SOME APPREHENSIONS ABOUT SPACE, TIME-FREQUENCY DUALISM AND ORTHOGONAL UNIVERSES

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Abstract. The Universe's description, space's and time's definition, their properties – among that of continuity-discontinuity, have a special place – belong to the many sided problems wherewith the humanity confronts starting with the dawn of civilization. As you can see below, the discontinuous aspects of Euclidean space, those of space or time, according or not with Antiquity or modern concepts will be emphasized.
At the boundary of temporal and spectral domains, have appeared the premises of some new formal developments that suggest the idea of the existence of some orthogonal Universes. Postulating the existence of an orthogonal Universe with our (or more?) models able to fit in the modern theory system regarding the Universe might be built and to lead to new interpretations of some phenomena such as residual radiation of the Universe, bulk conveyance through black holes and even worm holes.
Apart from exhausting the subject, it is possible that this present approach to generate more questions than answers.

INTRODUCTION

Our Universe, that is mainly defined as matter-space-time triad, was represented for human, that became "sapiens", one of the cogitation topic that lead to philosophy constitution. Before arriving at apprehension, mainly adopted nowadays, that considers space and time categories as the matter ideation of existence, history records a lot of cogitation, more or less elaborated.

As far back as ancient, physical space was associated with geometrical space and with his fundamental elements – point, line and plane. Democrit and Epicur considered space as an emptiness and endless receptacle of substantial atoms. Euclid, the illustrious geometrician of foretime, in order to arrive at the space concept ("*... the things that exist, exist somewhere ...*"!) (Euclid, 1939), defined: "*The point is something that has no part, and the line is a length without width. Surface is something that has only length and width*." In his turn, 23 centuries ago, Aristotle (whence, in mathematical domain, were modest), elaborated a similar set of definitions: "*The point is not a thing and it has a position. The line has length without width. The surface is a quantity which extends itself in continuous mode in two ways or it is dividable in two ways.*" (Aristotle, 1966 – XLI). For him the space represented the sum of the places occupied by the things but he was considering (major error!) matter, and also space, as being finite.

It is of exceptional importance the fact that the Aristotle formulated "*... the axiom that says that it is impossible for solids to coexist in the same place...*"

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(Aristotle, 1965 – XIII, 2) (after millenniums, the uncertainty principle suggests that it might be possible for a particle to occupy, simultaneously, many places – one of the few and fragile supports for the parallel Universe idea).

The category of space and time, as there were shown before, represents the way of existence of the matter, and are complementary and inseparable. These characteristics confer him the movement, which signifies, in general, the spatial change in time. Again, Aristotel manifests his extraordinary depth of thinking when he asserts that "*... time is partially real and partially thought. Namely, since it is the consequence of movement, it is real ... as it is a number of the movement, its determination here, it is conceptually thought ...*" (Aristotle, 1966 – IV, 14).

The space-time connection is revealed also by causality, a category that, for some hard to understand reasons, was categorized as principle, that is a law which must be respected, when in fact it represents a natural succession cause-effect, that exists without being imposed through a law. In an elaborated way, this reality was formulated since Antiquity: "*In fact infinite in size, movement and time are not the same thing as would have been one and the same nature, but between this notions that one which is posterior is determined related to the anterior one, so we speak about movement considering the quantity where take place the movement, the change or augmentation, and about time we speak as about something that exists in function of movement...*" (Aristotle, 1965 – XI, 10). In the same way, Aristotle points out the "*... four aspects of causality, which only together produce an effect ...*" (Aristotle, 1966 – LXXV) (the material cause, formal, final and efficient) (D. Şcheianu, 2007, *Signals*)[2] and assert that "*...a thing has multiple causes ...*" (Aristotle, 1966 – LXXVI) (assertion which is the base of the actual concept of chaos!).

The modern epoch, as "refined" and crystallized the traditional concept about space and time. So, the great Newton developed the atomist conception about space and time, for him these categories were absolute, objective and universal and that's why independent of the moving matter. Two new currents have also appeared (and obviously opposite!).

One current of philosophical origin (Kant, Hegel, Berkley, etc.) negates the objectivity of space and time, considering them as being dependent of the man consciousness or as subjective forms of his living.

