

# Methodological aspects of post-non-classical philosophy and science based on the coordinate system of deterministic chaos

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**Abstract:** The characteristic features of post-non-classical philosophy and science are examined, where the priority of philosophy over science is emphasized. It is investigated how a broad and stable philosophical foundation will make possible to identify the contribution of basic concepts of post-non-classical science to the development of its methodology. Among these concepts, we will single out primarily the basic ideas of phenomenology, hermeneutics, synergetic, co-evolution, global evolutionism, universal interdisciplinarity, global studies, and ecology.

**Keywords:** world coordinate system, dynamic equilibrium, chaos, harmony, phenomenology, hermeneutic triangle, synergetic, self-organization

## CHARACTERISTIC FEATURES OF POST-NON-CLASSICAL PHILOSOPHY AND SCIENCE

During the last third of the twentieth century, philosophy faced with completely new types of reality, which required the development of fundamentally new methodological approaches, the formation of a new type of rationalism. Post-non-classical philosophy turned out to be closely intertwined with the post-non-classical philosophy of science, since the epistemological and methodological resources of the previous stages of development were exhausted. Despite the close intertwining of the main characteristic features of post-non-classical philosophy and science, we choose the most important thing for them.

For post-non-classical philosophy, such features are: flexibility of ontological matrices; ethical categories and value orientations included in the very structure of scientific and philosophical knowledge; human-sized systems, such as the biosphere, biocenosis, social objects, including complex systems of modern technology (“human-technical device-ecological environment”, “human-computer network”, etc.)

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united in planetary being; methodology of complexity and pluralism; opportunity to consider the world in its inherent fullness.

For post-non-classical science, the main characteristic features are: universal, complementary, omnipresent synthesis of philosophy and science; fundamental nonlinearity of the post-non-classical scientific picture of the world; formation of mechanisms for the synthesis of all types of philosophy and science based on post-non-classical universalism; interdisciplinarity covering almost all the main directions of science; opportunities for sustainable consideration of the relationship of each thing with its environment, that opens up new horizons for the development of environmental philosophy.

Comparing these characteristics between each other allows us to see the priority of philosophy over science. Modern science can develop if it is constantly based on philosophy. A universal, complementary synthesis of philosophy and science is possible only on a broad, stable philosophical basis, which was not, for example, in the interdisciplinary nature of non-classical science, where the methods and principles of one of the sciences penetrated into another science; for example, the case of geochemistry, biochemistry, geophysics, etc. In addition, this ontological basis must be stable and optimal at all levels of the world's organization.

It should be noted that the methodology of post-non-classical science is closely related to the basic concepts of phenomenology, hermeneutics, synergetic, co-evolution, global evolutionism, universal interdisciplinarity, global studies, and ecology. We examine how a broad and stable philosophical foundation will make possible to identify the contribution of the above concepts to the methodology of post-non-classical science.

#### REFINEMENT OF THE INITIAL FUNDAMENTAL CONCEPTS IN TERMS OF THE LIMIT DYNAMIC EQUILIBRIUM OF THE WORLD COORDINATE SYSTEM

The ontological basis for post-non-classical philosophy and science can be the coordinate system of the world based on deterministic chaos, since the dynamic equilibrium of this chaos is the most common at all levels of the world's organization.

The world coordinate system is based on two cells: the inside (I, C, K) and the outside (F, H, G). The first combines the limits of identification (I), communication (C) and the main rhythms of things directed towards stable rhythms of the world (K). Limits are the

transcendental boundaries of the world and, despite their unattainability, they can be described by texts created by a specific 'thing' under study that interacts with them. The second characterizes the limiting dynamic equilibrium of a particular 'thing' associated with intermediate essences. Here (F) is a phenomenon, (H) is the horizon, and (G) is the main rhythm of a certain stage in establishing the dynamic equilibrium of a thing associated with its corresponding relaxation time. Similar ideas were developed in our previous works (Kozhevnikov and Danilova 2016; 2018; Kozhevnikov 2018).

