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Remark on vacuum fluctuation as the cause of Universe creation: Or How Neutrosophic Logic and Material Point Method may Resolve Dispute on the Origin of the Universe through re-reading Gen. 1:1-2

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Abstract: Questions regarding the formation of the Universe and what was there before the existence of Early Universe have been great interest to mankind of all times. In recent decades, the Big Bang as described by the Lambda CDM-Standard Model Cosmology has become widely accepted by majority of physics and cosmology communities. Among other things, we can cite A.A. Grib Pavlov who pointed out some problems of heavy particles creation out of vacuum and also other proposal of Creatio ex nihilo theory (CET). But the philosophical problems remain, as Vaas pointed out: Did the universe have a beginning or does it exist forever, i.e. is it eternal at least in relation to the past? This fundamental question was a main topic in ancient philosophy of nature and the Middle Ages, and still has its revival in modern physical cosmology both in the controversy between the big bang and steady state models some decades ago and in the contemporary attempts to explain the big bang within a quantum cosmological (vacuum fluctuation) framework. In this paper we argue that Neutrosophic Logic offers a resolution to the long standing disputes between beginning and eternity of the Universe. In other words, in this respect we agree with Vaas, i.e. it can be shown: “how a conceptual and perhaps physical solution of the temporal aspect of Immanuel Kant’s „first antinomy of pure reason“ is possible, i.e. how our universe in some respect could have both a beginning and an eternal existence. Therefore, paradoxically, there might have been a time before time or a beginning of time in time.” By the help of computational simulation, we also show how a model of early Universe with rotation can fit this new picture. Further observations are recommended.

Key words: Big Bang, Steady state, rotating universe, fluid, singularity-free, cosmology model, early Universe, the book of Genesis, Spirit, Creation.

1. Introduction

Questions regarding the formation of the Universe and what was there before the existence of Early Universe have been great interest to mankind of all times. In recent decades, the Big Bang as described by the Lambda CDM-Standard Model Cosmology has become widely accepted by majority of physics and cosmology communities. Among other things, we can cite A.A. Grib Pavlov who pointed possible heavy particles creation out of vacuum and also other proposal such as Creatio Ex-Nihilo theory (CET).[36-37]

But the philosophical problems remain, as Vaas pointed out: Did the universe have a beginning or does it exist forever, i.e. is it eternal at least in relation to the past? This fundamental question was a main topic in ancient philosophy of nature and the Middle Ages. Philosophically it was more or less banished then by Immanuel Kant’s Critique of Pure Reason. But it used to have and still has its revival in modern physical

cosmology both in the controversy between the big bang and steady state models some decades ago and in the contemporary attempts to explain the big bang within a quantum cosmological framework.

Interestingly, Vaas also noted that Immanuel Kant, in his Critique of Pure Reason (1781/1787), argued that it is possible to prove both that the world has a beginning and that it is eternal (first antinomy of pure reason, A426f/B454f). As Kant believed he could overcome this „self-contradiction of reason“ („Widerspruch der Vernunft mit ihr selbst“, A740) by what he called „transcendental idealism“, the question whether the cosmos exists forever or not has almost vanished in philosophical discussions. [3]

Further problems also remain with the Big Bang theories, such as: a) what force was responsible to trigger the first creation of heavy particles out of vacuum?, b) if we take the statistical approach, i.e. the vacuum fluctuation alone was responsible for first creation, then one can ask how much is probability of such statistical chance to create all regularities as we observe of the Universe? (such as Tifft’s quantized redshift data.)

