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RESEARCH ARTICLE

Biocentric Universe, Non-Archimedian Complex Number Axis, Laws of Conservation

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Abstract

Biocentrism, whose main ideas were put forward by biologist Robert Lanza, asserts that current theories of the material world do not work and will not be successful until they include life and consciousness in their scope. This paper proposes the idea of developing complex-valued physics as a mathematical model of a living and intelligent, i.e., biocentric, universe. Complexification, in fact, consists in the assumption that the quantities appearing in all physical laws are complex. An attempt is made to clarify some properties of this model.

1. Introduction

The biocentric theory of the universe was proposed by biologist Robert Lanza [1,2]. Biocentrism asserts that current theories of the material world do not work and will not succeed until they include life and consciousness in their scope. Life creates the universe, not the other way around. This theory essentially summarizes the ideas of panpsychism [3]. Biocentric ethics calls for a rethinking of the relationship between humans and nature. It proclaims that nature exists not only to be used or consumed by humans, but that humans themselves should be just one of its many species.

Works [3-6] put forward the idea of complexification physics. Complexification, in fact, consists in the assumption that the quantities appearing in all physical laws are complex. We consider the real parts of quantities to be measurable. It is possible that the imaginary part is unobservable, but at the same time it must be inherent in the physical quantity, being something like a hidden parameter, and manifests itself only indirectly, causing the system to move in one direction or another. In other words, the imaginary part of a quantity is its "soul," causing the system to move in different directions under the same external conditions, depending on the content of this "soul." In this sense, we can say that Nature is a living being. That is, complex-valued physics can be developed as a mathematical model of a living, intelligent universe. Let's try to clarify some of the properties of this model.

2. Space

2.1 Pythagorean Theorem

The Pythagorean theorem connects elements of two-dimensional space and states

$$a^2 + b^2 = c^2.$$

Pythagoras' theorem was applied to the field of real numbers (although problems arise when constructing segments and triangles in the field of irrational numbers). But what about complex numbers? In complex-valued space, the sides of a triangle are also complex:

$$a = Rea + i * Jma;$$

$$b = Reb + i * Jmb;$$

$$c = Rec + i * Jmc;$$

Let us assume that

$$\mathrm{Re}\,a = 3, \mathrm{Re}\,b = 4, \mathrm{Re}\,c = 5,$$

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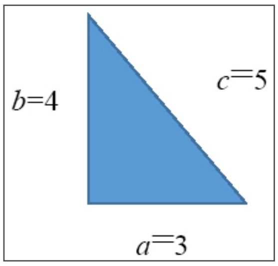

Figure 1. *Pythagorean theorem in the field of real numbers*

then at

$$Jma = 0{,}1 * Rea; Jmb = 0{,}1 * Reb; Jmc = 0{,}1 * Rec\ ; \quad (1)$$

the squares of the hypotenuse and the cathets are equal:

$$c^2 = 24{,}75 + 5*i; \quad (2)$$

$$a^2 + b^2 = 24{,}75 + 5*i. \quad (3)$$

Pythagoras' theorem also holds true in the field of complex numbers. However, the areas of the squares on the sides of the triangle are complex, see (2), (3). Moreover, the real part is less than 25 and tends to this value as the imaginary parts (1) tend to zero. The complex sides of the triangle at the same time take real values, see Fig. 1.

3. Complexification of Physics

The main property of quantities is to be greater or less than each other, i.e., to be ordered. Consequently, complex physical quantities, like their corresponding complex numbers, must be ordered structures. Some aspects of complexification are discussed in [3-6]. Let us try to outline a general path for creating a consistent system of complex-valued physics.

3.1 Ordering the Field of Complex Numbers

Taking the above into account, let us order the field of complex numbers. It follows from Zermelo's theorem that any set can be completely ordered, and that the number of ways to order it is infinite. Let us order the set of complex numbers as follows.