Let us clarify the basic concepts of 'thing', 'world', 'thing-in-existence', 'being' and 'essence' from the point of view of the world coordinate system, since the reliance on extreme dynamic equilibrium changes ideas about them. A 'thing' is something that independently exists in the world. A 'thing' always contains some degree of organization, a store of energy, information, etc. (depending on the level of structural organization of the world). The 'world' consists of many separate things in the process of becomingness, flowing into each other, and it contains their organization and randomness. It is reasonable to single out the levels of organization of the world by depending on the type of its dynamic equilibrium. 'Essences' are comparable to the outer cell of the world coordinate system (F, H, G), based simultaneously on the phenomenon, horizon and the main rhythm of a thing. 'Thing-in-existence' is the totality of the limits of all essences. Thing-in-existence and essence create 'texts' forming 'being'. The rhythms corresponding to the thing-in-existence are the fundamental rhythms of the world. They are the rhythms of world harmony with which all the supporting rhythms of things are connected. 'Being' is taken as a combination of 'texts of essence' and 'thing-in-existence'. Texts of essence are chaos of being, while texts of thing-in-existence are ultimate texts and provide self-organization of all things of the world and, accordingly, the world as a whole. The 'texts of being' pervade the whole world and act on the 'thing', like the environment, providing its interaction with other things.

The levels of the world's organization are associated with the fundamental dynamic equilibrium of things. They differ from the traditionally allocated, such as inanimate, living, social, spiritual, and their sublevels. The levels distinguished in our approach correspond in particular to inertial systems, quasi-static processes, vacuum, etc. The levels of the world's organization based on the limiting dynamic equilibrium of a thing are much greater than traditionally

distinguished. They correspond to each thing-in-existence for a certain class (kind) of things. The level of fundamental equilibrium of the world, its thing-in-existence, corresponds to the inner cell (I, C, K) of the coordinate system.

#### CONTRIBUTION OF THE BASIC CONCEPTS OF POST-NON-CLASSICAL SCIENCE TO THE METHODOLOGY DUE TO THE COORDINATE SYSTEM OF DETERMINISTIC CHAOS

From the point of view of the traditional structural levels of the world, there cannot be any universal unified method, since all the attributes of these levels (things, parameters of processes and interactions) are completely different. This fact is one of the main provisions of the methodology of non-classical and post-non-classical science. However, if we look at this methodology from the point of view of the basic principles of the world coordinate system, we can say that the limiting states of these processes and interactions are closely correlated to each other, which can be illustrated in the basic concepts of post-non-classical science. Phenomenology, hermeneutics, synergetic, co-evolution, global evolutionism and its varieties, global studies, universal interdisciplinarity and ecology are closely interconnected with the ontological basis of the world coordinate system described above.

The key issues of the *phenomenological approach* are the 'mechanisms' of the formation of the world coordinate system's cells (F, H, G) and (I, C, K). The formation of cells is carried out in various ways. Unattainable limits of dynamic equilibrium in these cells are revealed through the interaction of a specific thing with them. This creates texts composed of the notation of the above limits (I, C, K) or (F, H, G), with the help of which the process of their self-organization can be described.

The outer cell (F, H, G) characterizes the limiting dynamic equilibrium of a particular thing associated with intermediate essences. The phenomenon characterizes the identification at a certain point in time of a thing, that is, a characteristic feature, which can provide a definition of its essence at this stage. However, to outline such a definition, it is necessary to have an optimal horizon within which this identification can be fixed due to communication and rhythm corresponding to this horizon. Thus, the horizon represents the boundaries of the system necessary to include the identification that has arisen in it, to give it stability and optimality. The basic rhythm of

thing provides the emerging phenomenon and horizon with stability and optimality.

The phenomenon and horizon are connected with limiting dynamic equilibrium only in the above cells of the world coordinate system. However, they can exist for relatively long in states close to these cells, but nonetheless different from them. These states correspond to various figures of phenomena and horizons, due to the peculiarities of the processes of self-organization of things, as well as the levels of the world's organization, each being herein determined by the 'thing-in-existence' of a particular 'thing'.

