
Foreword

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Biographical notes: Eugene Solozhentsev is a Professor in the Department of Information Technologies in Business at St. Petersburg State University of Aerospace Instrumentation (SUAI), Russia, and Head of the Intelligent Integrated Systems of Automated Design Laboratory of the Institute of Problems of Mechanical Engineering (IPME) of Russian Academy of Sciences, Russia. He is also an Honoured Scientist of the Russian Federation, and the Chairman of the International Program and National Organizing Committees of the 'Modeling and Risk and Safety Analysis in Complex Systems' International Science Schools, Russia. He has published more than 300 scientific works, including nine books.

Vasily Karasev is working in the Institute of Problems of Mechanical Engineering of Russian Academy of Sciences (IPME RAS), Intelligent Integrated Systems of Automated Designing Laboratory as a senior research worker. He is a candidate in technical science. He graduated from St. Petersburg State Academy of Aerospace Instruments Making in 1996. During postgraduate activity, he prepared his dissertation work entitled *The Development and Research of Logical and Probabilistic Risk Models in Business and Methods of their Identification with Account of the Groups of Incompatible Events*. The dissertation was successfully defended in 14 June 2000. His research interests include logic, probability theory, combinatorial analysis, optimisation methods, graph theory, classification methods, expert systems, data analysis and management technologies. He is the author of more than 50 published papers and co-author of three books.

Our first special issue of *IJRAM* (V18 N3/4 2015) was devoted to classes, procedures and software for risk management technologies in complex systems. This second special issue is continuing the first one and is devoted to management of socio-economic safety because the economics is far from being perfect and needs to be developed further. This can be seen from the failures of companies, economic recessions in many countries and unsolved problems in economics.

Let us name just a few problems in economics, unsolved owing to the lack or incorrectness of the following mathematical models of system states: connections between economy, politics, state, science and society; taking into consideration events-statements made by government officials, businessmen, scientists and public figures concerning the changes in legislation, the situation in the market, the emergence of innovations, etc.; the interconnection of different socio-economic systems (SESs); transition from any databases to knowledge bases in order to make decisions; using multi-state invalidity in economics in the same way as failures in engineering; the techniques of building system risk models using the parameters of one of its states; invalid, conceptual, indicative and hybrid models built for the universal assessment of economic systems; the integration of models by logical operations *AND*, *OR*, *NOT*; the study course 'Socio-economic safety management'. Economics departments at universities (created on the basis of accounting and audit departments) and academic institutions under the name of 'Economic safety' do not actually deal with safety management of SESs.

Here are some more problems in economics unsolved owing to the lack or incorrectness of the following mathematical models of management: taking decisions using mainly certain 'notions'; management of the banks' operation risk and capital reservation by Basel; management of the quality of systems and products by the WTO; management of crediting process in banks; management of economic wars caused by sanctions; management of reforms in education, science and the economy; management of the participation of public opinion and scientists in the solution of socio-economic problems; the development of systems as complex objects moving along the pre-set trajectory with corrections in case of deviations from it; management of the strategy of the development of the country and its regions on the basis of the adjustments of models using the information concerning the changes in economy, politics, law and innovations.

The analysis of unsolved problems in economics has shown that we need a new economics discipline 'Socio-economic safety management'. This new academic discipline has been influenced by many scientists: G. Boole, who introduced the logical calculus of sentences; P. Poretsky, who established the connection of logic and the probability theory; I. Ryabinin, who created the theory of LP-analysis of reliability in engineering; Nobel Prize winners J. Buchanan and J. Heckman, who studied the interconnection of economy, politics and the state on the basis of game theory and statistical data analysis; N. Wiener and J. von Neumann, who believed that mathematical methods, used for managing economic and social systems, must be based on logic, probability theory, sets and combinatorial theory; A. Einstein, who thought that no problem could be solved at the level where it appeared.

The papers of this special issue define the invalidity of parameters and the system as a deviation from pre-set values. It introduces the new types of Boolean events-propositions and new types of logical probabilistic (LP) risk models for managing socio-economic safety. We use the event approach to modelling the risk of systems and solving the problems of risk analysis, forecasting and management on Software Arbiter и Expa.

The objects of the new economics discipline, socio-economic safety management, are SESs of several groups. The first group includes SES, which are top priority for the government, aimed at reducing financial losses and increasing revenues:

- 1 Management of the state of the innovation system of a country.
- 2 Counteraction to bribery and corruption.
- 3 Counteraction to drug addiction in a country.
- 4 Management of the banks' risk and capital reservation in accordance with Basel.
- 5 Systems and goods quality management by the WTO.
- 6 Monitoring and management of credit provision to banks.

We should consecutively build scenarios, structural, logical and probabilistic risk models for a SES. In the SES safety management technique, the central place is occupied by the following procedures: building of risk LP-models, orthogonalisation of the risk logical function, the assessment of the invalidity of initiating events, and the LP-analysis of system risk by the contributions of events.

The new economics discipline, based on logical and probabilistic modelling of reliability and safety in engineering, is extending the reliability theory in engineering: the states of a system's elements are described by not only two values (failure and normal functioning) but they are multi-state, and the logical and probabilistic risk model is dynamic.

The economics discipline socio-economic safety management is a unified complex of models, methods, knowledge, techniques and software based on LP-risk models and LP-calculus. The academic and practical relevance of this discipline is defined by the fact that it solves the unsolved problems in economics mentioned above.

This special issue introduces new scientific directions: 'management of socioeconomic safety' and 'the top level management in economics'. The objects of management include: governments, socioeconomic problems of governments, and socioeconomic systems of a country and its regions.