The second current considers that the space and time represent distinct physical categories and not forms of the matter existence. Riemann, in the middle of the XIXth century, asks himself if the Universe laws are in concordance with the old geometry and with non-euclidean geometries (Riemann, Lobacevski and so on). Maybe the geometrical properties of the space are not everywhere the same (because of some physical properties). From this will result that the space lacks in homogeneity and anisotropy. Based on quantities taken from the theory of black body radiation and

[2] The form represents information.

from theory of gravity, Max Planck proposed a new fundamental system of measurements: Planck's mass, Planck's length, and Planck's time.

On his turn, in the relativity theory, Einstein considers the time as the fourth dimension of the space[3] (Riemannian, curb, as a sphere) and sustains that some properties of the space-time continuum (the length of the objects and the duration of phenomenon), depends on the speed of material speed and vary in function of the intensity of the gravitational field generated by the big agglomeration of substance. According to the hypothesis (formulated by Alan Guth and Andrei Linde) that claims that the Universe has its origin in a super fast inflation which has followed the big explosion (Big Bang)[4], Friedmann proposed a space-time binary model that describes the Universe evolution from its birth (in this model appears an interesting topological property – any closed line can be reduced to a point).

It is also interesting the fact that the hypothesis of Universe birth through "Big Bang", correlated with the idea of space deformation because of substance accumulation it is not confirmed but also not infirmed the idea of speed limit in Universe.

In the sense to transform physics in a geometrical one, Klein and Kaluza proposed, in 1926, the raising of the number of physical space dimensions at five (the added having a special topology).

Also, they have defined the electromagnetical field (the only force field known at that time, except for the gravitational one), as a geometrical property of space. The theory of super-gravity, which appeared in 1976 as an extension of relativity theory, increasing the number of Universe's dimensions (space-time) at seven. At present, one has in attention spaces with 11 dimensions in the theories of super-gravity and with 10 dimensions in the theories of super-chords (a part from this is reserved for explaining the electrical charges and the supplementary forces that these charges produce besides the electrical forces).

The theory of Big Bang supposes that at the 10^{-43} momentum the physical space had 3+1+N dimensions! And, going further, Felix Haussdorff and Abram S. Besicovitch introduced, and Benoit Mandelbrot made famous the category of fractal dimension of shapes!

SPACE CONTINUITY

The usual term of space refers to many categories that belong to enough far off domains. Starting from the physical space where we exist (and which expresses the order, the position, the distance, the size, the shape and the width of the existing

[3] Attractive idea, but still remains the controversial issue of the directions in which this new dimension may be heading.

[4] Suggested by the assumed theory of Universe expansion, theory that desires to explain a far celestial body spectra movement to red, discovered by Hubble in 1920.

objects from the real world), the philosophy created a new speculative category with the same name, and the mathematics modeled, besides the geometrical space, an entire class of multitude of different elements named spaces (in general, the mathematical models tried to cover the physical reality and from this reason, in many situations, did not have in view destroying the two categories).

In mathematics, the space is defined as a multitude of elements with some properties. Numerous species of this category exist – the Euclidean space (real) n-dimensional, s. affine, s. projective, s. linear, s. linear real, s. linear complex, s. linear norm (or s. pre-Hilbert), s. linear norm complete (s. Banach), s. Hilbert, s. topological, s. linear topological, s. functional, s. Riemann, s. Euclidean, s. Minkovski (space-time) etc.

The starting point in any analysis must consider the definition of his object. And any definition must include the essential characteristics of the object. The deviations from the definitions of the category in the case may lead in fact to erroneous assertions (but spectacular and beneficial from the publicity point of view for that who launch them), appearing in this way the risk to develop considerations in contradiction with the definition of the category (compression-dilatation and the space curving, supposing a physical existence itself, refers to another category, that must be defined with strictness[5]).

Metric space, in modern acceptation, consists in an infinite set of points whereon is defined distance function. As is known, distance function is positive when it refers to two different points and null for the same point case.

If we allow for two some points, $\boldsymbol{P_1}$ and $\boldsymbol{P_2}$ (that belong to one-dimensional Euclidean space, as is shown in figure 1), these points may be at finite distances one from the other. Whichever may be the distance between the points, between these there is yet a point.

