

Summaries

V.Gorokhov. From simple to complex explanation: from classic natural sciences to engineering sciences

In the early New Time mathematical principles could be applied to the development of new machines from practical engineers. There was a practical problem of developing a model into full-scale machine. The classic six simple machines are the elementary «building blocks» of which all complicated machines are composed. Heron of Alexandria lists five mechanisms: winch, lever, pulley, wedge, and screw. By Galileo we find one more – inclined plane. But for Galileo inclined plane is also an abstract theoretical object and the universal explanatory model for all machines. Abstract theoretical objects are specially designed in theoretical knowledge as a result of a particular kind of idealization and schematization of experimental, and hence, engineering objects. For example the mathematical pendulum is an idealized model of a gravity pendulum, which can be used to investigate the laws of free fall. Galileo did more than just observe natural phenomena. He would design an ingenious project of the technically feasible experimental situation. Based on this project, a real experiment could be devised and conducted. Galileo not only related a geometrical scheme to physical reality, but also to the constructions of the different complex machines. But it was Euclid geometry. In the next phase of the development of the theory of mechanisms (kinematics of machinery) as an engineering science instead of Euclid geometry was elaborated the descriptive geometry of Gaspard Monge. Theory of mechanisms encloses now the general classification of mechanisms and the description of the structure of different mechanisms with help of the kinematic geometry as consists from kinematic pairs, chains and gears to multiply of structural schemes of the new technical systems.

Keywords: theory of «simple machines», complex machines, Galileo, theory of mechanisms.

A.P.Ogurtsov. Overcoming complexity and expanding the boundaries of scientific theories

The paper offers an analysis of the various historical forms of the complexity of the objects of reseaching (irrationality in the antique mathematic, the organic and teleological systems for analytic science) is an attempt to follow this eqwifinality and the autopoiesis in the history of science.

Keywords: Complexity, eqwifinality, autopoiesis, teleological and organic systems.

V.Arshinov. Observer of Complexity in the Context of Paradigm of Post-non-classical Rationality

New concept of observer of complexity is introduced in the context of “evolution and constructive” science development model elaborated by Vyacheslav S. Stepin who distinguishes three basic stages in this process: classical

phase, non-classical stage, and post-non-classical one. Observer of complexity is successively connected with quantum mechanical observer of non-classical science and with observer of Laplace in classical theory. In this connection special attention is devoted to the significance of works of such authors as Edgar Morin, Heinz von Foerster and Gregory Bateson which are the founders of second-order cybernetics, Francisco Varela and Humberto Maturana who are the autopoiesis conception authors, and also to the logical form of differentialist thinking presented by George Spencer Brown.

Keywords: complexity, recursion, communication, the observer of complexity.

Y.Svirsky. Individuation in complexly-organized world

The article traces the relationship between a paradigm of postnonclassical science and poststructuralism. In this case, we consider the tendencies presented in the self-organizing processes of individuation. First of all, the accent is made on the role which technology plays in this kind of processes that define a person's position in the complexity-organized world. Here it is necessary to develop a new type of intuition, which is not only come back to the Cartesian-Kantian paradigm, but has in view the strategies related to researches and concepts of G.Simondon, G.Deleuze and others, given that one of the important aspects of these strategies of philosophizing is desire to give a genetic explanation for current individuations in living and inanimate nature. Particular importance is the Simondon's introducing of understanding of concrete technical objects and associated media, which outlines a ways to remove these intuitions on the methodological level.

Keywords: complexity, self-organization, nonlinearity, individuation, the technical object, technical individual, associated media, recursive causality.

H.Knyazeva. The Cognitive Complexity

The concept of cognitive complexity is developed in the article. The complexity of cognition involves the syncretic inner connection of the level of perception and the mental level (perceptual thinking), the logical and intuitive components, the analogue, continuous and digital, discrete ones as well as loops of feedback between a cognitive agent and a medium which it cognizes, the connection of cognition with action, of cognition with communication. The cognitive complexity is formed also by complexity of functioning of consciousness and of the intertwining of its levels. Mind is considered as a structure-process in the interdependence of its bodily and mental aspects: body is able to cognize; it is thinking one, whereas mind is moving one. Mind is a self-organizing system, and self-organization engenders the phenomena of emergence, unpredictability on the level of the whole. The concept of cognitive complexity is discussed in the context of the notions of complexity and

nonlinearity of thinking as well as of nonlinearity of writing. It is argued that a “complex epistemology” (Edgar Morin) is necessary for comprehension of complexity of cognition and creativity.

