of them will be subject to further scrutiny when/if my finitesimal lifetime allows me to publish a few papers on mathematical physics, as they appear in multiple physical equations. The most important of them, being, Xn, the fundamental finitesimal, which we shall often comment on (the minimal part of an N whole, the dimensionless angle/curvature of a motion) and its closely connected -1/n2, for accelerated motions.

Finally to notice that in the example, -ȷn makes the volume slightly smaller than 1/3rd as -1/2n>1/6n²; which in reverse fashion if we consider the inner region of the curved parabola, makes it slightly larger than 2/3^{rds} which is a general rule for the internal volume of curved surfaces, always slightly larger than the polygonal, lineal form it encloses. I.e. the hexagon has a 3 perimeter, in its inscribed π=3,14… circle; which again has important consequences for the real, vital structure of organs, as the smaller parts are 'lineal', and fit in the larger curved enclosures, leaving a safety space to its walls, which often has apertures when constructed as most circles are with 3 diameters, equal to π-3/π=4%, which is the ideal amount of outer reality perceived through those apertures left by the 3 diameters that construct the porous membrain (percentage of energy and matter in the Universe we observe).

Finitesimals treated with other operands.

If we shall study how operands are treated with calculus it is customary to consider the reverse action of treating finitesimals with the polynomial operands, and as now 'finitesimals' are real fractal point with parts, it is obvious all the laws, properties and operands of polynomials work with 'finitesimals', the so-called laws of operations with limits of classic mathematics.

It is then not necessary (but possible to prove with the axiomatic ideal method, consistent in itself beyond the limitations we include, that if the variables xn and yn approach finite limits, then their sum, difference, product, and quotient also approach limits which are correspondingly equal to the sum, difference, product, and quotient of these limits. This fact may be expressed as:

$$x_1 \pm y_1 \,,\, x_2 \pm y_2 \,,\, x_3 \pm y_3 \,,\, \cdots$$

$$x_1 y_1 \,,\, x_2 y_2 \,,\, x_3 y_3 \,,\, \cdots$$

$$\frac{x_1}{y_1} \,,\, \frac{x_2}{y_2} \,,\, \frac{x_3}{y_3} \,,\, \cdots \,.$$

The only case that deserves further analysis, which is when a quotient of two finitesimal 0's of different value is considered. Here it is impossible to state in advance whether the ratio xn/yn will approach a limit, and if it does, what that limit will be, since the answer to this question depends entirely on the character of the approach of xn and yn to 0'; *that might result in either a 0' or an $\propto$, thus proving ad lateral the falsehood of Cantorian equal infinities, as N^2 regardless of Cantor's musings IS larger than N but has paradoxically LESS information as a set of numbers (because in 5D larger Spatial forms have paradoxically less information, stored in the faster time cycles of smaller beings, SxT=C).* Now, if we just care for the 'size' then the previous examples, Xn=1/n & Yn=1/n^2 means that, Yn/Xn=1/n->0' & Xn/Yn=n->$\propto$

While Xn/ Zn:$(-1)^n$/n -> $(-1)^n$ does not approach any limit because Zn does not; and *in quotients the dominant element is the denominator which tends to be the predator that imposes its properties to the whole.*

DIFFERENT DIMENSIONAL MOTIONS OF SPACE-TIME CHANGE

We then need to consider in how many dimensions finitesimal change and its aggregated account into a continuous Δ+1 parameter of the whole change of the event can be observed, and how it can be diversified into Time, scalar or spatial change. Let us then consider two example of dual dimensional, holographic change, in Ts-speed and St-volume, which were the first 2 themes solved historically, to see how calculus methods can be used equally for quanta=frequency=steps of time, or quanta=populations=finitesimals of space: by virtue of S=T :

There are many different parameters of change in space and time in human sciences, due to the lack of clear-cut unifying concepts of space and time.

But in all we need to find a 'finitesimal quantity', either in time or in space, to measure 'changes of speeds and frequencies of time motion for each spatial step', Δs/Δt , or changes on volumes of space and populations of simultaneous space-beings. The difference between both analysis is one of 'persistence of change' or 'simultaneity of change' studied in space, vs. sequential time changes. In spatial analysis we often calculate a 'whole' domain in which populations have a gradient of change in its parameters, even if they co-exist together.

In time, this 'gradient' of change or 'acceleration' is calculated at 'each instant of time', for a single point, and thus its change, has lesser 'dimensionality in space'.

So the study of change in space tends to have more 'volume and dimensionality' and 'simultaneity', as the study of pure time changes (locomotion, entropy) is analyzed with the being reduced to a time point, or even loosing its spatial simultaneity through entropic processes.

Adding a new dimension of 'width-energy-population-intensity-density-pressure.'

Let us put an example and resolve it in terms of space-quanta (method of limits) which is the first 'basic understanding' of calculus in terms of its finitesimal units:

Quanta of space.

A spatial use of the limit concept calculates not a time but a space volume, forebear of differential calculus:

Example 2. A reservoir with a square base of side a and vertical walls of height h is full to the top with water (figure 1).

With what force is the water acting on one of the walls of the reservoir?

We divide the surface of the wall into n horizontal strips of height h/n. The pressure exerted at each point of the vessel is equal, by a well-known law, to the weight of the column of water lying above it. So at the lower edge of each of the strips the pressure, expressed in suitable units, will be equal respect $\frac{h}{n}, \frac{2h}{n}, \frac{3h}{n}, \cdots, \frac{(n-1)h}{n}, h.$

We obtain an approximate expression for the desired force P, if we assume that the pressure is constant over each strip. Thus the approximate value of P is equal to:
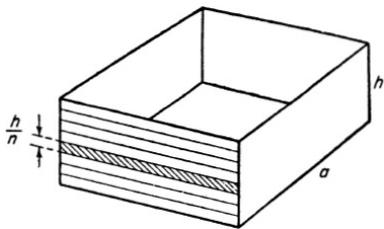
$$P \approx \frac{ah}{n} \cdot \frac{h}{n} + \frac{ah}{n} \cdot \frac{2h}{n} + \cdots + \frac{ah}{n} \frac{(n-1)h}{n} + \frac{ah}{n} h$$

$$= \frac{ah^2}{n^2}(1 + 2 + \cdots + n) = \frac{ah^2}{n^2} \cdot \frac{n(n+1)}{2} = \frac{ah^2}{2}\left(1 + \frac{1}{n}\right).$$

To find the true value of the force, we divide the side into narrower and narrower strips, increasing n without limit. With increasing n the magnitude 1/n in the above formula will become smaller and smaller and in the limit we obtain the exact formula:

P = ah²/2

Leibniz rightly considered 1/n the 'finitesimal unit', whereas we consider 1 the whole, and n, its minimal fraction, usually 1 of its 10^{10} elements ($1/10^{10}$): the standard value of finitesimal units.

In the example again the finitesimal limit is extremely small. How much? We should consider statistical mechanics to find it is the size of molecules of water, which form bidimensional layers of liquid to shape the 3D volume, and are about 10^{20} times smaller than the whole in terms of Avogrado's Mols.

The error ε is so small as to be P=(ah²/2) x 1.00000000000000000001 (1 +1/n)

And this is a general rule in most cases: the finitesimal error is as small as 1/n, where n is the quanta of the scale. So when we do Δ+1 calculations as in most cases it is irrelevant. But theoretically *it is important and in fact it will give us a 'realist' concept for the uncertainty principle of Heisenberg.*

Hence unnoticeable, truly ¡n=finitesimal, still important to understand the idealization of mathematical rules. *As it means theoretically that the correct concept is a differential equation, where the finitesimal is 'real'.*

The idea of the method of limits is thus simple, accurate and amounts to the following. In order to determine the exact value of a certain magnitude, we first determine not the magnitude itself but some approximation to it. However, we make not one approximation but a whole series of them, each more accurate than the last. Then from examination of this chain of approximations, that is from examination of the process of approximation itself, we uniquely determine the exact value of the magnitude. by ignoring the finitesimal error.

The same practical problem can be resolved with the differential used as an approximate value for the increment in the function. For example, suppose we have the problem of determining the volume of the walls of a similar closed cubical box whose interior dimensions are 10 × 10 × 10 cm and the thickness of whose walls is 0.05 cm. If great accuracy is not required, we may argue as follows. The volume of all the walls of the box represents the increment Δy of the function y = x3 for x = 10 and Δx = 0.1. So we find approximately:

$$\Delta y \approx dy = (x^3)'\, \Delta x = 3x^2 \Delta x = 3 \cdot 10^2 \cdot 0.1 = 30 \text{ cm}^3.$$

Speed and acceleration: 2D TT

We used a simple spatial case of a gradient with a clear equation, **P=ah²/2** to compare it with one case of time change in which the gradient also caused by gravitational 'weight' is not constrained by a wall, hence the force is released to become a time dimotions. Not surprisingly in such a case, as it was established experimentally by Galileo, the distance s covered in the time t by a body falling freely in a vacuum is expressed in terms of TT-acceleration by a similar formula: **s=gt²/2**

Whereas g is a constant that measure the acceleration on Earth, equal to 9.81 m/sec².

What is the velocity of the falling body at each point in its path?

Let the body be passing through the point A at the time t and consider what happens in the short interval of time of length Δt; that is, in the time from t to t + Δt. The distance covered will be increased by a certain increment Δs. The original distance is s1 = gt²/2.

From the increased distance we find the increment: $\Delta s = s_2 - s_1 = \frac{g}{2}(2t\Delta t + \Delta t^2).$

This represents the distance covered in the time from t to t + Δt. To find the average velocity over the section of the path Δs, we divide Δs by Δt: $v_{\text{av}} = \frac{\Delta s}{\Delta t} = gt + \frac{g}{2}\Delta t.$

Letting Δt approach 0', we obtain an average velocity which approaches as close as we like to the true velocity at the point A. On the other hand, we see that the second summand on the right-hand side of the equation becomes

vanishingly small with decreasing Δt, so that the average υav approaches the value gt, a fact which it is convenient to

$$v = \lim_{\Delta t \to 0} v_{av} = \lim_{\Delta t \to 0} \frac{\Delta s}{\Delta t}$$

write as follows: $= \lim_{\Delta t \to 0} \left(gt + \frac{g}{2}\Delta t\right) = gt.$

While both formulae are never compared in classic physics, it is worth to notice that they are mimetic by virtue of S=T, so now the spatial gradient, 'h-eight' becomes the temporal gradient, t-ime; the intensity of the gradient, giving for P by the a-mass of liquid, is now given by the g-force of the mass of the Earth; and the outcome is an inverse dynamic parameter of time change Pressure vs. a static parameter of spatial length, distance.

Pressure is an energy ST density. So a pressure gradient is an energy density gradient, acceleration is a TT-double time motion. And yet as both are ultimately 'holographic ST, TT' dual functions its equations in 'scalar terms' are the same, a key concept for all the similar equations we will find regardless of the 'holographic dimotion' we integrate or derviate.

<div align="center">

THE UPPER LIMIT: ¡MMENSITIES: ∝

</div>

The relative ∝. +¡mmensity.

It is then customary in calculus to teach the inverse concept of an infinite magnitude, which we also reduce to a relative Immensity, ∝; as infinities loose meaning and become entropic, uncertain in the borders of Δ, or beyond the domain of existence in time and space of the function we deal with.

Following the rules of ¡nglish that change slightly the wording of 5D we thus substitute the word infinity for +¡mmensity. Immensity as we all know is not infinite, but it is immensurable which is *the meaning that matters here, as such 'largesse' becomes the +¡ whole world for the -¡nfinitesimal that finds it 'infinite', because it no longer can measure it.*

We does talk of an ¡mmensely large magnitude, which is defined as a variable xn (n = 1, 2, ∝), with the property that after choice of an ¡mmense large positive number M, *the limit of measure for the -¡n=finitesimal* it is not possible to find a number N>M that we can 'count in reality', within the limits of time and space of our ¡n≈finitesimal existence, such that for all n > N, $|x_n| > M.$

M+¡ thus become the +¡mmense value, ∝, that limits the world of X. Such a magnitude xn is said to approach +immensity. If it is positive (negative) from some value on, this fact is expressed thus: xn → + ∝ (xn → − ∝).

For example, for n = 1, 2, ∝; lim log 1/n = -∝, lim n^2= +∝; limg tan (π/2+1n)=-∝

It is easy to see then that if a magnitude +¡ M is ¡mmense, then -¡ n = 1/M is immensely small, and conversely.

Something that as, 5D mathematics is experimental, moving into the realm of 'reality', not an 'ideal mathematical entelechy' must have an experimental consequence on the study of 'real immense creatures'. And indeed, we immediately notice that the largest species feed on ¡ndifferent ¡n≈finitesimals that are paradoxically ¡mmensely small. I.e. the largest mammals, Whales, feed on the smallest animals, Krills and Planckton; the largest cosmological bodies, gravitational black holes, feed in the smallest quanta, 'gravitons≈neutrinos?', etc.

Which justifies the Δ±¡ structure of nested Universes, where the largest beings are made of the smallest parts.

This also shows that when we talk of an ¡ndifferent ¡n≈finitesimal, we are mostly referring to a quanta of entropic feeding, which is indifferent to the being. I.e. we reduce even further our food to its ¡ndifferent amino acids that we will then reform to our specific information.

The topological view is simple; the limits of the domain of a function for its finitesimal parts, are the membrain and singularity they cannot reach, as the whole for its inner parts is an open ball transited by the finitesimal.

It is thus essential in calculus the question of the 'boundary conditions', in which the membrane determines the volume which is integrated as the Space-time area, surrounded by the being that is meaningful to its territory.

The area integrated on a function has then 2 S=T meanings. Either is a measure of its vital energy between the singularity at 0' point and its membrane, the limits of the domain in space (albeit elongated in the lineal Cartesian frame) or if we integrate a motion between its initial condition where it receives its momentum and its final stop.

When a point moves back and forth within its world as it performs repetitive dimotions of existence we can integrate the path to extract information of its motion. For the larger Δ+1 world, the finitesimal integrated along the path is often a point of energy or information shared between the membrain and singularity as the initial point and boundary condition of its world seen as a topological open ball, where the membrain is its 'birth-seed' state and the singularity its final point of death-entropy. It is thus the quanta that the membrain 'sends to the singularity' for it to perceive or feed, which moves in a path of minimal action=consumption of energy between both. And finally the finitesimal might represent , an 'ex-foliated' unit of angular momentum, a skin layer of vital space subtracting piece by piece, finitesimal by finitesimal, for the T.œ to communicate in the outer world

The limit is called the definite integral of the function f(x) taken over the interval [a, b], and it is denoted by: $\int_a^b f(x)\, dx.$

The expression f(x)dx is called the integrand, a and b are the limits of integration; a is the lower limit, b is the upper limit. And very often they are the initial and final point, the 0' singularity and membrain that cancel a worldcycle. And so *in 5D a and b are NOT part of the integral, as the finitesimal if it is a time path does not exist on those 2 limits, we might consider to belong to Δ±1, or if it is a volume, represent the membrain and singularity of an open ball, of a 'different substance', not to be integrated.*

RECAP. We change following the transformation of sciences into slightly different stiences, the concept of infinite from a relative infinite, , and an infinitesimal for a finitesimal. The first being the whole of an ¡-plane of reality, the second its minimal part.

The connection between differential and integral calculus.

The problem considered then reduces to calculation of the definite integral: $\int_0^h ax\, dx.$

Another example IS the problem of finding the area bounded by the parabola y = x².

Here the problem reduces to calculation of the integral: $\int_0^1 x^2\, dx.$

We were able to calculate both these integrals directly, because we have simple formulas for the sum of the first n natural numbers and for the sum of their squares. But for an arbitrary function f(x), we are far from being able to add up the sum (that is, to express the result in a simple formula) if the points ξi, and the increments Δxi are given to suit some particular problem. Moreover, even when such a summation is possible, there is no general method for carrying it out; various methods, each of a quite special character, must be used in the various cases.

So we are confronted by the problem of finding a general method for the calculation of definite integrals. Historically this question interested mathematicians for a long period of time, since there were many practical aspects involved in a general method for finding the area of curvilinear figures, the volume of bodies bounded by a curved surface, and so forth.

