0.4 The Proof

Andrej Rehak

www.principiauniversi.com

Abstract

If the result of the product of zero and infinity is not defined then the system located within dimensions of their ideas has no definition. On a scale between zero and infinity, we establish the system. Universally valid definition of its geometry of motion proves its validity. We prove that the system is. We establish a platform for its unification.

Is there an existence outside of space and time? Is it possible to imagine, measure or to express anything that does not include their variables? Can we allocate physical unit that is not some space-time relationship? Does information exempted from the space-time context exist? ...
And is there a way to express space or time independently, regardless of their relationship to any kind of velocity?

If the answer to these questions is negative, we presume that the foundation of every universal variable of the physical world, in other words, the foundation of its existence, is its space-time description.

Besides being physically unrelated, the conventional units for space and time, meter and second, originate from various numerical systems, decimal and sexagesimal. From such preset, it is difficult to recognize, essentially a simple matrix, of the complex appearance of the system.

Let's imagine that we are located in the system from whose centre goes n lines. Wherever we are, the picture of our imaginary planar world will be an infinite number of points. Only at the position of the centre, we'll see n points. By logical judgment, we will understand its structure.

We depart on a search for the reference space-time position of the centre, the universal referent now and here, from which we measure. From the perspective of that unique point, step by step, we uncover the rigid matrix of the system.

Let's start with a valid statement: 1=1. Stated is unquestionable and absolute truth, independent of scale and context. As such, it is ideal for the end of proof, but since, besides its authenticity, does not contain any other information it is useless for its beginning. However, implicitly we can write: 1=1/1. In displayed relation, the position of seemingly identical units determines the nature of their relationship, i.e. the nature of their relationship determines their position. In fact, their position describes their nature. For all cases when the factor n is different from 1 applies: 1=n/n and $n=n/1$. In contrast to stated, expressions 1=1/n, $n=1/1$ and $n=n/n$ are not valid.

If in the upper equality of the "abstract" world of mathematics, the fundamental physical variables of space, time and velocity are included, *v=s/t*, their relations will comply the same law.

The above is a fundamental, rigid and inseparable relation, the primary tool for the truth, independent of scale, equally valid in the "abstract" script of mathematics and the "real" language of nature. On it we build the other truths, on truths we build a system.

Euclid's first axiom says that through any two points in space we can draw a straight line.

If one of these two points is with a straight line connected with all the other infinite points, the geometry of these lines fills the volume of infinite sphere. At the same time, though infinitely filled, the density of these lines towards the centre is infinitely greater than their density toward infinity.
The described applies to every point of all infinite lines that with all the other infinite points share the same line. Therefore, to understand the law of described system, we observe an element of its modularity: the line defined by two points one of which is zero, and the other anywhere between zero and infinity.

If we ask a computer - what is the product of zero and infinity - the answer will be that it is the wrong data entry or undefined. The time it takes to calculate infinities is infinite. In the case of zero and infinity computer doesn't count but executes the command. Any number multiplied by zero is zero and any number multiplied by infinity is infinity. Handling these instructions, the computer cannot give an answer to the question asked.

If the undefined answer satisfies us, one might conclude that the system of described line defined by any two points is not defined, or it is a wrong entry.

Focusing in digital information inevitably ends at its bit, illustratively the "pixel". Although the pixel consists of an infinite number of points and their shared lines, they all contain the same information. Its design isn't fractal. Due to the space-time limit of information recording depth, the computer is not handling the ideas of infinity, i.e. computer doesn't "think".

What makes us fundamentally different from our attempts of artificial replicas of thought is the possibility of abstract, conceptual reasoning i.e. thinking. Intellection of notions of zero and infinity, as the ideas of directions of all infinite lines defined with a common point.

If we agree with the computer, i.e. if we say that the product of zero and infinity is undefined, then the geometry of all the endless lines defined by one common and all the other points is not defined. In other words, the system either is, either isn't, either is and isn't, or neither is and neither isn't.