We assume (see Fig. 2) that for $z' = x' + iy'$ и $z'' = x'' + iy''$

$$\begin{cases} z' < z'', & if \quad x' < x''; \\ if & x' = x'', \quad then \\ z' < z'' & at \quad y' < y''. \end{cases} \quad (4)$$

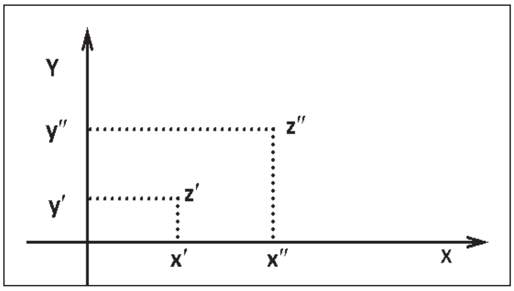

Figure 2. *Complex plane*

If we denote the ordinal type of the set of all real numbers by ρ, then the set of complex numbers is ordered by type ρ^2 (lexicographically).

The method described for ordering a set of complex numbers is well known, and here this formalism is used as the basis for defining complex physical quantities. If we arrange all the points of the set of complex numbers, ordered by type ρ^2, on a straight line (projecting the plane onto a straight line), we obtain a complex non-Archimedean number line, since it contains uncountably many non-overlapping segments, namely: the cardinality of this set of segments is the cardinality of the continuum. The set of points of any vertical line in Figure 2 can be mapped onto the complex axis as a segment of arbitrary length; let us choose a certain segment α as such a segment.

3.2 Non-Archimedean Complex Number Axes

In ordinary physics and geometry, only Archimedean lines are considered, i.e., those that contain only a countable number of non-overlapping segments. All points on ordinary Archimedean lines are valid.

The desire to follow the logic of defining the concept of a number as the ratio of two quantities and the resulting ordering of the set of complex numbers leads to each physical quantity being located on the corresponding non-Archimedean complex number axis (see Fig. 3).

Interval β - the region of complex numbers of the form $-x \pm iy$; interval γ - the region of complex numbers of the form $x \pm iy$; segment α_0 - the region of imaginary numbers, the points of this segment are uniquely related to the points of the imaginary axis $-\infty \le iy \le +\infty$. Each real number x of the non-Archimedean complex number axis is surrounded by a field of complex points of the form $\pm iy + x$ of the corresponding segment α.

As follows from the above consideration, any physical quantity is located on the corresponding non-Archimedean complex number axis and is complex except for its value at the real points of this axis (including the areas of the squares of the sides of a triangle in Pythagoras' theorem). The same applies to energy, which is complex everywhere except at real points. Consequently, a complex quantity also appears in the law of conservation of energy. This leads to a violation of the law of conservation of energy in the world of real numbers that we are familiar with.

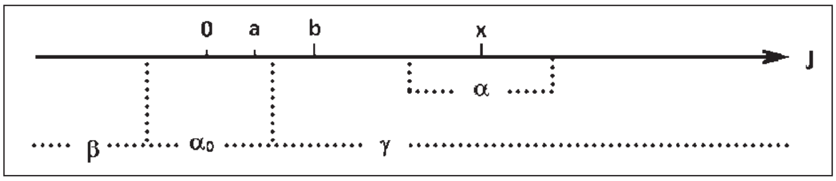

Figure 3. *Non-Archimedean complex number line*

4. Conservation Laws

4.1 Classical Oscillator

The latter conclusion can be illustrated by the example of the simplest mechanical system—an ideal classical oscillator $m\ddot{x} + kx = 0.$

Here, m is the mass and k is the elasticity coefficient.

