

CONTENTS AND ABSTRACTS

DATA TRANSMISSION AND PROCESSING

S.N. Kirillov, A.S. Slesarev. FAST SEARCH AND DETECTION ALGORITHM OF PHASE-SHIFT KEYED SIGNAL OF SATELLITE DATA-TRANSMISSION SYSTEM THAT IS ADAPTIVE TO NARROWBAND INTERFERENCE INFLUENCE

Key words: fast Fourier transformation, wavelet packet decomposition, search and detection, cross-correlation function, matched filter, narrowband interference.

Fast wideband binary phase-shift keyed signal search and detection algorithm for satellite data-transmission system is developed. It provides 20..25 dB higher interference immunity as compared to the known fast algorithm on basis of wavelet packet decomposition and fast Fourier transformation while signal-to-noise ratio is higher than -10 dB. This algorithm is shown to need 15..50% less computing operations in comparison with optimal under minimum mean-root-square error criterion filter usage.....3

A.V. Blagodarov, A.N. Pylkin, D.M. Skudnev, A.P. Shibanov. THE OPTIMAL BY COST ETHERNET NETWORK STRUCTURE SYNTHESIS

Key words: computer networks, Ethernet, synthesis, optimization, algorithm, procedure.

Questions of optimal by cost Ethernet network structure automatic synthesis are examined. The ability to get the optimal by cost Ethernet network structure is described. The procedure of choosing the optimal quantity of switchers in the network and the procedure of choosing the way of switchers interconnection are suggested.....8

A.A. Voronin, N.A. Egoshkin, V.V. Ereemeev, I.V. Moskatinyev. GEOMETRIC DATA PROCESSING FROM EARTH GLOBAL OBSERVING SPACE SYSTEMS

Key words: Earth remote sensing, image processing, geometric correction, shooting models, geodetic binding, computing parallelization.

Universal mathematical models of formation and geometric correction of images from the Earth global observing systems using two different vision probe designs, with linear and circular sweeps of an observable scene, are presented. Issues of specification of a geodetic binding of images and their representation in cartographical projections are considered12

O.A. Gomofov, A.E. Kuznetsov, V.I. Pobaruev, V.I. Poshehonov. SOFTWARE AND MATHEMATICAL SUPPORT OF SPACEBORNE STEREO IMAGE PROCESSING SYSTEM

Key words: spaceborne stereo image, block adjustment, disparity map, triangulation model, digital elevation model.

Main stages of spaceborne stereo image processing for digital elevation model (DEM) generation are considered. For DEM quality improvement it is proposed: firstly, cloudiness and water body segmentation algorithm, secondly, conjugate points identification procedure by means of disparity map generation. Results of practical aprobation of the developed software system with "Resurs-DK" spacecraft images are presented.....17

D.Y. Guzhva. VPN-NETWORKS EVOLUTIONARY SYNTHESIS IN INFOTELECOMMUNICATION SYSTEMS

Key words: network synthesis, network topology, genetic optimization algorithm, bandwidth, the system of mass service.

Method for searching a VPN-network rational topology using the approach known as evolutionary synthesis has been supposed. Genetic algorithm of network structure optimization

has been considered. Structure of chromosomes, clearly reflecting the specific network topology, is given. A VPN-bandwidth network assessment model, based on the theory of queries and considering the topology and network processing load, has been offered.....22

RADIOTECHNICAL AND MEASURING SYSTEMS

V.I. Koshelev, I.S. Kholopov. RESEARCH OF MULTIMODE PASSIVE CLUTTER PARAMETERS INFLUENCE ON PROBABILITY OF ITS CORRECT CLASSIFICATION

Key words: clutter situation, recognition algorithm, multimode clutter, logarithm of likelihood ratio, probability of correct recognition.

The analysis of deliberate masking clutters recognition system effectiveness at the limited volume of control sample is done. Masking clutters classification algorithm sensitivity to the change of passive clutters parameters and size of the noise-clutter relation is investigated28

O.R. Nikitin, P.A. Polushin, M.V. Girshevich, V.A. Pyatov. THE METHOD OF COMBINED PROCESSING OF DIGITAL DIVERSED SIGNALS

Key words: diversified signals, noise immunity, before detection and after detection summing.

The method of after detection diversified signals processing is proposed and described. The method doesn't need preliminary phasing of signals but provides the noise immunity conforming to combining of diversified signals before detection. By joint using of linear summing of signals and selection of the greatest of signals the noise immunity that corresponds to the optimal combining is achieved. The method doesn't use regulation of summing coefficients32

S.V. Mavrin, V.V. Udin. MATRIX MODEL OF A.C.VOLTAGE REGULATOR WITH SECONDARY WINDING COMMUTATION BASED ON TWO TRANSFORMERS

Key words: matrix, model, regulator, transformer.

Merged matrix method to obtain output voltage set for two transformer A.C. regulator with secondary winding commutation has been used.....37

S.S. Mamonov. LIMIT CYCLES OF THE FREQUENCY-PHASE SELF-TUNING SYSTEM OF SECONDARY FREQUENCY WITH INVERTED CHARACTERISTIC OF THE FREQUENCY CIRCLE

Key words: limit cycles, stability, frequency synchronization.

