The Fourth Conference on Information Theory and Complex Systems
TINKOS 2016

BOOK OF ABSTRACTS

Editors: Velimir Ilić and Miomir Stanković

Belgrade, Serbia, October 27-28, 2016
Mathematical Institute of the Serbian Academy of Sciences and Arts

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МИНИСТАРСТВО ПРОСВЕТЕ
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THEMATIC FIELDS

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- Information transmission
- Complex networks
- Decision making in complex systems
- Stochastic processes
- Intelligent systems
- Bioinformatics
- Mathematical physics

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The Width of Complexity Potential as an Integral Factor of Science

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complexity; fractality; new methods; cultural heritage; Orthodox icon

Summary

Complex systems theory represents an umbrella term for various types of research that include dynamical systems, discrete dynamical systems and cellular automata, game theory, information theory, networks, computational complexity, numerical methods, agent-based modeling and more [1]. Organizational clusters of complex systems reveal dozens of thematic frameworks, because each of these is covering several. For the chaos theory the turning point is considered to be in 1970-s [2], while the end of the second and the beginning of the third millennium is considered a milestone for complexity [3].

The frequent appearances of topics that are not classical example of complex systems and those that are not studied within mainstream scientific disciplines are of particular interest. Even the mere titles of papers in the field of fractality, which is a very illustrative field, draw the scientists' attention. Some of these topics are: structural scaling of Johann Sebastian Bach's Cello Suite No. 3 [4], fractal behaviors in a soccer game [5], measuring the temperature of texts [6], fractal analysis of different musical instruments [7], complexity perturbations in tanpura signals [8].

It is very interesting to look at the most cited papers in the field of complexity, as well as at the most approached works. They illustrate the impact of complexity as well as its permanent appearance in new areas. Among these are: Risk evaluation of diabetes mellitus by relation of chaotic globals to HRV [9], Cosmological natural selection and the purpose of the universe [10] etc.

Looking at the originating and linking of the fields over the period of the last 60-70 years (taking, for example, cybernetics as the starting point [11]) it is clear what kind of theoretical diversification we are talking about – the one that corresponds to the observed phenomena in natural as well as in social sciences. In the context of the diversity of topics we give an example from the practice of local authors. It is about a research that is completely unknown and new in this field. It is a specific, integral approach to an Orthodox icon that includes fractality, self-organization, examination specific geometry, lighting and the role of observer [12]. This was preceded by the following steps: the research of quantification of self-organization and complexity by which a door to a new methodological framework for dealing with data is opened [13,14]; simultaneously, the work on the application of new methods in working with cultural heritage [15], primarily Orthodox iconography, was being created [16]. Consideration of the role of the observer in this model was based on relying on phenomena of quantum optics [17].

The presented example is a typical indicator of the potential which complexity has, as well as its power of integration.

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