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## SUMMARY

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### THE MATHEMATICAL METHODS OF SYSTEM ANALYSES AND CONTROL

*Birjuk N.D., Nechaev Yu.B., Alehin S.Yu.*

#### TIME VARYING SYSTEMS OF TWO COUPLED CIRCUITS WITH CONDUCTIVE COUPLER

Imperceptible for naturalists and engineers linear including principle attaches great importance to analysis the linear systems of general view id est systems with time varying parameters. Below two such systems are considered – systems of two coupled circuits with internal and external conductive coupler. It is discussed mathematical description and is solved a problem of stability according to Lyapunov.

*Kopytin A.V.*

#### MODELING PROCESS OF WAVE PROPAGATION ON A NETWORK

Consider the initial value problem for wave equation on a graph  $\Gamma$  :

$$u_{tt}(t, x) = u_{xx}(t, x), u(0, x) = \varphi(x), u_t(0, x) = 0,$$

where function  $u(t, x) : [0, +\infty) \times \Gamma \rightarrow \mathbb{R}$  determinates the shift of point  $x \in \Gamma$  in the moment  $t$ . Test for existence of such a constant  $C$ , that  $\max_{x \in \Gamma} |u(x, t)| \leq C \max_{x \in \Gamma} |\varphi(x)|$  regardless of the initial shift  $\varphi$ . For this purpose we simulate wave propagation on  $\Gamma$ .

*Sirota A.A., Sergeev D.N.*

#### UNCAUSAL MODELS AND ALGORITHMS OF GENERATION RANDOM FIELDS

The acausal model of Markov indivisible random field and algorithm generation random fields based on this model are examined. Pattern of calculation spatial correlation function for those algorithms is obtained. Characteristics of algorithm generation which were obtained using artificial neural networks means, are researched.

#### THE INFORMATION-CALCULATION, CONTROL AND NET SYSTEMS

*Budko V.N.*

#### TUNING OF ANALOG-TO-DIGITAL CONVERTER METHOD

We introduce the way of static mistake decrease of the measurement of the digital report of voltage, called the method of reduction to the sample voltage, during input into personal computer IBM via COM port.

*Karelin K.N., Flegel A.V.*

#### THE PARALLEL ALGORITHMS IN SIMULATION OF LASER-ASSISTED ELECTRON-ATOM SCATTERING

The parallel computing methods on cluster systems for cross sections of multiphoton processes are considered for the case of strong laser field-assisted electron scattering from short-range atomic potential. Using the most common OpenMP- and MPI-technologies of parallel programming, we develop the powerful algorithms of calculations.

*Tolstobrov A.P., Fertikov V.V.*

#### EFFECTIVE MANAGEMENT OF VSU INFORMATION SYSTEM USING THE ADVANTAGES OF ORACLE DBMS

The article describes the development technology, tools and algorithms for Oracle server-based implementation of specialized components for saving tracks of constantly-modified data in correspondence with quick changes in knowledge domain, keeping the task automatic and transparent for clients applications.

*Shashkin A.I., Shiryayev M.M.*

#### DETAILS OF PROJECT PLAN CREATION AUTOMATION ON DIFFERENT MANAGEMENT LEVELS

This article describes the management problem – automation of project plan creation. The article contains description of an automation object management structure and comes to light details of work plan creation problems definition that appears at different management levels. The article source is most applicable for automation solutions in firms where primary resources are manpower resources and duties are complex.

#### THE INTELLECTUAL INFORMATION SYSTEMS

*Altukhov A.V.*

#### TAKAGI-SUGENO FUZZY RULES DESIGN BASED ON FUZZY CLUSTERING RESULTS

The paper studies the choice of the problem of the best shape of membership function based on fuzzy clustering results and their usage for Takagi-Sugeno type of fuzzy rules. Comparison of two algorithms for constricting membership function is made basing on fuzzy partition matrix and ellipsoid projection onto the coordinate axis. Two approaches for solving the problem of detecting the points belonging to clusters are given.

*Golovinskiy P.A., Dovzhikova O.S.*

### **REPRESENTATION OF FINITE GROUPS BY NEURAL NETWORKS**

Representations of discrete groups and semigroups by neural networks are considered. The algorithm of extraction from the time series of some structures represented by the finite automata is constructed, and realization of the finite automata by neural networks is demonstrated. Connection of discrete symmetry with rearrangement symmetry of the neurons inputs in a network is established. The opportunity of application of the neural networks with the utilization of invariants of groups, for an estimation of the accuracy of data symmetry is shown.

*Sirota A.A., Solomatin A.I.*

### **STATISTICAL AND NEURAL NETWORK ALGORITHMS OF ALLOCATION OF OBJECTS BORDER IN IMAGES**

Synthesis and comparative analysis of local algorithms of brightness jump allocation in images corrupted the additive Gaussian noise are realized: statistical algorithm of detection and brightness jump parameters evaluation; neural network algorithm of ideal brightness jump detection; algorithm detection of border using dynamic programming method for search of minimum quality functional. Border «stitching» algorithm are described.

*Tukachev N.A.*

### **APPLICATION TEHSOR CURVATURE FOR CHOOSING NUMBER OF NEURONS AND BASE CONDITIONS INSTRUCTION NEURON GRIDS**

There is described the project allowing make several functions: construction neuro grid with any count of inputs, layers and neurons; choose fiew function by source instruction and import set instructioning series by grid, choose one of 11 function responded; select topology curface by graphics with changing params of the first layer; teaching neuro grid by method quickly down; drawing instructioning surface, output curface of neuro grid, curface of gaussian curvature, curface of criterion with dependence for any two params.