If it is defined by the law, then it is. We prove that the system is.

At the line from zero to infinity we choose another point. In fact it can be set anywhere, but wherever we place it, it will be our unit (measure). At that reference point, speed, space and time are equal and amount one, 1=1/1. We have chosen the space time position in which all scalar operations are unchanged, the referent one, elusive now and here from which we measure.
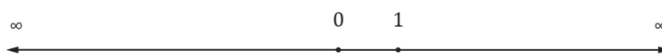

Figure 0.4.a

Shown line is a vector whose direction can be from zero to infinity, or vice versa. The nature of its directions we measure from one.
By adding units to the displayed line, we have created the basis of Euclidian space time grid. To understand the nature of its distortions, i.e. the nature of motion, we put it in a relationship with its mirror projection, whereby they mirroring point is in one.

The results of all the positive potentials of all the numbers on a scale from one to infinity are higher, and their roots are lesser than the listed numbers of described scale. For all the numbers between one and zero, applies the opposite. We can say that the scalar invariant unit reflects the rules of scalar operations. The product of any number of the described scale, with its mirror projection equals one, $1=n*1/n$. As zero and infinity at shown line are the ideas of directions toward the infinitely small and infinitely large radii (since observed line is a modular element of above described sphere), and the results of the multiplication of all mirror pairs of these infinite sets are equal to one, we assume that the result of the product of the ideas of zero and infinity must be one. If in the above equality for all mirrored pairs, in place of the variable n, zero or infinity are included, $1=0*1/0$ or $1=\infty*1/\infty$, we actually wrote $1=0*\infty$ and $1=\infty*0$. Any number divided by zero is infinity and divided by infinity is zero. Therefore, for the implicit equalities $\infty=1/0$ and $0=1/\infty$ computer knows the answer.

The validity of the conjecture $1=0*\infty$ we prove thru the validity of the laws of implicitly emerging system.

If we look at the equality for speed, we see that the infinity is at position of velocity, the one is at position of space and the zero is at position of time. Accelerating speed, speed tends to infinity. Accelerating time, time tends to zero. Thereby, each speed n, in time $1/n$, and each speed $1/n$ in time n exceeds the unit area, i.e. reaches the unit velocity and the unit acceleration. Implicitly applies that in time n, acceleration 1 reaches the speed n. Thus, in described unitized system, in time 1 acceleration 1 reaches the speed 1. The infinite line of time is placed in relation with the infinite line of velocity. We draw unitary v, t diagram. From one, the mirroring point of zero and infinity, their focal centre, from units of acceleration and units of time in which that acceleration is measured, we construct the Euclidean space-time grid. Independent of scale and rotation i.e. valid in all directions and for all infinite lines and orbits of described model, it is the grid by which we measure. We establish the system (Figure 0.4.a).
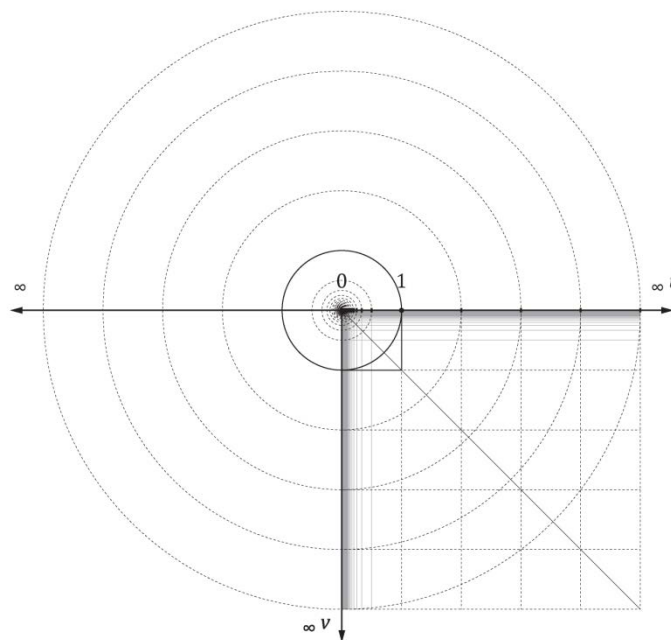

Figure 0.4.b

Although the conventional direction of velocity coordinate is "up" and presented graph, can be rotated and translated in any direction and place, respecting the empirical direction of acceleration, the velocity coordinate is turned toward "down". In this way the displayed geometry of space time relations will be intuitive.

