

# Nature's coordination

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“Virtual reality represents a spatio-temporal illusion whose task it is to appear different from the 'real' spatio-temporal illusion created by universally adopted spatio-temporal conventions. Yet the most exciting experience of virtual reality is not so much the one that totally alters the viewer's perspective on the real as the one that is able to expand, augment and enlarge the real. In other words, it is in its *relationship* with the real, rather than in its attempts to substitute itself for the real, that the most original use of virtual reality is found.”

GABRIELLA GIANNACHI, *Virtual Theatres*

*Abstract* The logic stretch that Relativity has imposed was caused by the alteration of length perception that Einstein forced to introduce in order to accommodate time in a four dimensional orthogonal manifold. Because no space and time can be both at once “absolute”, Einstein changed both definitions in order to keep light's velocity - that was derived by space and time - invariant. This was a mistake in logic. In this work a different approach is proposed that uses a real space-time manifold with only three degrees of freedom in a real four dimensional manifold. This simple model seems to explain a lot of extremely complex phenomena with an extremely primitive way although it demands an alternative intuitive view of Nature.

Keywords: space; time; coordinate system; NCS; universe expansion; world black hole

## I. INTRODUCTION

Due to Gödel incompleteness theorems it is evidence that our Universe is working with a bigger number of independent parameters than the ones that could be calculated by experimental data. This means that everyone could state a set of axioms and assumptions in order to build a theory about world. The axioms that classical physics was built on were those included in Euclidean geometry, number theory and Pythagorean Theorem by using Cartesian coordinate system. This set of axioms and theories concluded to a three dimensional physical world in a more or less static condition. When motion is considered as a state that could alter the laws of static physical world there is a need to introduce the entity of time in a fourth dimension. This forced science to alter the set of axioms it was based on and to add new formulations that changed the so far notion of space dimensions. From this time on, a slippery scientific route was followed because Cartesian coordinate system – which worked wonderfully until then – cannot be easily abolished. Physicists start changing the conception of space as well as that of time in order to accommodate these within a Cartesian system instead of replacing the latter by a more appropriate coordinate system. They refuse to acknowledge that the Cartesian system imposes its own restrictions (negative numbers, asymmetry and orthogonality) that may mislead physicists. Natural Coordination System (NCS), which consists in a coordinate system together with a theory about cosmology, comes in order to reconstruct science by a revised notion of conception.

The coordinate part of NCS embodies two sub-systems (Real and Virtual Coordinate Systems). This coexistence of real (RCS) and virtual (VCS) coordinate systems as two separate subsystems with an overall stable unique origin on the middle between RCS' and VCS' origins permits the uniqueness of any event throughout the Universe' s life. Furthermore, its inherited granulation of its manifold makes use only of rational numbers and demonstrates a direct connection to projective geometry through homogeneous manipulation of its coordinates.

## II. INTRODUCTION TO NATURAL COORDINATION SYSTEM

Three dimension space is presented by real 4-D space and virtual 4-D space. Real three dimension space is presented by four real hemi axes ( $R_x, R_y, R_z, R_\phi$ ) that are directed towards the vertices of a regular tetrahedron. Virtual three dimension space is presented by four virtual hemi axes ( $\Phi_x, \Phi_y, \Phi_z, \Phi_R$ ) that also are directed towards the vertices of a regular tetrahedron. Direction of  $R_x$  is the same but “opposite” of  $\Phi_x$  (the same for the others three). The Origin (O) of NCS is on the point of singularity where Universe started

(Big Bag, BB) and it is the only stable point in NCS. NCS is defined by the Origin and the present position of the reference event (here and now). These two points are the only ones that are well defined and the straight line (in space-time) between them is the World Line (WL) of the reference event from the Origin (BB) to here and now. The two special hemi axes,  $R_\phi$  in RCS and  $\Phi_R$  in VCS have the same but opposite directions to real and virtual WLs of the reference event. Real reference event is moving with time on its straight real WL departing from Origin. In other words its distance in NCS space-time from the Origin (BB) is continuously increasing. This is true only for the real era as will explain later.

