



CONTENTS & ABSTRACTS

PREVENTIVE SAFETY PROBLEM. THE MODEL AND DECISION-MAKING METHODS 2

Matrosov V. M., Baranov V. V.

The problem of making control decisions aimed at ensuring availability, efficiency and safety of industrial systems is examined. The problem is reduced to choosing control strategies balanced with respect to utility, risk, and diagnosis criteria. The methodology, model, problem statement and key results determining constructive decision-making techniques are presented.

DESIGN CONCEPTS OF MULTIVARIABLE ADAPTIVE ON-OFF CONTROL SYSTEMS 12

Kudinov Yu. I., Kudinov I. Yu.

The design of adaptive fuzzy controller consisted of multi-positional and pulse-duration controllers is discussed. The paper shows that the multi-positional controller implements the quasi-optimal control with respect to response time while the pulse-duration one performs pulse control ensuring the desirable accuracy. With the help of a fuzzy parametric adaptation algorithm and the proposed controller, high control performance was attained under changing plant dynamics and control actions' cross influence.

A LINEAR MODEL WITH UNCERTAIN MATRICES. 19

Leibov R.L.

The paper presents a time domain estimation method for uncertain parameters of aircraft turbofan engine model. The parameter estimation makes use of a multivariable linear model with uncertain matrix elements. The uncertainty of matrix elements enables the description of the difference between nonlinear and linear models. Minimum and maximum values of linear model's uncertain matrix elements are determined using nonlinear model time responses and quadratic or linear programming techniques. The results of the proposed techniques application to the estimation of the uncertain matrix elements in a linear model of an aircraft turbofan engine are presented.

THE ADEQUACY OF THE MANAGEMENT OF SELF-DEVELOPING SOCIO-ECONOMIC SYSTEMS (WITH A CASE STUDY OF FERROUS METALLURGICAL WORKS). 23

Kleparsky V. G., Kleparskaya E. V.

System approach to the evaluation of enterprise management adequacy is discussed where an enterprise is understood as a self-developing socio-economic system. The paper shows that the adequate enterprise management based on the minimum dissipation principle can be implemented through the formation by both the system and the environment a finite-dimensional attractor and through the system (enterprise) tracking the central line of attraction channel.

COLLECTIVE OUTCOME INCENTIVE MECHANISMS IN ORGANIZATIONAL SYSTEMS WITH INFORMATION MANIPULATION 30

Vybornov R. A.

The paper notes that the opportunity of violating organizational system's operation rules by its element was not allowed for in the existing incentive mechanisms. A model of organizational system's elements interaction is offered that assumes the possibility of information manipulation. The problem of preventing such manipulation is solved for improving the efficiency of the organizational system in whole.

A MODEL OF AN INTELLIGENT PRODUCTION CONTROL SYSTEM 36

Stolbov V.Yu., Fedoseev S.A.

A model of a control system of discrete production with intelligence elements is considered. The elements are connected and referred to as mathematical models of optimization with fuzzy constraints. An original structural adaptation algorithm is used to co-ordinate the solutions at different structural levels.

MODELS OF EMPLOYEE'S CAREER MANAGEMENT IN AN ORGANIZATION 40

Ivashchenko A. A.

The problem of career management is formulated as a problem of employee's and organization's interests coordination with respect to his/her promotion within the organization. The paper shows that mutually beneficial decisions could be made by comparing results of the following problems solution: the problem of the individual career planning (which is reduced to the shortest path problem) and the problem of personnel promotion (which is reduced to the Markov's chain analysis problem).

ON THE DEVELOPMENT OF COMPUTER-AIDED DECISION-MAKING SUPPORT SYSTEMS FOR CITY OPERATION CONTROL TASKS 44

Grebnyuk G.G.

The paper reviews city economy features as an informatization object: sectorial authority functions, the content of dataware and its integration into the inherently multivendor program-technical environment of the city, the necessary algorithms for informational and intellectual support of decision-making process in city operation control tasks.

THE TECHNUES OF TRAVELLING AUDITOR'S RISKS ANALYSIS AND EVALUATION 48

Shelkov A.B., Pelikhov V.P., Gladkov Yu.M.

The problem of analysis and evaluation of auditor risk is examined for improving the effectiveness and efficiency of field audits. A formalized model of general auditor risk evaluation is developed where the risk is understood as making a wrong resulting judgment.