As it is worth that each speed n, in time $1/n$, and each speed $1/n$ in time n exceeds the unit area, it is worth that the surfaces of triangles representing paths travelled, for all described mirrored systems of speed, are equal and correspond to surface of the unit triangle of a system (Figure 0.4.c).
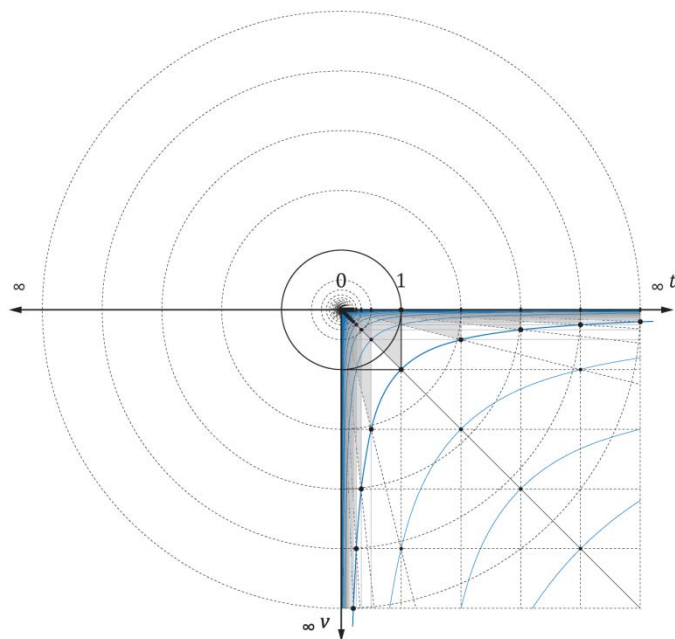
Figure 0.4.c

Since our unit grid is constructed of acceleration and time units of a reference radius speed system, equality *v=s/t* can be written *v=a/t*. In time *t*, the constant acceleration of a system reaches the reference speed *v*, whereby also applies that in time *t*, constant speed *v* exceeds the amount *a*. Therefore, the values at the velocity coordinate of a system are equivalent to its acceleration while the values at time coordinate represent referent time in which observed acceleration reaches the reference speed or reference acceleration. In other words, the position on the coordinate of speed is the length and the position on the coordinate of time is the time of the acceleration wave of corresponding orbit *n*, measured by the reference speed.

Measured from the reference orbit applies, that the acceleration of any orbit *n* amounts $1/n$. All monitored systems of mentioned acceleration, in time *n* reach the reference speed, i.e. acceleration of the reference system. Described values draw gravity vectors *g* of their corresponding orbits (Figure 0.4.d).
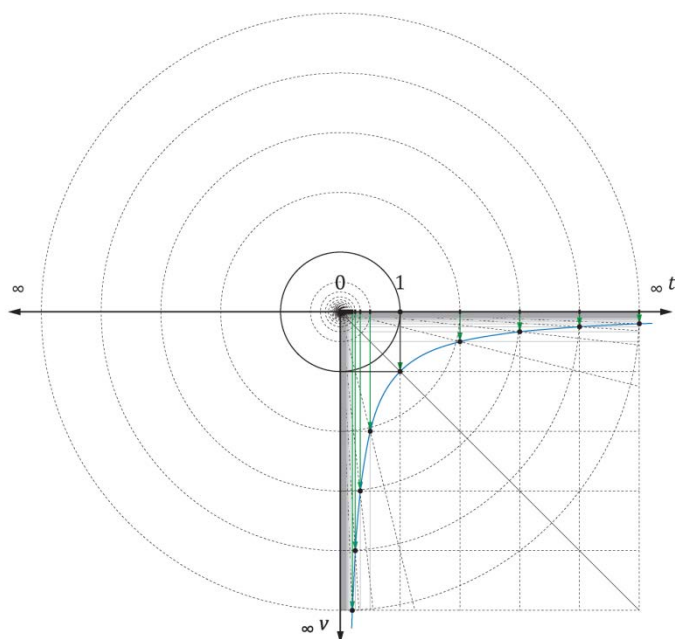