It is obvious that any reference event has its own NCS that is defined by the direction of its WL or  $R_\phi$  and the only movement allowed to NCS is its rotation around this direction.

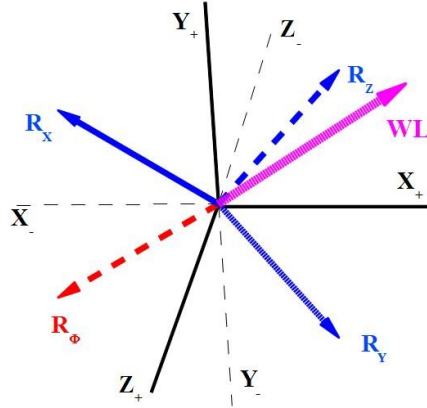


FIGURE 1

Every event (point) in 4-D NCS space (3-D Cartesian space – time included) is defined by its four homogeneous coordinates  $[R_X, R_Y, R_Z, 1/R_\phi]$ . According to Cartesian coordinates this is defined by the three coordinates  $(R_\phi * R_X, R_\phi * R_Y, R_\phi * R_Z)$ .

For reference event all four coordinate parameters  $(R_X, R_Y, R_Z, R_\phi)$  are natural numbers and equal. In other words  $R_X = R_Y = R_Z = R_\phi = R \in \mathbb{N}$ . This is because any change happens according to quantum length (Plank length,  $10^{-35}$  m) and from the geometry of NCS it is found that the sum of vectors  $R_X, R_Y, R_Z$  is equal but opposite to  $R_\phi$ .

Hence, reference event has Cartesian coordinates  $(R^2, R^2, R^2)$  or  $(0, 0, 0)$  if the origin of Cartesian system is allowed to move (in contrast to NCS). Movement of origin of a coordinate system is another cause of confusion in physics.

In fig. 1, Cartesian and the NCS are shown with Origin O being the BB (Big Bang). The NCS hemi axes are shown by vectors for clarity reasons. Axes' part and hemi axes are presented by dotted lines if are below paper and marks are at their increasing end.

TABLE 1. CONNECTION BETWEEN CARTESIAN AXES AND NCS HEMI AXES

| CARTESIAN AXIS | COMBINATION OF | CNS HEMI AXIS | COMBINATION OF    |
|----------------|----------------|---------------|-------------------|
| $X_+$          | $R_Z + R_Y$    | $R_X$         | $X_- + Y_+ + Z_+$ |
| $X_-$          | $R_\phi + R_X$ | $R_Y$         | $X_+ + Y_- + Z_+$ |
| $Y_+$          | $R_X + R_Z$    | $R_Z$         | $X_+ + Y_+ + Z_-$ |
| $Y_-$          | $R_\phi + R_Y$ | $R_\phi$      | $X_- + Y_- + Z_-$ |
| $Z_+$          | $R_Y + R_X$    |               |                   |
| $Z_-$          | $R_\phi + R_Z$ |               |                   |

Every event is consisted by two complementary sub-events a real one  $[R_X, R_Y, R_Z, 1/R_\phi]$  and a virtual one  $[\Phi_X, \Phi_Y, \Phi_Z, 1/\Phi_\phi]$ . These two sub-events are symmetric to  $H_{\infty/2}$  (see below) and  $R_X * \Phi_X = h_{\infty/2}^2 = H_{\infty/2}^2$ .

In real physical world a real observer (during the real eras) can conceive only the real part of the RCS. This is the space that is enclosed by the three real hemi axes  $R_x, R_y, R_z$ .

More details on NCS can be found in previous publications [1],[2].