The formation of a cell (F, H, G) begins with the fact that a 'thing' in the process of self-organization tends to "cling" to any equilibrium, to be identified through it, since anything in the world (elementary particles, gas nebulae, individuals, populations, people) strives for self-identification. This equilibrium can be random, "wrong", it is still far from the limit of the dynamic equilibrium state, so that the identification will be intermediate. Moreover, at different levels of the world's organization, each is determined by its 'thing-in-existence'; so, the mechanisms of this identification will be different.

The formation of a stable invariant from a phenomenon, horizon and rhythm corresponds to the internal quasi-equilibrium process of a 'thing', as a result of which it reveals its intermediate essence. The intermediate essences are subject to their self-organization that can be regarded as external; and the result of which is 'thing-in-existence'. The combination of these essences can be considered as a quasi-equilibrium process. When an essence approaches to a thing-in-existence, the quasi-equilibrium process slows down.

Internal cells of the world coordinate system (I, C, K) are formed by specific things and are both created as a result of using their internal resources and under the influence of external being. To the limits of identification (I), communication (C) and the basic rhythms of things directed towards the stable rhythms of the world (K), the stages of its dynamic equilibrium ascend.

The coordinate system is a regulatory system that selects 'texts' able of forming quasi-equilibrium states and processes as the most stable and therefore preferable for a particular 'thing' from the set of 'texts of being' from various types of 'thing-in-existence'. This regulatory system directs the process of interaction of a 'thing' with its 'thing-in-existence' and 'being'. A thing organizes itself and creates a thing-in-existence, forming new dynamic equilibria corresponding to them.

‘Being’ can be anything, including non-equilibrium, but the ‘text of being’ is a quasi-equilibrium stream of signs, that is, it has a stable structure and rhythm. The flow of signs can only come from sustainable things.

As a result of self-organization due to the guiding action of the ‘texts of being’, identification becomes more and more stable and optimal. Similarly to the formation of an external cell, this is ensured by the desire for two other ultimate equilibria: the communication and basic rhythm of things oriented towards world harmony. All three of these ultimate equilibria (identification, communication and basic rhythms) ensure each other’s stability in equilibrium by interacting with each other. An animal unit, an individual is determined through the flows of information, at all levels of living exchange between themselves; personality, through a system of dialogue relationships; culture, through dialogues and relationships between individuals and their groups. In addition, all stable natural or cultural formations are based on the rhythms of dynamic equilibrium; all outstanding religious texts, works of literature and art have stable basic rhythms correlated with the rhythms of the world harmony.

The contribution of *hermeneutics* to the methodology under consideration can be made primarily through the universalization of the classical hermeneutic triangle - “author-text-reader”. The universal hermeneutical triangle “thing-essence-being” can be considered as its generalization.

By analogy with “author-text-reader” hermeneutical triangle in the universal hermeneutic triangle within the process of the corresponding self-organization of its elements, follows that: essence (and thing-in-existence) produces the ‘text of being’; the text of being affects the ‘thing’; a thing forms an ‘essence’, which then transforms into its limit state (into ‘thing-in-existence’).

The non-equilibrium random rhythms of things disappear as quickly as they appear. So that the process of self-organization of a thing can continue for a sufficiently long time, the stage of this self-organization must be stable. It must be the limits of dynamic equilibrium for a given thing, each of which characterizes the stage of its self-organizing process. ‘Essence’ and ‘being’ of concrete things participate in a universal process in which the whole world is involved, forming infinite ‘thing-in-existence’ and being common to it.

The hermeneutic triangle reveals three self-organizations: thing, essences and being. A ‘thing’ organizes itself in a quasi-equilibrium

formation, within which the ‘essence’ becomes. ‘Essence texts’ are transformed into ‘being’. Self-organization of ‘being’ reveals the ‘thing-in-existence’ and its ‘texts’. The latter ensure the self-organization of things and close all these processes into a single whole. These three self-organizations complement each other and cannot exist without one another. A universal triple self-organization process arises, the stability of which is ensured by the interaction of individual quasi-equilibrium processes that provide alternate support for chaos and order from each other.

The core of *synergetic* is self-organization, so it is often called the science of self-organization. Deterministic “order-chaos” has two facets: order and chaos. Thus, the self-organization of every thing can be considered inside and outside. For example, if for a ‘thing’ there is deterministic chaos, for ‘being’ there is a deterministic order, etc. When chaos is inside a thing, order is outside and vice versa.