In this paper we will take a closer look at Genesis 1:2 to see whether the widely-accepted notion of creatio ex-nihilo is supported by Hebrew Bible or not. It turns out that Neutrosophic Logic is in agreement with Kant and Vaas’s position, it offers a resolution to the long standing disputes between beginning and eternity of the Universe. In other words, in this respect we agree with Vaas: “how a conceptual and perhaps physical solution of the temporal aspect of Immanuel Kant’s „first antinomy of pure reason“ is possible, i.e. how our universe in some respect could have both a beginning and an eternal existence. Therefore, paradoxically, there might have been a time before time or a beginning of time in time.”[3] In the subsequent chapter we will discuss how to answer this question by the lens of hermeneutics of Sherlock Holmes. This is a tool of mind which we think to be a better way compared to critical hermeneutics.

1.1. What is Hermeneutics of Sherlock Holmes?

One article suggests: Holmes: “I have no data yet. It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.” Far too often students of the Bible (and cosmology folks as well) twist verses to suit interpretations instead of formulating interpretations to suit what the verses say. Guide: Don’t approach your passage assuming you know what it means. Rather, use the data in the passage – the words that are used and how they fit together – to point you toward the correct interpretation.

2. A closer look at Genesis 1:1-2 implications

One of the biggest mysteries in cosmogony and cosmology studies is perhaps: How to interpret properly Genesis chapter 1:2. Traditionally, philosophers proposed that God created the Universe out of nothingness (from reading “empty and formless” and “bara” words; this contention is called “creatio ex nihilo.”). Understandably, such a model can lead to various interpretations, including the notorious “cosmic egg” (primeval atom) model as suggested by Georges Lemaitre, which then led to Big Bang model.[18-20] Subsequently, many cosmologists accept it without asking, that Big Bang stands as the most faithful and nearest theory to Biblical account of creation. But we can ask: Is that primeval atom model the true and faithful reading of Genesis 1:2? Let us start our discussion with examining key biblical words of Hebrew Bible, especially Genesis 1:1-2. It can be shown that the widely accepted creation ex nihilo is a post-biblical invention, rather than as faithful reading of the verses. To quote Ian Barbour: “Creation out of nothing is not a biblical concept.”[4] Let us consider some biblical passages:

2.1. bereishit

The literal meaning of Gen. 1:1, “bareishit bara Elohim.” This very first statement of the book of Genesis literally reads: ‘first’ and ‘beginning’ are reasonable alternatives for the Hebrew noun, reishit. Also note that in Hebrew, subjects and verbs are usually ordered verb-first (unlike English in which the subject is written first). If the verb and subject of this verse are reordered according to natural English grammar we read: [1] In, When first, beginning Elohim created. . . reishit: The noun, reishit, has as its root the letters, (Resh -Aleph-Shin). Words derived from this root often carry the meaning of ‘primary’, ‘chief’, ‘begin’, ‘first’ or “first-in-line”, “head of”, and so forth. Harris’s Theological Wordbook of the Old Testament (TWOT) is more specific, namely, reishit means[1] “. . .first, beginning, choicest, first or best of a group. [Reishit is] a feminine noun derived from the root [Resh-Aleph-Shin], it appears fifty times in nearly all parts of the [Old Testament]. [Its] primary meaning is “first” or “beginning” of a series.” Accordingly, we can now retranslate breishit bara Elohim as “When first created Elohim”, or as we would render in English,[1] ”When Elohim first created. . .”

2.2. Gen. 1:2

Gen. 1:2, “And the earth had been.” In English this is easily handled by the past perfect tense (also called the pluperfect or the “flashback” tense). Likewise, if haytah in v 1:2 is translated as a past perfect verb, then verses 1:1-2 would read,[1] When Elohim first created the heavens and the earth, the earth had been . . . In this translation the universe, in some form or other, was already in existence when God executed His first creative act, the creation of light.