### III. UNIVERSE(S) WITHIN NATURAL COORDINATION SYSTEM

NCS is appropriate to visualize the whole Universe during all its real and virtual eras. Today's (n)Universe may have started from a BB singularity that may be considered as the end of a previous (n-1)Universe that also had started from another singularity that had been the end of a (n-2)Universe and so on without any recognizable start or end. The present nUniverse can be visualized in NCS as in fig. 2a. Closed curves  $H_1, H_2, \dots, H_{\infty-1}$  represent nUniverse at different times.  $H_0$  is singularity S (Start, BB) while  $H_\infty$  or singularity E (End) or singularity S for the (n+1)Universe. It is evident from fig. 1 that the volume of real nUniverse (space enclosed by the three real hemi axes  $R_x, R_y, R_z$ ) in NCS increases as time passes up to  $H_{\infty/2}$ . After  $H_{\infty/2}$  nUniverse is in its virtual era where an observer has become a virtual observer able to conceive only virtual entities enclosed by the three virtual hemi axes of its VCS ( $\Phi_x, \Phi_y, \Phi_z$ ). The curves are always closed and they are the loci where all the events have a certain distance from S (BB). In other words all synchronous events are on these 4-D surfaces (curves), which are called horizons ( $H$  for real and  $h$  for virtual). On horizons, every event (of any time) appears as the result of its projection transformation, origin S standing for real world and origin E for virtual world. However, the realizable (conceivable) events for a real observer are the ones that exist on the horizon at the specific time and not the projection of events in the past (real) or future (virtual) time.

Another form of presenting nUniverse is as a sphere with "infinity" radius (fig. 2b); even more, the whole history of Universes (past and future Universes) could be presented as spherical shells (fig. 2c).

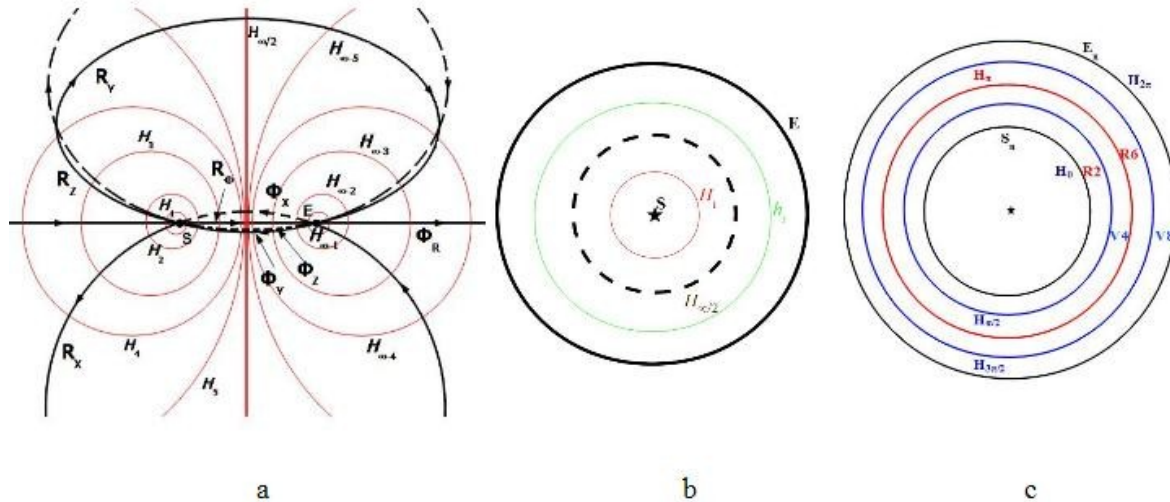


FIGURE 2

### IV. HOW AND WHY ANY UNIVERSE COORDINATES BETWEEN AND WITHIN REAL AND VIRTUAL WORLDS?

At the very beginning of a Universe there is just a real singularity S in RCS and a virtual singularity E in VCS. This stage could be figured by using spherical form (see figures 2b and 3). As time passes the new Universe goes to stage 2, 3, ..., 8 and then to stage 1 of the next Universe. These eight different stages of any Universe possess different Universe's properties. Before examining each stage separately it is needed to state that the whole volume of the Universe (the whole sphere) is occupied by a NCS manifold whose among other properties is that its vertices show a constant and uniform "mass" density distribution (approximately  $10^{-26}$  Kg/m<sup>3</sup>).