In light of the hypothesis about the complexity of physical quantities, we will consider all quantities in this equation to be complex. The conserved quantity is the complex energy—the first integral of this equation:

$$\frac{m\dot{x}^2}{2} + \frac{kx^2}{2} = const \tag{5}$$

Using explicit comprehensive view of values

$m = \mathrm{Re}\, m + i\,\mathrm{Im}\, m$, $k = \mathrm{Re}\, k + i\,\mathrm{Im}\, k$, $x = \mathrm{Re}\, x + i\,\mathrm{Im}\, x$, $\dot{x} = \mathrm{Re}\, \dot{x} + i\,\mathrm{Im}\, \dot{x}$,

we obtain from (5):

$$\begin{cases} A + iB = const \\ \text{where} \\ A = \mathrm{Re}\, m(\mathrm{Re}^2\, \dot{x} - \mathrm{Im}^2\, \dot{x}) - 2\,\mathrm{Im}\, m\, \mathrm{Re}\, \dot{x}\, \mathrm{Im}\, \dot{x} + \mathrm{Re}\, k(\mathrm{Re}^2\, x - \mathrm{Im}^2\, x) - 2\,\mathrm{Im}\, k\, \mathrm{Re}\, x\, \mathrm{Im}\, x, \\ B = \mathrm{Im}\, m(\mathrm{Re}^2\, \dot{x} - \mathrm{Im}^2\, \dot{x}) + 2\,\mathrm{Re}\, m\, \mathrm{Re}\, \dot{x}\, \mathrm{Im}\, \dot{x} + \mathrm{Im}\, k(\mathrm{Re}^2\, x - \mathrm{Im}^2\, x) + 2\,\mathrm{Re}\, k\, \mathrm{Re}\, x\, \mathrm{Im}\, x. \end{cases} \tag{6}$$

It follows from the latter ratio that the following equalities must be satisfied separately

$$A = const_1, \qquad B = const_2 \tag{7}$$

And only in the case of small imaginary parts $\mathrm{Im} \to 0$ expression (7) coincides with the ratio we are familiar with:

$$\frac{\mathrm{Re}\, m\, \mathrm{Re}^2\, \dot{x}}{2} + \frac{\mathrm{Re}\, k\, \mathrm{Re}^2\, x}{2} = const. \tag{8}$$

In the world of complex quantities, energy is also a complex quantity that retains its value. Energy, composed of real quantities, as can be seen from (6), does not remain constant when the imaginary parts are not zero and tends toward a constant only when $\mathrm{Im} \to 0$. The violation of one of the conservation laws—the principle of parity conservation in weak interactions, discovered experimentally in 1957—led to numerous experiments aimed at testing all known conservation laws. In this case, if any principle is not conserved, the aim is to find a broader conservation principle. In this spirit, it is permissible to suggest that energy is a quantity that preserves a complex value, while the real value may not be preserved, which under certain conditions can be tested experimentally.

4.2 On Setting up a Test Experiment

As a possible experiment to test the hypothesis of the complex significance of physical quantities, the following experiment with an oscillator in which friction forces are at work is proposed.

Equation

$$\frac{d^2y}{dt^2} + \frac{\gamma}{m}\frac{dy}{dt} + \frac{\kappa y}{m} = 0 \tag{9}$$

describes a mechanical oscillator and an electrical oscillating circuit. The function y (particle displacement) and the parameters m (particle mass), γ (friction coefficient), and κ (elasticity coefficient) are complex-valued. Let us take the following as initial conditions:

$$\begin{cases} y(t=0) = \delta y \\ \dot{y}(t=0) = 0 \end{cases} \tag{10}$$

Article [3] provides a solution to this problem. The results show that the solution loses stability

when

$$\begin{cases} \dfrac{\mathrm{Im}\, m}{\mathrm{Re}\, m} = \dfrac{\mathrm{Im}\, \kappa}{\mathrm{Re}\, \kappa} = \dfrac{\mathrm{Im}\, \gamma}{\mathrm{Im}\, \gamma} \ge 10^{-12}, \\ if \quad \mathrm{Re}\, m = 10g; \quad \mathrm{Re}\, \kappa = 10^{21} \cdot \mathrm{Hz}^2 \cdot g; \quad \mathrm{Re}\, \gamma = 0,05 \cdot \mathrm{Hz} \cdot g \end{cases} \tag{11}$$

This effect can only be expected to be detected in areas far removed from everyday practice. Thus, the characteristics (11) that an oscillator must possess in order to detect imaginary quantities are at the limit of modern technological capabilities [7]. The oscillator must have the maximum possible own frequency ω = (κ/m) $^{1/2}$ = 10^{10} Hz and minimum dissipation g = $0,05 \cdot \mathrm{Hz} \cdot g$, which requires cryogenic and vacuum technology. By studying the Cauchy problem for such an oscillator, one can attempt to detect the existence of imaginary quantities (their influence on the real part of the solution), if they are not less than J/R= 10^{-12}, which is a physically small enough value.

