CONTENTS & ABSTRACTS

It is noted that in the face of the exhaustion of extensive exploitation potential of raw materials, digital transformation is a «window» of great opportunities for Russia. It is shown that in such conditions the need for digitalization of energy systems increases, taking into account the complexity and reduction of self-adaptation and self-sustainability to many destabilizing factors. A comparative assessment of the level of attention from specialists to cross-cutting digital technologies in various sectors of the economy has been carried out, which resulted in the conclusion that in the energy sector this attention has a clear reserve of growth. It is noted that a significant part of sophisticated modern digital equipment is supplied to the energy industry by foreign firms, which is a clear threat to the country's energy security and requires increased attention to solving the problem of importing independency. It justifies the need to ensure a leading strategic role of the Russian Academy of Sciences in the breakthrough development of Russian digital energy.

Keywords: artificial intelligence, computer modelling, breakthrough development, digital technologies, digital energy, energy security.

Main approaches to the problem of the improvement of staff meetings efficiency have been classified. As opposed to traditional approaches described in the first part of this work, non-standard approaches to the problem of the improvement of meetings efficiency in small groups have been considered. Special attention has been paid to psychology of small groups, to motivation methods, and to the theory of group decision-making. A short review of meeting types has been offered. New research topics have been described, which may contribute to the improvement of meetings efficiency.

Keywords: meeting, efficiency of the meeting, meetings types, new research topics.

We propose a model of specialization in abstract systems with a resource constraint and under the assumption that all structural constraints in the model are linear functions. We study essential properties of solutions to the problem of efficiency maximization of system functioning. We show how and when specialization emerges in the system containing identical elements.

Keywords: abstract systems, specialization, resource constraint, structural constraints, efficiency.

In this article the synthesis of regression analysis methods with the tools of nonlinear dynamics analysis is proposed. Such an approach proves effective in case of analysis of empirical data of nonlinear processes developing under conditions of constraint, provided that the increments of processes are proportional to the achieved level adjusted for the constraints. Application of the method proposed is demonstrated by example of the analysis of revenue dynamics of Russian large and medium-sized companies from 2009 to 2015. The generalizing results obtained allow to classify the companies by the nature of changes in revenue as well as to assess their current positions and further dynamics. The models are proposed for different mechanisms of process developing which manifest in a variety of constraints.

Keywords: nonlinear processes, empirical data, mappings as models of nonlinear dynamics, growth rates, regression analysis models, correlation of parameters of maps and regression coefficients, singular points, stability.

On the base of factorial model a methodical approach to complex accounting of various factors of economy functioning, threats and measures of counteraction to them with use of nonlinear convolution and logistic functions is offered. A function of integration of assessment of economic security condition during the long-term planning period is introduced. This function is offered as target for rational distribution of budget allocations for measures during planning. Various approaches to integrating of indicators and defining of preferences are considered. It is offered to use an additive form for utility functions. A set of target indicators of economic security is offered.

Keywords: economic security, factor, indicator, complex function, factorial model, threat, measure, preference.

In this paper, the problems of assessing the impact of active forecasts on energy markets are considered. An imitative game reflexive model describing the behavior of producers on the natural gas market is presented. With the help of regression analysis, the influence of the values of various forecast parameters on the behavior of energy market participants was studied.

Keywords: energy industry, forecasting, forecasting methods and models, informative control.

The main provisions, models and methods for solving the problems of control and diagnosing of processes in the system by the indicators of changes in the relationships of events in processes are developed. For this, for the first time the classical recursive definition of sequences is extended to *Z*-recurrent definition of sequences, which allows to represent processes by formal models in the form of orders of *Z*-recurrent forms. A classification of the orders of *Z*-recurrent forms and algorithms for solving the problems of control and diagnosing processes to a system using the representation of processes by the orders of *Z*-recurrent forms are developed. To increase the efficiency of calculating the orders of *Z*-recurrent forms, an algebra of the precedence relations of elements has been developed, the formulas of which allow one to develop methods for calculating the orders of *Z*-recurrent forms.

Keywords: control and diagnostic problem, complex system, process, event, *Z*-recurrent definition of the sequence, order of the *Z*-recurrent form, the algebra of the precedence of elements in a sequence.

The principle of organization of a multi-level situational control model for complex technological processes in uncertain environment is proposed. The tools are developed that present and process technological knowledge obtained by experts, based on the use of fuzzy set apparatus, which allows generalizing the representation of reference situations and on this basis reducing the number of decision rules used in the situational control model. The basic conditions are determined that ensure the possibility of prompt comparison of reference and problem situations and of the choice of effective controls on this basis.

Keywords: technological process, technological equipment, multilevel model, situational management, reference situation, problem situation, linguistic variables and functions.

The paper covers a part of the visualization research stand for the motion automatic control system of a submersible vehicle allowing the visual evaluation of control algorithms during the motion along the predefined trajectory near the complex sea bottom contour.

Keywords: submersible vehicle, sea bottom contour, predefined trajectory motion, software complex, visualization, research stand.