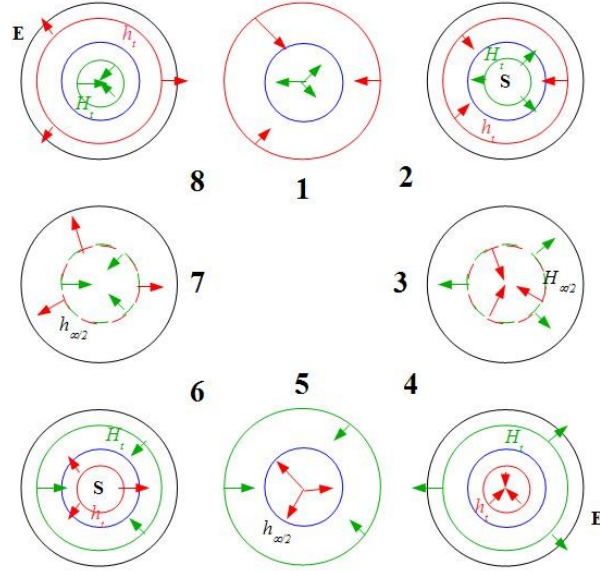


FIGURE 3

It seems that gradually we are returning to Newton's notion about Cosmos.

**Stage 1:** This is the stage of singularity BB for the newborn Universe. The centre of the sphere (green) presents the starting singularity  $H_0$  of real Universe and the outmost spherical surface (red) presents the starting singularity  $h_0$  of its compliment virtual Universe. Real horizon is moving as time passes because the events on it are exerted a classical repulsive "gravitational" force while events on its complimentary virtual horizon are exerted a classical attractive "gravitational" force.

It is worth noting that "mass" is supposed to be a property of NCS manifold and not a property of event. The force that acts on an event is the vector sum of the force on real event (green) plus the force on its virtual partner (red). Hence, singularity E ( $h_0$ ) is going to move inwards because attractive "gravitational" force is acting on it that is proportional to the volume of the Universe's part inside  $h_0$ .

The force that acts on  $H_0$  event is zero as it is the centre of the sphere. So, the sum of the two forces will be the maximum and hence the acceleration of the horizon movement will be the maximum and proportional to the difference ( $Sh_0 - SH_0$ ) as it will be shown. The velocity of horizon movement is zero like the velocity of a mass at the highest point of a pendulum. The mass (the quotation marks will be omitted) of the real horizon's events is zero and the radius of  $H_0$  ( $SH_0$ ) is also zero.

**Stage 2 (real):** This is the stage where the new Universe develops in its real era and so the reference observer is real and conceives the real events within 4-D space enclosed by the real hemi axes  $R_x, R_y, R_z$ .

The force that acts on each event of horizon  $H_n$  and  $h_n$  are:

$$F_n = G \cdot M_n \cdot m / SH_n^2 \quad \text{and} \quad f_n = G \cdot m_n \cdot m / Sh_n^2 \quad (1)$$

Where:  $G$  is the gravitational constant;  $M_n, m_n$  is the mass of the vertices that are in the sphere with radius  $SH_n$  and  $Sh_n$  respectively;  $m$  is the mass of a vertex (constant).

Because  $M_n = 4 \cdot \pi \cdot \rho \cdot SH_n^3 / 3$  and  $m_n = 4 \cdot \pi \cdot \rho \cdot Sh_n^3 / 3$

(1) becomes:  $F_n = 4 \cdot \pi \cdot \rho \cdot G \cdot m \cdot SH_n / 3$  and  $f_n = 4 \cdot \pi \cdot \rho \cdot G \cdot m \cdot Sh_n / 3$

and  $F = f_n - F_n = 4 \cdot \pi \cdot \rho \cdot G \cdot m \cdot (Sh_n - SH_n) / 3$  (2)

Where:  $F$  is the sum of forces that acts on an (n)event and  $\rho$  is the mass density of Universe.

