

The Arrow of Time

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By tautological and rigid mathematical logic, we focus on the explanation of the dynamic nature of time and implicitly the dynamic nature of space. We hope that this understanding will change the paradigm of linear notion of the past, present and future, and contribute to the understanding of the concept of "I am". We also hope that the expected shift of awareness will induce the cognition that, regardless of the technology and its implementation, regardless of the melliflence of nicely packaged ideas and persuasiveness of their presentation, only the healthy, non-preconditioned, free and conscious "I am" judges, decides and has a future "I am".

Let's imagine that we are the crew that is sailing the ocean. Our ship is a construct of knowledge. We know her, we love her and rule her. On the endless sea, she is our home. Our navigation relies on the knowledge of the starry sky, the position of the sun, sextant and watch. Weather conditions are anticipated by observing waves, clouds and colours, measuring the wind and air pressure. The crew is skilled, well-coordinated and united. Everyone is doing everything, we learn from each other, help each other and rely on each other. We sleep in similar cabins and dress according to the weather. Our water and food supplies are sufficient. We are familiar with the spherical geometry of our planet but the map of the ocean we sail on, is not yet charted. We do not know what is beyond the horizon in front of us, but without fear and expectations we look forward. We enjoy every moment of freedom of navigating the ocean. We are sailors who know and love the sea. With safe hands and excited thoughts we are steering towards the self-similar.

Suppose now that we are on a sailing ship that was constructed by conjecture. Its behaviour at sea and the sounds it produces are not quite as they should be. As voyage progresses, the increasing fear of the growing insecurity in the boat, retracts into the crew. Several times daily, from constructor assigned captain, rings the bell, announcing the gathering on deck and convinces the crew to believe in ship. He reads the lines from the book of ships origin. Majority of the crew believe the authority of nicely dressed captain, whose father's portrait hangs in every cabin. Their belief alleviates the agony of doubt in the unknown ship. Others continue to rely on its observation and listening. They do not stop asking awkward questions about its validity. Against them, the captain introduces sanctions and to preserve "order," writes a regulation on allowable and unallowable questions.

In the spirit of that "order" the crew is strictly specialized. Some read only the starry sky, second only watch the waves, third observe only clouds, the fourth measure only air pressure. Knowledge and information among groups is not merged into the complete picture, but favoured by each group imposing it as the best model of proper navigation. There is no clear and complete picture of the position of the ship, its speed, direction and weather forecasting. Are we going in circles or are we going somewhere? Is the Earth on which we sail round or is it a flat plate with terrifying monsters at its end? Are the stories about the Dark Depths and the Black Whirlpools that swallow vessels which approach too close, true? ... Shall we surrender to the will of the Gods of the sea? ... Should we begin to offer them sacrifices? ...

Although supplies of water and food are slowly vanishing, daily showering and banquets in decorated officer's quarters do not stop. The tension among the crew becomes unbearable. Group at the stern ceased to communicate with the group at the bow. The group on the port side ceased to communicate with the group on the starboard. Our ship is visibly deteriorating. Several times a day, nicely dressed and always clean-shaven captain continues to read excerpts from the book of origin of the ship. Behind the rudder... stands nobody. The helmsman was one of the sanctioned infidels who watched and listened the ship. After the famous Greek of similar fate, helmsman's name was Socrates.

Is it meaningful to ask a question, on which ship would we board?

Let us think of the ocean as the ocean of time. Conjecture about the laws of that ocean constructed a ship that we sailed out into the open sea. On the horizon behind the stern, the line of that ocean is coupled with the sky. If we look from the bow ... what do we actually see? How much do we know the ocean that we sail on, i.e. what at all do we know about time?

We have no information that anyone has ever changed the direction of its flow. Just thinking about the possibility of such change leads to insolvable paradoxes. In order to preserve the validity of our conjunctions from collapsing, the universal limit of the speed of light is placed in the domain of "forbidden questions".

What is the secret of time directionality and is there any obvious link that we still, for some reason, fail to recognize? Is there in nature some other ubiquitous arrow of immutable direction?

For events described by Newtonian mechanics, celestial mechanics, electromagnetism, special and general theories of relativity... are said to be T-invariant. In other words, regardless of the fact that time flows from the past to the future, their scenario will be performed by the same laws, regardless of the direction of the flow of time. Thus, the customary attitude of modern physics is that the direction of time flow in no way reflects on the laws of motion of the body.