Frequency-phase synchronization system of secondary frequency with inverted characteristic of the frequency circle is analyzed. Conditions for positive and negative secondary limit cycles existence have been obtained, their stability has been considered. The tranquillities' domain of attraction for a system with sinusoidal nonlinearity in case of secondary limit cycles existence has been constructed40

COMPUTER SCIENCE AND APPLIED MATHEMATICS

V.V. Belov, A.A. Rybakov. LINEAR MODEL VALUES CALCULATION WITHOUT MODELS PARAMETRICAL IDENTIFICATION

Key words: linear model, projective matrix, recurrent calculations, search of arguments.

The method of linear model values calculation, in particular, MLR (Multiple Linear Regression) without its parameters estimate is offered. The result is equivalent on values to the description, parameters of which are estimated by a method of the least squares. The offered way can be used in algorithms of the best somewhat linear process description search submitted by discrete values, for example, by a time series47

A.V. Prutskov. GENERATION AND RECOGNITION OF NATURAL LANGUAGES WORDFORMS BASED ON CONSEQUENT WORDS TRANSFORMATION

Key words: morphological analysis, morphological synthesis, automated text processing.

A universal method of generation and recognition of natural languages wordforms of different families and groups is supposed. The method is based on wordforms representation as transformation sequence and is intended for morphological level text processing problem solving. The possibility of using the method for various natural languages and the adequacy of the offered wordform model is proved.....51

A.A. Shkadov. COMPUTER NETWORK PROTECTION CONTROL MODEL BASED ON HIERARCHICAL COLORED PETRI NETS

Key words: colored Petri nets, security policy, vulnerabilities, protection control.

Computer network protection control model based on hierarchical colored Petri nets is offered. Analysis of existing approaches to computer network protection control is made. Peculiarities of model usage by the example of threats implementations aimed at Web-applications are considered58

A.A. Terekhov. STATISTIC MATERIAL IDENTIFICATION AND TIME SERIES CONSOLIDATION

Key words: identification, consolidation, forecasting, formal process, multiple prediction, tendency.

The principles of statistic material identification problem solution with non-semantic method application and time series algebraic operations definition are given. Time series consolidation problem solutions are exemplified and this consolidation place in a cycle of functioning of intellectual system forecasting is shown62

ELECTRONICS

A.A. Svijazov, V.V. Soldatov. INSTALLATION FOR RESEARCH OF THE FACTORS INFLUENCING GAS-DISCHARGE PANELS PARAMETERS

Key words: gas-discharge non-mercury filling indicators, discharge initiation voltage, discharge maintenance voltage, discharge initiation lag time.

Dynamic changes of gas-discharge non-mercury filling indicators parameters have been investigated at various modes of operation. The purpose of research - reception of recommendations on modes of gas-discharge indicators application, giving the greatest durability. Characteristics of gas-discharge non-mercury filling indicators have been received. Results will be used in time of new type gas-discharge mercury filling indicators, working in a wide temperature range, development 71

A.I. Bakulin. REGARDING ORTHOGONALITY OF ELECTROMAGNETIC FIELD COMPONENTS

Key words: electromagnetic field, orthogonality.

Dot products of electric and magnetic components of degenerative waves superposition in rectangular and circular waveguides and of two free space plane waves have been considered. Conditions of orthogonality executing are formulated, conclusions are drawn75

BRIEF REPORTS

V.S. Ivanov, A.A. Trubitsyn, V.S. Gurov, A.A. Dyagilev. REALIZATION OF PARALLEL COMPUTATIONS ALGORITHM AT THE DECISION OF PROBLEMS OF THE THEORY OF POTENTIAL BY BOUNDARY ELEMENTS METHOD

Key words: boundary elements method, electron-optical systems modelling, multithreaded computations.

The algorithm of parallel computations of an array of potentials in electron-optical systems is developed and realized by boundary elements method. Comparative testing of developed and standard one-threaded algorithm is done. The opportunity to save a lot (more than 40 %) of time resources in case of two-threaded computations is shown80

A.K. Musolin, V.V. Klenov. AUTOMATED INFORMATION-MEASURING SYSTEM OF ELECTRIC POWER CHECKING AND ACCOUNTING AT THE ENTERPRISE

Key words: automation, data-measuring system, electric power, energy system, sensor, controller, analysis.

The decision of the problem of electric power consumption and losses accounting due to the process automation and electric power accounting at the enterprise is supposed.....83

V.N. Loktiukhin, S.P. Vikhrov. CHAIR RESEARCH WORK INFLUENCE ON A TRAINING STRATEGY CHOICE IN MULTILEVEL EDUCATION IN THE "BIOMEDICAL ENGINEERING" DIRECTION

Key words: educational program, training technology, level education, professional competence, research work.

Chair research work subjects influence aspects on a training strategy choice in multilevel education in the "Biomedical engineering" direction are considered. Their practical decision will be carried out at the Ryazan state radio engineering university (RSREU) at the Biomedical and semi-conductor electronics department.....86

Yu.M. Korshunov. THE APPLICATION OF TWO LEVELDISCRIMINANT ANALYSIS METHOD FOR QUALITY ESTIMATION OF OUTPUT PRODUCTION

Key words: cluster analysis, discriminant analysis, Matlab package, learning sample.

The algorithm for discriminant analyses allowing to detect with high probability corruptly produced details is described. The one is based on estimation of few detail features characterizing their quality89

INFORMATION ABOUT THE AUTHORS (Russian)93

INFORMATION ABOUT THE AUTHORS (English).....95