Because  $\rho, G$  and  $m$  are constants,  $F$  is proportional to  $(Sh_n - SH_n)$ .

This relation implies that horizon follows a harmonic law of movement with  $SH_n = SH_{\infty/2}$  ( $= Sh_n$ ) being the radius of "equilibrium". Hence, radius of real horizon  $SH_n$  increases with time as well as velocity while acceleration decreases throughout stage 2. Note that  $SH_n + Sh_n = SE$  ( $\infty$  or  $\pi$  to harmonic law).

**Stage 3:** At this stage  $Sh_n = SH_n$  and  $H_n$  is the  $H_{\infty/2}$ . So this is the time point where Universe has finished its real era and is inserting into its virtual era. Horizon radius (real or virtual) is at its half maximum while acceleration is zero. Velocity and real conceivable mass are at their maximum.

**Stage 4 (virtual):** Virtual era of Universe is taking place during this stage. Observers become virtual observers, the conceivable events are the virtual ones and observers consider singularity E as their Universe centre. Their horizon's radius  $Sh_n$ , velocity and virtual conceivable mass “decrease” while acceleration decreases becoming negative.

**Stage 5:**  $Sh_n$  and  $SH_n$  become singularity S and E respectively. A new “anti-Universe” is going to emerge. “Anti-Universe” behaves like Universe but the realization of its properties differs. At this time point Universe is entering, once more, its real era. Horizons' velocity and mass are zero while acceleration takes its minimum negative value (real direction outwards).

**Stage 6 (real):** During this stage the newborn real “anti-Universe” develops. The real observer “witnesses” his horizon expanding according to its new centre E. This perception is “wrong” as the actual swell is taking place according to the “outer” centre S. Realizable mass seems to “increase” (however, we are dealing with a form of “antimatter”). Velocity and acceleration decrease and reach negative values.

**Stage 7:** At this time point the inward force  $F_n$  minus the outward force  $f_n$  is zero. So, acceleration is zero and realizable real mass is maximized. The real observer becomes a virtual observer.

**Stage 8 (virtual):** Radius of virtual Universe decreases referring to virtual centre E. Outward velocity decreases in magnitude while inward acceleration increases in magnitude. Realizable mass (“antimatter”) decreases referring to the virtual centre E.

After stage 8 this Universe ends to a new stage 1 that is the start of the next Universe.

The overall horizon's harmonic movement is shown in fig. 4 together with the change of horizon's properties (radius, velocity, acceleration, force, mass,  $c$  and  $H_t$ ) in relation to the elapsed time (one period).

