CONTENTS & ABSTRACTS

A CONCEPT OF A MATHEMATICAL KNOWLEDGE BANK FOR SCIENTIFIC RESEARCH. P. 1. A METAPHOR. 2 Kleschev A.S.

Basis on an extendable internal model of mathematical practice and of a model for the analogy between proofs, a concept of a computer support system for scientific research in the field of mathematics and its mechanisms is offered. A system metaphor and the structure of an external model of mathematical practice are presented.

NETWORK PROGRAMMING TECHNIQUE IN THE SYMMETRIC TRAVELING SALESMAN PROBLEM......7 Burkova I.V.

A dual problem is formulated where the constraints are split into 2 groups with corresponding division of arcs into 2 parts and solution of the resulting 2 evaluation problems. The sum of the objective functions of optimal solutions to the evaluation problems gives the lower bound for the original problem. The solution of the evaluation task is reduced to the design of the shortest *i*-trees. A new method for building the lower bounds for evaluation problems underlain by the shortest-distance tree design is proposed. The paper shows that the design of *i*-trees and the shortest-distance tree for the original distance matrix would not deliver an optimal solution to the dual problem.

Agaev R.P., Nikiforov S.V., Andryushina N.A.

In the paper, it was investigated that if 2 arcs were removed from ring-structured directed graph with 2 Hamilton circuits, its spectrum would remain real if and only if the number of nodes were even, and the «distance between the arcs» removed from one cyclic path were maximal. The applicability of the results to fault-tolerance estimation of ring topology networks is examined.

NON-DIFFERENTIABLE 2-D RAVINE TEST

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Rykov A.S., Matvienko M.Yu.

The paper discusses the design of two-dimensional ravine functions for testing optimization techniques. These demonstrate a new type of non-differentiable test-functions featuring the ravines with acute piecewise-linear ravine bottom and piecewise-linear slopes. The algorithm for designing ravine test functions with desirable properties is offered.

Yakovenko G.N.

A concept of robustness with respect to initial data is proposed: several control impacts transfer a system from a fixed initial state to a same finite state; the same controls transfer the system from any other initial state to a same finite state. A theorem is proved: a controllable system is robust w. r. t. initial conditions if and only if it allows the maximal group of state symmetries. Case studies of various controllable systems robustness investigation are included.

Sokolov S.V., Kucherenko P.A.

The topicality of investigating new and enhancing the existing methods of nonlinear stochastic parametric identification is shown. A solution to an identification problem based on applying the generalized probability criteria explicitly dependent on a posteriori density function is proposed. An identification algorithm is synthesized using the criterion of minimum estimation error probability. A numerical example illustrating the effectiveness of the approach proposed is included. The method proposed can be effectively applied in various fields such as communication, control, measurement, etc.

ANALYSIS OF COLLECTIVISM AND EGOISM

Chebotarev P.Yu., Loginov A.K., Tsodikova Ya.Yu., Lezina Z.M., Borzenko V.I.

Comparative utility of major behavioral patterns including collectivism and egoism is investigated in the context of group decision making.

Burkov V.N., Iskakov M.B., Korghin N.A.

Multicriterion active expertise mechanisms are represented as generalized median voter schemes in terms of right/left coalitions systems. This allows to apply the results of the public choice theory to the design of strategy-proof mechanisms.

MULTICRITERION COMPETITIVENESS EVALUATION AND THE RANKING OF ECONOMIC OBJECTS OPERATING UNDER VARIOUS UNCERTAINTY CONDITIONS48

Kuvshinov B.M., Chelyadin A.S., Shiryaev V.I.

An approach to multiple criteria estimation of competitiveness of economical objects and to their ranking is proposed. The approach is based on estimating their economic potential. Pattern recognition techniques is used to estimate the competitiveness. The peculiarities of the economic potential estimation problem as well as those of the interval estimates comparison under uncertain source information are examined.

VENDOR SELECTION MANAGEMENT SUBJECT

TO MARKET INFORMATION INFLUENCE55

Baikin A.A., Ivanov E.Yu., Isaeva O.V.

This paper presents the investigation results of a vendor selection model modified subject to information cost. The investigation was undertaken for several types of production functions, such as linear, Leontieff, Cobb-Douglas, Stone, CES, and Philippov. The estimates of the nature and the influence of supplemental market information on the structure and volumes of the resources used by the company are presented.

Zhevnerov V.A.

Parameters evolution techniques is proposed to apply in nonlinear network optimization tasks. The application features are demonstrated in a case study of optimal distribution of incoming load flows in a data communication network. The paper shows that the method ensures significant problem time reduction as against the known algorithms under comparable implementation costs.

Kirin Yu.P., Zatonsky A.V., Bekker V.F., Kraev S.L.

The features of spongy titanium recovery and vacuum separation process modeling are discussed. The paper suggests to describe processes dynamics with differential equations with variable coefficients. The methods of model dynamics identification in positional control systems are included.

Dorofeyuk J.A.

The method for solving analysis and forecasting problems in large-scale control systems is presented. A markovian chain with r states, where r — the number of structural units (classes) was used as a forecasting model. For the effective realization of presented method the complex classification algorithm was developed.

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