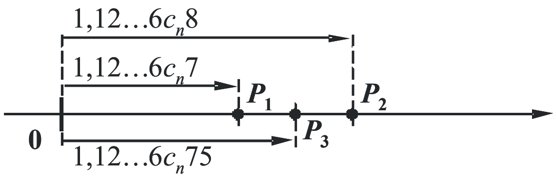

Fig. 1. – Position of some points on a line.

Broadening is immediate (and much known!) – between two points that belong to a line exists an infinity of numbers of another points. Namely, it is impossible to find two adjacent points on one line and that may lead to idea that the line is continuous!

The continuity of (Euclidean) space is supported by the extraordinary logical structures conceived of ancient savants. Aristotle, for instance, "... *has differentiated*

[5] As good as some other Einstein ideas – for example assumption relating to existence of an additional physical force, named cosmological constant, that governs the Universe so that this would not breakdown because of its own gravitational force – this may be erroneously too.

continuum by the things with which is in contact or adjacent ... One line cannot be made of points, because the point has not parts, is not divisible and therefore can be neither in continuous connection, nor in contact." (Aristotle, 1966 – LXXXVI). To advocate the idea, he affirmed that "*...is infeasible that in indivisible things to exist continuous something, witness points in straight line, if the straight line is a continuous thing and the point is indivisible.*" (Aristotle, 1966 – VI, 1).

It would have been outermost curious if Aristotle, a giant of human ideation (this epithet is rather modest than exaggerated), does not analyze the time continuity question. Aristotle not only missed out this subject, but also, in harmony with another of his foretime philosophers, asserted that: "*...if the time is continuous, the motion is continuous too ... the measure, the time and, generally, anything continuous, certainly are double entendre, or in division, or to the extreme.*" (Aristotle, 1966–VI, 2), and associate space continuity with motion continuity: "*...motion imperatively presumes continuity; motion would not be conceived as a discontinuous sequences*." (Aristotle, 1966 – LXXXVI).

Conclusively, physical space is perceived as a continuous entity, as well as Euclidean space, associated mathematical category and other related categories. It is represented the support to define diverse kinds of limits, convergences and continuities, and the relation with substance determines endless character of space and time eternity.

SPACE DISCONTINUITY

It is remarkably that "*... until bearing quantum mechanics, Aristotle's theory of continuum belonged to advanced physics and mathematics bases.*" (Aristotle, 1966 – LXXXVI). There are a few scientific concepts that had so much longevity. And yet, space (and time) continuity idea is not immutable.

CUTTING OFF A LINE IN ONE-DIMENSIONAL EUCLIDEAN SPACE

Let be a line in one-dimensional Euclidean[6] space with section like represented in figure 2.a. The extremities $\boldsymbol{P_1}$ and $\boldsymbol{P_2}$ of the two quasi lines resulted can be found, at one moment of time, to a finite distance $\boldsymbol{d}$.

By moving these two quasi lines one to another to put them together, the distance $\boldsymbol{d}$ will be smaller but still remains positive (see fig. 2.b).

The rejoin of the quasi lines supposes $\boldsymbol{d} > \boldsymbol{0}$, that means is respected the order of $\boldsymbol{P_i}$ point disposition.

[6] One needs to remember that, although are superposed, one-dimensional Euclidean space and included line are distinct categories.

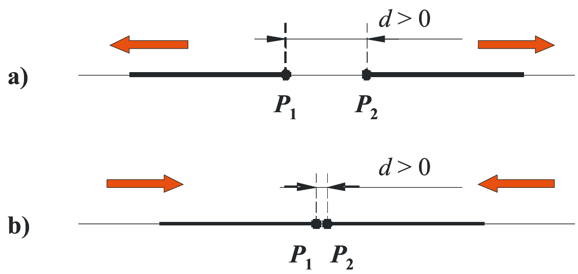

Fig. 2. – Cutting off and get together a line in one-dimensional Euclidean space.

If a null distance is considered, according to the distance function properties, results the supposition of the points $\boldsymbol{P_1}$ and $\boldsymbol{P_2}$. Obviously, the reconstruction of initial line is inadequate, this hasn't the pair elements.

In conclusion, in Euclidean one-dimensional space, the points $\boldsymbol{P_1}$ and $\boldsymbol{P_2}$ are two adjacent points, which are found at infinitesimal distance one from another!