*The internal self-organization of a thing* allows its essence and existence to reveal, which are ensured by “thingness”, that is, organization, communication resources (energy, information), time, etc. This self-organization forms intermediate essences of a thing, which then can be transformed into thing-in-existence - the limit state of all these essences. Steps of this self-organization should be the limits of dynamic equilibrium for a given thing. Self-organization of the essence of things is generated by the texts of the world coordinate system.

The self-organization of a thing goes under the influence of various texts and co-organizes the thing and the text of thing-in-existence coming from the cell (I, C, K). Initially, a ‘thing’ is passive, but in the process of interaction of a ‘thing’ with ‘being’, the ‘text of being’ most relevant to this ‘thing’ is updated. It makes the ‘thing’ active and directs it to the search for its ‘thing-in-existence’ - the cell (I, C, K). Each new element of the ‘text of being’ provides a certain stage in the process of self-organization.

*The external self-organization of a thing* is ensured by its interaction with the environment. As a result, the signs of the ‘essence’ (F, H, G) are formed, and the ‘texts of being’ are formed, too. Self-organization of these texts of being allows us to identify the ‘thing-in-existence’ of a ‘thing’ as its ‘essence’ limit.

Interacting with the thing, ‘being’ contributes to the restructuring of the random organization of things on dynamic equilibrium (deterministic order-chaos). Each cell (F, H, G) corresponds to an

intermediate essence that is often frozen to forming a dead-end development. The impact on a thing allows us to make an identification step, which is then fixed by communication and the basic rhythm that a ‘thing’ selects from the stream of ‘being’ as a main for this stage. A ‘thing’, as a random object of a non-equilibrium world, meets the ‘text of being’ and begins to transform, rushing to the nearest quasi-equilibrium state, being oriented at three limits of dynamic equilibrium at the same time. One limit will not be able to provide a stable state of dynamic equilibria of the corresponding ‘texts of being’.

Concerning the *self-organization of essence*, if all “thingness” is completely randomized (mental procedure), then the ‘thing-in-existence’ arises and its limits define the cell (I, C, K). ‘Thing-in-existence’ as the limit state of an ‘essence’ can interact with all essences of its kind. The ‘text of thing-in-existence’, as a coordinate system of the world, is a “passive beholder”, with respect to which all things of the world are considered. The concept “passive beholder” is more broad and neutral than the “observer”. A look from the outside reveals the presence of a ‘thing’ in the world coordinate system, that is, in the totality of stably interconnected limiting dynamic equilibria.

According to Aristotle, “the question of what is thing-in-existence is a question of what is essence ... Some people believe that essences are the limits of the body ...” (Aristotle 1976, 188). Thus, the self-organization of the essences of things is due to their internal resources. Things that have found their own kind of thing-in-existence possess a tendency toward self-organization. ‘Thing-in-existence texts’ provide self-organization of ‘being’.

As regards the *self-organization of being*, we note that ‘being’ is an endless semi-sphere from various texts, caused by random transitions from one state to another; and mostly of them are dead-ends. In addition to various texts, ‘being’ also contains individual signs of all possible texts of the world. However, all texts that produced without the participation of thing-in-existence are not able to ensure the self-organization of the world and represent chaos itself. Self-organization of ‘being’ leads to limit texts of ‘being’: ‘texts of thing-in-existence’ that can be considered as the limit state of ‘being’ based on deterministic chaos. It can be said that the ‘texts of being’ are in the chaos of all other signs.

Theories of *co-evolution* are seriously criticized now, because the scale of rhythms, things, their structures and systems at different levels (for example, “non-living” or “living”) is significantly different. This

concerns the traditional point of view on the issues of co-evolution. From the point of view of the world coordinate system, the representation of co-evolution is changing. It follows that all the limits of identification, communication and the basic rhythms of the harmony of things are interconnected. Since all things strive for these limits, they turn out through them to interact with each other. Some of the things reach their thing-in-existence and corresponding fundamental rhythm of the world, the totality of which unites all the limit rhythms of the world harmony.