For the illustration of the T-invariance, we sometimes hear the examples like the one in which the ball at some angle hits the wall, repels and continues to roll. If in the experiment the flow of time is reversed, the ball will be on the same trajectory, passing through all the points passed, by the same laws returning back... So all the laws of mechanics describe the motion of the ball equally well in both directions of time flow. If the movie of the recorded event is set backward, the balls motion will be in the opposite direction, but we actually would not be able to determine which of these two scenarios is true.

In the above-mentioned and similar examples, the fact that the observed ball, at the observed surface is measuring some constant weight, i.e. that the ball is actually constantly "falling", is somehow left out. If the surface on which it rolls is removed, following its natural state, the ball will fall free ... When the recorded event is played backwards, the ball will appear at the bottom of the cadre, constantly slow down and settle on the surface, where it will continue to roll. In this scenario, it will immediately be intuitively clear that the direction of the film that we watched was played backwards. Direction of free fall will be the conclusive indicator of the direction of the flow of time...

If the vector scalar - speed is positive, by reversing the direction of vector of time, we would reverse all directions of motion, therefore, we would reverse the direction of its vector product - gravity (1.01).

$$\vec{g} = c\vec{d} \quad 1.01$$

In the above equality, gravity g is the wave length representing a geometric mean among accelerations a , at the radius of the surface r , and acceleration a_s , at radius of one light second c (1.02). d is its wave-time equivalent to the amount of time change calculated by Schwarzschild's formula for gravitational time dilation t_d wherein r_s is the Schwarzschild's radius derived from Newton's equation for the escape velocity, equalized with the speed of light (1.03).

$$g = \sqrt{aa_s} \quad 1.02$$

$$r_s = \frac{2GM}{c^2} \Rightarrow t_d = \frac{1}{\sqrt{1 - \frac{r_s}{r}}} \Rightarrow d = t_d - 1 \quad 1.03$$

The above tautological principle of vector geometry (1.01) is the key to the secrets of time and implicitly the key to the secrets of space. Anomalies of contradicting conjectures are its implication.

After several centuries of the rule of Aristotle's view that heavier objects fall faster than lighter, it was Galileo who proved that the acceleration in free fall for all objects on Earth is equal. In doing so, he

used logic; if the lighter object is falling slower than the heavier, it would mean that in case they are bound together, lighter object would have to slow down the heavier one... However, two bounded objects form a body of a third object, whose weight is equal the sum of their weights. Thus, according to Aristotle's belief, described bounded object should fall even faster... For that logical problem, Galileo's opponents were unable to find a solution that would support their belief.

We are all more or less familiar with some version of that famous victory over invalid paradigm and perhaps some witnessed a tourist demonstration of throwing balls from the Tower of Pisa. But why is this trivial truth so exceptional? And how would in fact our world look like if the objects of different weights fell at different speeds?

Since their masses are considered constant, this would mean that heavier objects would accelerate at a higher rate than the lighter... Thus, in their relation to each other, heavier objects would become heavier, while the lighter would become lighter... We would have a system of constant growth of tension between the polarities among objects of its world.

Imagine the scenario where we went to sleep and woke up after eight hours. While we lay in bed, each second we accelerated 9.807 meters. When we woke up, our system of speed increased by some 300.000 meters per second, compared to our speed before going to bed. However, as our feathered blanket is lighter than us (let's say that, according to Aristotle, its acceleration is twice slower than ours), during our sleep, blanket speed increased by only 150,000 meters per second. According to Aristotle, the acceleration of our heavy bed is for half the amount of acceleration greater than ours. Therefore, during the night, the speed of our bed increased by 450,000 meters per second ...

In the morning, when we woke up, our feathered blanket was tightened to the ceiling and all our attempts to unstick it were unsuccessful... The blanket fell 150,000 meters per second slower than us, so its weight on the ceiling (i.e. reversed direction) was equal to its mass multiplied by 150,000. When we decided to move the bed, to see the slippers (we couldn't see them since they were falling slower than the bed, so they stuck to its bottom panel), it appeared to us as our bed is walled up in to a floor. As if we tried to move the rock ... Our bed was falling 150,000 meters per second faster than us and its weight has increased by 150,000 times!

