CONTENTS AND ABSTRACTS

TRANSMISSION AND PROCESSING OF INFORMATION

S.N. Kirillov, V.M. Berdnikov, E.V. Akopov. ALGORITHM OF OBJECTS VIDEOPOSITIONING IN URBAN AREA ON THE BASIS OF DIGITAL MAP

Key words: videopositioning, videonavigation, urban area, digital map, contours of buildings.

Algorithm for determining the location of an object in the urban area based on the image obtained with the onboard camera/imager, data about the direction of an objective and digital terrain map is offered. It is shown that achievable mean square error of positioning for a given direction determination precision (1° azimuth, 2° angle of elevation) is 9.5 m using a single image, and 2.5 m using three images 3

L.A. Demidova, R.V. Tishkin, S.V. Trukhanov. PROBLEM SOLUTION OF OBJECTS HYPERSPECTRAL FEATURE IDENTIFICATION BY MEANS OF INTELLECTUAL DATA PROCESSING SYSTEM OF HYPERSPECTRAL REMOVAL

Key words**:** intellectual data processing system of hyperspectral removal, object hyperspectral feature, Euclidian distance similarity measure, fuzzy similarity measure, fuzzy linear regression, consolidation.

The problem of earth surface objects identification on the basis of their hyperspectral features, received from the space images, is considered. To solve the delivered problem it is offered to use the intellectual data processing system of hyperspectral removal, which provides consolidation of private identification results, formed by means of identification algorithms on the base of Euclidian distance similarity measure and fuzzy similarity measures..... 10

B.V. Kostrov, S.I. Babaev, A.G. Upakova. BASIS FUNCTION CONSTRUCTION USING GENERAL ORTHOGONAL BASIS FUNCTION SYSTEM

Key words: orthogonal functions, Vilenkin-Krestenson, Rademacher functions, aerospace images filtering.

Usage of Vilenkon-Krestenson functions to aerospace image processing problem is discussed. Basis functions construction examples with radix 4 and their application in temporal correlation are discussed 18

A.V. Bragin, D.V. Pyanzin. SELECTION OF INFORMATIVE FEATURE FOR RECOGNITION OF LABYRINTH DOMAIN STRUCTURES OBJECTS IMAGES

Key words: labyrinth domain structure, informative features, morphological analysis.

The classification of objects labyrinth domain structure is presented. Informative features to recognize labyrinth domain structure objects are selected and analyzed. An algorithm for analyzing branch objects of labyrinth domain structure based on morphological image analysis is offered 21

A.Yu. Linovich. UPPER BOUND FOR THE SEARCH OF OPTIMUM CHANNEL QUANTITY FOR OVERSAMPLED MULTIRATE ADAPTIVE FILTER

Key words: multirate signal processing, multirate adaptive filter, structural optimization.

Analytic dependence for upper bound while choosing maximal channel quantity of oversampled multirate adaptive filter is obtained. The channel quantity search procedure is performed on the step of structural optimization of analysis-synthesis system. Here the optimization consists of computational complexity reducing for multirate adaptive filter realization while steady-state accuracy is predetermined.....25

M.V. Akinin, N.V. Akinina, M.B. Nikiforov. APPLICATION OF INDEPENDENT COMPONENT METHOD FOR SEPARATION OF SIGNAL AND ADDITIVE NOISE

Key words: Independent component analysis, artificial neural networks, computer vision.

An algorithm for separating of desired signal and noise through the use of independent component analysis is considered. Different types of neural networks that are applicable to implement the independent component analysis are viewed. The results of some experiments that show temporal and qualitative analysis of the effectiveness of independent components to separate the signal from the noise of various origin are given.....33

RADIO ENGINEERING AND MEASURING SYSTEMS

V.I. Koshelev, D.N. Kozlov. ADAPTIVE MANEUVERING TARGET DETECTION ALGORITHM

Key words: maneuvering target, acceleration, adaptive algorithm, Doppler detector.

We propose adaptive Doppler algorithm to detect maneuvering target. Its simulation modeling was carried out. We compared proposed algorithm with known nonadaptive multichannel algorithm. The criteria are receiver operating characteristics and computational complexity. The resulting gain in threshold signal-to-noise ratio is 1.46 dB at three channels of acceleration.....38

V.K. Klochko, A.N. Usachev. MATHEMATICAL MODEL AND METHODS TO ESTIMATE ANGULAR COORDINATES OF AIR TARGETS BY DOPPLER RADAR

Key words: target detection, estimation of angular coordinates, Doppler filtering, restoration fields.