Figure 0.4.d

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We observe that the values of their vectors decrease linearly with their orbital distance.
The orbital gravity value of described system is the geometric mean of the acceleration at the point of reference radius and the acceleration at point on radius n, i.e. accelerations a and a_n, $g=\sqrt{aa_n}$. It can also be expressed as the ratio of the referent radius and acceleration with the observed orbital distance n, $g=ra/n$. Thus, in the described unitized system, acceleration a_n at the point of any orbit n is equal to the square of its gravity, $a_n=g_n^2$. The same value is obtained if gravity g_n of orbit n is divided by time n, in which the aforementioned gravity reaches the reference speed, i.e. acceleration of a reference system. We see that, unlike the gravity, acceleration decreases with the square of the orbital distance. For all described points of all infinite orbits of described system applies that in time n^2 acceleration a_n reaches the value of reference speed of the system, i.e. the value of its acceleration (Figure 0.4.e).
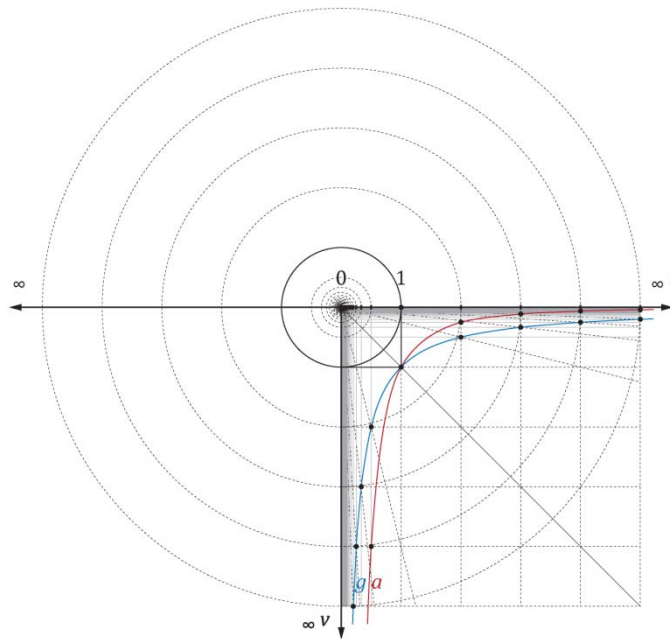

Figure 0.4.e

Geometric mean of orbital radius and its acceleration is the orbital velocity of a system, $v_o=\sqrt{ra}$. Also, we can write it as the geometric mean of the reference speed and gravity of observed orbit. $v_o=\sqrt{vg_n}$. Therefore, for the described unitized system applies that the orbital velocity of all infinite radiuses is inversely proportional to the root of its orbit n, $v_o=1/\sqrt{n}$. Relationships of orbital velocities with their respective orbits draw a dynamic geometry of vortex (Figure 0.4.f).
Due to its "winding", two motions appear: rotation around and acceleration towards the centre. The consequence of that geometry is "stretching" i.e. dilating of all referent space-time grids of a system. With the "fulcrum" at the reference radius, more time at less space winds up more space at less time. The equilibrium between infinite sets of their polarities of "mass" and velocity is in one.