We have already noted that Archimedes was able to calculate the area of a segment and of certain other figures. The number of special problems that could be solved, involving areas, volumes, centers of gravity of solids, and so forth, gradually increased, but progress in finding a general method was at first extremely slow. The general method could not be discovered until sufficient theoretical and computational material had been accumulated through the demands of practical life.

The work of gathering and generalizing this material proceeded very gradually until the end of the Middle Ages; and its subsequent energetic development was a direct consequence of the rapid growth in the productive powers of Europe resulting from the breakup of the former (feudal) methods of manufacturing and the creation of new ones (capitalistic).

The accumulation of facts connected with definite integrals proceeded alongside of the corresponding investigations of problems related to the derivative of a function. The reader already knows from that this immense preparatory labor was crowned with success in the 17th century by the work of Newton and Leibnitz. It is in this sense that Newton and Leibnitz are the creators of the differential and integral calculus.

One of the fundamental contributions of Newton and Leibnitz consists of the fact that they finally cleared up the profound connection between differential and integral calculus, which provides us, in particular, with a general method of calculating definite integrals for an extremely wide class of functions.

To explain this connection, we turn to an example from mechanics.

We suppose that a material point is moving along a straight line with velocity v = f(t), where t is the time. We already know that the distance a covered by our point in the time between t = t1 and t = t2 is given by the definite integral:

$$\sigma = \int_{t_1}^{t_2} f(t)\, dt.$$

Now let us assume that the law of motion of the point is known to us; that is, we know the function s = F(t) expressing the dependence on the time t of the distance s calculated from some initial point A on the straight line. The distance σ covered in the interval of time [t1, t2] is obviously equal to the difference: **σ= F(t2) - F(t1)**

In this way we are led by physical considerations to the equality:
$$\int_{t_1}^{t_2} f(t)\, dt = F(t_2) - F(t_1),$$

which expresses the connection between the law of motion of our point and its velocity.

From a mathematical point of view the function F(t), may be defined as a function whose derivative for all values oft in the given interval is equal to f(t), that is:

F'(t)= f(t). Such a function is called a primitive for f(t).

We must keep in mind that if the function f(t) has at least one primitive, then along with this one it will have an infinite number of others; for if F(t) is a primitive for f(t), then F(t) + C, where C is an arbitrary constant, is also a primitive. Moreover, in this way we exhaust the whole set of primitives for f(t), since if F1(t) and F2(t) are primitives for the same function f(t), then their difference φ(t) = F1(t) − F2(t) has a derivative φ(t) that is equal to 0' at every point in a given interval so that φ(t) is a constant.*

From a physical point of view the various values of the constant C determine laws of motion which differ from one another only in the fact that they correspond to all possible choices for the initial point of the motion.

We are thus led to the result that for an extremely wide class of functions f(x), including all cases where the function f(x) may be considered as the velocity of a point at the time x, we have the following equality:
$$\int_a^b f(x)\, dx = F(b) - F(a),$$

where F(x) is an arbitrary primitive for f(x).

This equality is the famous formula of Newton and Leibnitz, which reduces the problem of calculating the definite integral of a function to finding a primitive for the function and in this way forms a link between the differential and the integral calculus.

Many particular problems that were studied by the greatest mathematicians are automatically solved by this formula, stating that the definite integral of the function. f(x) on the interval [a, b] is equal to the difference between the values

of any primitive at the left and right ends of the interval.‡ It is customary to write the difference (30) thus:

$$F(x)\Big|_a^b = F(b) - F(a).$$

Example 1. The equality: **(x³/3)'=x²** shows that the function x³/3 is a primitive for the function x². Thus, by the formula of Newton and Leibnitz:

$$\int_0^a x^2\, dx = \frac{x^3}{3}\Big|_0^a = \frac{a^3}{3} - \frac{0}{3} = \frac{a^3}{3}.$$

Example 2. Let c and c' be two electric charges, on a straight line at distance r from each other. The attraction F between them is directed along this straight line and is equal to:

F=a/r² (a = kcc', where k is a constant). The work W done by this force, when the charge c remains fixed but c' moves along the interval [R1, R2], may be calculated by dividing the interval [R1, R2] into parts Δri.

On each of these parts we may consider the force to be approximately constant, so that the work done on each part is equal to: $a/r_i^2\, \Delta r_i$. Making the parts smaller and smaller, we see that the work W is equal to the integral:

$$W = \lim_{n\to\infty} \sum_{i=1}^n \frac{a}{r_i^2}\, \Delta r_i = \int_{R_1}^{R_2} \frac{a}{r^2}\, dr.$$

The value of this integral can be calculated at once, if we recall that: $\dfrac{a}{r^2} = \left(-\dfrac{a}{r}\right)'$,

So that: $$W = -\frac{a}{r}\Big|_{R_1}^{R_2} = a\left(\frac{1}{R_1} - \frac{1}{R_2}\right).$$

In particular, the work done by a force F as the charge c', initially at a distance R1, from c, moves out to Immensity, is equal to: $$W = \lim_{R_2\to\infty} a\left(\frac{1}{R_1} - \frac{1}{R_2}\right) = \frac{a}{R_1}.$$

From the arguments given above for the formula of Newton and Leibnitz, it is clear that this formula gives mathematical expression to an actual tie existing in the objective world. It is a beautiful and important example of how mathematics gives expression to objective laws.

We should remark that in his mathematical investigations, Newton always took a physical point of view. His work on the foundations of differential and integral calculus cannot be separated from his work on the foundations of mechanics.

The definite integral

Returning now to the definite integral, let us consider a question of fundamental importance. For what functions f(x), defined on the interval [a, b], is it possible to guarantee the existence of the definite integral: $\int_a^b f(x)\, dx$, Namely a number to which the sum: $\sum_1^n f(\xi_i)\, \Delta x_i$

Tends as limit as max Δxi, → 0? It must be kept in view that this number is to be the same for all subdivisions of the interval [a, b] and all choices of the points ξi.

Functions for which the definite integral, namely the limit (29), exists are said to be integrable on the interval [a, b]. Investigations carried out in the last century show that all continuous functions are integrable.

But there are also discontinuous functions which are integrable. Among them, for example, are those functions which are bounded and either increasing or decreasing on the interval [a, b].

The function that is equal to 0' at the rational points in [a, b] and equal to unity at the irrational points, may serve as an example of a nonintegrable function, since for an arbitrary subdivision the integral sum sn, will be equal to 0' or unity, depending on whether we choose the points ξi, as rational numbers or irrational.

Let us note that in many cases the formula of Newton and Leibnitz provides an answer to the practical question of calculating a definite integral. But here arises the problem of finding a primitive for a given function; that is, of finding a function that has the given function for its derivative. We now proceed to discuss this problem. Let us note by the way that the problem of finding a primitive has great importance in other branches of mathematics also, particularly in the solution of differential equations.

As we stated before integrals are mostly useful when we are studying a 'defined' full S<ST>T system with a membrane or contour closing the surface. As integrals are more concerned with 'space' and 'derivatives' with time. And further on, those which integrate space-time systems, or double and triple integrals.
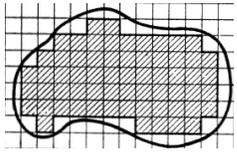
 Calculus of ALL type of vital spaces, enclosed by time functions, with a 'scalar' point of view, parameter that measured what the point of view extracted in symbiosis with the membrane, from the vital space it enclosed. Alas, this quantity absorbed and ab=used by the point of view, on the vital space would be called 'Energy', the vital space 'field', the membrane 'frequency', the finitesimal 'quanta or Universal constant', and the scalar point of view 'active magnitude.

The fundamental language of physics are differential equations, which allow to measure the content of vital space of a system. The richness and varieties of 'world species' will define many variations on the theme. Sometimes there will not be a central point of view, and we talk of a liquid state', where volumes will not have a 'gradient', but 'Pressure', the controlling parameter of the time membrane will be equal, or related to the gradient of the eternal world p.o.v. of the Earth (gravitational field).

Then we shall integrate along 3 parameters, the density that defines the liquid, the height that defines the gradient and the volume enclosed. Liquids, due to the simplicity of lacking an internal POV, would be the first physical application of Leibniz's findings by his students, the Bernoulli family. Next a violin player would find the differential equation of waves – the essential equation of the membranes of present time of all systems. The 3rd type of equations, those of the central point of view, will have to wait a mathematician, Poisson – latter refined by Einstein in his General Relativity.

This is the error of Newton. All cycles are finite, as they close into themselves. All worldcycles of life and death are finite as they end as they begun in the dissolution of death. All entropic motions stop. All time vortices once they have absorbed all the entropy of their territory become wrinkled, and die. Newton died, his 'time duration' did not extend to infinity.

But those minds measure from their self-centered point of view, only a part of the Universe, and the rest remains obscure. So all of them display the paradox of the ego, as they confuse the whole Universe with their world, and see themselves larger than all what they don't perceive. Hence as Descartes wittingly warned the reader in his first sentences 'every human being thinks he is gifted with intelligence.

The mean value theorem.

A differential expresses the approximate value of the increment of the function in terms of the increment of the independent variable and of the derivative at the initial point. So for the increment from x = a to x = b, we have:

ƒ(b) - ƒ(a)≈ ƒ'(a) (b-a).

It is possible to obtain an exact equation of this sort if we replace the derivative f'(a) at the initial point by the derivative at some intermediate point, suitably chosen in the interval (a, b). More precisely: If y = f(x) is a function which is differentiable on the interval , then there exists a point ξ, strictly within this interval, such that the following exact equality holds:

ƒ(b)-ƒ(a)=ƒ'(ξ)(b-a)
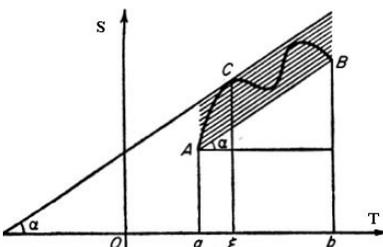
The geometric interpretation of this "mean-value theorem" (also called Lagrange's formula or the finite difference formula) is extraordinarily simple. Let A, B be the points on the graph of the function f(x) which correspond to x = a and x = b, and let us join A and B by the chord AB.

Now let us move the straight line AB, keeping it constantly parallel to itself, up or down. At the moment when this straight line cuts the graph for the last time, it will be tangent to the graph at a certain point C. At this point (let the corresponding abscissa be x = ξ), the tangent line will form the same angle of inclination α as the chord AB. But for the chord we have:

tan α = f(b) - f (a) / b-a.   On the other hand at the point C: tan α = f' (ξ):

$$\frac{f(b) - f(a)}{b - a} = f'(\xi)$$

This equation is the mean-value theorem, which has the peculiar feature that the point ξ appearing in it is unknown to us; we know only that it lies somewhere in the interval (a, b).

Its interpretation in Δst is that f'(ξ) corresponds to the value of a finitesimal lying between both.

FIRST, the fact that 'membranes must determine the beginning and end point of any function for it to be meaningful and solvable. And indeed, only because we know when it starts and ends the domain, we are sure to find a mean point.

If we consider then a T.œ mean value theorem, where f(b) > f(a) if we are deriving in space, where f(b)=Max. S represents the *parameter of the membrane, f(a) will represent the singularity and so we shall find in between a finitesimal part of the vital energy of the T.œ with a mean value within that of Max. S (membrane) and Min. S (singularity). And viceversa, if we are deriving in search of the minimal quanta of time, f(a) > f (b), where f(a) represents the time speed of the singularity and f(b) the time speed of the membrane. And the mean value will be that of the infinitesimal.*

But in spite of this indeterminacy, the formula has great theoretical significance and is part of the proof of many theorems in analysis.

The immediate practical importance of this formula is also very great, since it enables us to estimate the increase in a function when we know the limits between which its derivative can vary. For example:

|sin b - sin a| = |cos ξ| (b-a) ≤ b-a.

Here a, b and ξ are angles, expressed in radian measure; ξ is some value between a and b; ξ itself is unknown, but we know that |cos ξ |≤1

Another immediate expression of the theorem which allow to derive a general method for calculating the limits

and approximations of polynomials with derivatives is: $\dfrac{\phi(b) - \phi(a)}{\psi(b) - \psi(a)} = \dfrac{\phi'(\xi)}{\psi'(\xi)},$

For arbitrary functions φ(x) and ψ(x) differentiable in the interval [a, b], provided only that ψ'(x) ≠ 0 in (a, b), the equation, holds where ξ is some point in the interval (a, b).

From the mean value theorem it is also clear then that a function whose derivative is everywhere equal to 0' must be a constant; at no part of the interval can it receive an increment different from 0'. Analogously, it is easy to prove that a function whose derivative is everywhere positive must everywhere increase, and if its derivative is negative, the function must decrease.

And so the 'classic function of mean-value theorem' allow us to introduce an essential element of ∫∂ which will open up the Δst calculus of worldcycles of existence, the standing points of a function.

Maxima and minimum. The 3 standing points of a world cycle. The mean value sets for the region between the limiting points of the curve - which must be taken in higher step-timespace as two sections of a bi-podal spherical line, part of the membrane of a 3D form, gives us then a value for the vital energy to be expressed with a scalar. And the initial and final point of the segment become the maximal and minimal of the function in F(f)=x values.
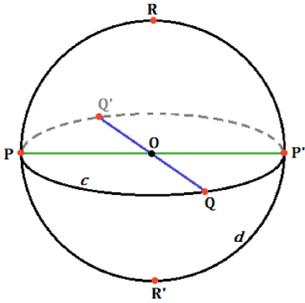
It is then between those two limits a question of find points of the vital energy among them the singularity Max. S x t, to have a well-defined TOE in its membrane (maximal minimal values) volume of energy, mean value and Maximal point of the Singularity.

We can then dissect the sphere in antipodal points related to the identity neutral number o-1 the sphere of time probabilities that the largest whole maximises in its antipodal points. If we consider the antipodal points the emergent and final death point, which imperfect motions still close to 0'-sums, the maximal middle point will be the singularity, Max. S x Max t.

Dimensional integration. Dimensions of form that become motions and vice versa.

Now the key to fully grasp the enormous variety of integral and derivative results obtained in all sciences, is to understand that all space forms can be treated as instants in time, or events of motion, and all motions in time can be seen as fixed present moments in space.

These series of combinations of time and space, S>T>S>T, which leaves a trace of steps and frequencies and its whole integration, which emerges as an Δ+1 new scale of reality is at the core of all fractal, reproductive processes of reality.

For example the s-T duality is at the core of the Galilean paradox of relativity (e pur se muove e pur no muove), of Einstein's relativity, of Zeno's paradox.

So we can consider motion in time as reproduction of form in adjacent topologies of discontinuous space.

We can consider the stop and go motions of films, picture by picture, integrating those 'spatial pictures' into a time 'motion picture'.

We consider the wave-particle paradox, as waves move by reproduction of form and particle collapse by integration of that form in space into a time-particle.

In those cases integration happens because a system that moves *in time, reproduces in space. And vice versa, steps in space become a memory of time.*

Now it is important also to study case by case and distinguish properly what are we truly seeing population in space or events in time, as we can and often it happens that humans confuse in quantum physics where motion is so fast that time cycles appear as forms of space. We shall then unveil many errors, where a particle in time is seeing as a force in space (confusion of electroweak, transformative force as a spatial force,and so on).

All systems can be integrated, as populations in space to create synchronous super organisms and as world cycles in time, creating existential cycles of life and death. The population integral will be however positive and the integral in time will be 0'.

Since. systems of populations in space do have volume. Yet the whole motion in time, can be integrated as closed paths of time, or conservative motions that are 0' sums, and this allows us to resolve what is time integration and space integration.

Consider to fully grasp this, the reproduction of a wave, which constantly reproduces its form as it advances in space, and cannot be localised (Heisenberg uncertainty) because it is a present wave of time, *as light moves NOT in the least space but the least time*. Now, consider a seminal wave - you, which reproduces in time, but becomes a herd of cells that integrated emerges into a larger scale. In both cases the final result is in space and so it is positive.

So each case must be studied to conclude we are either observing a time event or a spatial organism.

In that regard the most important and hence first view of the Rashomon Effect on ∫∂ is: this

$$∫≈∂ \text{ are time=space beats/steps in any } d^2$$

It follows then that we can *escape the memorial creation, step by step of the spatial form, as something which for us is no longer needed, when we are interested only in integrating the space, and for that reason the integral work merely as an integral of a volume, a surface - whose creation in time has already happened.*

But we still have to find a quanta of that 'creation' now a mere 'population in space'.