In this condition appears the problem of explication of the concept of infinitesimal distance. The start point is the fact that the real domain is composed of three areas (D. Şcheianu, 1998; D. Şcheianu, 2005, *Signals, components, circuits and systems*): infinitesimal, finite and infinite which have the measure unit gave by the length value of differential integration variable, ***dx*** (**\$**), value **1** and the value of abscise length, $\boldsymbol{x_\infty}$ (in correlation with size expression $\boldsymbol{x_\infty}$ – that is equal with amplitude of Dirac impulse – must summon again Aristotle: "*... the number is potential infinite, not in act, but the number can exceed always the quantity of the size*.") (Aristotle, 1966 – III, 7). Mathematically, $\boldsymbol{dx}\times\boldsymbol{x_\infty}$ (measure units product) is equal with 1.

Will be considered that the distance between the points $\boldsymbol{P_1}$ and $\boldsymbol{P_2}$ has infinitesimal value **\$**, the initial line is rebuild and, by scanning the line, the absence of any discontinuity is observed.

CUTTING OFF A PLANE IN THE BI-DIMENSIONAL EUCLIDEAN SPACE

By developing the building in one-dimensional Euclidean space in one bi-dimensional[7], can be resumed the method of section to one complex level, like is illustrated in figure 3. By operating two sections in one plan which cover the bi-dimensional space and cut off the four resulted surfaces $\boldsymbol{S_{I}}\div\boldsymbol{S_{IV}}$, leads a situation like figure 3.a.

If there is a similar act to the preceding one to the rejoin of the surfaces $\boldsymbol{S_{II}}$ and $\boldsymbol{S_{III}}$ (fig. 3.b), the points ***B*** (from $\boldsymbol{S_{II}}$) and ***C*** (from $\boldsymbol{S_{III}}$) (like the pairs of the corresponding points from the side which are rejoined) will be found of distance $\boldsymbol{\$_x}$. Then, the surfaces $\boldsymbol{S_{I}}$ and $\boldsymbol{S_{IV}}$ will be rejoined and, finally, the two resulted surfaces will be rejoined and the initial plan will be rebuilt.

[7] Again, in these circumstances, one needs to see difference between bidimensional Euclidean space and an included plane.

The problems come if we proceed to rejoin of the surfaces $\boldsymbol{S}_{\mathbf{II}}$ and $\boldsymbol{S}_{\mathbf{IV}}$ (fig. 3.c). The points ***B*** (from $\boldsymbol{S}_{\mathbf{II}}$) and ***D*** (from $\boldsymbol{S}_{\mathbf{IV}}$) will be found at infinitesimal distance, and the enumerations from $\{s_n\}$ which correspond to the surfaces will be colligated by "contact points" ***B*** and ***D*** which create a bridge between the $\boldsymbol{S}_{\mathbf{II}}$ and $\boldsymbol{S}_{\mathbf{IV}}$. If, after this first rejoin, one would try the join of the surfaces $\boldsymbol{S}_{\mathbf{I}}$ and $\boldsymbol{S}_{\mathbf{III}}$ (fig. 3.d), cannot be create "the bridge" ***AC*** because will intersect "the bridge" ***BD***! If is proceeded first to join of the surfaces $\boldsymbol{S}_{\mathbf{I}}$ and $\boldsymbol{S}_{\mathbf{III}}$ will be created the "bridge" ***AC***, but cannot be created "the bridge" ***BD***!