The phase portrait of the solution at parameters (11) and J/R<10^{-12} is shown in Fig. 4 and represents a slowly converging focus. The phase portrait for the same parameters (11), but with J/R>10^{-12}, represents a slowly diverging focus (see Fig. 5). The foci converge and diverge very slowly because the friction coefficient γ is very small.

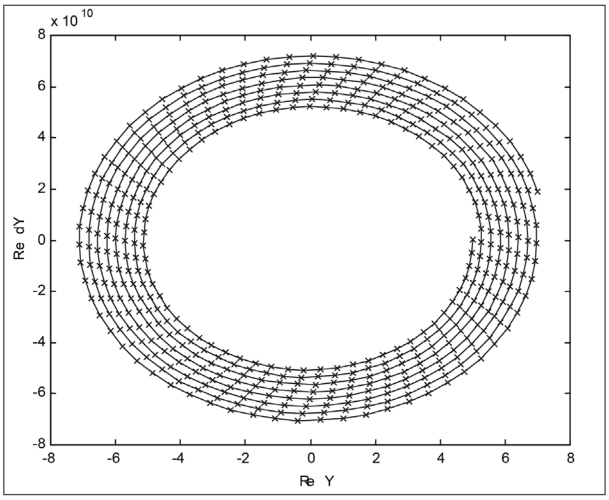

Figure 4. *Oscillator. Phase portrait J/R≤ 1.0·10^{-12} Re dY – displacement velocity; Re Y – displacement*

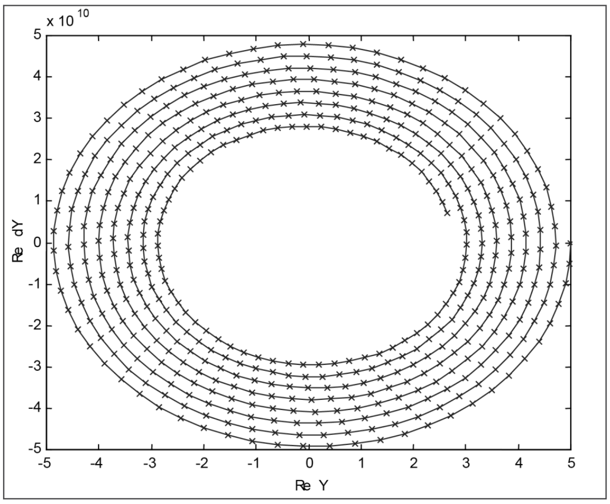

Figure 5. *Oscillator. Phase portrait J/R≥ 1.0·10-12 Re dY – displacement velocity; Re Y – displacement*t

In a series of experiments demonstrating a typical convergent solution at J/R < 10^{-12} (see Fig. 4), a number of divergent solutions can be found (see Fig. 5) if the parameter fluctuations reach a value of J/R > 10^{-12} and if, of course, the physical quantities are complex-valued. If the oscillations diverge, this can only manifest itself during a certain initial time interval, since subsequently the experimental sample will heat up as a result of the oscillations, dissipation will increase, and the system will transition to the usual mode of convergent oscillations.

Thus, at certain values of the imaginary part of the parameters, the usual damped oscillations of an oscillator in which friction acts become divergent.