A mathematical signal model for multichannel Doppler radar in the task of angular coordinates estimation of detected air targets is done. The methods of solving the problem for moving and stationary RADAR based on direction-finding, restoring the fields of reflection and estimation of angular coordinates are offered.....41

V.G. Andreev, T.P. Nguyen. ADAPTIVE ALGORITHM SUPPRESSION OF CLUTTER AND NOISE WITH UNCORRELATED COMPONENTS POWER VARIATIONS

Key words: clutter and noise, whitening filter, clutter suppression, adaptive signal processing.

In this paper we propose a simplified algorithm, which allows us to reduce the amount of computational cost of operations by a factor of 2.3 ...18.7 as compared with optimal solution. We show that the use of the proposed algorithm allows to increase the accuracy of the calculation of the coefficients of inverse clutter and noise correlation matrix and provides the increase of average probability detection by 10 %...23 % in comparison with known (nonadaptive) algorithm 47

K.A. Batenkov. DISCRETE CHANNEL TRANSMITTING INFORMATION POTENTIALITIES RECOGNIZING STOCHASTIC NATURE OF CONTINUOUS CHANNEL INCLUDED IN DISCRETE CHANNEL

Key words: continuous channel discrete mapping, discrete channel, continuous channel, likelihood function, space matrix.

Analytical form of mutual information potential boundaries of discrete communication channel

composed of continuous channel, modulator and demodulator is received. Continuous channel nature is characterized by likelihood function, while operations of modulation and demodulation are identified by space matrix operators 50

V.I. Koshelev, A.V. Safonova. MODIFIED PM ALGORITHM OF DOA ESTIMATION

Key words: angular coordinates, positioning accuracy, computational costs.

A modified Propagator method (PM) algorithm to estimate the direction of radio signal arrival is offered. A comparison of accuracy and scope of required computational operations of proposed algorithm of radiation sources coordinates estimation with known ESPRIT and PM algorithms is made. The advantages to use the proposed algorithm of radiation sources coordinates estimation in real time are proved 53

A.N. Kovalev, F.N. Kovalev. ACCURACY OF TARGET TRAJECTORY PARAMETERS ESTIMATION IN FORWARD-SCATTERING BISTATIC RADAR SYSTEM

Key words: forward-scattering radar, bistatic radar system, potential accuracy, maximum likelihood method, trajectory parameters.

The problem of estimating the trajectory parameters targets in forward-scattering radar with measurements of Doppler frequency and direction of echo signal is considered.The investigation of potential accuracy to determine the parameters of maximum likelihood method is performed. Algorithm of estimating the coordinates based on the model of target movement orthogonal to base line is proposed.The accuracy of algorithm is estimated from mathematical simulation..... 58

D.A. Gulyaikin, V.A. Tarusov, V.A. Shalaginov. MODEL OF SIDE ELECTROMAGNETIC RADIATION MEASURING SYSTEM

Key words: side electromagnetic radiation, special research.

Mathematical model of side electromagnetic radiation measuring system considering the possibilities of modern measuring equipment to analyze nonstationary signals is offered 62

COMPUTER ENGINEERING AND APPLIED MATHEMATICS

V.P. Koryachko, O.V. Lukyanov, A.P. Shibanov. FINDING PARALLELISM PROTOCOLS TO IMPROVE THE PERFORMANCE OF DATA TRANSMISSION NETWORK OF LANDFILL MEASURING COMPLEX

Key words: measurement system, GERT-network queuing system, synchronization protocol, probability density function.

The questions of quality polygon network improvement to carry traffic from several measuring systems are considered. A method to enhance performance of communication protocols by identifying them in parallelism and simulation using GERT-networks (Graphical Evaluation and Review Technique) and queuing system (QS) M/M/1 - M/G/1 is proposed 68

A.V. Antipov, *O.V. Antipov*, *A.N. Pylkin.* INTEGRATION OF DISTRIBUTED PROGRAM APPENDICES ON THE BASIS OF ROUTING UNDER THE CONTENTS OF MESSAGES

Key words: distributed appendices, messages, router.