# WHY DIFFERENTIALS=FINITESIMALS NOT INFINITESIMAL 0s ARE THE REAL THING

Finitesimals as Differential of a function. The stœps of motion and form that shape the flows of timespace.

The essential connection between ΔST actions and dimotions performed by a larger whole and algebra occurs in calculus, whereas the whole is the integral and the minimal indistinguishable part its (in)finitesimal. Again here the key concept is one of perception. So in fact we talk NOT of an infinitesimal limit but more on the thought of Leibniz of an $1/n$ quanta, so small that the whole doesn't distinguish and so it can be discharged. Themes those we shall analyze in depth when studying calculus.

This deep thought fact - that small steps are 'lineal' and longer ones are curved and ultimately 0' sum closed paths is the justification for the use of differentials instead of derivatives in most applications of calculus to reality. Because while the limit to infinity does not exist, there is a fundamental paradox between lineal approximations and open free steps in the small realm and curved closed worlds in the upper realm, which makes every 'finitesimal being' to feel happy and unbounded, tracing 'zig-zag' stop and go motions, where the motion is always a lineal step (try to walk in curved fashion)… but during the formal observation in stop-mode of the next step to run, the Δ+1 enclosure whole will deviate your absolute motion into a cyclical step. And so while small steps are differentials, the sum of them, with the length-motion, height-perception, represented by the X and Y components of the tangent gives us finally a closed curve, or one which will have limits of its validity – mathematical domain – imposed by the higher Δ+1 world.

Thus when we observe reality in any scale at the maximal detail of its stœps it appears exactly as the two sides of the tangent of a derivative, if we consider the 'absolute frame of coordinates', where X is the measure of steps of motion in lineal continuous time, and Y the coordinate of form and perception, which we already defined for evolution in biology, vital topology in ¬E Geometry and wave-particle states in quantum physics, in other papers, turn out to be in mathematics the ideal form of 'ST, space-time, form and motion states.

So we see electrons in a stop and go motion, deviating its path at each stage even if finally will trace its natural flow of time, and we see Brownian motion in particles that try to go straight but are constantly deviated by the larger world.

$$dy = f'(x)\, \Delta x.$$

BD is dy, a lineal finitesimal of change
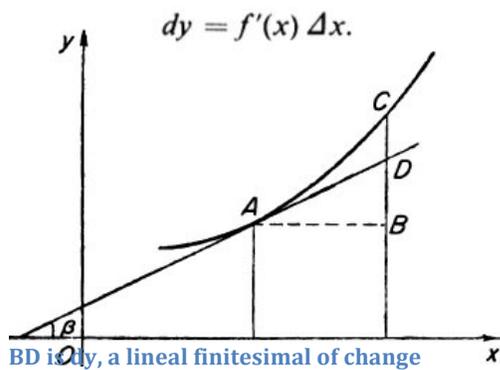
And the Earth looks flat but Elcano returned went to the west and returned through the east, and we think we shall live for ever when we are young looking at the future but when we are old we only see the past; and so in time, space and scale the paradoxes of curved order and small freedoms carry the exist;ential momentum through its worldline that always becomes a worldcycle for those who go beyond the 'shallow' 4D continuum into the sudden stops and discontinuities of moving on, to assess the new direction to take in front of insurmountable larger walls.

Differentials in essence are 'lineal' rates of change in small 'intervals' of any function that is curved, and whose exact, ideal, non-lineal rate of change in a long stretch is difficult to calculate. And in reality is used everywhere instead of the ideal derivative. And the justification in 5D is the concept of a finitesimal minimal quanta, and the fractal nature of points and stœps, the minimal quanta of change. That is change is never infinitesimal, but a change implies a minimal ¡-1 unit of the being, either its frequency step or reproductive cell, etc. So that 'quanta' of change, which is better measure by the 'diameter' or 'height' or length of the spherical or tall or flat form (cell, atom, individual) is a differential.

The maths of it, are well known to any student. As it is so essential to 5D 'experimental mathematics' we shall bring it here for further comments.

Let us then consider a function $S = f(t)$ that has a derivative. The increment of this function: $\Delta s = f(t+\Delta t) - f(t)$ corresponding to the increment Δt, has the property that the ratio $\Delta s/\Delta t$, as $\Delta t \to 0$, approaches a finite limit, equal to the derivative: **$\Delta s/\Delta t \to f'(t)$**

This fact may be written as an equality: **$\Delta s/\Delta t \to f'(t) + a$**

where the value of a depends on Δt in such a way that as Δt → 0, a also approaches 0'; *since in Δst the minimal step of any entity always has a lineal form*.

Thus the increment of a function may be represented in the form:

Δs=ƒ'(t)Δt + aΔt   where **a → 0, if Δt → 0.**

The first summand on the right side of this equality depends on Δt in a very simple way, namely it is proportional to Δt. It is called the differential of the function, at the point tn corresponding to the given increment Δt, and is denoted by: **ds=ƒ'(t)Δt**

The second summand has the characteristic property that, as Δt → 0, it approaches 0' more rapidly than Δt, as a result of the presence of the factor a.

It is therefore said to be a **finitesimal** of higher order than Δt and, in case f'(t) ≠ 0, it is also of higher order than the first summand.

By this we mean that for sufficiently small Δt the second summand is small in itself and its ratio to Δt is also arbitrarily small.

Practical stience only needs to measure a differential either in space dy=BD+BC or in time, as a fraction of the unit world cycle, $f(x)=cos^2x+sin^2x=1$ which becomes a minimal lineal st-ep or action, ƒ(t)=S step.

In graph, decomposition of ΔS into two summands: the first (the principal part) depends linearly on ΔT and the second is negligible for small ΔS. The segment BC = ΔS, where **BC = BD + DC, BD = tan β · ΔT = f'(t) Δt = dS,** and DC is an infinitesimal of higher order than Δt.

For symmetry in the notation it is customary to denote the increment of the independent variable by dx, in our case dt to call it also a differential. With this notation the differential of the function is: **ds= ƒ'(t) dt**

The derivative is the ratio, f'(t) = ds/dt of the differential of the function, normally a 'whole spatial view' to the differential of the independent variable, normally a temporal step or minimal change-motion in time. The differential of a function originated historically in the concept of an "indivisible", similar to our concept of a finitesimal and so much more appropriate for Δst than the abstraction of an infinitesimal with Δt->0, since time is discrete and there is always a minimal step of change, or reproductive step in a motion of reproduction of information*.

Differentials of calculus are practical infinitesimals and its knowledge for any function acts as an ∂st limit.

On the other hand, there is for any group that we can take as vital space-time, finds us a middle point.

Rightly then the indivisible, and later the differential of a function, were represented as actual infinitesimals, as something in the nature of an extremely small constant magnitude, which however was not 0'.

According to this definition the differential is a finite magnitude, *measurable in space,* for each increment Δt and is proportional to Δt. The other fundamental property of the differential is that it can only be recognized in motion, so to speak: if we consider an increment Δt which is approaching its finitesimal limit then the difference between ds and Δs will be arbitrarily small even in comparison with Δt - *till it becomes 0'. The error of interpretation in classic calculus being that it is the difference what approaches 0 as finally the function will be also lineal, not Δt, which will become a 'quanta' - as quantum physicists would latter discover.*

As this is the real model, the substitution of the differential in place of small increments of the function forms the basis of most of the REAL applications of the now-called 'finitesimal analysis' to the study of nature.

The ¬Algebraic/graphic duality.

On view of our deeper departure from the ultimate essence of Analysis, which is to study steps of space-time. That is *to put ¬Algebraic S=T symmetries in motion; the ¬Algebraic vs. graphic interpretations of calculus responds to yet another symmetry of spatial vs. temporal methods, considered on our posts of @nalytic geometry and ¬Algebra.*
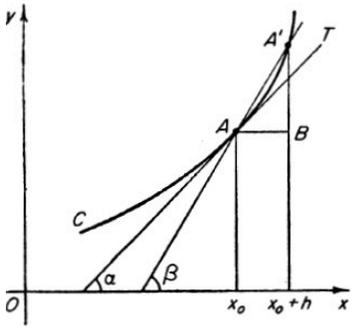
It does show more clearly what we mean by those 'steps' as basically the 'tangent' of the curve is in most cases a space-time step expressed by the general function: $X(s) = f(t)$

Obviously as s and t are ill defined, it was only understood for lineal space-distance and time-motion. And so the 'geometrical' abstract concept remains, void of all experimental meaning... as a... tangent... it was...

Spatial:geometric view.

We are led to investigate a precisely analogous limit by another problem, this time a geometric one, namely the problem of drawing a tangent to an arbitrary plane curve.

Let the curve C be the graph of a function y = f(x), and let A be the point on the curve C with abscissa x0 (figure 10). Which straight line shall we call the tangent to C at the point A? In elementary geometry this question does not arise. The only curve studied there, namely the circumference of a circle, allows us to define the tangent as a straight line which has only one point in common with the curve.

To define the tangent, let us consider on the curve C (figure up) another point A', distinct from A, with abscissa $x_0 + h$. Let us draw the secant AA' and denote the angle which it forms with the x-axis by α. We now allow the point A' to approach A along the curve C. If the secant AA' correspondingly approaches a limiting position, then the straight line T which has this limiting position is called the tangent at the point A. Evidently the angle α formed by the straight line T with the x-axis, must be equal to the limiting value of the variable angle β.

The value of $\tan \beta$ is easily determined from the triangle ABA' (figure up):

$$\tan \beta = \frac{BA'}{AB} = \frac{f(x_0 + h) - f(x_0)}{h}.$$

For the limiting position we must have

$$\tan \alpha = \lim_{A' \to A} \tan \beta = \lim_{h \to 0} \frac{f(x_0 + h) - f(x_0)}{h}$$

It is then clear that h is the frequency quanta of time, or if we are inversely using the ∫∂ method to measure space populations, the minimal unit. And so the ultimate concept here is that h NEVER goes to 0. And the clear proof is that if it were arriving to 0', x/h=∞.

So infinitesimals do NOT exist, and it only bears witness of the intuitive intelligence of Leibniz that he so much insisted on a quantity for h=1/n... (and the lack of it of 7.5 billion infinitesimals of Humanity, our collective organism, which memorise this h->o that so much abstract pain gave me when a kid - one of those errors I annotated mentally with the absurd concept of a non-E point with no breath, or else how you fit many parallels, of the limit of c-speed, how Einstein proved that experimentally?, and other 'errors' that Δst does solve in all sciences).

But for other curves such a definition will clearly not correspond to our intuitive picture of "tangency."

Thus, of the two straight lines L and M in figure below, the first is obviously not tangent to the curve drawn there (a sinusoidal curve), although it has only one point in common with it; while the second straight line has many points in common with the curve, and yet it is tangent to the curve at each of these points.

And yet such a curve is ultimately the curve of a wave, and we know waves are differentiable. So the tangent IS NOT the ultimate meaning of the ∫∂ functions - time/space beats are. The question then is what kind of st beat shall we differentiate in such a transversal wave?

A different dimension, normally as waves are the 2nd dimension of energy, as in the intensity of an electric flow... a mixture of a population and a motion; or 'momentum' (the derivative of energy)...

And so *the next stage into the proper understanding of ∫∂ operations is what 'kind of dimensional space-time change-steps' we are measuring.*

Δ view: The inversion of the finitesimal calculus of Δ-1 is the integral calculus of 5D.

The transition to Δnalysis: new operations

The mathematical method of limits was evolved as the result of the persistent labor of many generations on problems that could not be solved by the simple methods of arithmetic, ¬Algebra, and elementary geometry.

<u>The inverse properties of Space problems and temporal problems</u>.

What were the problems whose solution led to the fundamental concepts of analysis, and what were the methods of solution that were set up for these problems ? Let us examine some of them.

The mathematicians of the 17th century gradually discovered that a large number of problems arising from various kinds of motion with consequent dependence of certain variables on others, and also from geometric problems which had not yielded to former methods, could be reduced to two ST types:

Temporal examples of problems of the first type are: find the velocity at any time of a given nonuniform motion (or more generally, find the rate of change of a given magnitude), and draw a tangent to a given curve. These problems led to a branch of analysis that received the name "differential calculus."

Spatial examples: The simplest examples of the second type of problem are: find the area of a curvilinear figure (the problem of quadrature), or the distance traversed in a nonuniform motion, or more generally the total effect of the action of a continuously changing magnitude (compare the second of our two examples). This group of problems led to another branch of analysis, the "integral calculus."

Thus 2 S=T problems are singled out: the temporal problem of tangents and the spatial problem of quadratures.

Now the reader would observe that unlike the age of Arithmetics and ¬Algebra, which stays in the same 'locus/form'; here we observe a key property of analysis: the *transformation of a temporal cyclical question, into a lineal spatial solution.*

I.e. the solution of acceleration/speed by a lineal tangent, through an approximation; and the calculus of a cyclical, spatial area by the addition of squares. And the deep philosophical truth behind it, which only Kepler seemed to have realized at the time:

'All lines are approximations or parts of a larger worldcycle'

And so we can consider in terms of modern fractal mathematics, that 'the infinitesimal is the fractal unit, quanta or step' of the larger world cycle, and as a general rule:

'All physical processes are part of a conservative 0'-sum world cycle'.

Which explains ultimately the conservation of energy and motion, as motions become ultimately world cycles, either closed paths in a single plane, or world cycles balanced through Δ±1 planes.

Such is the simple dual ÐST justification of Analysis, as always based in Δ… finitesimals and St… the inverse properties of ∫∂.

Are there other operands of mathematics beyond those of calculus and hence other dimensional motions and complex minds beyond humind's maximal understanding of the game of existjence reflected in those texts?

Yes… We have not really analyzed the most important of all operands, the symbol of equality, which mathematical praxis uses so merrily even of logicians and rigurous mathematicians have rightly studied the fact that equality as an identity is the rarest of all occurrences. Even so more in a world in which fractal points hold an invisible inner mind-world which can only be equalized with the restricted view of Euclid's points with no breath.

Differentials - any St-Dimensional Steps

The disquisition of which 'minimalist finitesimal' allow us to differentiate an S≈T ¬Algebraic symmetry, brings us to the 'praxis' of calculus techniques that overcome by 'approximations' the quest for the finitesimal quanta in space or time, susceptible of calculus manipulation, which gave birth to the praxis of finding differentials, which are the minimal F(Y) quanta to work with and obtain accurate results (hence normally an spatial finitesimal of change under a time dependent function). This was the origin of the calculus of differentials.

As always in praxis, the concept is based in the duality between *huminds that measure with fixed rulers, lineal steps, over a cyclical, moving Universe. So Minds measure Aristotelian, short lines, in a long, curved Universe.*

So the question comes to which minimalist lineal step of a mind is worthy to make accurate calculus of those long curved Universal paths.

It is then obvious that the derivative of a lineal motion has more subtle elements that its simplest ¬Algebraic form, the x ÷ lineal operation of 'reproductive speed' and so the concept of a differential to measure the difference between steady state lineal reproduction and the variations observed by a curve appeared as the strongest tool of approximation of both type of functions.

As we have considered that most differential equations will be of the form: F(s) ≈ g(t), where s and t are *any of the 5 Dimensions of Space ($, S, §, ∫, •) or 5 Dimensions of time (t, T, ð, ∂, O), whose change respect to each other, we are bound to study...* showing how a spatial whole is dependent on the change and form of a world cycle, we shall consider generally that y->s and x->t...

The result of this change will be a much more generic concept of speed of change in any of the dimensions of entropy, motion, iteration, information or form that defines the Universe, letting us introduce its 3 fundamental parameters, S/t=speed, t/s=density and s x t = momentum/force/energy... in a natural way with its multiple different meanings, Đisomorphic to each other - as we repeat the s and t of the general

Space finitesimals vs. Time finitesimals

We must 'differentiate' when differentiating (:

-Space finitesimals, *which are the minimal quantity of a closed energy cycle or simultaneous form of space,* easier to understand, as they are 'quanta' with an apparent 'static form', which can be 'added', if they are a lineal wave of motion-reproduction, along the path; or can be integrated (added through different areas and volumes), to give us a 3D reality.