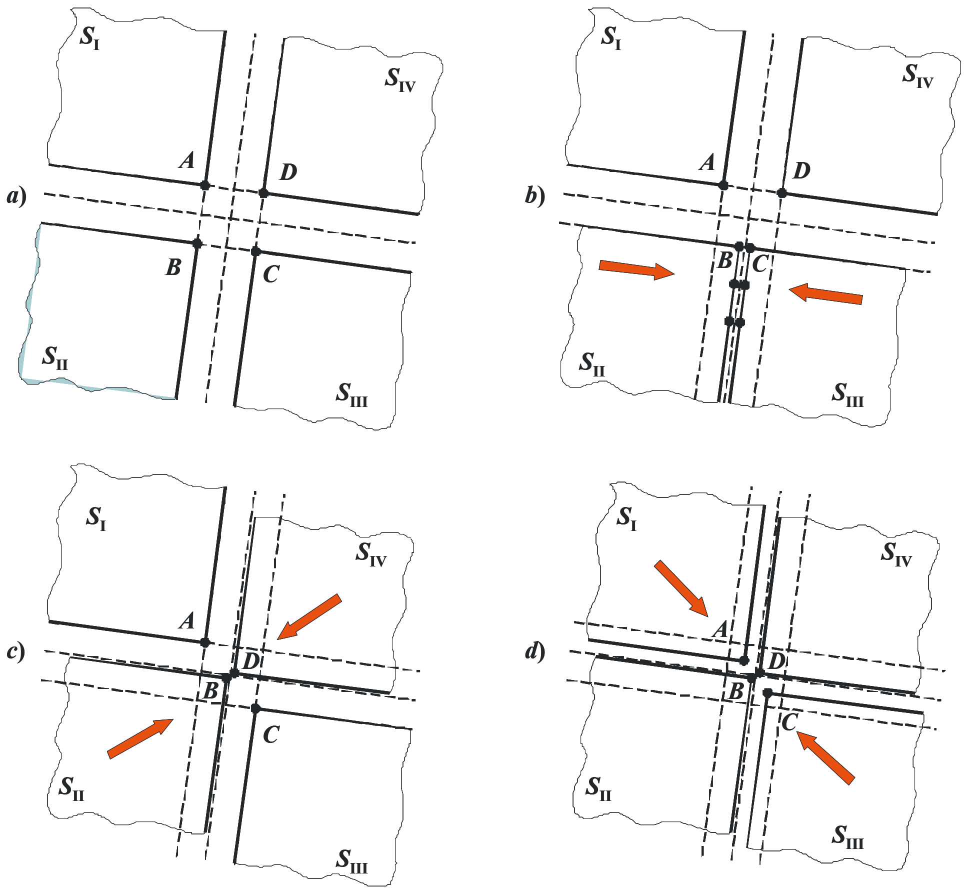

Fig. 3. – Cutting off and getting together of a plane in bi-dimensional Euclidean space.

SOME OTHER VIEWPOINTS

The presented papers are difficult to acquire and the interpretation of the above assertions is complicated, especially because the custom to watch the things from the posture of "habitants" of the finite sub-domain, like in the case illustrated in figure 1. Looking over at the Euclidean one-dimensional space, the point appears to have null length (like the "***dx***"). But an observatory situated in the interior of the infinitesimal sub-domain can find that there are adjacent points and the distance between them can be determinated and if we consider two bordering intervals, one opened and the other one closed – like the type (A, B)[B, C] – between these intervals there aren't any points.

Other unexpected aspects appear. For instance, the section in the origin (in the "zero" point) can't be operated because this point – like other points in the space – is unique and after the cutting can be found only in one of the resultant parts!

It is almost impossible to imagine how Aristotle succeeded in formulating the following assertion: "*Therefore it is clearly that the idea of units, if we want to define strictly literally, it's a gauge, first for measure and second for property. That thing it's one if it's indivisible qualificative. Therefore One is indivisible, in absolute mode or because it is One.*" (Aristotle, 1965 – X, 1) and he concluded that: "*... if the point is entity, ... numerically, the entity is indivisible ... the term* "*One*" *means: the natural continuum, completely, entity and universal*" (Aristotle, 1965 – X, 1) (following the same idea, one can say that the expression ½***\$*** doesn't suppose that ***\$*** is divisible!), but not only the point is indivisible, but also "*... the moment as it is from its origins is indivisible*" (Aristotle, 1966 – VI, 3).

In theoretical physics appeared the idea which says that infinitesimal dimensions can be met also in the case of some bodies. So, according to the Big Bang hypothesis, from the first moment after the great explosion, after the born of elementary particles, in the Universe remained also some "leavings" of initial incandescent nucleus, named "cosmic strings". One may say that those "strings" consisted of extra fine ligaments of substance and energy, which move with a speed closed to the one of light. Their diameters would be "non-measurable" small (it has Planck's length[8]), but they have the substance density thousands times greater than the atomic nucleic density.

It is undeniable the fact that, if a body is "non-measurable" small, than also the space it occupies is infinitesimal!