2.3. Re-reading Gen. 2:7 with Hermeneutics of Sherlock Holmes?

If we glance at Gen. 2: 7, we see at a glance that man is made up of the dust of the ground (adamah) which is breathed by the breath of life by God (nephesh). Here we can ask, does this text really support the Cartesian dualism view? We do not think so, because the Hebrew concept of man and life is integral. The bottom line: it is not the spirit trapped in the body (Platonic), but the body is flowing in the ocean of spirit. (check also Eric McKiddie’s article: <https://www.thegospelcoalition.org/blogs/trevin-wax/10-tips-on-solving-mysterious-bible-passages-from-sherlock-holmes/>)

2.4. Gen. 1:2, formless and void

Gen. 1: 2, ”The earth is without form and void, darkness over the deep, and the Spirit of God hovering over the waters.” Patterns such as Adam’s creation can also be encountered in the creation story of the universe. Earth and the oceans already exist (similar to adamah), but still empty and formless. Then the Spirit of God hovered over it, in the original text ”ruach” can be interpreted as a strong wind (storm). So we can imagine there is wind/hurricane, then in the storm that God said, and there was the creation of the universe. See also Amos Yong [6], also Hildebrandt [15]. From a scientific point of view, it is well known in aerodynamics that turbulence can cause sound (turbulence-generated sound). And primordial sound waves are indeed observed by astronomers.

2.5. Psalm 107

Ps. 107: 25, ”He said, he raised up a storm that lifted up his waves.” The relation between the word (sound) and the storm (turbulence) is interactive. Which one can cause other. That is, God can speak and then storms, or the Spirit of God causes a storm. Then came the voice.

2.6. Ezekiel 37

Ezekiel. 37: 7, "Then I prophesy as I am commanded, and as soon as I prophesy, it sounds, indeed, a crackling sound, and the bones meet with one another." In Ezekiel it appears that the story of the creation of Adam is repeated, that the Spirit of God is blowing (storm), then the sound of the dead bones arises.

2.7. Conclusion to re-reading the above three verses

The conclusion of the three verses above seems to be that man is made up of adamah which is animated by the breath or Spirit of God. He is not matter, more accurately referred to as spirit in matter. In other words, a close reading of Hebrew Bible seems to suggest that creatio ex-nihilo is a post-biblical invention. Other scholars have suggested an alternative concept, called creatio ex-materia, but many orthodox Christian scholars have raised objection to this notion, partly because the term seems to undermine God's ultimate power and control of the Universe. Besides, the notion of creatio ex-materia has been advocated by Mormon preachers. To overcome this problem, and based on what we learned recently, allow us now to come up with a new term: creatio ex-rotatione (rotatione is a Latin word for rotation). As we shall see in the next chapter, it is possible to come up with a physical model of early Universe with rotation, where the raw materials have been existed for long period of time, but suddenly it burst out into creation. And it seems to fit with Kant's idea to resolve the dichotomy between finite past or eternal Universe. Furthermore, it can be shown that the model naturally leads to accelerated expansion, without having to invoke ad hoc assumption like dark energy or cosmological constant.

3. A physical model of turbulence-generated sound for early Universe

Our discussion starts from the fundamental question: how can we include the rotation in early Universe model? After answering that question, we will discuss how "turbulence-generated sound" can be put into a mathematical model for the early Universe. We are aware that the notion of turbulence-generated sound is not new term at all especially in aerodynamics, but the term is rarely used in cosmology until now. We shall show that 3D Navier-Stokes will lead to non-linear acoustics models, which means that a turbulence/storm can generate sound wave.

3.1. How can we include rotation in early Universe model?

It has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as "Hubble's law". More realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe. In this section, we will derive an Ermakov-type equation following Nurgaliev [8]. Then we will solve it numerically using Mathematica 11. After he proceeds with some initial assumptions, Nurgaliev obtained a new simple local cosmological equation:[8][9]

$$\dot{H} + H^2 = \Omega + (4.\pi.G.\rho)/3$$

where

$$\dot{H} = dH/dt.$$

The angular momentum conservation law $\Omega.R^2 = const = K$ and the mass conservation law makes equation solvable :
[9]

$$\dot{H} + H^2 = (K^2/R^4) - (GM)/R^3$$

or

$$\ddot{R} = (K^2/R^3) - (GM)/R^2$$

Equation above may be written as Ermakov-type nonlinear equation as follows:

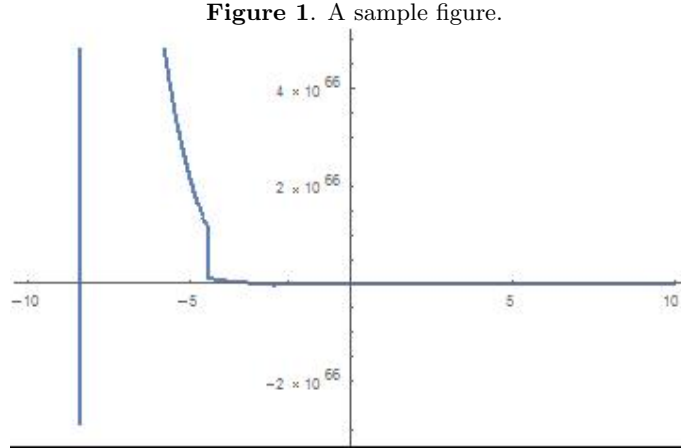
$$\ddot{R} + (GM)/R^2 = (K^2/R^3)$$

Nurgaliev tried to integrate equation (3), but now we will solve the above equation with Mathematica

11. First, we will rewrite this equation by replacing $GM=A$, $K^2 = B$, *soweget* :

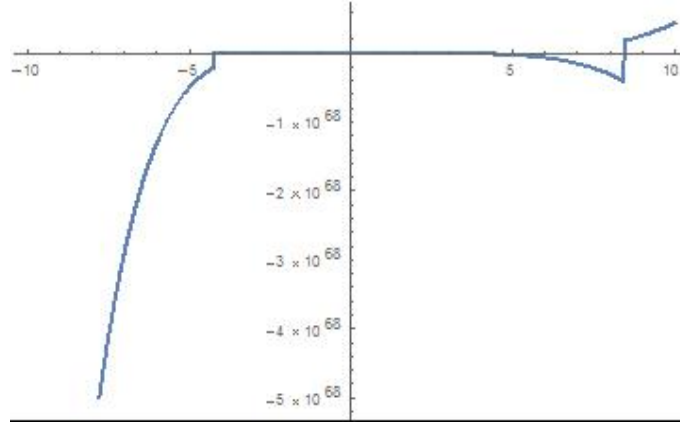
$$\ddot{R} + A/R^2 = B/R^3$$

As with what Nurgaliev did in [8][9], we also tried different sets of A and B values, as follows: a. A and $B \leq 0$
 $0A = -10; B = -10; ODE = x''[t] + A/x[t]^2 - B/x[t]^3 == 0; sol = NDSolve[ODE, x[0] == 1, x'[0] == 1, x[t], t, -10, 10] Plot[x[t], t, -10, 10]$



b. $A \geq 0, B \leq 0A = 0B = -10; ODE = x''[t] + A/x[t]^2 - B/x[t]^3 == 0; sol = NDSolve[ODE, x[0] == 1, x'[0] == 1, x[t], t, -10, 10]$

From the above numerical experiments, we conclude that the evolution of the Universe depends on the constants involved, especially on the rotational-vortex structure of the Universe. This needs to be investigated in more detailed for sure. One conclusion that we may derive especially from Figure 2, is that our computational simulation suggests that it is possible to consider that the Universe has existed for long time in prolonged stagnation period, then suddenly it burst out from empty and formless (Gen. 1:2), to take its current shape with accelerated expansion. As an implication, we may arrive at a precise model of flattening velocity of galaxies without having to invoke ad-hoc assumptions such as dark matter. Therefore, it is perhaps noteworthy to discuss briefly a simple model of galaxies based on a postulate of turbulence vortices which govern the galaxy dynamics. The result of Vatistas' model equation can yield prediction which is close to observation [14]. Therefore it appears possible to model galaxies without invoking numerous ad hoc assumptions such as dark matter, once we accept the existence of turbulent interstellar medium. The Vatistas model is also governed by Navier-Stokes equations, see for instance [14].

