

ABOUT SYSTEM-PARAMETRIC FORMALIZATION OF ECONOMIC AND ECOLOGICAL PROCESSES

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One of the important problems of the present economic and environmental studies, in our opinion, is development of theoretical and methodological bases of analysis of complex economic and ecological interactions. At the same time the complexity of analysis of such processes is increasing: on the one hand, if it is necessary to take into account, at least indirectly, nonlinearity and other uncertainties; on the other hand, if it is necessary to provide a system-parametric description of the "image" of the object (process). These problems were highlighted in the papers, which addressed economic and environmental problems of the Black Sea and Azov basin and coastal regions.

Development of scientific bases of system-parametric formalization of complex economic and ecological processes (EE processes) can be provided with the help of coevolution of methodology of parametric general theory of systems (PGTS) of A. I. Uyomov and the methods of Matrix- Incidence Analysis. According to PGTS, EE processes as the objects of research can be presented with the help of the terms of the language of ternary description (LTD) - interconnected parameters "thing", "properties" and "relationship".

Matrix-Incidence Analysis is considered as a method of studying of binary relationships (interactions) between objects (economic, ecological, social) using parameters that characterize their specific incidence. This type of analysis is based on the mathematical theory of matrices.

In the Matrix-Incidence Model (MIM) incidence is considered in the following conceptual and categorical outline: incident (incidence) in the mathematical context is associated with "relation of accessory"; in the MIM incidence with a "plus" is considered as a demonstration of a positive synergetic affect and defined as an "interest" ("resource of development"); incidence with "minus" is considered as a demonstration of the negative effect and defined as a "threat" ("anti-resource of development")

Relatively simple model of formation of scientific and applied bases of Matrix-Incidence Analysis and System-Parametric formalization of economic and ecological processes can be presented by the following three blocks and respective directions of studies.

I. Methodological bases of System-Parametric Matrix Analysis of the objects of study of economic and ecological processes (Variant and invariant concepts of matrix analysis; Principles of System-Parameter Matrix formalization; Matrix models of integrated analysis of economic and ecological systems (EE systems)).

II. Methodological and methodical bases of Incidence Analysis of EE systems (Conceptual apparatus of Incidence Analysis; System-parametric concepts of Incidence of EE systems).

III. Applied basis of Matrix-Incidence Analysis of parametrically determined system (object) of studies (Matrix-Incidence Analysis of EE systems at the level of enterprises, branches, areas (cities), region, country).

Matrix-Incidence Analysis methods can be scientifically and practically efficient for environmental projects feasibility studies, expert assessments of environmental projects, scenario analyzes in the process of socio-economic and economic-ecological foresight.

It should be taken into account complexity and non-linearity of the EE processes that determines the need of comparisons of options using several criteria (it should be noted that the single-criteria optimization for such systems is unproductive). Decision making options for the discussed problems (management of EE systems) is related to multi-criteria optimization, which can be successfully implemented using the following models: 1) models of interests coordination, which allow to take into account processes and mechanisms for obtaining compromise decision, sustainable and fair; 2) models of Pareto-optimality in the assessment of EE systems with several indicators - optimality criteria, on the basis of which assessment of the quality of social, economic or ecological object is made.

In the final part of the discussed problem of Matrix-Incidence Analysis of complex systems we would like to stress an important issue of system methodology of MIA of higher order, which is related to object cognition and ways of cognition, which, according T. Kuhn and S. V. Stepanenko can be defined as a "Methodological Matrix."

Conceptually-categorical nature of "Methodological Matrix" in the above mentioned context can be defined as the set of methodological principles of studying and way of studying which help to obtain, structure and accumulate the knowledge. This set includes the following: a) general scientific approaches to be followed at the present level of the historical development of science and which represent a type of domination of certain scientific paradigm; b) fundamental theoretical principles of the science, taken as axioms and used in the process of cognition as a type of control points forming a systematic presentation of the object of studies; c) main directions of scientific analysis, in particular, identification of the object and subject of scientific research; d) methods of cognition in accordance with the features of scientific object; e) criteria to determine the level of scientific value of knowledge obtained.

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