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AN OPERATIONAL MODEL FOR INTUITIVE PROOFS . . . 2

Kleschev A.S.

An operational model for intuitive proofs is suggested. It is a sequence of instructions. Operands of an instruction are formalized mathematical propositions. The set of instructions is extendable one. Operational semantics of instructions is defined by means of the macrolanguage based on the fixed set of basic operations. The residual model (macroexpansion) of the operational model for an intuitive proof which is formed by a macrogenerator is a program for a virtual machine. The successful completion of this program execution verifies correctness of the intuitive proof.

Keywords: intuitive proof, formalizing, operational model, macrolanguage, interactive system for theorem proving, automatic theorem proving, checking correctness of intuitive proofs.

ON THE THEORETICAL INCORRECTNESS OF THE ANALYTIC HIERARCHY PROCESS 8

Podinovski V.V., Podinovskaya O.V.

The paper considers the basic statement of the analytic hierarchy process (AHP), that the priorities of decision variants on individual criteria are compared on the ratio scales that are not linked to each other and are also independent of the priorities of criteria. According to the mathematical theory of measurement this approach is incorrect. To demonstrate its potential consequences a simple example in which the use of the AHP procedure leads to a clearly erroneous result is provided.

Keywords: multicriteria decision making, analytic hierarchy process, ratio and interval scales, priorities of variants, criteria importance theory.

ADAPTIVE PID-CONTROLLER FOR MULTI-MODED (TIME-VARIANT) PLANTS WITH TIME DELAY 14

Palenov M.V.

The paper presents a new adaptive PID-controller for multi-moded plants with time-delay. The plant has some unknown coefficients which can change at some moments of time; external disturbances affect the plant. The disturbances are unknown-but-bounded function.

Keywords: PID-controller, frequency identification, adaptive control, unknown-but-bounded disturbance.

REFLEXIVE PARTITIONINGS METHOD IN THE MODELS OF COLLECTIVE BEHAVIOUR AND CONTROL 21

Korepanov V.O., Novikov D.A.

Method of reflexive partitioning (corresponding to different levels of reflexion) is proposed for the set of rational agents, implementing collective activity. Examples of informational control are given for different problems of collective decision-making.

Keywords: game theory, collective behavior, decision-making, reflexion, informational control.

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Dyomin N.S., Andreeva U.V.

The paper presents a solution to problems of hedging for the three types of exotic call options of European type with limited payments and guaranteed income in case of payment of dividends on the underlying asset. The formulas which determine the option prices as well as the evolution of the hedging strategies (portfolios) and capitals have been derived. Properties of the decision are considered.

Keywords: financial market, option, payment function, capital, portfolio, hedging.

ORGANIZATIONAL METHODS OF INVESTMENT SOLUTIONS RISKS REDUCTION 40

Akinfiyev V.K., Korgin N.A.

The problems of synthesis of organizational procedures for support and making of investment decisions on companies' development that reduce the risks of inefficient decision-making related to the «activity» of the process participants.

Keywords: risk, investment decisions, organizational mechanisms.

ON THE ISSUE OF DEVELOPING OF INTELLIGENT CONTROL SYSTEMS OF COMPLEX ORGANIZATIONAL STRUCTURES (II). SOFTWARE SUPPORT FOR CONTROL SYSTEM OF THE VERTICALLY INTEGRATED OIL COMPANY INVESTMENT ACTIVITIES. 47

Akopov A.S.

The second part of the paper presents the important problems of developing of intelligent control systems, in particular, those, related to issues of integration of developed models of chains of difficult organizational structures with multidimensional information Data Warehouse. The algorithms supporting the mechanism of efficient object control, in particular, of a class of genetic algorithms, greedy algorithms, etc. with realization in a software package developed for the vertically-integrated oil companies are studied.

Keywords: intelligent control systems, management of vertically integrated companies, genetic algorithms.

THE SYSTEM OF RATIONAL RESOURCES ALLOCATION CONTROL ON THE BASIS OF MODERNIZED METHOD OF CONSECUTIVE APPOINTMENTS 55

Zyryanov Y.T., Konovalov O.A., Malykov A.K.

The problem of rational allocation of scarce resources to dependent operations in organizational-technical systems with application of modernized method of consecutive appointments is considered. The proposed structure of control system of rational resources allocation allows to manage and control the project performance.

Keywords: resource distribution, project, control system, dependent operations, network model.

A LOGIC REGRESSION MODEL FOR ILLNESS DIAGNOSTICS. 63

Tyumikov D.K., Blashentseva S.A., Subbotin A.M., Savchenkov N.N.

The statistics has been processed by three methods. Correlation coefficients, dispersion ratios (multiple, pair, dispersion ratios of interaction effects and dispersion ratios of interconnection effects) and information measures (multiple and pair) have been calculated. Their analysis served as the basis for selecting dominant variables, and proposed logic regression model for illness diagnostics.

Keywords: correlation coefficients, dispersion ratios, information measures of association, dominant variables, logic regression model.

CONFIGURATION SCHEDULE PROBLEM FOR WIRELESS SENSOR NETWORKS 68

Nagradov E.A.

The paper is related to the problem of constructing configuration schedule for wireless sensor networks to maximize the network lifetime until the single node failure. The proposed centralized algorithm for constructing the schedule is based on constructing the set of configurations using Garg – Konemann algorithm and solving LP problem on the set of configurations.

Keywords: wireless sensor networks, routing, schedule.

METHOD OF NAUTICAL OBJECT CONTROL 74

Tarasov N.N., Tahtamyshev M.G.

This paper describes the method of realization of decision support system for the management of nautical object with zero horizontal velocity. The proposed approach is based on solving the problems of filtration and recovery of unmeasured coordinates and identification of the object parameters.

Keywords: nautical objects, filtering, decision support system.

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