**DYNAMIC PATTERNS RECOGNITION
BY AN SEGMENTAL TYPE MEASURING
SYSTEM 52****Kul'chin Yu.N., Kim A.Yu.**

An architecture of a segmental-type distributed measuring system employing a neuron network for dynamic patterns recognition is offered. An algorithm for dynamic pattern model development with the help of Hankel matrices transformation is developed. An algorithm for images classification in a neuron network based on fuzzy sets theory is proposed.

**INTERNET SERVICE FOR SERVER—SERVER
COMMUNICATIONS SUPPORT IN DISTRIBUTED
INFORMATION SYSTEMS. 58****Asratian R.E.**

The principles of server-to-server communications in RFPS (Remote File Packets Service) are described. The service was specially designed for supporting internal interactions of distributed systems. The examined interaction mechanisms enable to organize both direct and indirect (via intermediaries) packets exchange with the help of the same set of basic server routing procedures and the same data structure.

**FOUNDATIONS FOR TRUTH VECTORIZATION
IN THE LOGIC-MATHEMATICAL DATA
PROCESSING MODELS. 63****Arshinsky L.V.**

A possible approach to the formalization of incomplete and contradictory data is discussed. It is based on the vector representation of verity, where the truth of an assertion is described by a vector with (True; False) components. Theoretical premises to the application of such notion of truth for intelligent data processing are discussed.

**AN INTERNAL MODEL OF MATHEMATICAL
PRACTICE FOR INTERACTIVE SYSTEMS
OF THEOREM PROOF CONSTRUCTION.
PART 2. A MATHEMATICAL DIALECT MODEL . . . 68****Gavrilova T.L., Kleschev A.S.**

A formal model of the mathematical dialect is described. The mathematical dialect is the language used in the mathematical practice to prove mathematical statements. Its model is a formal language whose syntax, semantics and pragmatics as well as basic structures such as the definitions of mathematical terms and propositional, mathematical and metamathematical statements are defined.

**A METHOD FOR PARCELLING OUT
THE SUBSYSTEMS OF SUFFICIENT DIMENSION
FOR PARALLEL DIAGNOSIS OF LARGE DIGITAL
SYSTEMS WITH REGULAR STRUCTURE. 74****Vedeshenkov V. A.**

A method for parceling out the subsystems of sufficient dimension for parallel diagnosis of large digital systems with

structures as toroidal grids is proposed where the system's check and diagnosis are performed in three stages. The components of subsystems parceled out by the primary apportionment are checked in parallel at the first stage; the connections adjacent to every subsystem's nodes to the right and from below are checked also in parallel at the second and third stages. The paper shows that for reducing the total time of system's checking it is advisable to parcel out the subsystems consisting of 9 nodes arranged as a 3×3 square.

**PARTNERSHIPS MECHANISMS UNDER
COMPETITION 80****Arzhakova N. V.**

The paper discusses the mechanisms of competition for products supply to the customer. Game theoretical approach was developed for the description of the customer and suppliers interaction based on supply schedule and product quality. At active (or passive) mode, the supplier selects the profitable for the customer (or for himself) product quality. Sufficient conditions of long-term partnership in competitive environment based on dominant and flexible mechanisms of supplier's activity are derived.

**CONTRACT IMPLEMENTATION
MECHANISMS 83****Arzhakov M. V.**

The paper discusses the mechanisms of contract implementation by long-sighted contractors who include non-compliance fines and penalties. Active systems theory was applied for the investigation of contractors interaction and building effective agreement mechanisms. The problem of synthesizing an optimal contract implementation mechanism is stated. Necessary and sufficient conditions for its optimality are found.

**COHERENT NEURON AND PATTERN
RECOGNITION. 86****Golovinsky P. A.**

The possibility of applying interference for creating an artificial neuron is examined. Wave phenomena entailing scalar product — the key action specifying the result of neuron's operation, are analyzed. The difference between a coherent neuron and the classical artificial neuron is discussed. The mechanism of coherent neuron learning is described, and the solution on its basis of a trivial pattern recognition problem is demonstrated.

**3RD INTERNATIONAL CONFERENCE ON CONTROL
PROBLEMS 89****SCIENTIFIC AND PRACTICAL SEMINAR
"MODERN CONTROL METHODS
FOR COMPLEX SOCIAL AND ECONOMIC
SYSTEMS. 94**