CONTENTS & ABSTRACTS

O.V. Podinovskaya, V.V. Podinovski

The paper proposes decision rules that allow comparing alternatives by preference for different cases of information regarding criteria importance and growth of preferences along criteria scale. These rules work within the framework of the new model of decision making situation with criteria forming a multi-level structure. This model was previously developed by the authors. The created methodology is free from fundamental drawbacks that cannot be avoided in principle, which are intrinsic to the analytic hierarchy process and all other known methods of problem solving with hierarchical structure.

Keywords: multicriteria decision making problems, hierarchical structure, criteria importance, criteria scales, criteria importance theory, analytic hierarchy process.

S.A. Gayvoronskiy, T.A. Ezangina

For damping vertical vibrations of descent submarine vehicle in conditions of heavy sea the paper proposes control system that uses cushioning winch located on the submarine vehicle. The winch control loop includes robust proportional-integral controller which guarantees preservation of acceptable dynamic properties of the system under the interval change of unit mass and rope length. Parametric synthesis controller is based on a robust expansion coefficient method of evaluation of quality indicators. The operability of the proposed system is confirmed by results of digital simulation.

Keywords: submarine vehicle, robust control, interval polynomial, synthesis, controller.

N.N. Ivanov

The paper proposes the technique of evaluation of distribution function and the first two moments of execution of stochastic network schedule. The technique is based on creation of multidimensional integrals calculated by the Monte-Carlo method.

Keywords: stochastic network, critical path, finishing-times distribution of the network schedule, two distribution moments, Monte-Carlo method.

S.A. Krasnova, A.V. Utkin

For non-minimum phase systems with single-input and single-output the structure of an equivalent form of input-output with the smooth, mismatched disturbances is formalized. On the basis of this form the basic law of combined control providing the asymptotic stabilization of the tracking error is synthesized. Unlike the traditional approach, which requires generators of given signal and external disturbances, for a comprehensive estimation of external signals and their derivatives the observer on sliding modes is used. Conditions of physical realizability of invariant tracking system for the case when direct measurements are only available for output (adjustable) variable and setting signal is formalized.

Keywords: nonlinear SISO-system, tracking, invariance, the states and disturbances observer on the sliding modes.

O.V. Zverev, V.M. Khametov

The paper considers solution of the European option calculating problem with quantile criterion in incomplete market with discrete time. The method of calculating of European option with quantile criterion with respect to any measure from the class of equivalent measures is justified on the basis of S-expansion of the two payment obligations.

Keywords: European option, quantile hedging, superhedging portfolio, incomplete market, optional expansion.

A.V. Batov, V.V. Breer, D.A. Novikov, A.D. Rogatkin

Problems of macro and micro characteristics identification are considered for the models of social networks, introduced in the first part of the paper. Identification was implemented to the data of real online social networks — Facebook, LiveJournal, and Twitter. The results of several imitational experiments and their comparison are given.

Keywords: threshold behavior, social network, graph theory.

O.I. Dranko, V.S. Filimonov

This paper describes income approach based analytical model of enterprise value that allows to select desired company parameters for company value increase. Profitability, required capital intensity, sales growth rate are found out as key parameters. Non-monotonic behavior for a sales growth rate parameter is discovered. There is also a possibility of division of companies into two classes: «strong» companies can generate positive cash flow and create value, and «weak» companies can't generate positive cash flow due to low profitability and/or significant requirements to investments and have negative value. Hence discovered that value concept leads to strong company differentiation and an average Russian company is in a losing state.

Keywords: business valuation, financial forecasting, cash flow, modelling, optimization.

V.B. Gusev, N.A. Isaeva

The procedures of expert analysis of reciprocal effect of the factors of credit and monetary policy and economic activity are described. The factors which include parameters of state of economy, financial spheres, and tools of state administration are examined. The concept of primitive connections whose estimations are assigned by expert evaluation is proposed. The reflexive procedures of calculation of estimations of primitive connections transitive closure are proposed. The different realizations of the operations with estimations are examined (linear, logical, time-like). Description of the process of model verification and numerical example of analysis of reciprocal effect of the factors of the investigated region are given.

Keywords: financial policy, evaluation of factor influence, primitive connections, transitive closure, reflexive procedures, logical conclusion.

V.A. Vedeshenkov, E.A. Kurako, V.N. Lebedev

The problems of diagnosing of digital systems (DS) with minimal quasicomplete graph structures are considered. The estimates of quantity diagnosability of analysed DS are defined on the basis of the diagnosing results of faulty situations in the DS with 7 abonents and 7 commutators. It is shown that the analysed DS are no more than 1-diagnosable for faulty abonents, no more than 2-diagnosable for faulty commutators, and no more than 1,1-diagnosable for faulty abonents and commutators on the selected tests. The example of diagnosing of malfunctioning abonent and 2 commutators is given.

Keywords: digital system, minimal quasicomplete graph, abonent, commutator, diagnosing, diagnosability, testing module, tested subsystem.