Also, every second of the expansion of speed of our system, our meter and second grew for the amount of acceleration dilatation, whereby for the same amount altered meter and second measure the unaltered speed. When we woke up, our meter was slightly bigger, and second a little longer. As the blanket and the bed had a different acceleration and therefore different dilation, their meter and their second have changed for a different amount. In the morning, the blanket was slightly smaller and more vibrant, while the bed was slightly larger with its less vibrant structure. Consequently, due to changes in the spectral absorption positions of their modular structure, changed their physical structure that we perceive. We, our blanket, our bed and all the objects of our world (since they all weight more or less different), began to differ in space and time... the physics of the world that we thought we know, ceased to be valid... Experiment with a pin and a kitchen magnet that demonstrates the weakness of gravity, became unfeasible :)

The consequence of our constant acceleration, is a constant expansion of our speed. The implication of that, is a continuous change of our referential system which is from within the system perceived unchanged. Accordingly, the measured speed of light, i.e. the relationship between our reference space and our reference time, remains the same.

Every second, on the surface of our planet, the speed of light c increases for the amount of acceleration a (celeritas + acceleratio) (1.04);

$$c_d = c + a \qquad 1.04$$

When this new, dilated speed of light c_d is divided by that we measure, therefore constant c , we get the amount corresponding to the altered meter and second (1.05).

$$(m, s)_d = \frac{c_d}{c} \quad 1.05$$

As the changed speed of light is slightly higher, measured by the new meter and in the new second, which are also slightly larger, it will remain constant. To get the amount of meter-second change d_a , acceleration is divided by the speed of light (1.06).

$$d_a = \frac{a}{c} \quad 1.06$$

This ratio illustrates the amount of overall stretching (9.807 m) in each meter of one second light trajectory (299,792,458 m). For the surface of planet Earth, it is some 0.0000000327 meters. This means that in one second of our duration and propagation on Earth, meter, i.e. space stretches by that amount. Since this time fraction is a wave time d_a of the wave length a (9.807 m), our second stretched for the same quantity.

The result for the Earth's radius, measured by new meter, which is in our scaled perception still one meter, remains unchanged. However, when change of the radius r_d is measured by dilated meter m_d (1.07);

$$m_d = 1 + d_a \quad 1.07$$

i.e. by constantly measured meter with added dilatation, we conclude that the radius r of our planet, every second grows for about 0.208 meters compared to a meter a second before (1.08);

$$r_d = r m_d \quad 1.08$$

The resulting amount is the difference between dilated, r_d and non-dilated radius r (1.9) which corresponds to the gravity of the planet in the space-time fraction of one light second from its centre (1.02);

$$g = r_d - r \quad 1.09$$

$$g = r d_a \quad 1.10$$

The relation (1.10) is equivalent to the equality for gravity expressed by the product of the speed of light c and the gravitational dilatation d (1.01). As space, time and speed are inseparable entities, it is the implicit consequence of tautology (1.11);

$$\frac{a}{c} = \frac{g}{r} = \frac{d_a}{1} \quad 1.11$$

Thus, the acceleration a , at the speed of light c is equal to gravity g over radius r which is equal to dilatation d_a per space-time units of the surface. Therefore, if the speed of light, measured at the Earth's surface, in one second expands for the amount of acceleration, at the same time, the Earth's radius grows for the amount of its gravity. As the stretching of both radiuses c and r is proportional to the stretching of measuring units, the physics of the systems from which and which we measure, excluding the phenomenon such as decaying, aging or galactic spectral shifts, remains unchanged.

If described expansion is observed in relation to fixed duration of a second and propagation of a meter at the beginning of the measurement, the accumulation of space-time difference, i.e. the difference between the values of the space-time units of the start and each new second, will constantly grow. In other words, the expansion of space and time is not linear but accelerating process.

Calculated with the new meter (1.0000000327), the radius of our planet (6,378,135 meters) grew for 0.208 meters compared to a second ago. After c/a seconds, i.e. after the time interval in which the acceleration a reaches the speed of light c from the beginning of the measurement (30,569,232 seconds, about 355 days), calculated by implicitly modified Galileo's formula for distance travelled s of a constantly accelerating system a in time t , where v is velocity at and c is the speed of light (1.12);

$$s = \frac{at^2 \left(1 + \frac{v}{c}\right)}{2} \quad 1.12$$

the radius of our planet grew 30,569,232 times (for this calculation, a in the above equation is Earth's expansion rate g , time t is c/a seconds and velocity is c). Also, that many times slowed down our second and increased our meter, so the measured radius, as well as the all perceived distances in space and time of our new speed system remain unchanged.

If this whole scenario is turned backwards, we conclude that in time before the time we measure, the meter was 30,569,232 times smaller and the second as many times shorter. Unchanged value for the radius of the planet, measured by units of the observed past, in our system of speed is 30,569,232 times smaller and amounts 0.208 meters, which is the length of Earth's light second gravity wave g . In one second of the observed system, its light speed travelled the distance equal to the acceleration wave of our present (9.807 m).