-Time finitesimals, which are the minimal period for *any action of the being and will trace a history of synchronicities as the actions find regular clocks, which interact between them to allow the being to perform ALL their 5D actions needed to survive. So we walk (A(a)), but then eat energy (Å(e)), and we do not do them often together. Actions have different periodicities, for EACH species that perform 5 actions. So to 'calculate' all those periodicities in a single all-encompassing function we have to develop a 5D variable system of equations.*

- Spacetime finitesimals. But more interesting is the fact that Nature *works simultaneously integrating populations in space and synchronising their actions in time. So we observe also space-time finitesimals where the*

synchronicity consists in summoning the actions of multiple quanta that perform in the same moment the same 'D-motion', which is 'reinforced' becoming a resonant action.

And for the calculus of those space-time finitesimals the best way to go around is by 'gathering the sum of Δ-1 quanta' into a 'larger Δº quanta' treated as a new '1' adding up its force. Even if most of them are just complex ensembles of the simplest actions of many cellular parts - steady state motions, reproduction of new dimensions and vortex of curvature and information absorption.

All functions of analysis thus can be considered operations on actions of space-time.

Groups of Finitesimals and their synchronous actions thus meet at Δº in the mirror of mathematical operations, through the localisation of a 'theoretical' tangent≈ infinitesimal of the nano-scale ($\partial s/\partial t$ proper) or an 'observable' differential, a larger finitesimal, which is the real element, as any finitesimal is a fractal micro points that have a fractal volume, expressed in the differential.

Then we gather them, in time or space and study their 'inverse' action in space or time.

So the first distinction we must do is between finitesimals expressed as functions of time frequencies and finitesimals expressed as areas of space. And the actions described on them. In practice though most finitesimals are spatial parts whose frequency of action is described by the $f(x)=t$ function.

The 3 parts of T.œ.
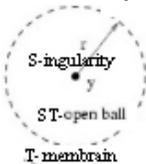
Every event and form must be analysed ternary, and so happens with integrals and derivatives, which often represent integrals of space-time quanta belonging to the vital energy of the system, constrained in time or space by the singularity and outer membrane. Or might be of time quanta. So how can we differentiate them?

Thus we establish a correspondence between 5 Dimotions, TT, St, Ts ST and SS and its integrals, such as:

TT: Both elements are time like. So in TT-dimotions *we integrate a frequency of Time dimotion, the finitesimal over a time duration:* $\displaystyle\int_{To}^{T1} \partial t$

SS: Both elements are space-like. So we integrate a quanta of population over a volume of space: $\displaystyle\int_{So}^{S1} \partial s$

Ts: If we call energy, Ts, a motion with a little form, we are thus considering more complex equations to integrate, and we can use the obvious example of physical systems, in which energy becomes the integration of existential momentum, mv, a *combined ST parameter of space and time, along a path of time, giving us E=1/2 mv^2 . So in general any Ts form will be integrated in the form:* $\displaystyle\int_{To}^{T1} \partial st$

St: Inversely for changes in the information of systems, which are perceived as spatial forms with a little bit of motion, the integration will be of the form: $\displaystyle\int_{So}^{S1} \partial st$

ST: And finally for systems that experience a reproductive process in space-time, a single integration will not suffice, so we will require a double or triple integral of the system either in space or time, requiring a more profound analysis for each case: $\displaystyle\iint_{S,T} st\partial s\partial t$

∫Sðt = Δe becomes the integral of the inner spatial quanta of the open ball, surrounded by the membrane of temporal cycles, which conserves its Energy and by the sum of all T.œs that of the Universe. Its calculus, after finding a 'continuous derivative', surrounded by the membrane is then an integral: ∫ Sp x ðf = Ke.

And inversely. If we consider a single quanta of space or a single frequency of time, a moment of lineal or angular momentum, the result is a derivative.

So Analysis becomes the fundamental method to study travels upwards and downwards of the 5th dimension.

In general if we call a spatial quanta a unit of lineal momentum of each scale and a time cycle a unit of angular momentum, the metric merely means the principle of conservation of lineal and angular momentum.

Thus analysis studies the process which allows by multiplication of 'social numbers' , either populations in space or frequencies of time, a system to 'grow in size'; which is the ultimate meaning of travelling through the 5th dimension. For example, when a wave increases its frequency, it increases the quantity of time cycles of the system. When a wheel speeds up its increases the speed of its clocks. And vice versa, when a system increases its quanta, growing in mass, or increasing its entropy (degrees of motion in molecular space), it also grows through the 5th dimension.

And the integration along space and time, of those growths, is what we call the total Energy and information of the system

It is what physicists call the integral of momentum or total 'Energy and information of the system '

So we shall only bring about here some examples of analysis concerned with the definitions of the fundamental parameters of the fractal Universe, that is the conservation principles and balances of systems which can be resumed in 2 fundamental laws:

Continuity of functions

All this understood we can then return to the inflationary nature of languages, which in the case of mathematics means that without a mirror reflection in reality, it tries to introduce false concepts of infinity and continuity with pedantic axiomatic methods, origin of the concept of absolute continuity of a function; when the true concept is the 'stop and step' nature of motions, and dark, non perceived regions between continuous points, or finitesimals. So it is irrelevant if the finitesimal is a natural number to talk of discontinuity, as the system will have contiguous finitesimals of 1 number size. We then talk of measure more than continuity and errors of measure, from an upper Δº mind"

Intuitively, a function $f(t)$ approaches a limit L as t approaches a value p if, whatever size error can be tolerated, $f(t)$ differs from L by less than the tolerable error for all t sufficiently close to p.

Just as for limits of sequences, the formalization of these ideas is achieved by assigning symbols to "tolerable error" (ε) and to "sufficiently close" (δ). Then the definition becomes: A function $f(t)$ approaches a limit L as t approaches a value p if for all $ε > 0$ there exists $δ > 0$ such that $|f(t) - L| < ε$ whenever $|t - p| < δ$. (Note carefully that first the size of the tolerable error must be decided upon; only then can it be determined what it means to be "sufficiently close.")

But what exactly is meant by phrases such as "error," "prepared to tolerate," and "sufficiently close"?

Again it is the relative ¡-1 quanta of the system studied. The 'error' of measure will then become ESSENTIAL to the explanation of the Uncertainty principle of Heisenberg, which indeed can be obtained from theory of measure and error, by pure mathematical methods.

So in ideal mathematics, having defined the notion of limit in this context, with no limit to the infinitesimal size of the error, it is straightforward to define continuity of a function. Continuous functions preserve limits; that is, a function f is continuous at a point p if the limit of $f(t)$ as t approaches p is equal to $f(p)$. And f is continuous if it is continuous at every p for which $f(p)$ is defined. Intuitively, continuity means that small changes in t produce small changes in $f(t)$— there are no sudden jumps.

But as that small change will always be in detail an ε-quanta, in great detail there are quantum jumps. In fact, as there is always an ε-quanta, in any process in space or time, in form and motion (as we have shown when considering the nature of motion as reproduction of form in adjacent spaces) there will always be a quantum jump for all motions. And motion will be the reproduction of form in quantum jumps of ε, nature.

1/n: the (in)finitesimal (in)finite

With the convention that ƒ (x) is normally a function of time frequencies, ƒ (t), of motions of time, whose synthonies of synchronicity in space are expressed by an ¬Algebraic equation, we bring the following understanding:

Infinitesimal quanta in any scale is the departure point to build any function, as such it must have a minimal size, and ƒ'(t) is normally a good measure.

The infinitesimal study as perceived from the finite point of view is the view of fractals, when in detail and observing the closed worldcycles that separate and make each infinitesimal a whole.

A derivative is the finitesimal of the function observed, and so when we go even further and study as enlarged into our scalar view tin maximal information we are in the fractal view of reality.

So as we expand our view the fractal view becomes more real, till finally the enclosures observed Δ-1 become fractal and we recognise its self-similarities: Δ-1 ≤ Δº.

For each derivative thus a function shows its 1/n infinitesimal (not necessarily this function, which is the derivative of the logarithm).

It follows that functions which grow ginormously have a 'quanta of time' reproduced and so its minimal derivative finitesimal is the function itself, e^a.

In the next graph we see inverse equations of exponentials and logarithms.
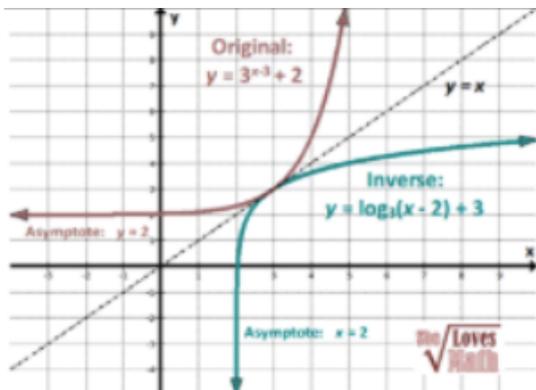
Exponentials express better decay than exponential growth, with the exponent "negative".

Mathematics is a reflection of nature. A small mirror of its Δº±i Structure and so we need for exponential growth that Nature provides unlimited energy for growth, which happens only in the 0'-1 generational dimension of the being, or in its inverse decay/ in its 4D entropy age. of death.

On the other hand the limit of logarithmic growth maps out better in logistic curves real growth being a good function to express Δ§cales.

So numbers reflect those processes in their inverse exponential/logarithm mathematical graphs and numerical series.

ST: As the three coordinate systems, self-centred into an Δº pov, which reflects each of the three 'topologies of space-time' (Cylindrical: lineal, polar: cyclical and cartesian: Hyperbolic); while the infinitesimal o-1 scale, and the infinite 1-∞ scale divided by the '1' Δº relative element, represent perfectly the Δ-scalar nature of super organisms.

Δº±1: Further on, we can 'reduce' each relative Immensity to those 3 Planes, and represent all timespace phenomena with the different families of numbers that close ¬Algebra (entropic, positive numbers, informative, negative numbers, present space-time, complex bidimensional numbers, s/t ir-ratio-nal numbers, etc.), mathematics becomes essentially the more realist language to represent the scalar, organic, ternary Universe.

The 0'-1 scale is equivalent to the 1-∞ scale for the lower Δ-1 Universe, where 1=Δº, the whole and 1-∞ is the Δ+1 eternal world.

And this is the symmetry to grasp the consequences of the o-1-∞ fundamental graph of the fifth dimension. Let us see how with a simple example:

The mirror symmetries between the 0'-1 universe and the 1-∞ are interesting as they set two different 'limits', an upper uncertain bound for the 1-∞ universe, in which the 1-world, Δº exists, and a lower uncertain bound for the 0'-1 Universe, where the 1 does not see the limit of its lower bound. Are those unbounded limits truly infinite?

This is the next question where we can consider the homology of both the microscopic and macroscopic worlds.

Of course the axiomatic method 'believes' in infinity - we deal with the absurdities of Cantorian transinfinities in articles on numbers. But as we consider maths, after Lobachevski, Godel and Einstein, an experimental science; we are more interested in the homologies of Δ±1. For one thing. While 0 can be approached by infinite infinitesimal 'decimals', so it seems it can never be reached, we know since the 'violet catastrophe' that the infinitesimal is a 'quanta', a 'minimum', a 'limit'. And so we return to Leibniz's rightful concept of an 1/n minimal part of 'n', the whole '1'.

This implies by symmetry that *on the upper bound, the world-universe in which the 1 is inscribed will have also a limit, a discontinuity with Δ+2, which sets up all infinities in the upper bound also as finite quanta, 'wholes of wholes'.*

So the 'rest' of infinities, must be regarded within the rest of 'theory of information languages' and its inflationary

nature, inflationary information. What is then the 'practical limit' for most infinities and infinitesimals? In ÐST, the standard limit is the perfect game of 3 x 3 + 0(±1) elements, where the o-mind triples as it is an Δ-1 'god of its infinitesimals it rules subconsciously, as you brain rules you cells', Δº, consciousness of the whole and Δ+1 infinitesimal of the larger world.
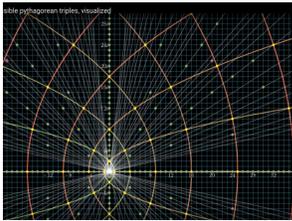
An o-1 time mirrored quantum world of probabilities of existence, as indistinguishable infinitesimals through the surface limit of its statistical description in the thermodynamic scale of atomic beings end in the 1 unit of our human cellular space, where thermodynamic considerations are reduced to temperature gradient towards the homeostatic mass based forces of our human level of existence, Δº.

So we consider as usual the Kaleiodoscopic, multiple function of analysis, and the multiple meanings of its inverse, Δ±1 operations, derivatives and integrals; since as usual the potency of Δst is on the search of whys, not on the discovery of new equations, which humans always exhaust by the Monkey Method of trials and errors, sweat and transpiration more then the inspiration of pure logic thought...

Physical equations in differential form, a general overview of its main species. History

Differential equations first came into existence with the invention of calculus by Newton and Leibniz. Newton listed three kinds of differential equations: those involving two derivatives one of space and time (or fluxions) and only one undifferentiated quantity (space or time parameter); those involving 2 derivatives and two quantities of space and time; and those involving more than two derivatives.

Its analysis thus was right in the spot as he referred changes to change in space or time, thus ∫∂ with ST-eps - a fact latter forgotten and today thoroughly missed with the 'view' of time as a single dimension of space (1D-lineal motion confused with 4D-entropy in philosophy of science)

It is still a good classification of partial differential equations as 'time-like' (∂x, ∂²x, ∂³x), or space like (∂²y, ∂y, ∂³y) or space-time like (∂x∂y, ∂y∂x) as the main variations that represent, T, TT, TTT; S, SS, SSS, ST, TS steps, which are the main *5D, 4D and 1,2,3D changes of the Universe.*

And it speaks of the enormous range of real phenomena ∫∂ functions can describe as the essential operands of mathematical physics and any Δst phenomena.

What allow all those Δst phenomena to enter the world of quantitative mathematics was the discovery of a pendulum clock to measure time in lineal fashion and a telescope to measure space. Both gave birth to the 2nd age of science,

the mathematical/scientific method, added to the experimental Aristotelian method, which now the isomorphic ÐST age of stience completes.

In 1609 appeared the "New astronomy" of Kepler, containing his first and second laws for the motion of the planets around the sun.

In 1609 too Galileo directed his recently constructed telescope, though still small and imperfect, toward the night sky; the first glance in a telescope was enough to destroy the ideal celestial spheres of Aristotle and the dogma of the perfect form of celestial bodies. The surface of the moon was seen to be covered with mountains and pitted with craters. Venus displayed phases like the Moon, Jupiter was surrounded by four satellites and provided a miniature visual model of the solar system. The Milky Way fell apart into separate stars, and for the first time men felt the staggeringly immense distance of the stars. No other scientific discovery has ever made such an impression on the civilised world.

It also killed a method equally valid of thought represented by the Greeks and Leonardo: the idealised understanding of the canonical perfect ÐST game of existence, of which we were all impure platonic forms, bond to dissolve unlike the perfect game of the ∞ Universe, which is immortal.

Man never went back because alas! what really mattered was ballistics, mechanisms, power. Idealism died away:

The further development of navigation, and consequently of astronomy, and also the new development of technology and mechanics necessitated the study of many new mathematical problems. The novelty of these problems consisted chiefly in the fact that they required mathematical study of the laws of motion in a broad sense of the word. And now we had machines to measure it better than the artistic Sp-eye-T=words of the human space-time mind.

Points of constrain, balance and limits of integrals.

Any equation with a real, determined solution must be a complete T.œ. Hence it will have limits either in space (membrane and singularity of the open ball), or in time, initial and final conditions, bridged by an action in the 'least time' possible.

This is the key Δst law that applies to the search for solutions in both ODE and PDEs.

Maximise its ðƒ/Sp, density of information/mass, its Sp/ðƒ density of energy and hence, reach a balance at ðƒ=Sp

This simple set of equations: max. ðƒ x Sp -> Tƒ=Sp: max Tƒ/Sp and Max. Sp/Tƒ are therefore the fluctuation points of systems that constantly move between the two extremes of information and spatial states across a preferred point of balance Sp=Tƒ as this is the max. Sp x Tƒ place.