According to the definition of Euclidean space ("*set of elements...* ") and to the observations made regarding cutting off and get together of some geometric elements in Euclidean spaces, one can deduce that the point, Euclidean L-dimensional space, has L dimensions, each of them of $\$_l$ size (size which can be different) and that the point, the line, plan, etc. are different regardless the number of dimensions of space they are into.

But, the questions series is not finished yet. If the point can be L-dimensional (and we give wideness to the line in the bi-dimensional space, thickness to the plan in the tri-dimensional space, etc.), what can we say about its (and their) shape?

[8] Infinitesimal measure! (see the Introduction).

What is the shape of the point in dimensional space and how does this cover the plane surface? What is the shape of the point in tri-dimensional space and how does this fill in a volume (are there any remaining interspaces where some "geometric" fluid might insinuate)?

The quantum concept (but also the term as it is) is very attractive and it has induced a series of models. First of all is the wave-particle theory introduced by de Broglie which is well-known (and accepted). In the same idea, in 1967, A. Saharov came to the conclusion that the gravitation can be only one quantum phenomenon grown from the emptiness energy (in contradiction with Einstein's ideas, which saw the quantum theory solvable in a nonlinear model field). And if a quantum theory of information was proposed,[9] why not a quantum theory of the space would be welcomed?

TIME

If we accept the idea that in the Euclidean space neighbor points can be identified, an important consequence refers to movement of a body, which cannot be realized but jumping from one point to another. In this way, as space, the movement gets a quantum aspect (contrary to the opinion of Aristotle!).

On its turn, time can be considered (and it is by many scientists) as having a quantum character. There are numerous supporters of this idea, but the simplest one consists of the identification of time with its representation on the time axis in the diagrams.

PARALLEL UNIVERSES

S.F. literature, and others as well, keeps, among the most prolific topics, the one of existence of other Universes – with more or less dimensions, "in mirror" Universes, Universes where other laws of nature work and so on. Generically, named parallel Universes, questions such as "where are these Universes" and "how can the border between them can be crossed" represent a continuous challenge for the human imagination.

One of the strangest theories was proposed in 1957 by the physicist Hugh Everett. An explanation was asked for behavior (hypothetic although) of one elementary particle which, as long as it is not watched, measured or it does not interact to other particles, the particle is in a special state (state which is an superposition of all possible states it may have – described by a Schrödinger wave-function). In this context, Everett initiates the hypotheses according to which, the particle exists simultaneously in all the possible states and this means that, to every state realization there is a corresponding Universe!

[9] Of course, this theory sensibly gets away from the conventional definition of information.

And he concluded that a number of about 10^{100} parallel Universes could be sufficient for his model, in order to solve the problem of states where the elementary particles can be. Obviously, these Universes must be isolated one from the other![10]

But, the problem of time in these Universes is a question to be debated!

ORTHOGONAL UNIVERSES

The signal theory, where the time-frequency dualism concept is in central point, insinuated, unanticipated, the idea of existence of another kind of Universes, orthogonal species.

There is notorious that the theoretical researches deal with the spectral representation of signals related to the implicated type of signal. In this context, the focal position among spectral representations is occupied by the Fourier Transform (FT) which is typically applied to the signals that belong to L_1 space. Because the $s(t)$ signals which are included in L_2 space have Fourier pairs in the same class, these signals receive a special attention, attention which is granted in the same measure to the representation of some generalized functions (such as Dirac repartition) though FT. For periodical signals as $s_{T_0}(t)$ (that do not belong to the L_1 space), the spectral representation is revealed by the coefficients of the exponential Fourier Series and, for random processes, because it rates as not having FT, the measure named power and energy spectral density has been introduced (defined in this way, these measure are some scalar functions, which is losing the phase-information).

In fact, the modeling action supposes the choice of some mathematical functions, called signals, which are able to describe, as close as possible, the physical signals. Temporality is a defining characteristic of the physical signals and, if the time-frequency dualism axiom is accepted, the existence of the spectral representations can be considered as being natural.

Explicitly, the previous assertions signify that any physical signal has both representations, in the time domain, as well as in the frequency domain, but these representations are accessible only if the signal contains a finite quantity of information.

The conceptual limitations have generated necessity of the construction of a natural and unitary spectral representation. This objective was attained using a set of four functions, based on Fourier Transform: Spectral Amplitude Density Function (SADF), Spectral Amplitude Function (SAF), Spectral Energy Density Function (SEDF) and Spectral Energy Function (SEF) (D. Şcheianu, 2005, *Time-frequency dualism and orthogonal Universes*).