Keywords: mind-body problem, cognitive complexity, nonlinear thinking, self-organization, complexity, consciousness, subject-object, embodiment, enactivism.

V.M.Rozin. Methodological approach as a modern way to resolve the problem of complexity

In the article methodology is analyzed from one more point of view, as a modern way allowing to overcome the complexity of studied phenomena. The criticism of methodology from phenomenology and post-modernism is considered. The author maintains that modern methodology provides for meeting challenges more efficiently than the mentioned disciplines. Specified are the particular features of modern methodology as a means of overcoming the complexity of studied phenomena.

Keywords: methodology, science, practice, thinking, support, genesis, normalization.

E.Kalinin, Yu. Chernovitskaya. The reality of the complexity or the complexity of the reality (information and communicative approach)

Classical rationality assumes that complexity has ontological nature. We can not say about complex organization of the world in postclassical approach with informative and communicative base among other, if we don't specify the communicative and cognitive processes. Objective development of the reality results to increase the number of the complexity can not be reduced to each other languages with the weakening of objectivity, but without the complete loss of meaning.

Keywords: information, communication, complexity, simplicity, reality, rationality, dynamic, system.

S.Konyaev. Complexity Problem and Pure Science Development Perspectives

Ancient Greek sources of philosophical foundations of modern science were considered. Different methodological approaches to the problem of physical observer construction were discussed. On the base of thought experiments it was shown that limits on the possibilities of reality observation connected with available sensing (measurement) means of proposed observer model. “Non-organic body of civilization” notion development was proposed.

Keywords: foundations of physics and mathematics, the philosophical foundations of science, corporeality, the boundary of the biosystem.

Yu. Sachkov. Probability – on the way of studying complexity

It is shown in the paper that a precondition of studying complex and complex-organized systems is appealing to probabilistic (statistical) methods of investigation. Complexity is not just catastrophic growth of the numbers of elements or parameters of the systems. It is rather an “intricacy” of the forms of interactions between elements and subsystems of the complex-organized systems. It is proved that adequate study of complexity demands special attention to the ideas of chance, independence and hierarchy which have its roots in the theory of probability and its applications. It is shown in the paper that a precondition of studying complex and complex-organized systems is appealing to probabilistic (statistical) methods of investigation.

Keywords: probability, chance, complexly-organized systems, the statistical system.

L.G.Antipenko. About geometric and quantum-physical experience for the study and development of cosmic space (Science and philosophical analysis of the problem)

Each astronaut in outer space is faced with a number of little-known phenomena that pose a danger to his physical and mental health. Usually such phenomena are called anomalous phenomena – phenomena such as UFOs. In this paper we show that they are based on complex factors of non-Euclidean structure of space and time, as well as physical vacuum.

Keywords: from simple to complex, time-space universe and the physical vacuum.

D.Taraborin. Unified theories in physics – searching for simplicity in the world of complexity

«Theory of everything» is considered in the article as a course of unification. It is illustrated that «theory of everything» displays a tendency to unify of the scientific knowledge and to simplify the ontology of physics. This trend seems to be a part of a more general human desire to find out a simple basis to realize variety of the world.

Keywords: theory of everything, unified theory of physics association, unity of scientific knowledge.

E.Chuvasheva. Complexity and symmetry

Ontological and epistemic meanings of the fundamental symmetry principle and the symmetry violation principle are analyzed. A relationship between the concept of symmetry, the symmetry violation effect and the complexity of theoretical reconstruction of the world of elementary particles is considered.

Keywords: symmetry, symmetry breaking, simplicity, complexity, theoretical reconstruction of the microworld, hierarchy of scientific knowledge, explanatory principles, ontology of science, dynamics of scientific knowledge.