Thus integrals, Lagrangians and Hamiltonians are variations of those themes. The motion of springs; the law of least time etc. all are vibrations along a point of balance, Tƒ=Sp, and 2 maximal inverse limits.

The different time-space beats.

This of course must be done because reality is bidimensional and a dimension of space goes accompanied by a dimension of time, *generating as in the previous graphs, the motions=changes, S≈T≈S≈T that shape reality.*

And it is the justification on why differential equations that make systems dependant of such pair of variables happen.

But then it follows we shall be able to apply pentalogic and find a use for the pair ∫ð as expression of an inverse beating for *each pair of dimensions of space-time.*

And decompose both space-time forms and time-space events in S>T<S beats.

And in the process of doing so, learn further insights about the symmetries between space and time.

PRODUCT AND INVERSE DIVISION INTEGRALS

The most abundant of all operand, the merging product requires therefore a more complex rule than a direct sum, which acts by 'superposition' of EQUAL BEINGS.

It is also susceptible to be operated by calculus and 'derivatives' as now we involve for the first time, both, a scalar level, since multiplication tends to happen in the lower scale of the being and different states of time and space. So we no longer operate as in additions, with the same type of T.œs in the same plane.

The most abundant of all operand, the merging product requires its own rule which interesting enough shows how indeed product is a merging operation, as the derivative of a product of functions merges first each function with the change rate of the other, and then once both are merged, superposes them by addition:

The Product Rule used to find the derivative of a product of two functions, is thus more complex than the sum even though it also keeps as in polynomials the distributive property - which shows once again that the product is a 'democratic merging' that can go both ways.

So h'(x) = [f(x) x g(x)]' = f(x) • g'(x) + f'(x) • g(x).

The rule, interesting enough shows how indeed product is a merging operation, as the derivative of a product of functions merges first each function with the change rate of the other, and then once both are merged, superposes them by addition.

In that sense it keeps with the 'rule' of merging at the lower 'plane level' of its infinitesimal parts, in this case, taking instead of the spatial elements of X and Y, its 'temporal' quanta of change, f(x)' and g(x)', MERGING them with the other wholes, before a 'superposition'=addition can be effected.

In the product rule thus Derivatives act in inverse fashion to power laws, searching for the infinitesimal.

While power wholes (integrals) search the wholeness, and as we know the two directions of space-time are different in curvature, quantity of information and entropic motions.

Here we shall bring a little explained fact - derivatives act in the inverse fashion to power laws, searching the infinitesimal, while power wholes (integrals) search the wholeness, and as we know the two directions of space-time are different in curvature, quantity of information and entropic motions.

So an external operation that reduces a whole which is NOT integrated as such but a *lineal product of two wholes, f(x) and g(x), a COUPLE, is mixing the infinitesimals of one, with the other whole before herding them; in a process of 'genetic mixing' of the parts of the first shared with the second whole and the parts of the second shared* with the first whole.

This law of Existential ¬Ælgebra simplified ad maximal as usual in mathematical mirrors surprisingly enough is the origin also of genetic 'reproduction', which occurs at two levels, mixing the 'parts' - the genes of the whole - in both directions to rise then the mixing to the Δº level of the G and F gender couple.

Then what will come out of that genetic multiplication is its division into two equal parts, showing how the interaction of inverse operands does not cancel reality but merely completes a dimotion moving ahead the eternal time space universe.

So if a power followed by a logarithm brings the infinitesimal seed into a whole herd, the multiplication followed by a division of the reproduced new layer of mixed 'axons, genes' or parts, brings the replication of identical forms.

While the simplest definition of a division is as usual in huminds an entropic destructive feeding action, the complex view from the perspective of information is a genetic mitosis. And both are reflected in the derivative of a division, which is impossible for two equal functions (resulting in 0 constant) and viceversa can give us any constant value in its integral - so it does not give us any information.

While in most cases is NOT a positive communicative act but a perpendicular negative reducing game, where the DOMINANT element is the 'predator' larger denominator that cuts the function, multiplying its infinitesimal f'(x) parts, to which it will deduce the lesser parts absorbed by the f(x) function from it, and then cut it at the 'lower' level of its potential elements (G(x)²) :

$$\left[\frac{f(x)}{g(x)}\right]' = \frac{g(x)f'(x) - f(x)g'(x)}{[g(x)]^2}$$

So the numerator, the victim, shared by the denominator the predator so to speak is first absorbed in its f'(x) parts, g(x) f'(x), subtracting the g'(x) parts that the prey has absorbed in the 'fight', f(x) g'(x), and then shared by the parts, g(x)² of the whole as entropic feeding.

So we can consider the derivative of a divisive function as an 'idealized' expression of the process of killing and feeding of a system, whereas the predator absorbs the infinitesimal parts of the other being, and feeds its cellular, i-1 elements with it. Which obviously is NOT a commutative process.

Of course, we love to bring vital interpretation to abstract math, but as we apply such rules to particular cases, the interpretations vary but in all cases will be able to be interpreted in terms of sub-equations of the fractal generator.

What might be notice in any case is that unlike in our rather 'abstract' dimensional explanation of the rules of power laws, here we are able to bring real vital analysis of those roles in terms even of biological processes, showing how much more sophisticated is the ∫∂ operands, the king of the hill of mathematical mirrors on real st-ep motions and actions, reason why its use is so wide spread.

So the fundamental law of operands to vitalize them is this:

By pentalogic all differential operands can become an action in one of the 5d dimensional vowels (a,e,i,o,u) that define the five dimensions of existence, as vital quanta-actions of the being.

This is the logic concept that truly vitalizes the operands of ¬Algebra.

So those properties tell us new things about the meaning of ∫∂.

Finally the chain rule which is truly the one that encloses all others is used in the case of a function of a function, or composite function writes:

$$(f[g(x_0)])' = f'[g(x_0)]g'(x_0)$$

And this truly an organic rule, as we are not derivating on 'parts' loosely connected by ± and x÷ herds and lineal dimensional growth, but the 'function' is a function of a function - a functional, as all Δ+1 is made of Δº which are also functions of xo fractal points.

So this is the most useful of all those rules to mirror better reality. And we see how the derivative, the change process deeps in at the two levels, at the Δº=g(xo) level, which becomes g'(xo) and at the whole level, which becomes f'[g(xo)], which tell us we can indeed go deeper with ∫∂ between organic Planes, which is what we shall learn in more depth when consider partial derivatives and second derivatives and multiple integrals.

We are *getting so to speak into the infinitesimal of the parts of a whole from its Δ+2 perspective, and this rule encloses all others, because it breaks into the multiplication of its parts - dwindling truly a scale down, and separating the whole and the parts derivated into loose parts and finitesimals now multiplied.*

And what will the parts do when they see their previous finitesimals now camping by themselves but 'at sight' to get them to 'produce' an operative 'action' (a,e,i,o,u actions are ALL subject to the previous operands), ON them.

And what will come of that multiplication. Normally it will capture them all again and then normally will not re=produce on them (one of the operands actions which are possible under pentalogic) but divide and feed on them the last operation to treat:

And its inverse, which is NOT a positive communicative act but often a perpendicular negative reducing game also consequently differs.

In that sense the most important ad on that Δst will bring to the use of differentials in existential ¬ælgebra, is its temporal use as the 'minimal action in time', of a being, a far more expanded notion that the action of physics (which however will be related to the lineal actions of motion on 1D).

Finally in the next stage of ¬Algebra, when @nalytic geometry allowed a more clear representation of those polynomials in more detail, as usual through its 3 AGES of evolution and through its PLANES of complexity and through its pentalogic 'Rashomon effect'; that is, how analysis operates independently to extract information from the 5 DImotions of a being.

S=T: ANALYSIS ON SPACE

A 2nd consideration on the pentalogic should be on analysis of SPACE and trans-form-ations between space= form and motion=time states. SO FIRST we shall remember what space is made of - namely ¬E points:

Dimensions and analysis are possible because points have volume.

A Universe of fractal spaces point-particles have an inner volume of information as Non-Euclidean points which gauge information in the stillness of a mind syntax, language mirror of the Universe. As points have volumes, lines are waves and planes topological networks, which ensemble in ternary a(nti)symmetries to form the topological super organisms of reality across 3 time ages, 3 topological forms and 3 Planes. It is this physical T.œ which we shall study in mathematical physics, explaining the meaning in 5D of the main mathematical laws of physics, which are enhanced by the understanding of an enhanced geometry and logic of time, born of the fractal cyclical structure of both, a priori elements of reality that the language of mathematics and its operands so accurately mirror.

The fundamental truth derived from this simple analysis of derivatives is profound. First it connects them immediately with the pure geometric nature of dimensions, which in non-Euclidean geometry (graph) are relevant in as much as they represent *motions in time but also dimensions in space.*

In that regard, it is important to understand that in the fractal Universe a dimension has 'always inner breath' as the points grow when we see them closer.. So it is very simple to consider a single dimensional being, simply as one, whose preferential X-dimension is much larger than the others, but still the other exist as the particle-point in detail is big:

1D being: X>>Y ≈ Z, for example a string, a lineal momentum...

And then a two dimensional being one whose two D are larger than Z:

2D Being: X ≈ Y >> Z; for example a graphene sheet; a plane wave.

Whereas a 3Dimotion being has volume, motion on the 3, for example a spherical being, an entropic explosion.

A derivative then merely 'annihilates' one dimension or one motion in space or time - we have here to split dimotions, as humans do, even if it is not the proper unit of the Universe, which is always bidimensional. I.e. even in a motion there is a particle that moves, so you have a point-dimension for the particle and one for the motion in time...

So indeed analysis IS the main mathematical instrument to study the 5D Universe and its ternary mirror symmetries between Planes, topologies and modes of time-change. And we can consider a general formulae for analysis, as a specific version of the fractal generator:

∂(Bodywave of vital energy) = Membrane; ∂Membrane = Singularity path and its inverse, better known as line integrals, surface and volume integrals.

Because analysis is mainly used in mathematical physics, in praxis, the previous relationship is connected to the 3 elements of a physical system:

Field (entropic, locomotion source) < wave (reproductive body) > Particle.

So we make double derivatives to obtain the field (Laplacians), and single derivatives to relate particles and waves - 'one-dimensional species.' (Fourier series). And those are the all pervading analytical functions of the 3 parts of the being:

Spherical harmonics and electron orbitals are the same, because our light space-time in particle state are photons that form the electronic nebulae. So both are homologic.

The result are s**pherical harmonics,** a set of functions used to represent functions on bidimensional membranes - surface of the sphere - the higher dimensional homology of Fourier series - periodic, single variable functions on the circle.

Spherical harmonics are thus the eigenfunctions of the angular part of the Laplacian, representing solutions to partial differential equations in which the Laplacian appears. Since the Laplacian appears frequently in physical equations (e.g. the heat equation, Schrödinger equation, wave equation, Poisson equation, and Laplace equation) ubiquitous in gravity, electromagnetism/radiation, and quantum mechanics.
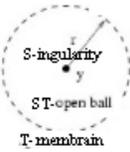
The orbitals of the hydrogen atom in quantum mechanics in fact are totally undistinguishable from spherical harmonics, showing indeed that we are all topologic beings, and mathematical functions for the simplest forms of spacetime as the electron is - a dense function of 'light spacetime particle-points.

The intimate connection between the 3 elements of the being is perfectly explained by the dual ∫∂ functions.

In that regard, variations over the same theme respond to the ternary structure of all T.œs:

In the graph, when deriving and integrating, most operations refer to a 'limited' system, in which first we extract the finitesimal part-element, and then we integrate it to obtain a whole; so most likely the system described with depart from a time-changing-variable quanta, and integrate it to obtain a 'static whole-spatial view'.

But variations on the same theme happen by the natural symmetry of space and time states.

So we can also start with a quanta of space integrated over time to get a spatial area or volume.

What we shall always need to find 'single solutions' is the parameters that describe in time or space the 3 elements of the T.œ: So we shall start with initial or final conditions (definite integrals), and define mostly in space as a whole, the enclosure or membrane that the limits the domain of the function (which might include as a different limit the singularity).

All in all the analytical approach will try to achieve a quantitative description of the unit/variable of 'change', the 'finitesimal quanta of space - interval, area, volume' or the 'steps of time' (frequency), and then integrate it over a super organism of space or an interval of time, we wish to study, often because it forms a whole or a 0' sum world cycle.

Galilean Paradox. lineal vs. Cyclical view.

In that regard, the S=T symmetry will once more become essential to the technical apparatus of analysis as it has done in all other sub disciplines.

Of them the 3 key 'dualities' between lineal perception in short and cyclical perception in large, is the key to obtain solutions, as the mind of measure is lineal made of small steps that approximate larger cyclical wholes. It is in essence the method of differential equations, where the differential dy= ƒ'(x) Δx + αΔx, approaches to a lineal derivative, ƒ'(x) Δx in short increases, and so we can get away with the smaller element that curves in longer distances the solution.

Finally the third Galilean paradox between continuity and discontinuity is also at the heart of analysis (and most forms of dual knowledge). Analysis has accepted as a dogma the continuity of the real number and so it considers continuity a necessary condition for differentiability but we disagree in a discontinuous Universe, continuity has a loose definition (as neither the axiomatic method is the proof of mathematical statements but experience also matters). So continuity is defined by a simpler rule: that the term $\alpha\Delta x$ of the discontinuity between the lineal and cyclical view of an infinitesimal derivative does indeed diminish faster the closer we are to the point 'a' in which the differential equation is defined. In brief, continuity means no big jumps and big changes in the direction of a function and the T.œ it reflects.

PENTALOGIC ON DERIVATIVES

Pentalogic of finitesimal change.

Leibniz defined the finitesimal as 1/x, where X is the whole. In terms of topological curvature and motion, 1/x also defines in Leibniz's work the curvature in space (as the oscular curve, 1/r of a cycle), which by virtue of S=T IS the minimal unit of cyclical time of a whole). Yet in lineal terms, curvature which is dimensionless can also be seen as the 'angle' of change in the direction of a motion, each quanta of time or step of space. So an angle changes in lineal, discrete quanta (1st Dimotion of change). It changes in curvature in a continuous longer measure. It becomes an acceleration, in S=T motion. Then a finitesimal of curvature becomes the fundamental concept that carries derivatives of motion into geometry in the gravitational theory of Einstein, not yet understood conceptually in Relativity theory as the S=T relativity principle on 5D philosophy is ignored.

Further on, a finitesimal represents an Δ-1 unit of change in scale; and finally, the 'ultimate finitesimal', is the @-mind singularity of the system.

So finitesimals can reprsent all forms of changes of Δ@st as minimal scalar parts, minimal steps of motion; discrete angular changes, curvature of an accelerated motion seen as form; and mind singularity… And its limit is absolute change or entropic change, which cannot be calculated because the function breaks and there is no derivative, or rather the derivative is the whole being, who changes so much that it is no more…

The actions it describes.

The minimal unit for any T.Œ are its a,e,i,o,u actions of existence, its accelerations energy feedings, information processing, offspring reproduction and universal evolution. So the immediate question about mathematical mirrors and its operations is what actions reflect. We have treated the theme extensively in the ¬Algebraic post, concluding that being mathematics a mostly spatial, social more than organic language, its operations are perfect to mirror simple systems of huge social numbers=herds; and as such to describe the simpler accelerations=motions, which are reproductions between two continuous Planes of the fifth dimension; informative processes, where the quanta perceive are truly finitesimal Δ-i elements pegged together into the mirror images of the singularity and so we talk of motions, simple reproductions and vortices of information, and time>space processes of deceleration of motion into form, as the key actions reflected by mathematical operations.

It follows that when we study the more complex systems and actions of reality, reproduction and social evolution of networks into organisms, mathematics will provide limited information, and miss properties for which illogical biological and verbal languages are better.

And it follows that physical and chemical systems are the best to be described with mathematical equations, either in ¬Algebraic terms or analytic terms, which fusion together when we try to describe the most numerous, simpler systems of particles and atoms (simpler because by casting upon them only mathematical mirrors we are limited to obtain mathematical properties).

