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GENERALIZED DYNAMICAL SYSTEMS AND LARGE-SCALE OBJECTS AS OBJECTS OF LONG-TERM PROGNOSIS

We consider the use of a systematic approach in the study of forecasting systems. The basic dynamic systems and large-scale facilities in dealing with different types of control problems involving different nature of forecasting methods. The value of building a mathematical models for the study of the systems in the short and long term.

Keywords: forecasting systems, dynamic systems, large-scale facilities.

У статті розглядаються питання використання системного підходу при дослідженні прогнозних систем. Визначені основні динамічні системи та багатовимірні об'єкти, які застосовуються при розв'язанні задач управління із залученням різних за своєю природою методів прогнозування. Підкреслюється значення побудови математичних моделей при дослідженні функціонування систем на короткострокову та довгострокову перспективи.

Ключові слова: системний підхід, динамічні системи, прогнозні системи, багатовимірні об'єкти.

В статье рассматриваются вопросы использования системного подхода в исследовании прогнрозных систем. Определены основные динамические системы и многомерные объекты, которые применяются при решении задач управления с применением различных по своей природе методов прогнозирования. Подчеркивается значение построения математических моделей при исследовании функционирования систем на краткосрочную и долгосрочную перспективы.

Ключевые слова: системный подход, динамические системы, прогнозные системы, многомерные объекты.

Statement of the problem. Accelerating economic integration process of Ukraine into the global economy requires the use of significant material and intellectual resources. Feature of the functioning of economic systems are the fundamental features management. They are always in development. The issue analysis and management are particularly relevant. Therefore, the study of complex dynamic systems or facilities is a prerequisite for their successful operation and management decisions on the future development of various terms . The key to the effectiveness of such a system is flexible work system, the ability to cultivate effective mechanisms of market behavior, timely development strategy. On how quickly will set development strategy depends on the speed of effective mechanisms of market behavior. The system should be open to bringing new staging, new techniques and have a modular approach to the organization.

The purpose of this paper is to identify the main tasks and functions in the analysis

and evaluation of the functioning of dynamic systems that are complex multi-dimensional objects. Show that in today's society development, systematic approach to forecasting is an integral part of the scientific approach to solving management problems in order to make optimal or close to them for making the set criteria.

Analysis of recent research and publications. Theoretical and practical issues of implementing a systematic approach in the sphere of economy devoted to the work of different scientific schools. This work, which are carried at the intersection of several sciences (economics, mathematics, statistics, forecasting, etc.). Also the scope of such developments is widespread and covers various sectors of economic and social spheres of social life of the state. In Ukraine these developments involved in leading research institutions (economics, computer science, strategic studies, etc.), branch institutes and firms . This school O. Bakayeva , V. Heyetsya , B. Panasyuka , I. Serhiyenka and others.

Statement of main content. There are two major trends in the prediction of first presents the development of relative or private forecasts in science, technology, economics, second - Integrated forecasts the prospects for development of the state as a whole or parties include, reality: social services, society, science, technology, material resources, and other natural areas [1 – 3]. It traced a comprehensive approach to this problem. The purpose of these forecasts is to prevent the negative effects of scientific and technological progress, or at least limit their scope. Because the timing of the introduction of scientific and technical developments in the industry declined sharply, the assessment of the prospects of the objects must be accurate to at any time, you can use the results of any scientific discovery [4]. It traced a comprehensive approach to this problem. The purpose of these forecasts is to prevent the negative effects of scientific and technological progress, or at least limit their scope. Because the timing of the introduction of scientific and technical developments in the industry declined sharply, the assessment of the prospects of the objects must be accurate to at any time, you can use the results of any scientific discovery [4] .

The purpose of forecasting is that by analyzing the current state of the phenomenon, accounting for quality changes and the real possibilities of objective uncover trends and identify its main terms and conditions. Solution of the problems due to the current level of progress can be made in different ways. Possible solutions to this problem are called alternatives. Alternatives can be very different from one another in size and cost by the time needed for their implementation. It follows that there are several alternatives requires a thorough qualitative and quantitative analysis. In recent years, there has a systematic approach to the phenomena being studied. The feature of this approach is a better understanding of the problem, establish objective principles and rules that allow you to compare possible solution [2 – 3]. Real life is characterized by the fact that all processes and phenomena are interconnected and interdependent. Links increasingly complex, changing nature of their interdependence. Activity results in some areas (social, political, industrial) affect the results of research in other areas. Politics depends on the economy, and the economy depends on the policy. Therefore, analysis of facilities management works onlechot-end features at least the basic relationships between individual elements between the object and the environment. Investigated phenomenon or object as a collection of objects that form a whole , constitute a system. There are dynamic and generalized dynamical systems . Classical dynamical systems are usually described by differential equations and represent a special case of generalized systems. Generalized dynamical systems are a set of interrelated objects and processes that change over time. They are divided into natural and artificial systems. Examples of natural systems is the universe,

the earth, man, piece – scientific and technical progress, society, economy, production and so on. However, any system can be viewed as a subsystem of some other system. It also varies by external and internal factors. Complex problems are never isolation as a systematic approach to the phenomena being studied aims to simplify the solution of the problem and identify the most significant in the complex.