Figure 2. A sample figure.

3.2. How “turbulence-generated sound” can be put into a mathematical model for the early Universe

We are aware that the notion of turbulence-generated sound is not new term at all especially in aerodynamics, but the term is rarely used in cosmology until now. We will consider some papers where it can be shown that 3D Navier-Stokes will lead to non-linear acoustics models, which means that a turbulence/storm can generate sound wave. In this section we consider only two approaches:

3.2.1. Shugaev-Cherkasov-Solenaya’s model

They investigate acoustic radiation emitted by three-dimensional (3D) vortex rings in air on the basis of the unsteady Navier–Stokes equations. Power series expansions of the unknown functions with respect to the initial vorticity which is supposed to be small are used. In such a manner the system of the Navier–Stokes equations is reduced to a parabolic system with constant coefficients at high derivatives. [16]

3.2.2. Rozanova-Pierrat’s Kuznetsov equation

she analysed the existing derivation of the models of non-linear acoustics such as the Kuznetsov equation, the NPE equation and the KZK equation. The technique of introducing a corrector in the derivation ansatz allows to consider the solutions of these equations as approximations of the solution of the initial system (a compressible Navier-Stokes/Euler system). The direct derivation shows that the Kuznetsov equation is the first order approximation of the Navier-Stokes system, the KZK and NPE equations are the first order approximations of the Kuznetsov equation and the second order approximations of the Navier-Stokes system. [17]

4. Neutrosophic Logic perspective and implications

In the previous sections we have discussed how closer look at Gen. 1:1-2 leads to different scenario than the widely accepted creation ex-nihilo. This new scenario is quite in agreement with Kant’s idea that it is possible that the Universe has both finite history in the past and also eternal background. We also discussed how such a mixed view can be modelled by introducing rotation in the early universe. Now there is an immediate question: Is this new look at the origin of Universe justifiable logically, or is it merely a compromised solution? So, in this chapter we will review Neutrosophic Logic, a new theory developed in recent decades by one of these authors

(FS). Vern Poythress argues that sometimes we need a modification of basic philosophy of mathematics, in order to re-define the redeemed mathematics; see [21]. In this context, allow us to argue in favor of Neutrosophic logic as one basic postulate, in lieu of the Aristotle logic which creates many problems in real world. In Neutrosophy, we can connect an idea with its opposite idea and with its neutral idea and get common parts, i.e. $\mathfrak{I}A_i / \mathfrak{I}nonA_i = \text{nonempty set}$. The common part of the uncommon things! It is true/real... paradox. From neutrosophy, all started: neutrosophic logic, neutrosophic set, neutrosophic probability, neutrosophic statistics, neutrosophic measure, neutrosophic physics, neutrosophic algebraic structures etc. It is true in restricted case, i.e. the Hegelian dialectics considers only the dynamics of opposites ($\mathfrak{I}A_i$ and $\mathfrak{I}antiA_i$), but in our everyday life, not only the opposites interact, but the neutrals $\mathfrak{I}neutA_i$ between them too. For example: you fight with a man (so you both are the opposites). But neutral people around both of you (especially the police) interfere to reconcile both of you. Neutrosophy considers the dynamics of opposites and their neutrals. So, neutrosophy means that: $\mathfrak{I}A_i$, $\mathfrak{I}antiA_i$ (the opposite of $\mathfrak{I}A_i$), and $\mathfrak{I}neutA_i$ (the neutrals between $\mathfrak{I}A_i$ and $\mathfrak{I}antiA_i$) interact among themselves. A neutrosophic set is characterized by a truth-membership function (T), an indeterminacy-membership function (I), and a falsity-membership function (F), where T, I, F are subsets of the unit interval $[0, 1]$. As particular cases we have: single-valued neutrosophic set when T, I, F are crisp numbers in $[0, 1]$, and interval-valued neutrosophic set when T, I, F are intervals included in $[0, 1]$. Neutrosophic Set is a powerful structure in expressing indeterminate, vague, incomplete and inconsistent information. See also [22]-[24]. To summarize, Neutrosophic Logic study the dynamics of neutralities. And from this viewpoint, we can understand that it is indeed a real possibility that the Universe has both initial start (creation) but with eternal background. This is exactly the picture we got after our closer look at Gen. 1:1-2 as discussed in the above section. In other words, our proposed term of “creatio ex-rotatione” has sufficient logical background.

