



# CONTENTS & ABSTRACTS

## PATTERN ANALYSIS: DIFFUSION-INVARIANT PATTERN CLUSTERING . . . . . 2

**Myachin A.L.**

The paper presents a modification of the pattern analysis method that allows allocating separate clusters of objects with similar structure as well as with close values of their parameters. A description of the method and its algorithm realization are given.

**Keywords:** pattern, cluster analysis, diffusion-invariant pattern clustering.

## HIERARCHICAL SYNTHESIS OF MANIPULATOR SIGMOIDAL GENERALIZED MOMENTS UNDER UNCERTAINTY . . . . . 10

**Krasnova S.A., Antipov A.S.**

Feedback synthesis decomposition procedure providing tracking trajectories in operating device coordinate system is developed for control system of manipulator working body with electric actuators positioning. It is shown that using *S*-shaped smooth sigma-functions as local communications and states observer corrective actions provides the invariance of the tracking system with a given accuracy with respect to the existing uncertainties taking into account the restrictions on the mechanical system variables. Pointed is that the developed approach does not require solving the kinematics and dynamics inverse problems and reduces the requirements to the volume of a priori information about the control plant and external influence.

**Keywords:** manipulator, tracking, invariance, restrictions on state variables, sigma-function, states observer.

## MODELS OF POWER EXCHANGE STABILIZATION PROCESSES MONITORING AND CONTROL IN AUTONOMOUS ELECTRIC POWER SYSTEM . . . . . 22

**Nyrkov A.P., Zhilenkov A.A., Chernyi S.G.**

The paper reviews the problem of ensuring the stable parallel operation of two or more gas diesel-generators as part of an autonomous power plant in the offshore drilling platforms and water transport facilities. The conditions and features of the plant were analyzed. The recommendations on the choice of optimal values for parameters of gas diesel engine controller were given. The models allowing to solve a wide range of control tasks in autonomous power plants and providing the energy of the required quality were developed.

**Keywords:** quality indicator, the electric power system, diesel engine-generator units, drilling platform, water transport.

## STOCK MARKET TRADING BEHAVIOR MODELING TO DETECT AGGRESSIVE TRADING STRATEGIES . . . . . 29

**Kazdagli M.N.**

The paper presents a novel approach to modeling coordinated traders' behavior in stock market. The main assumption that we rely on is that traders may conspire to manipulate stock prices. The presented algorithm efficiently identifies malicious traders abusing market instruments to gain extra profit. Comparing to other similar algorithms, our algorithm provides much higher accuracy when processing historical market data.

**Keywords:** securities market, stock prices manipulations, hidden Markov model, time series analysis.

## ON MIGRATION MATRICES APPLICATION FOR CREDIT RISK EVALUATION AND MANAGEMENT UNDER THE INTERNAL RATINGS-BASED APPROACH . . . . . 37

**Stezhkin A.A.**

Noted is that under conditions of unstable global economy the issues of risk quantitative estimation accuracy and reliability and of risk-management as well become more and more relevant. Internal ratings-based approach to credit risk estimation allows to get its' precise values, however the weak point of the method is the necessity of taking into account the procyclicality (economic cycle changes) influence on borrowers solvency, which as a result affects the quality of risk

management. A tool based on the theory of continuous-time Markov chains is designed to improve the quality of credit risk estimation and therefore to upgrade risk-management quality.

**Keywords:** credit risk, internal ratings-based approach (IRB), migration matrices, Markov chains, default probability, economic cycle, risk management system.

## DETERMINING THE PROBABILISTIC ESTIMATES FOR TIME RESERVES AS ONE OF THE PLANNING AND CONTROL PROBLEMS . . . . . 45

**Troyanovskiy V.M., Zapevalina A.A., Rumyantseva E.L., Serdyuk O.A.**

Probabilistic characteristics of time parameters for business processes planning and implementation stages are considered. It is shown that the sum of planned time reserves has the close to normal probability distribution, even at fairly short chain of works. It is also shown that unspent time reserves have a probability distribution that is close to truncated normal distribution. A method of evaluating time reserves distribution at a final stage of work is suggested. It is noted that results verification is conducted through comparison of obtained theoretical results of time reserves distribution with the real process of letters passage to the regions.

**Keywords:** control problems, chain of works, statistical criteria, probabilistic characteristics, computer modeling.

## TARGET OBJECTS ENERGY AND RESOURCES SUPPLY BLOCKING IN NETWORK INFRASTRUCTURES . . . . . 52

**Grebenyuk G.G., Nikishov S.M.**

Considered is the security problem of target objects, obtaining the energy or resources from network infrastructure, subjected to negative impact on network components, breaking connections between special-purpose objects and energy or resources supplies. Known approaches to network stability problem solution are described. Analyzed are features of the task of finding damaged network components, resulting to the special-purpose objects group functionality loss, ways of its solution are suggested as well as the approaches to calculations optimization. A particular example of using the damage search algorithm is given.

**Keywords:** vulnerability, network infrastructure, reliability of power supply.

## PROBLEMS OF PROGRAMMABILITY, SECURITY AND RELIABILITY OF DISTRIBUTED COMPUTING AND NETWORK-CENTRIC CONTROL. PART 2: THE APPROACH TO GENERAL SOLUTION . . . . . 58

**Zatuliveter Yu.S., Fishchenko E.A.**

In the global computer environment stated are the principles of forming the mathematically uniform, seamlessly programmable and cybersecure algorithmic space of the distributed computing and network-centric management, based on tree-like structures computer calculation. The properties of seamless programming language in this space are presented, as well as the principles of software-based organization of reliable distributed computing in computer environments with unreliable components. Defined are the requirements to the network computers with the non-microprocessor architecture, which are necessary for the effective and cybersecure implementation of given algorithmic space in the global computer environment.

**Keywords:** global computer environment, powerful global information connectivity, distributed computing, network-centric control, computer calculation of tree-like structures, mathematically uniform algorithmic space, seamless programming, cybersecurity, reliable computing in environments with unreliable components.

**Stanislav Nikolaevich Vasil'ev (to the 70-th anniversary) . . . . . 70**

## THE 8<sup>TH</sup> INTERNATIONAL CONFERENCE «MANAGEMENT OF LARGE-SCALE SYSTEM DEVELOPMENT» . . . . . 72