Co-evolution deals with processes that occur at various levels of dynamic equilibrium (the levels of thing-in-existence). These levels can be collected into groups and included in traditional areas: inanimate, living, spiritual, etc.; then the co-evolution - from the point of view of the world coordinate system - can be considered within the framework of traditional approaches adopted in most modern studies.

The foregoing observations can be considered by analogy with respect to the concepts of *global evolutionism*, if we engage the broadest view of the world. In this case, there is no question of considering the whole world as a single system, which is undoubtedly controversial, since in reality the totality of many interconnected systems and structures can be compared to the world. We can talk about the evolution of things located at all levels of the world that is carried out in various ways, closely intertwined with each other. In this approach, global evolutionism is divided into many separately evolving systems and structures that are continuously interconnected.

The world coordinate system allows us to take a fresh look at other varieties of post-non-classical universalism, grounded on the concepts of post-non-classical philosophy. Among them, first of all, it is worth highlighting the planetary synthesis of various spheres of human activity, the concept of open rationality, the interaction of scientific and extra-scientific approaches, the cognitive and value parameters of knowledge, the close relationship of explanation and understanding, Western and Eastern types of thinking, rational and irrational methods of cognition, etc. Such universalism must be based on dynamics and network of fundamental equilibria for an individual and for humankind alike. On the one hand, each person can develop his natural being in the social and spiritual context, making it unique, but predisposed to interact with the universal. On the other hand, 'being' on a planetary scale formed combinations of biological, social and spiritual subsystems that are homeomorphic to the 'being' of individuals. This

approach deepens the synthesis of West and East philosophical ideas and it is consonant with the cross-cutting ideas of the “great equilibrium” and “world harmony” of Chinese and Indian philosophies.

The foundation of post-non-classical universalism is the organization of the earth’s shells, which surpasses everything created by man, having high stability, optimality and the ability to self-developing. If the parameters and the rhythms of geosphere did not correspond to the cosmic ones, then they would not exist for billions of years as the hydrosphere and atmosphere. The modern person must be involved in sustainable natural and social cycles in which the final product of one of the intermediate cycles becomes the beginning of the other. The general totality of all these cycles forms a single closed system that implements in nature and society the fundamental process of its circular return. The criterion for such cycles is the cost of energy, information, spirituality. The emerging human-sized complexes created by the efforts of personalities get self-sufficiency, responsibility, internal harmony, ability to carry out regulatory processes to optimize the flow of matter, energy, and information within their limits. A person in such conditions will not be alienated from itself, but will be capable of the most complete development.

*Universal interdisciplinarity* is based on a set of dynamic equilibria at all levels of the world’s organization. There are stable relationships within a separate level of the world’s organization and between these levels, too. In contrast to co-evolution, here we are dealing not with processes, but with structures and systems of educated ‘things’.

The set of dynamic equilibria at all levels of the world’s organization provides universal interdisciplinarity of post-non-classical science with a broad and stable philosophical foundation, which is different comparing with the non-classical science. The main approaches of the latter were the dissemination of the methods or concepts of one science in related fields or the identification of the border area where an intermediate methodology was developed for these sciences. Despite the radical differences between the limits of identification, communication and basic rhythms of harmony at different levels of the dynamic equilibrium of the world, the algorithms for their interaction with ‘things’ of these levels are organized in a similar way.

*Global studies* cannot be oriented toward regulation, letting alone control over global processes. Global studies need a harmonization of

global processes for an individual (person), community, and planetary (universal) phenomena.

Huge possibilities for harmonizing global processes are possessed by planetary cultural and civilizational networks that are closely connected with the world coordinate system. On the one hand, rational concepts, meaningful concepts, clear rhythms and cognitive thinking can be used in organizing the cells of these networks. On the other hand, irrational oriented to intuition, unclear but somehow correlated with limit dynamic equilibria can also be included in these cells.

There is feedback in network processes that creates counterweights for processes occurring in all areas of modern human activity. Any hasty non-equilibrium solution and the action directed by it will inevitably be stopped by the inertia of the networks, “get stuck” in them, which will allow to return the action or part of it and to correct the error. Harmonization of all these shells and global processes will ensure a sustainable dialogue between individuals and cultures in modern conditions.