Spectral Energy Function (SEF) can also be named Spectral Power Density Function (SPDF). It can be noticed, among others, the fact that the given

[10] "Parallelism" between these Universes is only an allegorical expression that needs to ensure assumption that they cannot meet together.

definitions for SEDF and for SEF (SPDF), unlike the classical ones, also include the phase, as it is natural and how it results from the relations of transformation.

If we were to give up the established notations (and scale coefficients will be adequate fit in), one may be able to consider the measure that we call frequency in our Universe could be time in an orthogonal Universe and vice-versa. In this case, time's "flow" could be indicated by the outline in fig. 4. Those two Universes are evolving in different directions but not independently, each punctual event produced in a Universe may be found scattered on the entire time axe from the other Universe. In a less formal language it may be possible to say that future (and the past and respective the present) from our Universe is entailed by the past, the present and the future of the orthogonal Universe (and mutually).

Yes, but the past, the present and the future of the orthogonal Universe do not have such significations related to our Universe.

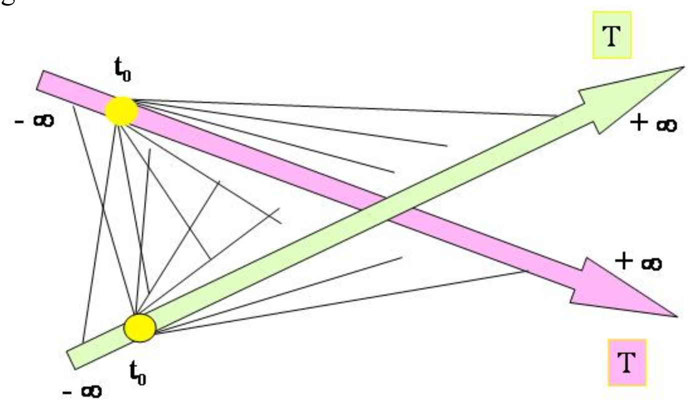

Fig. 4. – Time display in two orthogonal Universes.

Moreover, the orthogonal Universe model is able to fit in the modern theory system regarding the Universe and to lead to new interpretations of some phenomena such as residual radiation of the universe, bulk conveyance through black holes and even worm holes.

Obviously, in the case of any speculations of this type, unconformities can also be found. Thus, one of the issues that could be generated by the notion of orthogonal Universes could bring back in discussion the predestination problem. But, the subject can stay opened.

And, to accentuate the beauty of this idea, an unexpected result: The transformation relations of sizes between these two Universes do not respect the natural symmetry, symmetry that is placing us in the Universe that, out of terminological habit, we name "temporal", toward the other one, that we call "spectral".

Looking from an orthogonal Universe presumed to be ruled by the same rules of nature, can be defined the same functions – Temporal Amplitude Density Function (TADF), Temporal Amplitude Function (TAF), Temporal Energy Density

Function (TEDF) and Temporal Energy Function (TEF). The Temporal Amplitude Function represents the function that describes signals in the time domain, ***s***(***t***), and the Temporal Energy Function determines repartition, in the time domain, of its energy, ***W***(***t***). The Temporal Energy Density Function allows determination, through integration on time axis ***t***, of the size of the signals energy. The Temporal Amplitude Density Function, like Spectral Amplitude Density Function, cannot receive a material interpretation.

But, as figure 5 shows, the FT associates Temporal Amplitude Function with Spectral Amplitude Density Function altering in this manner the symmetry of the system.

Symmetrical transforms can be realized by the **S** Transform (*ST*) (D. Şcheianu, 2007, *Addagio to Development of Space and Time Concepts – Definitive Universes Category*), at which one arrives easily, by coefficients matching.

The transforms symmetry given by the previous relations is marked by the exponent sign, sign that in the existence differentiates between the left and the right hand.