I.Yu. Alexeyeva. Complexity and simplicity in self-knowledge of society

The notion of “complexity of the observer of complexity” (constructed by V.I.Arshinov) makes non-trivial effects in the area of self-knowledge of society. Society may be considered as subject that comprehends its own complexity. “Second-order cybernetics” as well as “first-order cybernetics” is relevant to this area. Science and humanities should take more important part in self-knowledge of society. The obstacles to this are created by those methods of evaluation of effectiveness of science and humanities that reduce one’s contribution to science to the contribution to mass of publications in English.

Keywords: Observer of complexity, self-knowledge of society, self-knowledge of science, reductionism

V.Lepskiy. Problems of control of complexity in improvement of mechanisms of democracy in Russia

Examines the problems of complexity associated with the view of democracy as a process control. Ways to improve democracy in Russia are being analyzed. A proposal to establish the civilized, supervised and society supported «dictatorship of development» formulated, as a form of Democracy, which includes new mechanisms, adequate to realities of the XXI century, allowing to combine hierarchical and network mechanisms of control and development to successfully cope with the increasing complexity of social processes.

Keywords: complexity, control, democracy, scientific rationality, reflexion, reflexive and active environments, the subject focused approach, dictatorship of development.

D.A.Stebakov. Following the complex human nature

The question of the complexity is discussed on the base of experimental psychological and psychotherapeutic discourses with involvement of concrete scientific material. The problems, linked with a specificity of the object of the research – its complex, multidimensional structure and involvement into the complicated system of connections and relations, occurs every time, when a human is studied. These problems are investigated and analyzed in detail in the article.

Keywords: complexity, psychology, psychotherapy, experiment, experimental psychology, probability.

V.Burov. Humanitarian foundations of science: factor of irreducible complexity of knowledge in the knowledge economy

On the basis of the analysis of the multidisciplinary practice is the use of special knowledge, knowledge management in education, practice and statistics of the CSE was allocated for determining the productivity of knowledge work factor of the irreducibly complexity of knowledge. Evaluated the influ-

ence of this factor on the development and implementation of new generations of technologies of material, social and humanitarian production. Offered humanitarian management technology of the complexity of knowledge.

Keywords: trans-modal knowledge economy, the factor of complexity, the subjective structure of knowledge.

O.E.Baksansky. The notion of world's complexity: the modern philosophy of education

The culture forms consciousness of the person, it gives a certain set of means which helps the person designs not only the special vision of the world, but also self-identification. It is impossible to understand outlook, thinking and mentality of the person without the cultural environment and those informative resources which it contains. Only joining them, the person becomes fully civilized. The thinking of the person is formed in the course of education. The main task consists today in carrying out retraining of all teachers so that they knew how to unite modern information technologies with actual methods of teaching and learning within the cultural and historical concept of education.

Keywords: philosophy of education, methodology of knowledge, information, knowledge, cultural-historical conception, converging technologies, narrative, discourse.

J.Khen. About complexity of life and simplicity of theories

The great number of evolution theories existing today may be conventionally divided into «darwinistic» and «non-darwinistic». Adherents of each group bring in defence of their positions serious arguments. Each group considers arguments of its opponents not so weighty, This opposition is very principal (there is no consent even on the occasion of the fact that natural selection is the factor of evolution) and lasts more than one hundred -and-fifty years already. The purpose of this article is, firstly, to clear up which role in the battle of ideas plays the scientific argumentation and why it does not convince opponents and, secondly, to find out connection between simplicity of this theory and its popularity.

Keywords: evolution, darwinism, natural selection, ecosystem theory of evolution.

L.P. Kiyashchenko Simplicity of complexity and complexity of simplicity (the dimension of distinction)

In this article the characteristic discourse of contemporary philosophy of science antitetika relationship between simplicity and complexity of simplicity. It acts as both constitutive and regulative principle, setting the mode here-now interval measure specific cognitive situation that goes beyond its borders. In this self-organizing dimension distinguishing complementarity fit

the classical setting of the first type band approach (being in formation) and band approach the second type (the formation of life), is characteristic of the experience transdisciplinary philosophy.

Keywords: antitetika, simple complex, the complexity of simplicity, transdisciplinary experience, interval approach, a measure dimension, the distinction becoming.