Formal specification of publication/subscription systems are the basis to the approach of router messages development on the basis of message contents 75

D.A. Perepelkin. ROUTES PAIRS PERMUTATIONS ALGORITHM BASED ON OSPF PROTOCOL IN THE COURSE OF DYNAMIC CORPORATE NETWORK NODES AND COMMUNICATION LINKS FAILURE

Key words: adaptive accelerated routing, routing algorithms, routes pairs permutations algorithm, OSPF protocol, dynamic changes, dynamic corporate networks, software defined networks.

Adaptive accelerated routing algorithm based on OSPF protocol during dynamic corporate network nodes and communication links failure which increases the efficiency of its operation is offered 84

A.V. Prutzkov, D.M. Tsybulko. APPLICATION OF PROBLEM-DRIVEN OBJECT PROGRAMMING FOR DESCRIPTION OF ARTIFICIAL INTELLEGENCE AND INFORMATION SYSTEMS ACTING

Key words: programming languages, object oriented programming, problem-driven programming.

We offer to use problem-driven object programming (PDOP) for the description of different system acting order. This method allows to use PDOP by specialists who aren't professional programmers. We exemplify descriptions of logical deduction system and information tableau control system. We describe the sphere of application of PDOP and show how program control constructions can be realized by the one construction of PDOP. We enunciate four principles of PDOP defining its development and evolution 92

E.V. Selivanov, I.Y. Kashyrin. CLOUD TECHNOLOGY AS A NEW EVOLUTION STAGE OF GLOBAL NETWORK INFORMATION SERVICES

Key words: cloud computing, internet services, distributed applications.

The article describes the history of the development of information services global networks and carries out its analysis. Modern market of web applications is studied. Main types of cloud systems are identified. The place of cloud technology in the modern world is determined. Perspective directions of development of Internet technologies are considered 97

O.V. Faleev. SYNTHESIS OF HARDWARE AND SOFTWARE AGGREGATE COMPLEX

Key words: The method to solve the problem of hardware and software aggregate complex synthesis considering functional dependency of complex modules price from their production volume is offered.

The algorithms for dynamic scheduling of parallel diagnostic computing in fault-tolerant multiprocessor real-time systems are developed. The application of collective checks for processors during the computation is proposed. This approach can increase the efficiency of self-diagnosis of the system due to more uniform loading of processors, compared with duplication checks 103

ELECTRONICS

V.S. Gurov, P.I. Kuksa. AXISYMMETRIC HYPERBOLOID ENERGY ANALYZER ON THE BASIS OF SIMPLIFYING ELECTRODE SYSTEM

Key words: energy analyzer, electron, ion, optics, electrode systems.

The results of calculations of energy analyzer axisymmetric hyperboloid parameters using asymptotic conical surfaces as end electrodes are given. Geometry and ion-optical scheme of energy analyzer is presented. The dependences of various parameters influence on the energy resolution and light-gathering power as well as efficiency parameter are built 110

V.V. Tregulov, N.V. Vishnyakov, Y.V. Vorobiov, D.V. Almazov. INVESTIGATION OF ANTIREFLECTIVE

POROUS SILICON SURFACE OF SILICON SOLAR CELL

Key words: atomic force microscopy, antireflective coating, porous silicon, photoluminescence, photovoltaic cell.

The results of antireflective characteristics of porous silicon films formed on the frontal side of silicon solar cell are presented. It is found that porous silicon films made by electrochemic way with and without simultaneous irradiation differ by structural characteristics.....113

V.S. Litvinova, V.G. Litvinov. VECTOR NETWORK ANALYSIS OF METAL-SEMICONDUCTOR NANOCONTACT

Key words: nanocontact, scanning microwave microscopy, vector network analysis, semiconductor, charge carrier concentration.

The limitations of existing electric probe methods research of semiconductor nanomaterials and nanostructures are considered. The characteristic features of the local method of charge carrier concentration determining in a semiconductor using scanning microwave microscopy are discussed.....116

S.V. Golovastov, A.E. Korobov, V.V. Mironov. MATHEMATICAL METHODS TO INVESTIGATE HEAT EXCHANGE IN HEAT PIPES

Key words: heat transfer; intensification; twisted pipe.