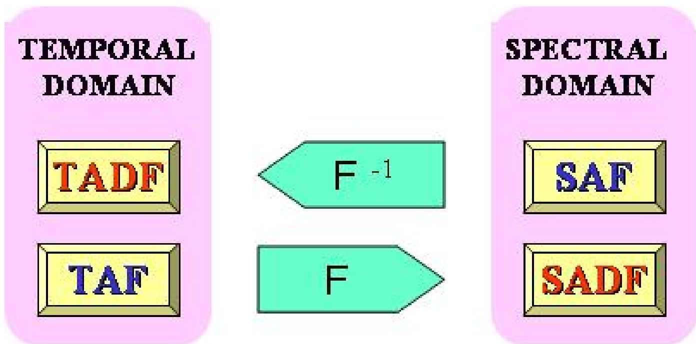

Fig. 5. – Functions classes associated through FT.

S.F. UNIVERSES

The S.F. literature represented (and it still represents) a challenge and a direct stimulations for scientific community. Until the literary gender came into being (and the consensus is that the person to start is Edgar Allen Poe) and even in the following period, the holly books, the folklore and common literature have given birth to an ocean of new ideas. Ideas such as: "The universe was born from chaos!" and "Prophets have foreseen the future" constitute solid proof of this.

Up to the development of non-Euclidean geometries, the space was treated as would the common sense dictate. Time however, and the possibility of time travel, has been in the attention of authors long before that.

In the universal S.F. literature, the model of time travel that presents interest is the one presented (in a simplistic fashion) in the H.G. Wells masterpiece "Time machine". The selection was determined by the apparent paradox presented there.

The scene that interests us is placed in the house of a scientist. The prototype of the time machine is placed on a table, in front of the guests, and launched in the future. The guests, that did not move during the experiment, should have seen the prototype all the time because it had passed through all the intermediary moments, so the device did not disappear at all (a further analysis would reveal that it is impossible for the guests to notice the time acceleration or the deceleration to "normal" speed as the guests are unable to see into the future, and the observation is limited to normal time. Besides, is the time travel a linear experience or an out-of-the time axis experience?).

The Romanian literature has many renowned authors in this domain: Alexandru Macedonski, Victor Eftimiu, Gib Mihăiescu, Ion Minulescu, Cezar Petrescu, Tudor Arghezi, etc. Some papers, such as "*A heavenly tragedy*" by Victor Anestin (that has foreseen in 1914 the use of atomic energy in peaceful purposes but also as a weapon), or "*Nights at Serampore*" where Mircea Eliade describes to us a time travel, deserve attention and recognition. The time travel is also the subject of the "*Paradoxical adventure*" where I. Mînzatu wishes to support the theory of relativity. Also we must not forget the monographic paper "*The golden age of Romanian futuristic literature*" of Ion Hobana.

However, the most attractive images of the universe (combined with a surprising scientific accuracy) come from Mihai Eminescu. What better perception of the dimensions of the universe can be found than in the following lyrics:

"*The icon of the star which died*
Slowly the vault ascended;
Time was ere it could be firstly spied,
We see now what is ended."

"*To the star*"

and what can estimate better the speed of the passing evening star than:

"*And Evening star went out. His wings*
Raise, into heavens dash,
And before him millenniums
Flee in less than a flash."

"*The Evening Star*"

Also, here is the place to disclose poet's general concept about the Universe (draw upon Kant): "*There aren't neither time, nor space – they exist only in our soul...*" apprehension that he enounced in "*Sărmanul Dionis*".

Hopelessly, at present we are invaded of commercial mass media products, mainly represented by TV serials whose story lines take place in a future (that is suggested by grotesque scenes). Persons are cutting of present underworld society, having as background dens. And, we are presented other completely stupid situation: in the entire Universe, people speak American English!

CONCLUSIONS

The present demarche wishes to have as a conclusion an addendum for answering the question (ambiguous enough) "How is the Universe?" In the framework of this addition, space and time categories, keep on initial definitions – substance being manner – get new valences.

Out of the multitude of contemporaneous theories, more or less speculative, the Universe seems to be homogeneous and isotropic, at least till the cosmic horizon boundary (attaining the distance of $2 \cdot 10^{23}$ km – ca 21 billions of year-light. And space may be left as thought since Euclid and should be considered the fact that the substance actions over substance, resulting effects which do not affect the concept of space.

But, the most interesting conclusion is that in the Euclidean space (like in other cognate spaces), the time and the motion give to the Universe a quantum character! And the idea about the orthogonal Universes could be better supported than that of the parallel ones!

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