5. Conclusion

One can try to explore the foundations of geometry and physics of the new reality that arose with the introduction of non-Archimedean complex number axes. Archimedes' axiom does not hold on a non-Archimedean complex number axis, i.e., it is impossible to find a large natural number N such that Na > b if a < b (see Fig. 3). Therefore, the set of points of the segment α of the non-Archimedean complex axis J can be likened to the set of actual infinitesimal numbers of non-standard analysis [8]; the real points of this axis play the role of standard numbers of non-standard analysis. The segment α, being a non-standard neighborhood of a standard number, has the meaning of a monad of non-standard analysis. The difference between the complex non-Archimedean axis we have introduced and the usually considered hyperreal axis is that in this case the monad consists of imaginary numbers. If we denote the actually existing infinitely small number of the monad of non-standard analysis by e , then in the complex non-standard analysis we propose, this number will have the form ie , where i is the imaginary unit.

The set of standard numbers on the non-Archimedean complex number axis (see Fig. 3) represents the usual Archimedean axis of real numbers. On these number axes, we can choose any values of any quantities. We can also move along the axis, for example, in temporal tasks, in the direction of increasing time. But we do not have the ability to perform the same procedure on the non-Archimedean complex number axis. This object is accessible only to the Higher Power — the Mind of the Universe — but not to us. We can only explore possible options for movement along the non-Archimedean complex number axis. The number of such options is infinite, and only the Mind of the Universe chooses a specific path. Thus, in our model, the infinitely small but finite values that make up the monads of standard numbers, like the non-Archimedean complex number axis itself, are tools of the Mind of the Universe. We only have access to the

Archimedean real axis. There is currently a debate: are the infinitely small quantities of non- standard analysis an objectively existing entity or a figment of the human imagination? Our reasoning leads us to the conclusion that in a rational Universe, complex numbers and the non-Archimedean complex number line exist as objectively as real numbers. In further following this direction, it is necessary to resort to a modified apparatus of non-standard analysis.

Now (within the framework of the prevailing materialistic view of the world), they came to the conclusion that the law of conservation of energy does not strictly apply in the universe. This follows from the fact that the law of conservation of energy follows from one of the postulates of symmetry: the homogeneity of time in the universe. But time, in the strict sense, is unhomogeneous, if only because of the firmly established fact of the expansion of the universe. Although the expansion is slow, and violations of the law of conservation of energy can only be observed over enormous intervals of time on a cosmic scale.

The model of complex-valued Nature proposed in this article reflects this violation of the law of conservation of energy in the space of real numbers. But this model covers a larger sphere—the realm of complex numbers (the complex-valued World). And it turns out that in the complex-valued universe, the law of conservation of energy is strictly observed. Since we believe that the complex-valued universe is a model of a living, intelligent universe, it should probably be assumed that the imaginary component of all quantities reflects the living state and intelligence of the universe. In a biocentric universe, the law of conservation of energy is strictly observed; energy can apparently be transferred from the psychic and spiritual to the mechanical and back again, with the integral energy of the universe being conserved.

6. References

1. Lanza, Robert. A New Theory of the Universe: Biocentrism builds on quantum physics by putting life into the equation. The American Scholar. March 1, 2007.
2. https://yandex.kz/video/preview/5112508940192301149 - Robert Lanza.
3. Lyahov V.V. Physics is the science of inanimate nature. And if nature is alive!? Journal of Religion and Theology, V. 7, I. 1, 2025.
4. Lyahov, V. V., Nechshadim, V. M. Complex numbers and physical reality. arXiv preprint physics/0102047. 2001.
5. Lyahov V.V., Neshchadim V.M. Models of Plasma Kinetics and Problems with Their Interpretation in the Current Paradigm, Nova Science Publishers, Inc., NY., 2018.
6. Lyahov V.V., Neshchadim V.M. Complex-valued physics: plasma waves. Horizons in World Physics, v. 312, Nova Science Publishers, Inc., NY., 2024.
7. Braginsky V.B., Mitrofanov V.P., Popov V.I. Low Dissipation Systems. Nauka. Moscow. 1981.
8. Davis M. Applied Nonstandart Analysis, JOHN WILEY&SONS New York- London- Sydney- Toronto. 1977.