Let us now consider the ∫∂ operations for the different dimotions of reality on the main functions with fundamental roles in Δst and its derivatives by dividing them in 3 great Δst 'groups':

@: ∫∂ of identity elements - forms that do not change expressed with the concept of an identity number, as 0 is the identity of sum and 1 of product. But they also have a clear meaning as the interval 0'-1 of the generation 'seed' dimension from Δ-1 to Δº.

And indeed, the surprising result that ∫o dx = C does indeed suggest that the 0'-point is a fractal point that 'has volume', or else how integrating the nothingness of existence shall we get a 'constant' which is a social number? But if we do start from a o-1 unit its 'integral' sum will give us a reproductive group, or 'social number'.

And if we integrate the full '1 being', we shall get a new dimension, the variable plus the constant, which suggest also a little understood process related to the operations of derivatives and integrals, the switching caused by operations on motions of sets (our definition of analysis), which change a spatial state into a time state and viceversa. So the spatial 1-form-whole becomes a time-variable X, while the variable X becomes a spatial derivative constant.

Since constant number does NOT change. So a time variable gives us the spatial identity number.

Finally, the deepest thought on those seemingly well known operations regards the subtle difference between both operations: the derivative localises a single 'finitesimal solution', or minimal Δ-1 past part of the system...

But the inverse, 'integral' or 'future 5th Dimensional arrow' of social wholes opens up the possibility of multiple constant solutions to add to the variables, as the future is open to subtle variations (∫) but the past is fixed by the infinitesimal identity number (∂).

Of course if we instead consider the integral not in time but as a fixed spatial path, this concept of future vanishes and we get a determined single solution to the integral where the constant is just the starting point.

Other way of seeing it though is to consider the identity element @, the constant mind that does NOT change.

Let us now study the seemingly simple 'equations of change' for the basic functions. Yes, of course, the scholar will find no interest on them. What can we really find of something so 'obvious' as $\partial x^2 = 2x$.

But we shall remind again the reader of 2 of my favorite masters' quotes, 'genius targets what nobody sees' and 'simplicity is genius' (Leonardo). Since the beauty of *5D spacetime consist on seeing relationships that nobody cares to wonder about, which are found in the simplest realities that hold fundamental laws of time=change.*

∫∂ of POLYNOMIAL GROWTH: POLYNOMIAL ACTIONS vs. DERIVATIVES

$$\frac{d}{dx}x^n = nx^{n-1} \qquad\qquad \int x^n\,dx = \frac{x^{n+1}}{n+1} + C$$

A polynomial can be understood as a regular T.œ, with greater symmetry between parts and wholes, expressed as a quantitative sum of its parts, x^a. That is in space it represents a 'line', 'square', or 'cubic form'.

And so as the *fundamental form of change happens when S=T, in the form of reproduction, the first insight of 5D calculus on the outcome of polynomial change is this:*

When we change a square, X^2 change does NOT happen only as it would seem natural at an X rate – that is the frontal line of the system, but at a 2X rate, in 2 of the 4 sides of the square. So change is NOT a motion in a single direction that would reproduce the square by an X rate, but it happens in 2 sides of the square.

And as a consequence it preserves the form of the square.

We thus realize by this simple analysis of $\partial X^2 = 2X$ that the MAIN form of CHANGE which ultimately appears in most realities is 'reproductive change', NOT mere locomotion (ultimately a form of reproduction)…

Again when we consider the cube, X^3, the rate of change is $3X^2$; so change now happens in 3 sides of the cube, and it is also a reproductive growth, that PRESERVES the form of the cube. While in a line, $\partial nX=n$, change happens in one of the sides of the line that PRESERVES the form of the line, reproducing it, something that can be perceived as the motion of the forehead that advances the line.

Inversely we can consider that to generate *through an integral of the unit of change, the finitesimal of a polynomial volume from 1 to 4 Dimensions ads from 3 sides of the cube, two sides of the square and 1 side of the line (as we know from algebra, a quintic does not exist in terms of radicals; because the Universe is made of 4 Dimotions plus dissolving death=entropy. So it is not worth to bother for more complex ones; while the fourth dimotion of social evolution or*

motion of a cube makes the system grow in scales of the fifth dimension; so it is a different case to the 3 basic polynomials that happen in a single scale).

Now this might also seem simple but we realize that if we are creating a whole cube from 3 faces, they are becoming intertwined, webbed together as they penetrate each other to form the cube. So they act in fact as 'networks' of points with 'dark spaces' through which the other two sides penetrate. And the result is not merely a cube but a network of 3 different 'orthogonal', networks, which is the idealized concept of a physiological trinity. The same can be said of the process of creation of a square from two 'orthogonal' dimotions of time-space. But, and this is also interesting to meditate in depth, the line is NOT webbing from the 2 extremes but merely reproducing and hence moving as a wave, which is NOT connected with the 'steps' left behind. Thus the line constantly moves because it does not 'entangle' with the memorial tail of its previous stœps of reproduction. While the square and the cube become entangled ending its reproduction when the area is filled with memorial persistence.

We conclude another startling consequence of all this:

- Only lineal inertia is eternal locomotion because the line does not 'last' and hence can be displaced ad eternal, but a holographic or trinity dimotion becomes a reproductive action that stops in its final completion of the higher whole form, once it is integrated.

Then it might as a quartic, develop a new reproductive motion, whereas the cube is a point of a larger scale.

So the derivative give us the 'units of reproduction' of the polynomial in space, its minimal growth parts and the integral reproduces a whole by webbing a number of parts, that entangle to form the ∫X whole.

Trilogic on polynomial derivatives for space and time.

Once all this is resolved we can consider how the trilogic of calculus widens the possibilities of a simple polynomial derivative, considering the simplest case of its application to space and time.

Exponential derivatives and integral

The first result already considered are the polynomial 'reduced' dimension by means of searching its infinitesimal, which however is for simple polynomials quite larger, compared to a direct x^n-1 reduction.

Further on, the logarithm IS clearly the 5D social scaling operation and its derivative is indeed the absolute finitesimal, $1/n$.

And inversely the maximal growth is its inverse, the absolute decay of e^{-x}.

It is worth to talk of those 3 co-related results from the philosophical pov: the maximal *expansion of an event is an absolute future to past, Δ+1 <<Δ-1 entropic death expressed by the exponential:*

The minimal process of growth (Log) is an infinitesimal, the maximal process of decay (e^{-g}) is equivalent to the whole, in a single quanta of time. We state in the general law that death happens in a single quanta of time, in which the entire network that pegged together the being, disappeared.

1D (singularity) + 2D (Holographic principle) = 3D (vital energy).

In practice this means the 'synchronicity in time of the clocks of the 3 parts of the being' and the superposition of the solutions that belong to each of the 3 elements of any T.œ

$$\frac{d}{dx}e^x = e^x \qquad \int e^x \, dx = e^x + C \qquad \frac{d}{dx}\ln x = \frac{1}{x} \qquad \int \frac{1}{x} \, dx = \ln x + C$$

Finally the logarithmic function and exponential function the ratio of change (derivative) diminishes from the absolute maximal, e^a, which is its own derivative, to the absolute minimal $1/a$ the log derivative which is the definition of an infinitesimal part (Leibniz), till it peaks, converting an Δ-1 first unit into an Δº whole in the peak of an existential world cycle that then will start an inverse function of decay with -1/x diminution and a final fast collapse in the 3rd age<<death moment at eˆ-a speed.

Finitesimal actions.

The logarithm's derivative thus ads as ratio of change only an infinitesimal, so it tends always to a balanced static form (y=c).

The quantity a system absorbs to create an action is generally defined as a 'finitesimal', not infinitesimal. Infinite does not exist in a single continuum, but through multiple discontinuities as all systems in time and space are limited in space and time, both in a single membrane, and in within the Planes of the 5th dimension (as information and energy doesn't flux between those Planes without loss of entropy).

A finitesimal is the quantity of energy, motion, information etc. used by a T.œ for an action of space-time IN any of the 5 Dimensions of the being, 'put in motion' to that aim.

4D: Thus entropy has a negative exponential which show the rhythm of decay of the system. And in this case there is no need for 'a logarithmic' limit, since for the predator the death body is 'unlimited ¡-1 energy', though once the 'relative infinite' number of its ¡-1 parts are absorbed the 'e-function' will have a cut off.

How the function combines with other functions shows then how the superposition and merging-product processes combine as Dimotions with the reproductive growth and decay processes, whose results are intuitive: the product=merging of two powers of reproductive growth, when its 'base=toe' is identical 'superpose=add' that growth.

So the combination of ± exponentials and logarithm curves are also the best way to graph as a bell curve the worldcycle of existence in lineal terms.

 4th dimension: Entropy: S∂ polynomial death dimension of decay.

Polynomials do not evolve reality towards an impossible infinite growth. THEY ARE the inverse decay process; of exponential extinction, eˆ-x.

Wholes are physiological networks, which we analyse mathematically in its parts, mostly performing a motion of space-time, an action that exchanges most likely bits and bites of time and space. So the logarithm is an operation that reflects the processes of minimal transmission and gathering of information and energy, of bidimensional holographic quanta... reason why it is so pervading in the concepts of entropy and information.

5th dimension: ∫T...

This is understood better observing that the inverse function does in fact model growth in the different models of biology and physics, limited by a carrying capacity straight flat line:

The logarithmic function has as derivative an infinitesimal, 1/x, which makes it interesting as it models better the curve of growth from o to 1 in the emergent fast explosive Δ-1 seed state, while the inverse eˆ-*x model the decay death process.*

$$\frac{d}{dx}e^x = e^x \qquad \int e^x \, dx = e^x + C$$

$$\frac{d}{dx}\ln x = \frac{1}{x} \qquad \int \frac{1}{x} \, dx = \ln x + C$$

$$\frac{d}{dx}n^x = n^x \ln x \qquad \int n^x \, dx = \frac{n^x}{\ln n} + C$$
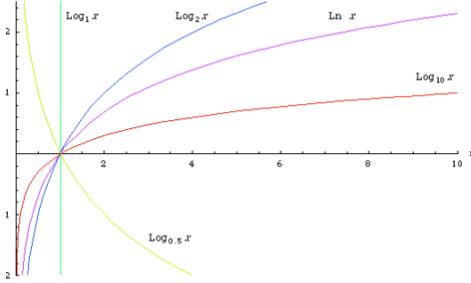
Integrals and derivatives which have a much slower growth, than polynomials on the other hand do model much better as they integrate the 'indivisible' finitesimal quanta of a system, its organic growth and 'wholeness' integrated in space.

Thus integrals do move up a social growth in new Δ+1 5D planes. And its graphs are a curved geometry, which takes each lineal step (differential) upwards, but as it creates a new whole, part of its energy growth sinks and curves to give birth to the mind-singularity @, the wholeness that warps the whole, and converts that energy into still, shrunk mind-mappings of information, often within the 3D particle-head.

We will retake the analysis of the more complex st-eps on 3, 4 and 5D, since most of the complex process related to the 3rd dimension, as a mixture of S and T inner Planes, will require a more complex double or triple derivative and integrals - only the 4D decay entropic explosion can be satisfied as the decay of the single Δ-1 finitesimal with a single variable.

TT. Entropy Equations

One Example. The law of decay of radium says that the rate of decay is proportional to the initial amount of radium present. Suppose we know that a certain time $t = t_0$ we had R_0 grams of radium. We want to know the amount of radium present at any subsequent time t.

Let R(t) be the amount of undecayed radium at time t. The rate of decay is given by the value of $- (dR/dt)$. Since this is proportional to R, we have:

-dR/dt=kR where k is a constant. In order to solve our problem, it is necessary to determine a function from the differential equation. For this purpose we note that the function inverse to R(t) satisfies the equation: **-dt/dR=1/kR,** since dt/dR = (1/dR)/dt. From the integral calculus it is known that equation is satisfied by any function of the form: T= - 1/k ln R+ C.

where C is an arbitrary constant. From this relation we determine R as a function of t. We have:

$$R = e^{-kt+kC} = C_1 e^{-kt}$$

From the whole set of solutions we select one which for $t = t_0$ has the value R_0. This solution is obtained by setting $C_1 = R_0 e^{kt_0}$.

From the mathematical point of view, equation (3) is the statement of a very simple law for the change with time of the function R; it says that the rate of decrease $- (dR/dt)$ of the function is proportional to the value of the function R itself. Such a law for the rate of change of a function is satisfied not only by the phenomena of radioactive decay but also by many other physical phenomena.

We find exactly the same law for the rate of change of a function, for example, in the study of the cooling of a body, where the rate of decrease in the amount of heat in the body is proportional to the difference between the temperature of the body and the temperature of the surrounding medium, and the same law occurs in many other physical processes. Thus the range of application of those equations is vastly wider than the particular problem of the radioactive decay from which we obtained the equation.

1D: PERCEPTIVE ACTIONS: Derivatives as angles of perception.

$$\frac{d}{dx}\sin x = \cos x$$

$$\frac{d}{dx}\cos x = -\sin x$$

$$\int \cos x \, dx = \sin x + C$$

$$\int \sin x \, dx = -\cos x + C$$

The 3rd type of functions are concerned not with Δ±1 past to future to past d=evolutions but with present sinusoidal wave *repetitions of the same time-cycle, hence change is cyclical repetitive, and so those functions are very useful for the 3rd reproductive dimotion in space, but also for a time dimotion or cycle:*

Both functions thus are clearly inverse not only in Γst but also in the Δ±1 Planes - being the negative symbol one of conventions regarding the chosen ± direction of the cyclical, sinusoidal motion.

Here though the interest resides in comparing both type of present vs. Δ past-future functions: the present derivative is self repetitive, as *we return to the sin after 4 quadrant derivatives; and ideed we return to the present considering also the generational cycle, after 4 ages of life. So we can model a sinusoidal function as a world cycle of existence in its 4 quadrants.*

SS: Sinusoidal functions of angles and sins and cosines relate to the SS-trigonometric perceptive function of organisms.

growing distortion and a 'blind' spot for its inverse 5th dimotion of existence (whose performance is the denial of its self).

St: Thus sinusoidal functions are also good to measure St-motions dominant in information. I.e. wave forms.

One very realized role of a derivative as a tangential division of the height in the dimension of information and distance-lineal motion to the observer is a measure of the angle of the being, which recedes in spacetime till reaching the non-perception as a relative finitesimal out of the territorial mind- world of the observer, which connects directly derivatives with the 1D first dimotion of perceptive existence. The being might still be of certain size but as a fractal point he has receded in the mental-space of the world of the perceiver.

While as all S=T, that is there is always a symmetry between discrete numbers and continuous motions, Leibniz with its geometric interpretation and far more profound understanding of finitesimals, which he rightly defined as 1/n, represents the first step in the future of the discipline, the renovator and deep understanding of it - which Newton, which can be considered merely an automaton mathematician, specialized brain, as most modern scientists is - he is indeed the father of the wrong view of science - understood nothing of it.

Indeed, Leibniz, the closest predecessor of this blog IS the genius, Newton the talent.

The Đimotion of cyclical perception *is expressed by the negative ¡ number, with its cyclical rules of summation, which implies the sum of the angle of perception of the self-centered number in its argument.*

Thus next then in the entangled representation of reality through those 'basic operand' comes then the duality of addition and subtraction, and its attached physical meanings of superposition and fusion of 'parts' into 'whole numbers', or its entropic inverse operands of negative subtraction.

It starts to be then obvious that all operands have its inverse function to maintain the balance of the Universe.

Addition by superposition in ever tighter spaces of similar clone species, is the simple ¬Algebraic expression of the social dimotions, both in its positive 5Đ and negative entropic 4Đ whose addition of decaying ¡-1 T.œs is so fast that it can be expressed as a negative exponential growth, which in this manner would complete the 3 'Planes' of addition: +, x, x$^{\underline{a}}$...

Moreover addition can happen in sequential time or adjacent space, forming growing probabilities or populations. So as the simplest mode of operands extends its diversification through space or time it will mean different things. If we consider the happening of an event or full world cycle 1, probabilities will represent parts of the whole event. If we

project it into space it will be a population of similar event, entering the region of maximal frequency. Both will be mathematically projected as a bell curve. S=T. Same function for the addition of events and populations, in time or space.