*Yarmoshevitch E.I., Mikhailova E.E.,  
Ponomarenko M.A.*

### **FUNCTIONAL SPECTRAL SPATIO-TEMPORAL MODEL IMAGING THE OBJECTS BY HUMAN VISUAL SYSTEM**

It has been made functional spectral spatio-temporal model imaging the objects by human visual system with spatio-temporal brightness distribution in form of optical transmission function, transmission functions of straight

and indirect channels, depending on background brightness distribution, any contrasts of object and of angle sensitiveness of human visual system.

### **THE COMPUTER LINGUISTICS AND NATURAL LANGUAGE PROCESSING**

*Kretov A.A., Ogarkova N.V., Beresovskaya O.A.,  
Dolbilova E.V.*

### **PARSING BLOCK OF PROGRAM COMPLEX «SPLexSis»**

The article presents the results of research work the structure of block analisys and advance procedding input datas for programming complex assign for perfomance lexical semantic analisys of natural languages.

*Kosinov D.I.*

### **LOCAL TEXT PARAMETERS AND NEAR-DUPLICATE DETECTION PROBLEM**

A new method of document signature creation on the sole basis of local parameters of its content without resorting to global collections is proposed. The set of parameters is formed on the basis of tolerance to different types of modifications. A number of experiments using some of these parameters are conducted. The possibility of use of this approach for large corpora processing is shown.

*Soloduhin A.S.*

### **TEXTS CLASSIFICATION ON THE BASIS OF THE APPROACHED CLASSES PROBABILITIES ESTIMATIONS**

In the given work is offered the method of tests classification on the basis of the conditional distributions approached classes probabilities estimations. The essence of a method consists in representation of feature sets and a class of the text as set of simultaneous events and the approached estimation of likelihood dependences between attributes and classes of texts.

### **THE SYSTEM ANALYSES OF SOCIAL-ECONOMIC PROCESSES**

*Baeva N.B., Kurkin E.V.*

### **TWO-LEVEL MODEL OF MAINTENANCE OF ECONOMIC OBJECT IN BALANCED GROWTH MODE**

The two-level model of economic object balanced growth maintenance is developed. The first level model allows to construct growth trajectory. The second level is model of optimum control moment choice based on conception of difficulty. Model realization algorithm is offered, experimental calculations are performed.

## Summary

*Berkolajko M.Z., Kashirina I.L., Ivanova K.G.*

### **USE D-ESTIMATIONS OF RUSSMAN FOR MANAGEMENT OF THE PORTFOLIO OF ACTIVES**

In given article is offered a method of management of a portfolio of the securities, based on representation of process of formation and management of a portfolio as achievement by system of some in advance declared purpose. The system is understood as a portfolio, and the purpose will be some fixed gain of its cost for the certain time interval.

*Gladskih N.A., Golub V.A., Semyonov S.N.,  
Choporov O.N.*

### **APPLICATION OF THE STATISTIC METHODS PROGNOSIS AND TECHNOLOGY OF GIS FOR MONITORING OF SYSTEM REGIONAL HEALTH SERVICE**

Mathematical models of medical-demographic processes, which can be used for management of Region Health System are represented in this paper. Comparison analysis of prediction results, which was obtained with the help of multiple regression and exponential smoothing are also takes place here. There are algorithms and software packages are also presented. Prediction results, represented with the help of GIS-technologies for the medical-demographic indices are showed here.

*Zenchuk A.I., Shashkin A.I.*

### **FUZZY MODEL ASSESSMENT THE INVESTMENT PROJECT**

In this article discussed the model of financial budgeting in the face of uncertainty, based on the fuzzy parameterization of input data.

*Tuboltsev M.F.*

### **MATHEMATICAL METHODS IN THE SYSTEM ANALYSIS OF FINANCIAL OPERATIONS**

The original system approach to the decision of tasks of the analysis of sets of financial operations is considered. Within the limits of the given approach the concept of system with reference to financial operations (tools) is specified. It is shown, that in a considered

subject domain this concept is, not declarative, but deductive (presence of system properties does not appear, and it is proved). The received results are compared to alternative statistical methods.

### **MODERN TECHNOLOGIES OF SOFTWARE DESIGN**

*Voronina I.Ye., Bogatyrev A.M.*

### **THE DEVELOPMENT COMPLEX MEANS OF MANAGEMENT ANIMATION OF 3D MODEL PERSON FOR PROGRAM PACKAGE AUTODESK MAYA**

The article is devoted to automation of CG-artist work to create the universal skeleton of biped and complex control facilities. The application is developed for Autodesk Maya as an external unit.

*Golub V.A., Ovchinnikova M.V.*

### **PROBLEM OF CORRECT DETERMINATION OF TERM THE “VREDONOSNAYA PROGRAM”**

Is Examined problem of correct determination of term «vredonosnaya program». The analysis of dignities and lacks of determinations, present presently is given. Requirements which must satisfy such the determinations are formulated. Determination of term is offered «vredonosnaya program», in the most complete measure satisfying these requirements.

*Solomatin D.I.*

### **SYNTAX EXTENSIBLE PROGRAMMING LAGUAGE OF MEANS IMPLEMENTATION LANGUAGES OF THE SUBJECT AREA**

The use of domain-specific languages (DSL) is an accepted practice in software development. With the advent of special tools for these languages construction, we can say about the birth of new programming paradigm – Language Oriented Programming. The fundamental idea of this paradigm consists in making new language for each specific task instead of using universal tools. The article proposes the use of extended languages as a basis for DSL implementation. The methods of extended language construction from general purpose languages are described.