5. Advantages of “creatio ex-rotatione” concept

In the preceding section, we have discussed on how our proposed term of “creatio ex-rotatione” has sufficient logical background. Now, allow us to discuss some advantages of the proposed “creatio ex-rotatione” cosmology view over the Lemaitre’s primeval atom (which is the basis of Standard Model Cosmology).

5.1. Avoid inflationary scheme

It is known that inflationary models were proposed by Alan Guth et al. (see [25][26]), in order to explain certain difficulties in the Big Bang scenario. But some cosmology experts such as Hollands Wald has raised some difficulties with inflationary model, as follows: “We argue that the explanations provided by inflation for the homogeneity, isotropy, and flatness of our universe are not satisfactory, and that a proper explanation of these features will require a much deeper understanding of the initial state of our universe.”[27] In our diagram plot above, it is clear that an early rotation model can explain why the Universe can burst out into creation in a very short period, without invoking ad hoc postulate such as inflation model.

5.2. Explain the observed late accelerated expansion.

As far as we know, one of the earliest models which gave prediction of accelerated expanding Universe is Carmeli’s Cosmological General Relativity.[29] But it has been shown by Green Wald that for the large scale structures of the Universe, Newtonian model can give similar results compared to general relativity picture.[28] Furthermore, it seems that there is no quite clear arguments why we should accept Carmeli use of 5D metric

model (space-time-velocity metric). In the meantime, in our rotating Universe model, we do not invoke ad hoc dimension into the metric.

5.3. Explain inhomogeneity, breeding galaxies etc.

Astronomers have known for long time, that the Universe is not homogeneous and isotropic as in the usual model. It contains of inhomogeneity, irregularity, clumpiness, voids, filaments etc, which indicate complex structures. Such inhomogeneous structures may be better modelled in terms of turbulence model such as Navier-Stokes equations, see also our early papers [11][12]. Furthermore, observations clearly suggest that matter ejected continuously in galaxy centers, which view is difficult to reconcile with Big Bang scenario of galaxy creation. From our point of view, the Hubble's law indicates that galaxies move fast from each other were because of continuous matter ejection, which effect seems to be a direct refutation of singularity point in the beginning of the Universe. This is in opposite to mainstream view that Hubble's law support Big Bang theory. It is also interesting remark that Edwin Hubble himself remained rather refrained from attributing his "law" to support the expanding Universe hypothesis. Remark on his seminal paper: "The features, however, include the phenomena of red-shifts whose significance is still uncertain. Alternative interpretations are possible, and, while they introduce only minor differences in the picture of the observable region, they lead to totally different conceptions of the universe itself. One conception, at the moment, seems less plausible than the other, but this dubious world, the expanding universe of relativistic cosmology, is derived from the more likely of the two interpretations of red-shifts. Thus the discussion ends in a dilemma, and the resolution must await improved observations or improved theory or both." See [34][35]. Added note: Moreover, for years, some researchers have developed a novel theory of gravity based on an old theory of Le Sage/Laplace (it is known as Le Sage's gravitation theory). An interesting remark on impetus to Le Sage gravitation theory can be found in article by the late Prof. Halton Arp on his work with Narlikar: "Nevertheless the ball had started rolling down hill so to speak and in 1991, with Narlikar's help, I outlined in Apeiron the way in which particle masses growing with time would account for the array of accumulated extragalactic paradoxes. Later Narlikar and Arp (1993) published in the Astrophysical Journal Narlikar's original, 1977 solution of the basic dynamical equations along with the Apeiron applications to the quasar/galaxy observations. The first insight came when I realized that the Friedmann solution of 1922 was based on the assumption that the masses of elementary particles were always and forever constant, $m = \text{const}$. He had made an approximation in a differential equation and then solved it. This is an error in mathematical procedure. What Narlikar had done was solve the equations for $m = f(x,t)$. This a more general solution, what Tom Phipps calls a covering theory. ... But Narlikar had overwhelmed me with the beauty of the variable mass solution by showing how the local dynamics could be recovered by the simple conformal transformation from t time (universal) to what we called time (our galaxy) time. The advertisement here was that our solution inherited all the physics triumphs much heralded in general relativity but also accounted for the non-local phenomena like quasar and extragalactic redshifts." [2] Summarizing, it is very significant to consider matter creation process in nature. For instance, one can begin by considering the correct presentation of Newton's third law is not $F=ma$, but $F=d(mv)/dt=v(dm/dt) + m(dv/dt)$. In other words, it is possible of matter creation (dm/dt), and this is consistent with Narlikar's work. We will explore this effect of receding Moon from Earth, in calculations to be presented in a forthcoming paper.