The first marvel of the Universe is the simplicity of its original principles, made complex by the differentiation across the symmetries of scale, topology or time. Indeed, something so simple as the sum and inverse subtraction IS still the most important operands of the Universe, which gives us new numbers, social gatherings of identical beings, which herd together into parallel flows adopting most likely a bidimensional ST superposition on laminar states that keep adding the 3rd dimension of the being. Like the simplest first masterpieces of Bach, the architectonical Universe is a simple principle before organicism twists its form, in which beings which are equal come together.

Superposition of bidimensional holographic fields is so important that the whole of quantum physics is based in this superposition principle. The sum thus is still the master of operands. But for sums to happen, the beings *must be externally identical, to be perceived as parts of a quantified mass, each of them the same value. Addition thus is the ultimate proof of the social nature of the Universe.*

infinitesimal 'curved' exponential changes that happen between two planes, where linearity is lost.

$$\frac{d}{dx}\sin x = \cos x \qquad \int \cos x \; dx = \sin x + C \qquad \frac{d}{dx}\cos x = -\sin x \qquad \int \sin x \; dx = -\cos x + C$$

We notice immediately that 4 changes turn a sin x cycle into itself, as 3-¡, 3 ages and an entropic death closes a 0'-sum worldcycle of any species back to its initial point. , starting in this case with the simplest cyclical clock-motions, which as they do NOT move in space, and repeat its form in time, are in fact not operated by ∫∂ measures of change.

Next comes from the bottom of that list, the functions of perception, sin and cos angles; and the result have some 'metaphysical' meanings. Indeed, the rate of change of our informative angle measure (the sine), becomes the cos, the rate of change of our motion, or in other words, we SWITCH from sin-stop states to cos-moving states, in stœps. We go from stop-sin to step-cos; but the inverse doesn't hold. That is if we go from motion cos to stop sin, this will be perceived from the perspective of cos-motion as a 'negative' reduction motion - sine.

$$I = \frac{1}{2}mR^2 \qquad I = \frac{2}{5}mR^2 \qquad I = \frac{1}{12}ml^2$$
$$I = \sum_i m_i r_i^2$$
$$I = mR^2 \qquad I = \frac{2}{3}mR^2 \qquad I = \frac{1}{3}ml^2$$
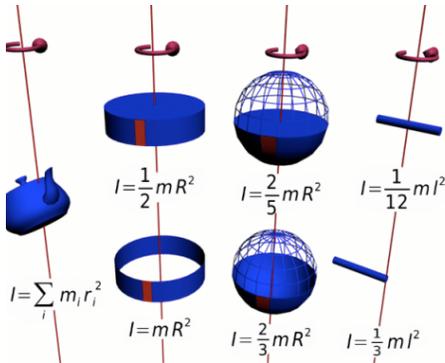
1D: cyclical clocks, angular momentum

In the graph, in the simplest physical systems 1D is merely the angular momentum of its cyclical clocks of time, maximised in the membrane that encloses the system. Strictly speaking it does not change but becomes the 'present function' of a repetitive frequency clock without a derivative of change as the time-space steps seem not to vary. When we introduce a torque, change happens, called 'acceleration', the second dimension of time motion in physics, which we shall latter study when analysing in 5D with the Galilean Px. Newton's laws. Here we just shall briefly explain why in lineal time, as humans only use t to measure change, the 1D is the invariant one and its derivative is 0'.

What about 'higher' more complex, cyclical, and scalar Dimensions? The answer is *that as we change the form of the dimensions, we have to change the operands we use; and specifically when we study the Dimensions of change, which is the one differential/integral equations quantify, those equations* must adapt not the other way around as mirrors of reality to the form of the dimensions of space-time they describe.

So as 1D is a steady state rotary motion, strictly speaking it does NOT change in space-time locomotion (which is what humans with its lineal single time express in derivatives). Hence basically the *derivative of those angular momentums is 0'. It is conserved.*

Let us recall briefly those classic definitions and maths:

Angular momentum is a vector that represents the product of a body's rotational inertia and rotational velocity about a particular axis. In the simple case of revolution of a particle in a circle about a center of rotation, the particle remaining always in the same plane and having always the same distance from the center, we discard the vector nature of angular momentum, and treat it as a scalar proportional to moment of inertia, I and angular speed, ω:

L= Iω: Angular momentum = moment of inertia × angular velocity, and its time derivative is

dL/dt =dI/dt ω +I dω/dt is 0', and **dL/dt=0+I dω/dt**, which reduces to **dL/dt =Iα.**

Therefore, angular momentum is constant, dL/dt=0 when no torque is applied. And this is the essence of its conservation law, a specific case of the conservation of the 5Dimensions of space-time of the Universe:

'In a closed system, no torque can be exerted on any matter without the exertion on some other matter of an equal and opposite torque. Hence, angular momentum can be exchanged between objects in a closed system, but total angular momentum before and after an exchange remains constant'.

 But when a torque is applied in a single present plane, or much more relevant to our inquire: when a system is submitted to the organising or disorganising entropic force of a higher or lower plane of existence, and acceleration exists, a vortex of time-space happens and we enter into the social dimensions of evolution - the 5th Dimension of the mind.

ODES =TIME-LIKE VS PDES. =SPACE-LIKE EQUATIONS: MATHEMATICAL PHYSICS.

A differential equation is a mathematical equation that relates some function with its derivatives. Let us apply simple trilogic to its meaning.

Δ: A differential equation basically give us the duality of its finitesimal local states and its global whole organic forms but at the simplest level, most often with a single field state, or network. Thus it is a good representation of the parts and wholes of 5D but for more complex systems, discrete, organic analysis fares better.

T: ODEs

In applications, the functions usually represent physical quantities, the derivatives represent their rates of change of a given dimotion, such as the first derivative is its 'time speed' and the 2nd its 'time acceleration', which are the two derivatives that give us all the maximal and minimal standing points of the 'function of existence' of the change in time we study.

Once we find the rate of change, or finitesimal of the dimotion of the space parameter; which overwhelmingly belong to those two meaningful ones, we integrate through an interval of existence of a worldcycle and thus the system is solved.

Philosophically then the interest of 5D calculus is to analyze *the geometry of the solution that will indicate us what type of SS«Ts<ST>St»TT organ or event of a function of existence we are studying.*

And if the solution is possible which will give us even deeper insights on the structure of existential algebra whose illogic is mirrored by the laws of mathematical algebra.

When we work with a single parameter we are 'obviously' working on change in lineal time.

This is the concept behind any ODE. Which is therefore clearly a time-like equation, as it probes mostly a single dimotion of the function of existence of a system and its rate of change.

S: PDEs.

On the other hand, a PDE work on several parameters which tend to be the 3 coordinates humans establish for space; hence it is the analysis of a motion in space *as a simultaneous whole – in the simplest forms as a herd in motion with continuity equations. Hence more often concerned with locomotions of the herd or system through space. And its changes of position in space.*

ST: True PDEs. It is essential to understand 5D Calculus the following concept. While a mere locomotion in space might appear as a PDE because of the use of 'vectors in x, y, z' coordinates that artificially multiply the variables for the position in space (which is a single parameter, SS, in terms of 5D) of a given point-T.œ-function, there is a clear case in which true PDEs appear of enormous importance for mathematical physics, and any analysis of reality in terms of the 'fractal generator' of SS»St≤ST≥Ts«TT supœrganisms:

Those are functions in which the 3 present elements of a supœrganism, Ts≤ST≥St appear in the same equation. We call them to distinguish them from PDEs of coordinates of position, 'True PDEs'.

And we can distinguish roughly two types of such functions:

- Spatial function in which the 3 dimensions of change are NOT coordinates external to a point (locomotion) but internal to the point (area and volume): For example, the area of a rectangle is a function S=xy, of its base x and its height y. The volume of a rectangular parallelepiped is a function v=xyz, of its three dimensions. Because the 3 classic dimensions are in vital topology related to its function, width≈reproduction≈ST, length≈locomotion≈sT, height≈information≈St, even though science normally uses them merely for fixed volumes, they do have in certain cases of 'hydrodynamics' and 'cellular growth', or social growth of populations a potential use for a dynamic study

when properly considered in 'mental spaces', where the 3 dimotions of change are analyzed as qualitative dimensions (themes of those of an advanced 5D algebra course we will not attempt for a long time).

- TImespace function proper, classic on physics, when considering formulae related to energy (ST) expressed by its 2 independent space-time parameters, E=H ƒ= K T = M V, in its multiple parameters and variables. The well-known formula p V = RT expresses the dependence of the volume v of a definite amount of gas on the pressure p and absolute temperature T.

And so we will find with those basic type of differential equations we can calculate most Fractal generators in its dynamic change in most stiences.

Δ¡: Differential vs. Δ<¡: simple calculus.

The difference between the simpler calculus of integrals and derivatives vs. differential equations thus is one of growth of complexity, from 'words' into 'sentences' of time dimotion; which means further extension in time, in spatial population and in the probing through scales, with those derivatives of motion or o information (Fourier transforms, etc.)

Because such ST-analysis of superorganisms or T, TT, analysis of time events are the fabric of which reality is built, even if analysis concentrates in simpler systems and herds, differential equations play a prominent role in many disciplines including 5D stience, concerned with the Dimotions of spacetime.

Differential equations can be divided into several types. Apart from describing the properties of the equation itself, these classes of differential equations can help inform the choice of approach to a solution.

Physical equations are related to the 3 elements of al the existential entities of the Universe. It must then be understood that within the general ƒ(x)≈f(t) and y=S isomorphism between mathematical equations and ST-eps (not always tHe case as symmetric steps can repeat itself with the same parameters in SSS and TTT derivatives as we have seen in our intro to ODE), partial differential equations, will be combinations of analysis of systems in its 'primary' differential finitesimals of space and time then aggregated in more complex St SYSTEMS, giving as an enormous range of possible PDE studies, which we shall strive to order according to the concept that *there is a geometric symmetry between ¬Algebra (s≈t symmetries) and geometry (S-wholes sum of t-dynamic points) and analysis (st-eps).*

So it is a good guidance for all ¬Algebra equations to make a comment of its significance in the vital ternary geometry of a T.œ or complex event between T.œs across different planes, Δ§ studied with those equations.

Calculus and physics: Partial Differential equations as Δ@st-equations.

Physical events and processes occurring in a space- time system always consist of the changes, during the passage of its finite time, of certain physical magnitudes related to its points of vital space.

This simple definition of space-time processes is at the heart of the whole differential calculus, which with slight changes of interpretation apply to all GST.

Any of those ST processes can be described by functions with four ST, independent variables, S(x, y), and (z, ƒ), where x, y are the coordinates of a point of the space, and , and z and ƒ of time.

So ideally in a world in which humans had not distorted bidimensional time cycles, the way we work around mathematical equations would be slightly changed. As we are not reinventing the human mind of 7 billion people - we are not that arrogant, we just will feel happy trying to explain a few of those processes of bidimensional space and time here.

In the study of the phenomena of nature, partial differential equations are encountered just as often as ordinary ones. As a rule this happens in cases where an event is described by a function of several variables. From the study of nature there arose that class of partial differential equations that is at the present time the most thoroughly investigated and

probably the most important in the general structure of human knowledge, namely the equations of mathematical physics.

ΔST symmetries.

Each partial differential equation represents a different finitesimal of scale, time and space, in the second level

Let us first consider oscillations in any kind of medium. In such oscillations every point of the medium, occupying in equilibrium the position (x, y, z), will at time t be displaced along a vector u(x, y, z, t), depending on the initial position of the point (x, y, z) and on the time t. In this case the process in question will be described by a vector field. But it is easy to see that knowledge of this vector field, namely the field of displacements of points of the medium, is not sufficient in itself for a full description of the oscillation. It is also necessary to know, for example, the density ρ(x, y, z, t) at each point of the medium, the temperature T(x, y, z, t), and the internal stress, i.e., the forces exerted on an arbitrarily chosen volume of the body by the entire remaining part of it.

These quantities can be described by functions with four independent variables, x, y, z, and t, where x, y, and z are the coordinates of a point of the space, nd and t is the time.

Physical quantities may be of different kinds.

Δ: Some are completely characterized by their numerical values, e.g., temperature, density, and the like, and are called scalars.

S=T: Others have direction and are therefore vector quantities: velocity, acceleration, the strength of an electric field, etc. Vector quantities may be expressed not only by the length of the vector and its direction but also by its "components" if we decompose it into the sum of three mutually perpendicular vectors, for example parallel to the coordinate axes.

In mathematical physics a scalar quantity or a scalar field is presented by one function of four independent variables, whereas a vector quantity defined on the whole space or, as it is called, a vector field is described by three functions of these variables. We can write such a quantity either in the form:

U (x,y,z,t) where the bold face type indicates the u is a vector, or in the form of three functions:**Ux (x,y,z,t), U y(x,y,z,t), Uz (x,y,z,t)**

where ux, uy, and uz denote the projections of the vector on the coordinate axes.

In addition to vector and scalar quantities, still more complicated entities occur in physics, for example the state of stress of a body at a given point. Such quantities are called tensors; after a fixed choice of coordinate axes, they may be characterized everywhere by a set of functions of the same four independent variables.

In this manner, the description of widely different kinds of physical phenomena is usually given by means of several functions of several variables. Of course, such a description cannot be absolutely exact.

For example, when we describe the density of a medium by means of one function of our independent variables, we ignore the fact that at a given point we cannot have any density whatsoever. The bodies we are investigating have a molecular structure, and the molecules are not contiguous but occur at finite distances from one another. The distances between molecules are for the most part considerably larger than the dimensions of the molecules themselves. Thus the density in question is the ratio of the mass contained in some small, but not extremely small, volume to this volume itself. The density at a point we usually think of as the limit of such ratios for decreasing volumes. A still greater simplification and idealization is introduced in the concept of the temperature of a medium. The heat in a body is due to the random motion of its molecules. The energy of the molecules differs, but if we consider a volume containing a large collection of molecules, then the average energy of their random motions will define what is called temperature.

Similarly, when we speak of the pressure of a gas or a liquid on the wall of a container, we should not think of the pressure as though a particle of the liquid or gas were actually pressing against the wall of the container. In fact, these particles, in their random motion, hit the wall of the container and bounce off it. So what we describe as pressure against the wall is actually made up of a very large number of impulses received by a section of the wall that is small from an everyday point of view but extremely large in comparison with the distances between the molecules of the liquid or gas. It would be easy to give dozens of examples of a similar nature. The majority of the quantities studied in physics have exactly the same character. Mathematical physics deals with idealized quantities, abstracting them from the concrete properties of the corresponding physical entities and considering only the average values of these quantities.

Such an idealization may appear somewhat coarse but, as we will see, it is very useful, since it enables us to make an excellent analysis of many complicated matters, in which we consider only the essential elements and omit those features which are secondary from our point of view.

I.e. the Poisson and Laplace equations are all over the place, as they represent the ideal form of most efficient 'sinks' that make an Δ-1 herd of T.œs fall into a 'door' to a larger/smaller nested TŒ scale of the fifth dimension (charges and masses sink); the Laplace equation, $\nabla^2 f=0$, represents the way in which *a herd of Δ-1 fractal points can 'fill in' a spherical membrane, which is the fundamental mode in which membrains that have motion even if we see them as fixed forms (a fixed form ultimately is a πS surface in which each point that appears static merely is a πd, self-turning diameter=point*). So it is all pervading in nature. In fact electrons, which are herds of 'ultradense light photons' trapped in the 'event horizon' of the black hole-proton on the quantum scale, can be modeled just as the spherical harmonics of its Δ-1 'field' of photonic points; and so on and so on.

So a beautiful way to 'read physics' as I used to do a few decades ago when my mental skills were at its height, and my memory intact, was just to 'see as ΔST functions=forms in dimotion, the classic equations of physics. This will be the future of physics to entangle the abstraction of those PDEs and ODEs equations, numerated in the following list, in terms of what they mean for the vital life-death dimotional cycles of its T.œs

Simple examples.

Differential equations are very common in science and engineering, as well as in many other fields of quantitative study, because what can be directly observed and measured for systems undergoing changes are their rates of change. The solution of a differential equation is, in general, an equation expressing the functional dependence of one variable upon one or more others; it ordinarily contains constant terms that are not present in the original differential equation. Another way of saying this is that the solution of a differential equation produces a function that can be used to predict the behaviour of the original system, at least within certain constraints.

