CONTENTS & ABSTRACTS

Kudinov U.I. and Kudinov I.U.

The paper considers basic methods of fuzzy clustering and their application for structural identification of piece-linear functions and fuzzy models with three kinds of production rules containing fuzzy sets, constants and linear equations in the right side.

Keywords: fuzzy models, fuzzy clustering, structural identification.

Zhirabok A.N.

The problem of obtaining canonical forms for nonlinear continuous and discrete dynamic systems is studied.

Keywords: nonlinear dynamic systems, canonical forms, observability, controllability, function algebra.

Zemlyakov S.D. and Danilova E.A.

The problem of relay nonstationary system analysis and synthesis is considered. The concepts of critical nonstationarity function and limiting convergence domain are introduced. For a case of relay nonstationary system the method of limiting convergence domain constructing is proposed. Analytical results are accompanied by illustrative examples. Analytical relations are verified by simulation results.

Keywords: relay nonstationary system, critical nonstationarity function, limiting convergence domain, asymptotical stability, phase plane.

Abramova N.A. and Kovriga S.V.

Formalization of expert knowledge ad conceptions on semistructured situations is an integral part of control problem solving with the use of models on the basis of cognitive maps. For these models the paper offers and proves a number of heuristic criteria of formalization validity that can be used for early detection of direct semantic errors and formalization risks (prior to processing of formalized knowledge). The revealed criteria aimed at decreasing of risk due to human factor.

Keywords: semistructured situation, cognitive map, formalization, information validity, validity criteria, human factor, risk factor.

Mihnenko P.A.

Random jump structure systems are a special class of stochastic dynamic systems. Random jump structure system theory provides a synthesis of algorithms of complex (simultaneous) control of both state and structure of organizational systems. The organization models, based on this theory, are the most general form of description of complex socio-economic systems dynamics.

Keywords: organization, system, socio-economic system, system structure, control, stochasticity, bayesian approach.

Grebenuk E.A.

The models of pollution concentration time changes in atmosphere have been constructed. The models are the autoregressive distributed lag models that include the lagged values of explained variable (pollution agents) and variables that characterize meteorological conditions. The models have been verified with the use of sequential detection algorithms.

Keywords: ecological monitoring, pollution agents, autoregressive distributed lag models, sequential detection.

Itzkovich E.L. and Uortchenko V.E.

Problem of Assigned Finance Resources (AFR) distribution among the innovation projects within the subject-various production activity sectors significant for enterprise is considered. A man-machine procedure for selection of innovation projects implementation proposals which meet the AFR range and have best characteristics in terms of the enterprise given criteria. The paper provides the AFR distribution algorithm for separate production activity sectors and for the package of innovation projects implementation proposals inside these sectors.

Keywords: innovation projects, procedure for selection of innovation projects, assigned finance distribution algorithm for selection of innovation projects.

INFLUENCE OF MULTIPLICATIVE EFFECT ON BALANCE OF INVESTMENTS AND SAVINGS IN HOUSING SECTOR

Lyamina M.A.

The paper provides economically sound interrelations between savings and investment capital and their transformation in real investments aimed at development of housing sector. Basic merits and demerits of different ways of investment of personal savings are revealed. That allows to study the nature of future investments in details. Necessity of working out of balanced control system of population's money with use of such effective tool as hypothecary credit is proved.

Keywords: investment streams, government, system of hypothecary crediting.

MATERIALS WITH SPECIAL CHARACTERISTICS QUALITY CONTROL

Garkina I.A. and Danilov A.M.

The paper provides an integrated conception of creation of a system of controlled materials development with special characteristics based on analysis of kinetic processes of structure formation and basic physical and mechanical characteristics of the material. The optimization of formula and technological parameters of material is realized.

Keywords: quality control, system concept, special-purpose materials.

MODAL METHOD OF OPTIMIZATION OF ENERGY FLIGHT CONTROL SYSTEM OF FLYING VEHICLES

Borisov V.G., Nachinkina G.N. and Shevchenko A.M.

The energy approach is a methodological basis of flying vehicles control systems development with extended requirements to quality of control. However, vehicles with strongly varying properties need adjustment of parameters of a control system. For purpose of parameters optimization the modal method is used. The version of a modal method of synthesis has been developed, allowing to calculate a feedback matrix without the use of iterative procedures, during one computing cycle.

Results of modeling of the maneuverable high-speed aircraft are produced. These results have shown that the combination of rational energy approach to flight control and formal mathematical methods provide control quality practically identical in large flight envelope.

Keywords: flight control, energy approach, optimization, modal control.

ON PIECEWISE CONSTANT CONTROL SWITCHING MOMENTS IN A LINEAR STEADY-STATE SECOND-ORDER CONTROL PROBLEM WITH COMPLEX EIGENVALUES

Rodionova A.G.

The paper provides explicit formulae for the switching moments of piecewise constant control in the time-optimal problem for a linear second-order system with constant coefficients when the system matrix has complex eigenvalues.

Keywords: time-optimal problem, controllability set, piecewise constant control, moment of switch.