Attraction delay increase toward bigger orbits creates the effect of the wave with its direction from the centre to infinity. The consequence of described "winding" is constantly accelerating expansion of the system. In any dynamic position of described vortex, dilated space-time measures linear flow of time, constant acceleration (linear propagation of space), and constant referent speed. From referent one, the unique and dynamic now and here, front at which the beginningless past and the endless future meet, reflection point where information transforms to memory, memory to information, velocity to its polarity, "mass", its polarity to velocity... the system measures constant radius. Thus, the system exists.
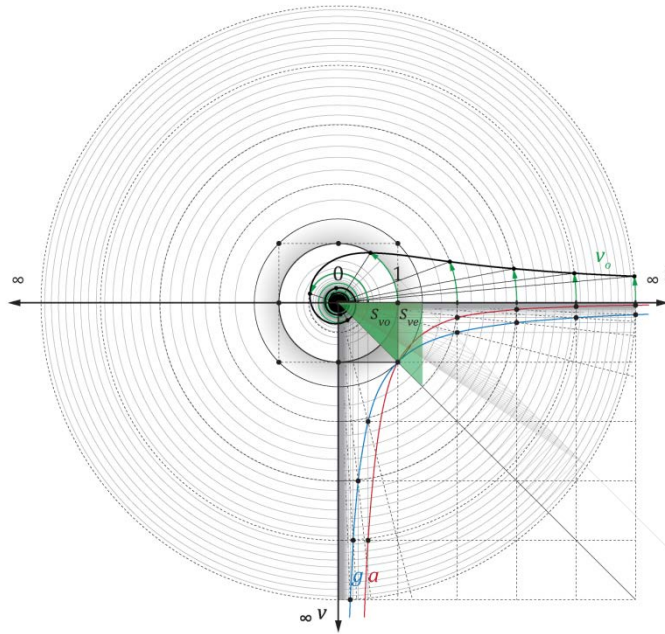
Figure 0.4.f

In the presented unitary model, the referent orbital velocity is equivalent to the referent radius. The geometry of its orbit relation with the referent square draws first mutual points of their intersection. The velocity of the orbit entered the referent grid of a system. The last points shared by expanding circle and a referent square, is at its diagonal √2. At that point, the radius of described velocity leaves the reference square of the observed system.

The irrational √2 is a universal distinction factor of orbital and escape velocities. We can define it as a universal factor of differences in speed of a body in free fall in (imaginary) constant accelerating environment, measured at any point on the observed trajectory and its half.

Because of the infinitely different space-time properties of all infinite orbits of described system of infinite lines, from its referent unit, the system records dilatation of space-time continuum.

Tautology by which we started, $1=1/1$, tells us that the only dynamic case in which the unit in place of velocity remains unchanged, is the proportional variability of space-time variables, $1=n/n$.

As the empirically universal referent speed of all systems of reference is the speed of light, in place of v we place variable c. Each gravitational wave of a described system of endless lines, in its time, measures the same reference velocity. However, the grid density of all other space-time grids is different from the reference one. Therefore, the dilatation of orbit is measured over time in which the reference velocity exceeds the amount of gravity of the observed orbit $d_n=g_n/c$ [i]. Also, in the reference time, the velocity of the observed orbit increases for its gravitational amount with the consequence of its reference space-time units expansion for the amount of dilatation, $(c+g_n)/c=1+d_n$. Consequently, for the same amount dilated space and time measure constant referent speed, $1=1+d_n/1+d_n$. We conclude that gravity is dilatation of the speed of a system, $g_n=cd_n$.