The limit view of globalization and global processes includes the scale of the planet itself, the geosphere, so everything secondary is eliminated. All limiting dynamic equilibria correspond to concrete things and the scales are connected with each other. Cultures, religions, economics, finance, etc. have their own identification, communication, rhythms (cycles), connecting them with the world coordinate system.

The problem of *ecology* focuses on the stability of connections between a ‘thing’ and its environment. All initial concepts of ecology, an individual, a population or a community (Begon et al. 1989, 10) call the philosophical term ‘thing’ used in our approach as part of a specific ecosystem. The methods of forming the external and internal cells of the world coordinate system, the self-organization of a ‘thing’ and its essence, etc., presuppose a complete coverage of all the connections of a ‘thing’ and of an ecosystem with the environment. According to the principles of ecosystem functioning, the latter is oriented toward its limit states. Research methods based on the limiting dynamic equilibrium of the coordinate system deepen this orientation and make possible to consider all the (inter)connections from the point of view of their limits.

Thus, the philosophy of ecology (Keller and Golley 2000) deals primarily with the totality of all the interconnections of a ‘thing’ with the environment. The world coordinate system allows us to explore these relationships in all their possible completeness, providing them

with maximum stability and optimality. This creates the ontological basis for modern environmental concepts.

## CONCLUSION

As we tried to emphasize, phenomenology sustains us to identify the ‘mechanisms’ of the formation of the world coordinate system’s external and internal cells. The universal hermeneutic triangle allows us to simultaneously consider the processes of self-organization in ‘things’, ‘essences’ and ‘being’ that can be called a “triple self-organizing spiral”. Synergetic considers two facets of the deterministic order-chaos, where order and chaos complement each other. Self-organization of a ‘thing’ reveals its essence; self-organization of essence discloses texts of ‘being’; and self-organization of ‘texts of being’ leads to the ‘thing-in-existence’. Co-evolution and all varieties of global evolutionism do not consider the whole world as a single system, but investigate the totality of many separately evolving structures that are continuously interconnected. Many stages of the world’s development (primarily its initial stages) show non-equilibrium, and the self-organization of all ‘things’ is spontaneous. But after the formation of a coordinate system based on ‘essences’, ‘texts of being’, and then on ‘things-in-existence’ and ‘limit texts of being’, the self-organization goes toward quasi-equilibrium. This self-organization always went on, but not always it determined the development of the world. Finally, universal interdisciplinarity is basing now on a broad and stable philosophical foundation; global studies need the harmonization of global processes at each level, from individual to planetary phenomena; and ecology claims that a stable relationship between man and humanity with the natural coordinate system is a prerequisite for their further development. Only following such a way, humanity will be able to develop harmoniously, optimally and almost unlimitedly long. Neither aliens nor beauty will save the world; but all further human activities based on the understanding of the world coordinate system will do it.

## REFERENCES:

- Aristotle. 1976. *Collected Works*. Russian translation. Volume 1. Moscow: Thought.
- Begon, M., J. L. Harper, C. R. Townsend. 1989. *Ecology: Individuals, Population and Communities*. Russian translation. Volume 1. Moscow: Mir.
- Keller, David R., and Frank B. Golley (Eds.). 2000. *The Philosophy of Ecology: From Science to Synthesis*. Athens, Georgia: University of Georgia Press.

- Kozhevnikov, N. N., V. S. Danilova. 2016. "The world coordinate system on the basis of limit dynamic equilibrium". *European Journal of Philosophical Research*. Vol. 5, No. 1: 18-26.
- Kozhevnikov, N. N., V. S. Danilova. 2018. "Human development in the world coordinate system on the basis of limit equilibria". *Agathos*. Vol. 9, Iss. 1 (16): 135-144.
- Kozhevnikov, N. N. 2018. *Metaphysical, ontological, phenomenological, and hermeneutical aspects of the world coordinate system based on the limit of dynamic and network equilibria*. Yakutsk: NEFU Publishing House.