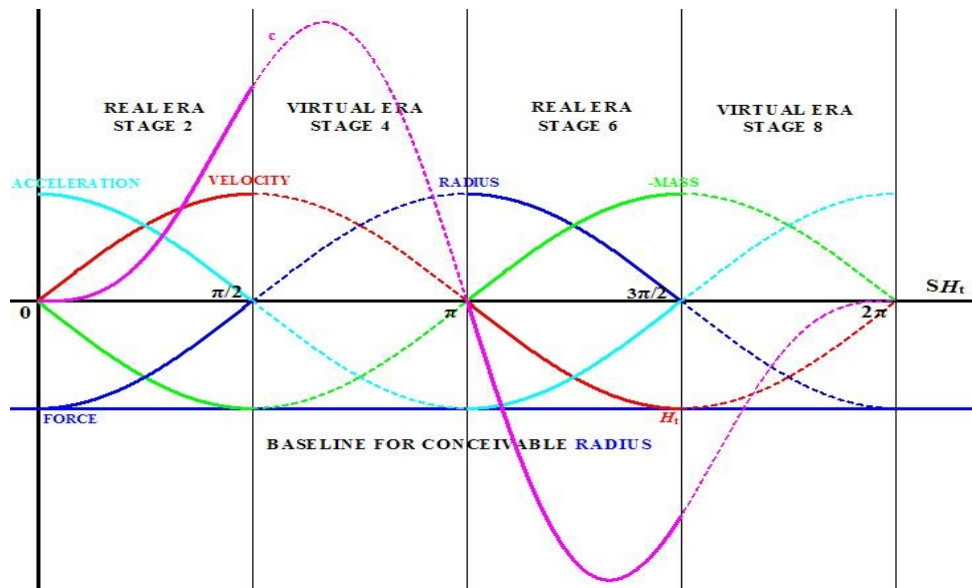


FIGURE 4

A difficult to answer question would be: Are we able to examine our real era by using only real parameters? The answer is “difficult” only because it contradicts our faith that anything will be determined when science in future will develop the appropriate theories. Unfortunately this is not the case and a direct indication of this is the unavoidable contribution of virtual part of our world to the force that governs Universe expansion. Is our matter made from real matter that exerts attractive or repulsive gravitational force? It seems the latter is true and the attractive gravitational force realized is due to the virtual part of our matter. As it stated even to the very first publication about NCS, its two complementary parts (real and virtual) represent two complementary notions of the Whole; the real part is the conceivable static measurable reality while the virtual one represents the dynamic functions by which the real static entities are all simultaneously interconnected.



## V. WHY PRESENT UNIVERSE ALWAYS “STANDS” ON ITS OWN BLACK HOLE’S EVENT HORIZON?

It is known that the Schwarzschild radius (event horizon) is proportional to the mass with a proportionality constant involving the gravitational constant and the speed of light:

$$r_s = \frac{2Gm}{c^2},$$

where:  $r_s$  is the Schwarzschild radius;  $G$  is the gravitational constant;  $m$  is the mass of the object;  $c$  is the speed of light in vacuum.

If we try to find the Schwarzschild radius of the whole Universe we will find that this is very close to its estimated radius. This astonishing coincident has an astonishing simple explanation that today’s physicists dare to consider. The velocity of light is NOT a constant but it is proportional to the NCS distance of the observer from S ( $SH_n = r_s$ ) and the constant of this proportionality is the experimental Hubble constant. In other words:

$$c = H_t * r_s \quad (3)$$

$$H_t = H * \sin(SH_t) \quad \text{where: } 0 < SH_t < 2 * \pi \quad (4)$$

Where:  $H_t$  is experimental Hubble “constant”;  $H$  is the actual Hubble constant (invariant to time).

Using equations (3) and (4) for Universe’s Schwarzschild radius the well known equation (5) is reached by primary mathematics,

$$3 * H^2 * \sin(SH_t)^2 = 3 * H_t^2 = 8 * \pi * G * \rho \quad (5)$$

How then the estimated velocity of light is found experimentally constant, even for the cases that light emitted billion of years before? Are there really such experimental data? The explanation is that light is travelling following a continuous process of “absorbing and emitting” quanta in any quantum of space (or time) with their properties (e.g. velocity and direction) to change according to the vertex from which they are emitted each time. Hence, any observed quantum of light is emitted at the previous quantum of time ( $\sim 10^{-43}$  s before) with velocity  $c = H_t * r_s = H * r_s * \sin(SH_t)$ .

## VI. CONCLUSIONS

Science needs to reconsider theories that were based on axioms, tools and preconceptions that became extremely hard to support. Is there any need to invent cosmological constant, dark matter and dark energy in order to understand how Nature works? Or to keep the four independent “orthogonal” dimensions instead of three independent dimensions? Is light a real entity or the real image of a virtual one? What is the point of distinction between real and virtual entities and not to consider two forms of expression (in RCS or VCS) of only one entity?

Nature seems to coordinate between “realities” and “virtualities” in a very tricky way that impedes us from uncovering their deepest laws just as Gödel has stated with his incompleteness theorems.

“It’s like having the coordinates of all the cars in town, but no street map. Without this tool, we don’t know why people are moving the way they are.” SOURCE: Iran Daily 2013-03-05 09:52:

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