For entity in a free fall in the environment of constant acceleration of described system, to reach orbital velocity, the distance travelled is equal to half the radius of the reference orbit at which it falls. To reach escape velocity, its trajectory is equal to its radius. Displayed in geometry, the surfaces of triangles representing distance travelled are equal to the half and the whole surface of the reference square (s_{vo} and s_{ve} in the Figure 0.4.f). As such, the escape velocity $v_{esc}=c\sqrt{2d}$, is the reference space-time position from which we derive dilatation as a consequence of velocity, $d_v=v^2/2c^2$ [ii]. Implicitly, the escape velocity dilatation is equal to the gravitational dilatation of observed orbit while the dilatation of its orbital velocity is equal to its half. Indicated is an illustration of their vector cancellation and their vector equilibrium.

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The projection of the above geometry of orbital velocities vortex on revolved geometry of gravitational curve, illustrates intuitive and coherent structure of the geometry of described motion (Figure 0.4.g).
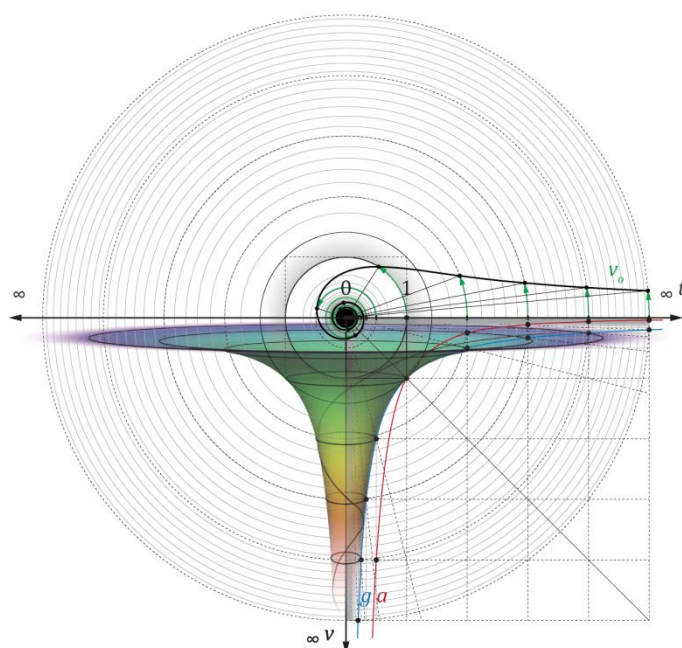

Figure 0.4.g

As it is true that each wave g_n in its wave-time d_n measure the same reference speed c, we conclude that the manifestation of space-time tension (energy) of all waves in their wave-times is equal. Also, we see that the universal reference speed c is the space-time scalar. In demonstrated system of infinities it is worth that for the same amount altered time and space measure unaltered speed. Expressed in vector geometry we can write: $\vec{g} = c\vec{d}$. In words, gravity is the cross product of vector of time and their scalar velocity. Being the expansion of velocity c [iii], gravity is the genesis of space in time. The described mechanism creates grids from zero to infinity.

If the speed is positive, the change of the direction of vector of time implies the change of the direction of vector of space i.e. gravity. In a system of infinite lines that share a common point, we explained the nature of the arrow of time.

Due to constantly measured scalar c, the described space-time expansion doesn't change the perception inside the system. All space-time ratios of changes retain their proportions.
The world perceived from a system is a scale of infinitely dense and infinitely expanded space-time grids, where each wave in its wave-time measures the same speed of light. In described model, time and space are dynamic entities, with their directions from lower to higher light velocities of a system. The result of that dynamic, on a scale from zero to infinity, is the constant growth of the dynamic unit, i.e. the accelerating expansion of a system.
In that process of duration and propagation, everything changes except the law of that change.

The nature of all infinite dimensions of the described system does not imply "new" coordinates or "new" laws. All infinite dimensions of infinity are separated by their space-time grid, i.e. the system of their speed, whereby for all of them apply the same scalar law. In all referent nows and heres, applies 1=1. As a consequence of their interactions, all infinite space-time systems in the described system of infinity, read the self-similar samples of appearances of their infinitely different and infinitely similar world.
The perceived spectrum of the system is the testimony of the various velocities of its genesis.