Efficiency of intensification of twisted pipe for three different flow regimes was observed: for laminar, transient and turbulent. Influence of Reynolds number on value of intensification of heat transfer through a twisted pipe was studied numerically. Comparison of numerical and experimental data was carried out. It was shown that the using of twisted pipe is not effective for heat transfer intensification at low Reynolds numbers. However, the intensification increases with increasing of Reynolds number. It was shown that the efficiency of heat transfer intensification with using of twisted pipe also increases with increasing of Prandtl number. The influence of twisted pipe step on the efficiency of heat intensification was investigated.....120

N.N. Bisyarin, E.Y. Chernyak. EXPERIMENTAL ION MOBILITY SPECTROMETRY WITH ION SOURCE BASED ON CONTINUOUS CORONA DISCHARGE

Key words: ion mobility spectrometry, ion source, corona discharge, ion gate, ion packet length.

An experimental study of analytical possibilities of ion mobility spectrometer with ion source based on continuous corona discharge is given. The influence of corona discharge current on the analytical characteristics of spectrometer is considered. It is found that injection pulse duration and intensity of electric field in two-grid ion gate at the time of injection influence on the analytical characteristics of spectrometer through the length of injected ion packet. It is shown that the installation of shielding on drive axis of ion gate has achieved the increase in signal-to-noise ratio of 1.5. 126

MANAGEMENT IN SOCIAL AND ECONOMIC SYSTEMS

S.V. Eremeev, D.E. Andrianov, A.S. Vedenin. CONSTRUCTION AND APPLICATION OF TOPOLOGICAL RELATIONS BETWEEN GROUPS OF OBJECTS IN GEOGRAPHIC INFORMATION SYSTEMS

Key words: topological relationships, groups of objects, map layers, vector tablets.

The article is devoted to the development of new types of topological relations between groups of objects. Formal description of objects grouped on limiting space is developed. Examples of practical use of this approach in tasks of vector tablets merge are considered.....130

O.A. Kozelkov. STRUCTURAL AND THEORETICAL SET MODELS TO SOLVE THE PROBLEM OF ESTIMATION OF TECHNOLOGICAL PARAMETERS IN INDUSTRIAL SYSTEM

Key words: technological realizability, enterprise, formalized model.

For formal presentation of task of technological realizability evaluation of enterprise modernization project a model which allows to systematize procedure of analysis of technological processes with different degree of detalisation and on different levels depending on concrete features of enterprise is offered. The hierarchical model of task is formed, its basic descriptions are certain in set-theoretic presentation. Basic principles of estimation of technological realizability of project requirements – efficiency of decision of general task and its hierarchicalness are formalized 134

R.S. Gubanov. MANAGEMENT OF INNOVATIVE ENTERPRISE RISK WHEN INTRODUCING NANOTECHNOLOGY

Key words: innovative risk management mechanism; socio-economic system; manufacturing; new product; nanotechnology.

The necessity of the account of nanotechnology as a factor of innovation era of socio-economic systems is described. The estimation of the situation causing the probability to wait for the tendency to reduce revenue from sale of innovative products is given. A mechanism of management innovative risks is proposed. Comparison of the proposed mechanism for accounting of nanotechnology with management approach to manage the risks prevailing in the modern scientific literature is carried out 138

Y.A. Merkulov. POSSIBILITIES OF CITY TRANSPORT SYSTEM MANAGEMENT BY MEANS OF CROWDSOURCING

Key words: city transport system, social efficiency of city transport system, crowdsourcing, management of city transport system efficiency.

One of the ways to determine social efficiency of transport system is considered. Use of the mechanism of crowdsourcing for adequate measurement of social efficiency and management of efficiency directed on its maximizing is offered 144

BRIEF REPORTS

I.E. Syrmolotnov. ANALYSIS OF SAW-ACCELEROMETERS WITH TOUGH ELEMENTS OF TORSIONAL AND FLEXURAL TYPES

Key words: accelerometer, piezoconverter, SAW-resonator, SAW-generator.

Acoustic surface wave accelerometers with tough elements were observed in this article. We studied some constructions of accelerometers and represented experimental technical characteristics 148

E.V. Vasilyev, A.A. Kuznetsov, E.Y. Chernyak. LAYER-BY-LAYER AUGER ANALYSIS OF MULTILAYER COATING GLASS BY METHOD OF AUGER ELECTRON SPECTROSCOPY (AES)

Key words: Auger-electron spectroscopy (AES), investigation of a solids surface, ion beam sputtering.

The findings of investigation of multilayer coating glass carried out by method of Auger electron spectroscopy (AES) with ion beam sputtering are represented 154

INFORMATION ABOUT THE AUTHORS (Russian) 158

INFORMATION ABOUT THE AUTHORS (English) 161