The economy as a whole – is a complex artificial system. It consists of material elements: industry and types of production, relations of production, infrastructure and others. Production industry is too complex artificial system or subsystem of the economy, which is her medium. Material element of this system is the enterprise. For the enterprise, both for the system, the material elements are shops, offices and so on. For example, process automation requires a self-regulatory system with multiple inputs, outputs and controls parade. This leads to the need to consider the same automated system in close connection with the environment, as part of a larger system.

However, considering the system in the environment, we must provide only important relationships. The value of any properties of the system must be assessed in terms of goals to be achieved. The emergence of computers has led to the creation of data-based models of «input-processing-output». Control by using a specially designed set of programs. Thus, a systematic approach involves combining the objects, setting their properties and relations, highlight the most important factors to achieve their goals, predicting their future povodinky aimed at simplifying the problem, the selection of the most significant in the complex. Unlike natural systems nobody created that described by differential equations and fully defined artificial systems created man to work when there is a purpose. Through analysis of the study, the researchers aim to improve the performance of the systems, to choose how to achieve them, which means finding the best ways to achieve the goal, that is the best solution when there are many options to achieve this goal. Problem-identification research object, defining the goal and objectives of the criteria for the study of the object and control them. This stage can not be fully formalized, there may be errors in setting goals, or incomplete definition of objectives:

Primary structuring problems. This means that a group of systems analysts determine the boundary review system breaks PA system elements and isolates it from external factors. If the system can be isolated from the external environment, the system is called closed, otherwise – open. If an open system can not be isolated from the external environment, it must be all the elements influence on it, make system settings; Construction of mathematical models and elaborate structure. Here are the following points as a parameterization model, ie all selected elements are characterized by parameters; establishing the relationship between the individual parameters, clarify relationships, the allocation hierarchy of subsystems and subsystem elements typical; Prediction of the studied system. Synthesis of control. It is possible to assign tasks to achieve a goal, or the goal of optimization. Any large-scale socio-economic or technological object (scientific and technical progress, the economy in general, the industry producing and others) can be viewed as an artificial system. Then the prediction of such objects – it is a process that can be described by «predicting system», including mathematical, logical, heuristic elements, the input of which receives information on the projected object, and the output is information about the future state object. Systematic approach to prediction of large-scale facilities including stages of work, some Glushkov, can be described as follows. At the first stage the aim and object of the forecast, which is considered as a system of interrelated internal components, elements according to their hierarchy and importance. Internal components may be, for example, the preconditions for a given purpose implementations that are the list of problems that are necessary for the development of each of the selected areas. If

the forecast is subject to a large-scale socio-economic and scientific-technical object, how forecasting purposes may be taken following objectives: to determine the possible and the most promising areas of the object, to determine the most pressing and relevant issues that meet the chosen direction, to determine the system of qualitative and quantitative indicators that describe the color problem and find the dynamics of their development time forecasting identify possible timing and capital investment to address current problems, to determine the effects of different problems to each other, identify possible ways to achieve the required or desired results, identify necessary resources and organizational measures for the development of other promising ways [4].

Because the object defies prediction Direct methods of analysis and formal description at this point , then the study of these objects is better to use heuristic methods using a large number of expert opinions that can take into account factors that are not taken into account by using mathematical methods. For example, large qualitative changes that lead to abrupt changes statystycheskyh variables that new technologies can not be predicted with professionals who have the necessary experience and knowledge in this field of research. The use of peer review for the analysis and prediction of large-scale objects requires consistent bahatoturove expert survey, in which we get a complete list of problems needed to solve the original purpose of the forecast.

The process of obtaining information from experts is formalized by means of specially designed questionnaires for each object prediction. Each round of questionnaires should take into account information obtained from experts in the previous round. Although somewhat limits the application form will «improvisation» by experts and the results are wondering what these disadvantages can be overcome to some extent by providing the expert to express their particular judgments, which are then analyzed and summarized.

At this point, we get a lot of alternative forecast graph type of wood, the top of which is the original purpose of the forecast, and the branches of a tree, directed downward, direction, challenges, technological, organizational, economic and other conditions. Mathematical models that describe the object will serve a specially designed set of algorithms for qualitative and quantitative analysis, by which to obtain the necessary estimates [5 – 6].

Conclusions. The final stage is to manage the forecasting projected object and copying the projections in the plan. This is a complex task, which is difficult to formalize the decision. At this point, the comparison is made of many alternatives with different performance and determined optimal alternative or closest to it. The solution to this is asked, choose the so-called «compromise» option, which could not optimal, but is most preferred in the studied population criteria.

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