6. Note on Methods

In this paper, basically we use two methods: (a) a new material point for fluid model; (b) logically, we use Neutrosophic logic. As with the material point assumption, allow us to quote from Nurgaliev: [30][31] “The method used in this article is nonlinear mathematical modeling. The concept of the nonlinear reaction-advection-diffusion equation along with the second type material point harmoniously provides a bridge between classical and quantum physics and explains why matter is organized discretely with different levels of organization (from clusters of galaxies to atoms and elementary particles). We may expect that system of evolutionary equations (called advection-diffusion-reaction equations)... describe arbitrary amount of material components with densities ρ_i , Hubble parameters H_i and coefficients of the effective diffusion D_i , generalized and adopted when needed. It may also provide component cosmological reacting media. The nonlinear term f stands for mutation of the components (i.e., nuclear and chemical reactions) of matter. This method in the frame Einstein–Cartan theory gave static cosmological solution. The last remark is: so, sometimes, more complicated theories help understand simpler ones.”

7. Concluding remarks

In this paper we argue that Neutrosophic Logic offers a resolution to the long standing disputes between beginning and eternity of the Universe. In other words, in this respect we agree with Vaas, i.e. it can be shown: “how a conceptual and perhaps physical solution of the temporal aspect of Immanuel Kant’s „first antinomy of pure reason“ is possible, i.e. how our universe in some respect could have both a beginning and an eternal existence. Therefore, paradoxically, there might have been a time before time or a beginning of time in time.” We argue that a re-reading of Genesis 1:2 will lead us to another viable story, albeit the alternative has not been developed rigorously as LCDM theories. It took around three years before now we have been thinking this problem out loud, and here our answer can be summarized as follows: “The relic sound wave in early creation is a faithful interpretation of John 1:1, but we can come up with a more complete picture if we combine it with Gen. 1:2, that is the Holy Spirit came to hovering over the primordial fluid, then a kind of hurricane/storm started which created perfect medium where God spoke (Logos).” And one conclusion that we may derive especially from Figure 2, is that our computational simulation suggests that it is possible to consider that the Universe has existed for long time in prolonged stagnation period, then suddenly it burst out from empty and formless (Gen. 1:2), to take its current shape which is accelerating. Such a possibility has never been considered before in cosmology literature. It is our hope that our exploration will lead to nonlinear cosmology theories which are better in terms of observations, and also more faithful to Biblical account of creation.

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