Since that speed is measured by 30,569,232 times shorter space-time units, it is actually the same speed which frequency, measured from the space-time of our present, vibrates 30,569,232 times per our second. Given the fact that the gravity is the expansion of the speed of light, it is the vibration of its acceleration wave. The manifestation of described scenario leads us to the erroneous conclusion that the "forces" which govern the world of "small", are in the presented case, 30,569,232 times stronger than gravity when calculated by space-time units of our speed system of the world of "big"...

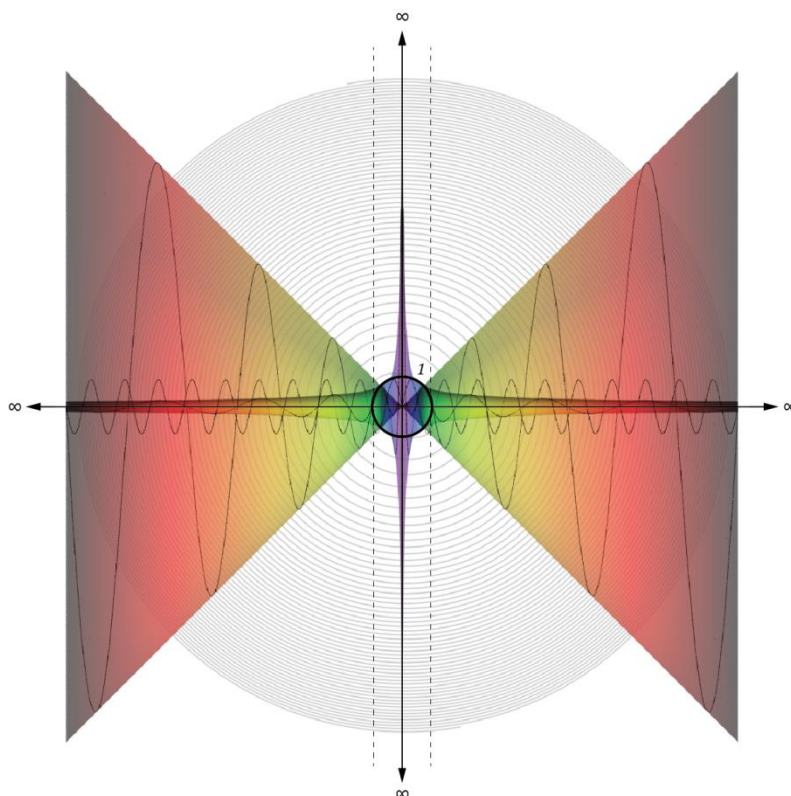
Subatomic entity which is from its space-time perceived as planetary, stellar or galactic system, measure its mass and its gravity. In terms of our system, their immensely small space in their unimaginably short time, measure the same speed of light. Implicitly, calculated by our space-time units, mass of the entity that we measure gives a result for gravity, which is incomparably smaller than that required for the observed system to remain in orbit. Frequency of gravity of that system, in the system of the observer, is equivalent to their space-time difference. Therefore, the weak and strong nuclear forces and electromagnetism, are different names by which we call the manifestation of the same unique principle, universally valid for all space-time orbits.

30,569,232 times smaller entity of our past that we call Earth, measured by units of our present, in one second of our time, turned around its axis 355 times and our being of past, left a trail of nearly a year of its duration. Calculated by new space time units, in the time of the observed past, our heart was beating 30,569,232 times faster. Our body temperature, atmospheric pressure, the amount of noise, light, acceleration... everything was vibrating 30,569,232 times faster. The observed point at 30,569,232 times smaller radius whose rotation cycles were as many times faster, travelled the same distance. The frequency of that space-time in space-time from which we measure was 30,569,232 oscillations per second...

According to the law of lever in balance, the product of the force and arm for both of its sides is equal. In the case of a weight, the force is equal to the product of mass and acceleration. Accordingly, n times higher frequency of acceleration in n times smaller space (arm), is in equilibrium with n times lesser frequency of acceleration in space (arm) which is n times bigger. This universal law is the implication of the universal principle which says that, independently of a system, the energies of all wavelengths of the electromagnetic wave, in their wave-times are equal. Each wave, in its wave-time, measure the same

Constantly measured acceleration implies the existence of an infinite range of speeds. Implicitly, the direction of the space-time is from lower toward greater speed scalar of the system. Thus, the present is not a zero, nor are the past and future, minus and plus infinity. Now is the expanding one for which is valid $1=1/1$, i.e., $1=1$ and $n=n/1$, i.e. $n=n$, but since one is the measure, is not worth $n=1/n$. The past is toward zero $1/\infty$, and the future is toward the infinity $\infty/1$, whereby it is worth: $1/n \cdot n/1=1$. Here and Now is the genesis of space over the genesis of time.