Differential equations are classified into several broad categories, and these are in turn further divided into many subcategories. The most important categories are ordinary differential equations and partial differential equations. When the function involved in the equation depends on only a single variable, its derivatives are ordinary derivatives and the differential equation is classed as an ordinary differential equation. On the other hand, if the function depends on several independent variables, so that its derivatives are partial derivatives, the differential equation is classed as a partial differential equation. The following are examples of ordinary differential equations:

$$\frac{dy}{dt} = -ky,$$

$$m\frac{d^2 y}{dt^2} = -k^2 y,$$

$$\left[1 + \left(\frac{dy}{dx}\right)^2\right]\frac{d^3 y}{dx^3} - 3\frac{dy}{dx}\left(\frac{d^2 y}{dx^2}\right)^2 = 0.$$

In these, *y* stands for the function, and either *t* or *x* is the independent variable. The symbols *k* and *m* are used here to stand for specific constants.

Whichever the type may be, a differential equation is said to be of the *n*th order if it involves a derivative of the *n*th order but no derivative of an order higher than this.

The equation:

$$\frac{\partial u}{\partial t} = k^2 \left[\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} \right]$$

is an example of a partial differential equation of the second order. The theories of ordinary and partial differential equations are markedly different, and for this reason the two categories are treated separately.

Instead of a single differential equation, the object of study may be a simultaneous system of such equations. The formulation of the laws of dynamics frequently leads to such systems. In many cases, a single differential equation of the *n*th order is advantageously replaceable by a system of *n* simultaneous equations, each of which is of the first order, so that techniques from linear ¬Algebra can be applied.

An ordinary differential equation in which, for example, the function and the independent variable are denoted by *y* and *x* is in effect an implicit summary of the essential characteristics of *y* as a function of *x*.

These characteristics would presumably be more accessible to analysis if an explicit formula for *y* could be produced. Such a formula, or at least an equation in *x* and *y* (involving no derivatives) that is deducible from the differential equation, is called a solution of the differential equation. The process of deducing a solution from the equation by the applications of ¬Algebra and calculus is called solving or integrating the equation.

It should be noted, however, that the differential equations that can be explicitly solved form but a small minority. Thus, most functions must be studied by indirect methods. Even its existence must be proved when there is no possibility of producing it for inspection. In practice, methods from numerical analysis, involving computers, are employed to obtain useful approximate solutions.

PDES

Abstract. Each stœp of a method of solution is grounded in a real property of the 5D ΔST symmetries and conservation laws of the Universe, which are the 3 Galilean paradoxes between Δ+1 curved closed worldcycles, sum of lineal steps, which gives birth to the most used method of lineal approximations; the equivalence between Space and time, in all Stœps of dimotions, which gives birth to the method of separation of variables on differential equations and more broadly allows to move around relative space and time parameters in equations joined by an operand of 'equivalence' (≈ not =). And the 2 conservation laws of the Universe, conservation of those 'beats' of existence, S=T in relative present, eternal balance, justifying the equivalence operands. And conservation of the 'volume of space-time' of each plane of the Universe, by virtue of the 5D metric equation SxT=C, which justifies the solution of differential equations by separations of scales and harmonizes those scales allowing constant but balanced transfers of larger bites energy exchanged by smaller bits of information, $St¡=1=Ts¡$.

As in both cases, because S=T and and Δ-1=Δ0, we can separate parameters *and make them equivalent to a common constant*

The Simplest Equations of Mathematical Physics. Solutions based in 5D laws.

The object of mathematical physics is to study the relations existing among these idealized elements, these relations being described by sets of functions of several independent variables.

The elementary connections and relations among physical quantities are expressed by the laws of mechanics and physics. Although these relations are extremely varied in character, they give rise to more complicated ones, which are derived from them by mathematical argument and are even more varied. The laws of mechanics and physics may be written in mathematical language in the form of partial differential equations, or perhaps integral equations, relating unknown functions to one another. To understand what is meant here, let us consider some examples of the equations of mathematical physics.

A partial differential equation (**PDE**) is a **differential equation** that contains unknown multivariable functions and their partial derivatives. (This is in contrast to ordinary differential equations, which deal with functions of a single variable and their derivatives.) PDEs are used to formulate problems involving functions of several variables, and are either solved by hand, or used to create a relevant computer model.

PDEs can be used to describe a wide variety of phenomena such as sound, heat, electrostatics, electrodynamics, fluid flow, elasticity, or quantum mechanics. These seemingly distinct physical phenomena can be formalised similarly in terms of PDEs. Just as ordinary differential equations often model one-dimensional dynamical systems, partial differential equations often model multidimensional systems. PDEs find their generalisation in stochastic partial differential equations.

Both ordinary and partial differential equations are broadly classified as **linear** and **nonlinear**; *such as linear are small steps of a non-lineal larger ΔST period, hence we can approximate all non-lineal systems by lineal equations.*

A differential equation is **linear** if the unknown function and its derivatives appear to the power 1 (products of the unknown function and its derivatives are not allowed) v. **nonlinear** of higher powers**.** The characteristic property of linear equations is that their solutions form an affine subspace of an appropriate function space, which results in much more developed theory of linear differential equations. **Homogeneous** linear differential equations are a further subclass for which the space of solutions is a linear subspace i.e. the sum of any set of solutions or multiples of solutions is also a solution. The coefficients of the unknown function and its derivatives in a linear differential equation are allowed to be (known) functions of the independent variable or variables; if these coefficients are constants then one speaks of a **constant coefficient linear differential equation**.

There are very few methods of solving nonlinear differential equations exactly; those that are known typically depend on the equation having particular symmetries. Nonlinear differential equations can exhibit very complicated behavior

over extended time intervals, characteristic of chaos. Even the fundamental questions of existence, uniqueness, and extendability of solutions for nonlinear differential equations, and well-posedness of initial and boundary value problems for nonlinear PDEs are hard problems and their resolution in special cases is considered to be a significant advance in the mathematical theory (cf. Navier–Stokes existence and smoothness). However, if the differential equation is a correctly formulated representation of a meaningful physical process, then one expects it to have a solution.

Linear differential equations frequently appear as approximations to nonlinear equations. These approximations are only valid under restricted conditions. For example, the harmonic oscillator equation is an approximation to the nonlinear pendulum equation that is valid for small amplitude oscillations.

A partial differential equation (PDE) is an equation involving functions and their partial derivatives; for example,

the wave equation $\dfrac{\partial^2 \psi}{\partial x^2} + \dfrac{\partial^2 \psi}{\partial y^2} + \dfrac{\partial^2 \psi}{\partial z^2} = \dfrac{1}{v^2}\dfrac{\partial^2 \psi}{\partial t^2}.$

Some partial differential equations can be solved exactly

In general, partial differential equations are much more difficult to solve analytically than are ordinary differential equations. They are mostly solved using *the fundamental illogic laws of 5D metrics, even if huminds don't know they are using them; that is (:*

An integral transform, (finding the Δ-whole or exact solution) a separation of variables (using the S=T= C metric) lineal procedures (using the $\sum|_{\mathrm{i}}$-1= O¡+1 law of small lineal steps that ad to Time cycle; or--when all else fails (which it frequently does)--numerical methods such as finite differences (using the fact that continuity is reall a sum of discrete stœps).

Let us make some comments on those methods of 5D calculus (:

The methods of solutions of Differential equations combined 5D calculus. S=T.

As we said somewhere, all resumes in the functio of present existence, S=T.

This is the method of solution of PDEs, to reduce them to two ODEs, such as S=T, hence S=c, T=c and we solve two equations. Simple, isn't? Simplicity is genius said L[1]. L[3] agrees (:

Consider the most famous equation of quantum physics, the **Schrodinger equation**, describing nonrelativistic quantum phenomena:

Ħ^2 $/2m\nabla^2\Psi + V$ (**S**)$\Psi = -i\hbar\partial\Psi/\partial t$

where m is the mass of a subatomic particle, ħ is Planck's constant (divided by 2π), V is the potential energy of the particle, and $/\Psi$(**s**, $t)/2$ is the probability density of finding the particle at **s** at time t.

Those Equations have partial derivatives with respect to time. As a first step toward solving these PDEs, let's separate the time variable. We will denote the functions in all four equations by the generic symbol Ψ(**s,**t).

The separation of variables starts with separating the **s** and t dependence into factors:

Ψ(**s**, t) ≡ S(**s**)T (t).

This factorization permits us to separate the two operations of space differentiation and time differentiation. As an illustration, we separate the time and space dependence for the Schrodinger equation. Substituting for Ψ, we get   ħ2 $/2m\nabla2(ST) + V$ (**s**)$(ST) = -i\hbar\partial\ \partial t$ (ST),

Dividing both sides by ST yields:

$-1/S$ ħ^2$/2m\nabla2S + V$ (**s**) $= -i1'\ T$ħ-dT/dt

Now comes the crucial step in the process central argument of the separation of variables.

The LHS of Equation (is a function of Space *position alone*, and the RHS is a function of *time alone*. Since **r** and *t* are independent variables, the only way that the equation can hold is for *both sides to be constant*, say α:

$-1/S \, \hbar^2/2m\nabla 2S + V(\mathbf{s}) = \alpha$

$-\Gamma 1' T\hbar dT/dt = \alpha$

We have reduced the original time-dependent Schrodinger equation, a PDE, to an ODE involving only time, and a PDE involving only the space position variables. Most problems of elementary mathematical physics have the same property, i.e., S=T, which by virtue of 5D metrics is the Constant state of present, hence S-> α T->= α

All this physicists do but don't know why it works for so many equation (:

The time-dependent PDEs of mathematical physics can be reduced to 2 ODEs in the time variable and the space variable by virtue of S=T = Constant, the equation of present.

Thus as usual our interest is not in repeating the well known 'pro' methods of study of PDEs and ODEs but the whys we can learn from its merging with 5D as we already noticed in our introduction.

As geometry defines form in space and by virtue of the S=T equivalence motion in time, the geometry of differential equations and its solutions illuminates in great deal the function or part of an organic whole the diferential equation studies. And greatly reduces the number of 'real differential equations' we find in nature, helping also to consider which solutions are valid and which restrictions and limits must be imposed.

Second order.

Partial differential equations of second-order are amenable to analytical solution *if they can be wrriten* as a lineal equation. Such PDEs are of the form: $A\,u_{xx} + 2B\,u_{xy} + C\,u_{yy} + D\,u_x + E\,u_y + F = 0.$

And once more according to 5D they can be classified into 3 topological variations, which miraculously huminds, without knowing vital topology have called exactly… believe it or not if you are an expert on 5D (that is if you are me, I and myself:) as elliptic, hyperbolic, or parabolic. Whereas, *a hyperbolic equation is one dominated by the ST body-wave topology; that is where $\partial s \partial t$ is larger than $\partial s \partial s$ and $\partial t \partial t$; elliptic when $\partial s \partial s + \partial t \partial t$ is bigger than SS+TT and parabolic when both are equal.*

In the language of classic math, we said that Linear second-order PDEs are then classified according to the properties of the matrix $Z \equiv \begin{bmatrix} A & B \\ B & C \end{bmatrix}$

as elliptic, hyperbolic, or parabolic.

If Z is a positive definite matrix, i.e., $\det(Z) > 0$, the PDE is said to be elliptic. Laplace's equation and Poisson's equation are examples. Boundary conditions are used to give the constraint $u(x, y) = g(x, y)$ on $\partial\Omega$, where

$$u_{xx} + u_{yy} = f\left(u_x, u_y, u, x, y\right)$$

holds in Ω.

If det(Z)<0, the PDE is said to be hyperbolic. The wave equation is an example of a hyperbolic partial differential equation. Initial-boundary conditions are used to give $u(x, y, t) = g(x, y, t)$ for $x \in \partial\Omega, t > 0$

$$u(x, y, 0) = v_0(x, y) \text{ in } \Omega\, u_t(x, y, 0) = v_1(x, y) \text{ in } \Omega,$$

where $u_{xy} = f(u_x, u_t, x, y)$ holds in Ω

If det (Z)=0, the PDE is said to be parabolic. The heat conduction equation equation and other diffusion equations are examples. Initial-boundary conditions are used to give $u(x, t) = g(x, t)$ for $x \in \partial\Omega, t > 0$

$$u(x, 0) = v(x) \text{ for } x \in \Omega,$$

where $u_{xx} = f\left(u_x, u_y, u, x, y\right)$ holds in Ω

Separation of variables by scales.

Finally the 3rd fundamental method besides lineal approximations and separation of S=T values, takes into account the conservation of volume of space-time between scale, but also the fact that smaller scales have faster times speeds and smaller parts, perceived as relative information compared to the bites of energy of a larger scale, so the equivalence is between a 'pool' of bits of information of a smaller Δ-1 scale and its equivalent volume of bites of energy of a larger Δ0 plane. *This equivalence being essential to everything in the Universe as it allows the coupling of languages and energy, making for example the physical economy equivalent to the financial economy, the language equivalent to the action; the mathematics mirror the reality, but as information is smaller and more abundant, this equivalence tends to be inflationary, themes those that appear in all the planes of space-time and the interaction of minds and languages of information (SS, St) with Energy bites and entropic boosts (TT, Ts).*

Let us then show the case, with the previous example of Schrodinger's equation for the orbit of an electron in an atom.

$$\partial^2(\rho\phi)/\partial\rho^2 = -(\varepsilon + 2/\rho)\,\rho\,\phi$$

Here, ε is the electron energy, ρ is the radial coordinate, and ϕ is the electron wave amplitude.

At small distances from the nucleus, ϕ may oscillate rapidly, but at large distances, ϕ must decrease exponentially with r. This is because, at large distances, a bound electron's potential energy is greater than its total energy. With a negative kinetic energy, wave number k becomes imaginary and the normal oscillatory exp{ikr} term becomes exp{–Kr}, where K=k/i.

We separate the large-scale exponential from the small-scale oscillations by making this substitution:

$$\rho\,\phi = g(\rho)\,\exp\{-\beta\,\rho\}$$

Here, β is an arbitrary constant, and g(ρ) is the unknown small-scale function of distance. After a lot of math, our differential equation becomes:

$$\partial^2 g/\partial\rho^2 - 2\beta\,\partial g/\partial\rho + (\beta^2 + \varepsilon + 2/\rho)\,g = 0$$

Believe it or not, this is progress. Let's choose $\beta^2 = -\varepsilon$, reducing our equation to:

$$\partial^2 g/\partial\rho^2 - 2\beta\,\partial g/\partial\rho + 2g/\rho = 0$$

If not for the ρ in the denominator of the third term, this would be a simple equation. But we can solve this with a Taylor series.

Let: $g(\rho) = \Sigma_k a_k \rho^k$

This technique will work if the coefficients ak approach zero for large k. Putting the Taylor series into our equation yields:

$$0 = \Sigma_n \{(n+1)na_{n+1} - 2\beta_n a_n + 2a_n\}\,\rho^{n-1}$$

Here the sum is from n=1 to n=+∞. The above equation is valid for all values of ρ. This can only be true if the coefficient of each power of ρ is zero. This is an important rule for polynomials that is well worth remembering. After rearranging, we obtain:

for all n>0: $a_{n+1} = a_n \{2(\beta n - 1)/n(n+1)\}$

With any choice of a_1, we can recursively calculate a_2, a_3, ⋯ in terms of β, which is related to the electron's energy. For the electron to be bound to the nucleus, β must equal then a finitesimal, 1/n for some integer n; which makes sense of why electrons in atoms have quantized energies which are its finitesimal parts (ultradense light photons trapped in the potential well of the atom).

This is the basis of the Periodic Table, chemistry, biology, solid state physics, digital electronics, and everything else we know about atoms; and the insight of 5D is to consider those quantized energies the finitesimal bites of electrons – its dense bosons of light.

So the question of Partial Differential equations 'reduces' to the study of ODEs, which we shall consider now in detail; to then plunge into the experimental praxis of the main differential equations of the Universe, which *will reflect the basic topologies of St<ST>Ts and Δ±¡ laws of existential algebra, regarding locomotion (Ts) and transfers of energy and information between planes and physiological networks (St¡-1=Ts¡)*

Thus with this brief introduction to Calculus we conclude this paper on Non-Aristotelian, Non-Euclidean mathematics.

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