Regardless of space time scale or context, on a scale between zero and infinity we proved that the system is. Dynamic component of its infinity proves that the system has always been and will always be. Implicitly, it proves that all infinite systems are, have always been and will always be.
We have also shown that the basis of the existence is not in it-bit or bit-it relation but in demonstrated law of the dynamic structure of polarities between directions toward zero and infinity.

We proved it by demonstrating the unique law of motion, the law of creation, persistence, transformation, preservation, duration and propagation, i.e. the law of existence, universally valid for all described systems of infinity. The inseparable component of zero and infinity, their cause and their consequence: the vector trinity of space, velocity and time.

If for the reference unit at the line of the described model, the radius of the reference speed of light measured in conventional unit of time (second) is chosen, regardless of the universal validity of the system, we notice that demonstrated unitization is impractical for our daily operations with space and time.
The system of acceleration where dilatation equals one, i.e. acceleration equals the speed of light, is the system of a "black hole".

Therefore, for the reference system of a celestial entity of perceived radius r, and the radius of the referent speed of light c, its gravity is calculated by aforementioned ratio: $g=ra/c$.
Consequently, for "physical" entities reflecting the described system of infinity applies:

$$g = cd$$
$$v_o = c\sqrt{d}$$
$$v_{esc} = c\sqrt{2d}$$
$$v_{on} = r\sqrt{a/n}$$
$$v_{escn} = r\sqrt{2a/n}$$
$$d_v = v^2/2c^2$$
$$a_n = ar^2/n^2$$
$$g_n = ar/n$$

wherein for the entities which measured radius is larger than the radius of the reference speed of light, the above relation is multiplied by their difference r/c;

$$g_n = ar^2/nc$$

In listed equalities for motion, g is gravity of one light second radius, a is the surface acceleration, g_n and a_n are their values for any orbit n, c is the speed of light, r is the measured radius, v_o and v_{esc} are orbital and escape velocities whereby v_{on} and v_{escn} are their values at orbital distances n, d is a gravitational dilatation and d_v is dilatation as a consequence of velocity v.

As our universal reference position is the surface of our planet, equality *(ra=cg)* indicates the necessity of equalizing the terrestrial and light radius. Implicitly, at the reference position of the Earth's surface, acceleration equals gravity.
In r/c seconds, light passes r and accelerates for g.

We have established a rigid platform for the unification of our referent system.

Technical endnotes

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i

Gravitational dilatation value *d* is the amount added to the unit in Schwarzschild's formula for gravitational dilation, which according to stated, we can write (0.4.1):

$$t_d = \frac{1}{\sqrt{1 - \frac{r_s}{r}}} = \frac{c + g}{c} = 1 + d \qquad \text{0.4.1}$$

ii

Up to escape velocity, dilatation as a consequence of speed is equal to the value added to the unit in Lorentz factor γ (0.4.2, 0.4.3).

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \qquad \text{0.4.2}$$

$$v \le v_{esc} \implies \gamma = d_v + 1 \qquad \text{0.4.3}$$

iii

When in the equation of the Special Theory of Relativity (0.4.5), which predicts the Doppler spectral shift for cases when the light signal moves in radial direction with respect to the gravity vector, the speed of light difference g_h of boundary positions in space portion of height *h* is included (0.4.4):

$$g_h = g \frac{h}{r + h} \qquad \text{0.4.4}$$

by unique expression we combine it with predictions for the gravitational spectral shift of the General Theory of Relativity(0.4.6):

$$v = g_h \implies \sqrt{\frac{1 - v/c}{1 + v/c}} = 1 - d \frac{h}{r + h} \qquad \text{0.4.5}$$

$$\sqrt{\frac{1 - \frac{2GM}{(r + h)c^2}}{1 - \frac{2GM}{rc^2}}} = 1 + d \frac{h}{r + h} \qquad \text{0.4.6}$$