The past is winding the future.



Due to the space-time scalar - speed of light, everything we perceive, we perceive with a delay. All that perceive us, perceive us with a delay. And in fact, without that delay, there would be no separated entities and events, there would be no space-time and no existence as such.

As in the experiential system of delay, one space-time entity "I am" perceives the past of the another "I am", while another, "I am" simultaneously perceives the past of the first, we conclude that time flows from and towards each unique "I am" whereby the direction of the reference time of their shared space-time orbit is towards and from the centre of its space-time attractor.

We realize that the only difference between the "I am", "I am", "I am"... "the Universe", is a unique space-time position of each dynamic unit, the position of mirroring the ideas of zero and infinity, which regardless of the scale, reflects all the duration and all the propagation and witnesses itself. "I am" concludes that "I am" is one between the idea of nothing and everything: $1 = 0 \cdot \infty$. "I am," concludes that "I am" is the equilibrium tending to equilibrium. "I am" orbits around the universe and the universe orbits around "I am".

All spontaneous systems in the universe tend to chaos. Because of its irreversibility, in that law of nature the direction of time has been recognized. Thus, the dynamics of its orientation, from the past to the future, is in the direction of a greater equilibrium. The property of chaos independent of scale, is the emerging of self-similar patterns. All the occurrence of the universe is a dynamic relation between these matrices perceived from the infinity of specific space-time orbits.

Implicitly we realise that the beginning-less and endless spectrum of chaotic function "Life" is not the exclusive privilege of the dynamic radius of Earth, or any moment of its duration. All infinite radiuses of all gravitational orbits are infinite systems of specific velocities. Due to the constant accumulation of differences in their space-time, from each of them, "Life" perceives only the spectrum of "life" with which it shares the same system of speed. "Life" meets "Life" only in the space-time of their shared gravitational orbit. Our "Blue jewel", so unique in the Universe, seen from the space-time of another unique "Blue jewel", is one too hot or too cold, gaseous or without atmosphere, toxic and waterless, desolate and lifeless planet in the neighbourhood...

Perfect sphere and the perfect cherry blossom, are geometric and philosophical ideas. Perfection of each spontaneous natural form is a resultant of its natural inclination toward equilibrium. In other words, the perfection of every form, is its pursuit to perfection. Resultant of self-organising of these self-organised entities, is the dynamics of self-similar matrix of a balanced system.

How perfect can be a sphere? How perfect can be a cube, tetrahedron, or any Plato's solid? How beautiful and unique can be the shape of a snowflake... cherry blossom, mistletoe, fern...? How inspiring can be Michelangelo's David, Vermeer's Girl with a Pearl Earring ... the music of Bach, Mozart, Tchaikovsky... starry sky, human face? How true can be the principle of lever, the Pythagorean Theorem, or Kepler's laws of planetary motion...? How true can be the truth and how beautiful can be a beauty?

Isn't the harmony, by definition, the concept of universal law of the nature of Universum Organum and by which value system do we recognize, judge and evaluate its appearance? Are we aware of it? How do we walk beneath the stars, and how do stars orbit around us?

The arguments of systems which do not tend to equilibrium but to accelerated polarization – are the contradictions of the laws of nature, and are therefore, not the arguments of knowledge. The values of systems which are not based on universal truth are universally contradicting. Due to the constant increase of tension, such unsustainable physical systems, produce the increasing ballast of instruments for maintain their viability and create even greater polarization of even greater, "Order". The Physics of such systems is equivalent to the physics of unsustainable world in which objects of different weights fall at different speeds... It is a physics of constant increase of tensions, collisions and breakings between the polarities of the system. Such physics is a contradiction of physics.

How implicit can the principle of the universe be? How spontaneous, self-organised and alive can be life? How beautiful and self-sufficient can be planet Earth? How spontaneous, self-organized and perfect nature can be and can its laws be truer? How not spontaneous, not self-regulated and unconscious can be "I Am not" who arbitrary regulations of non-living systems proclaims laws and opposes them to the universal laws of nature, that is, universal laws of "I am"? Future of a cell conditioned by a virus is a future of virus. Do we evolve life or non-life? Eros or Thanatos? "I am" or "I am not"?

Astronomically, this is the Earth's year one of its new epoch.

Who steers Earth's future?