

CONTENTS AND ABSTRACTS

DATA TRANSMISSION AND PROCESSING

S.N. Kirillov, V.T. Dmitriev, Ya.O. Kartavenko. ALGORITHM OF OBJECTIVE DECODED SPEECH SIGNAL QUALITY ESTIMATION ON THE BASIS OF SPECTRAL DYNAMICS CHANGES OF SPECTRUM CRITICAL STRIPS

Key words: speech signal, objective estimation of speech quality, phonetic function, spectral dynamics, critical strip.

The algorithm of an objective estimation of speech signal quality on output of the decoder on the basis of spectral dynamics change within the range of critical strips is offered. Parameters of algorithm are proved and the degree of correlation of subjective and objective estimations of speech quality is shown to be in the range between 0,78-0,97.....3

B.A. Alpatov, P.V. Babayan, S.A. Smirnov. COMBINED ALGORITHM FOR AIR OBJECTS TRACKING

Key words: objects tracking, coordinate measuring, Bayesian segmentation, spatial filtering, performance measurement, data fusion.

The procedure of automatic coordinate measuring algorithm selection based on conditions observation estimation for air objects tracking algorithm is suggested. The increase of continuous tracking duration is shown. The procedure selects one of two object coordinates measuring algorithms: an algorithm based on Bayesian segmentation and the algorithm based on spatial filtering. The results of the experimental research of proposed algorithm with the usage of extensive video database are presented.7

V.K. Zlobin, A.N. Kolesenkov, B.V.Kostrov. CORRELATION-EXTREME METHODS OF SPACE IMAGES COMBINATION

Key words: correlation-extreme algorithms, identification of images, material convolution.

The problem of volume calculations reduction in correlation-extreme algorithms of images identification is considered. The methods based on application of material convolution are offered.12

E.M. Dondik, A.N. Pylkin, N.E. Skorobogatova. ALGORITHM FOR PATTERN RECOGNITION WITH VARIABLE STRUCTURE

Key words: images of variable structure, pattern recognition, a fan of vectors, contour analysis, dactyl speech.

An algorithm for pattern recognition formed by a single dynamic system with variable structure in which recognizable information signs are uncorrelated with each other and create a combination of its components being in continuous motion. Examples of such systems can be a speaking person face or hand dactyl speech of deaf people. An algorithm for selection and subsequent detection of such images is proposed.....17

V.G. Andreyev. THE METHOD FOR DETECTION OF SIGNALS FROM PERMANENTLY RADIATING ROLLING OBJECTS

Key words: Fourier transformation, spectrum, signal integration, multichannel filter.

The method for detection of signals from permanently radiating rolling objects under conditions of particularly known parameters of object's rolling is offered and investigated. It is shown that the offered method allows to reduce 1.5...3 dB signal-noise threshold ratio during radiation

detection in comparison with known detecting methods. The prize allows to increase up to 1.3...1.4 times the range of detection of radiation from permanently radiating rolling objects. The prize is reached thanks to extra filtration and its results normalization procedures based on apriority data about rolling parameters of the object.23

RADIOTECHNICAL AND MEASURING SYSTEMS

V.I. Koshelev, E.S. Shtrunova. EFFICIENCY INCREASE OF ALGORITHMS OF RADAR PROTECTION FROM ACTIVE NOISE HINDRANCES

Key words: active noise hindrances, algorithms of spatial processing, aprioristic uncertainty, factor of improvement of the relation a signal - (a hindrance + noise).

The comparative efficiency analysis of algorithms of signals spatial processing in the presence of active noise hindrances operating from the taken out point of space, for a coherently- pulsing radar is carried out. The expediency of usage of two-stage algorithm providing smaller sensitivity to errors of correlation hindrances matrix estimation in the conditions of parametrical aprioristic uncertainty is proved.27

S.I. Gusev, Yu.N. Parshin. ACCELERATION OF ADAPTATION IN SIGNAL-PROCESSING SYSTEM WITH OPTIMIZATION OF SPATIAL STRUCTURE

Key words: adaptive signal-processing, preprocessing, optimization of spatial structure.

This work investigates the problem of increasing convergence velocity for the process of adaptive weight vector adjustment in spatially reconfigurable antenna system against the background of point-source interferences. It is shown that preprocessing with adjustment of the adaptive antenna array element spacing gives the capability to reduce considerably eigenvalue spread of spatial correlation matrix and to obtain faster convergence of adaptation gradient-type algorithm31

A.A. Ovinnikov. ANALYSIS OF CARRIER FREQUENCY OFFSET ESTIMATION ALGORITHM FOR OFDM SIGNALS IN ADDITIVE WHITE GAUSSIAN NOISE CHANNELS

Key words: cyclic prefix, guard interval, OFDM, maximum likelihood estimation.

In this paper a frequency estimation algorithm for a multicarrier system based on a maximum likelihood principle is considered. The efficiency of such detector is analyzed in additive white Gaussian noise channel using different guard intervals and window lengths34

S.I. Yelesina, V.V. Zotov, M.B. Nikiforov. IMPROVING OF GLOBAL OPTIMIZATION METHODS BASED ON CLUSTERING OF SEARCH REGION

Key words: global extremum, objective function, search region, clusterization, modified method of deform polyhedron.

This paper offers some methods to reduce labor intensity in the process of searching for a global extremum, their effectiveness is researched. It's confirmed that correlation-extreme navigation systems using information from radars may38

COMPUTER SCIENCE AND APPLIED MATHEMATICS

E.V. Larkin, N.A. Rudyanov. MATHEMATIC MODEL OF MOVING LAND OBJECT TRANSVERSE OSCILLATIONS

Key words: simulator, moving land object, balance position, relief, transverse oscillations, vertical co-ordinate, tangage angle, roll angle, dynamic model.

A model defining a balance position of hull multi-suspension vehicle moving across Earth surface with arbitrary relief for the cases of hard and/or viscous/elastic wheels is worked out. Taking into consideration the road force a mathematical model of vehicle transverse oscillations

on the linear vertical co-ordinate, tangage angle and roll angle is formed. Results of a given differential equation system integration including input force pure lag are exemplified. Results are recommended to use in simulators software43

A.E. Balyasov, V.V. Bukharin, V.I. Andrianov. SPECIAL SOFTWARE CHECK UP OF COMPLEXES RADIO-CONTROLLING THE PRESENCE OF ERRORS AND UNDECLARED CAPABILITIES

Key words: verification, special software, adaptation, undeclared capabilities, radio control complex.

The paper considers the sequence of steps during verification of special software for the presence of undeclared capabilities and errors. This method allows to determine with high probability the absence of undeclared capabilities and errors affecting the accuracy and reliability of radio control complexes measurement results47

D.A. Perepelkin. THE ADAPTIVE ACCELERATED ROUTING ALGORITHM BASED ON OSPF PROTOCOL IN THE COURSE OF DYNAMIC CORPORATE NET ELEMENTS FAILURE

Key words: adaptive accelerated routing, OSPF protocol, dynamic changes, routing algorithms, corporate networks.

An algorithm for rapid adaptive routing based on protocol OSPF during dynamic corporate net elements failure which increases the quality of its operation is offered.....53

P.A. Baranchikov, E.A. Baranchikova. OPTIMIZATION APPROACH OF RELATIONAL DATABASE STORED REGULAR EXPRESSIONS SEARCH WITH THE HELP OF INDEX TABLE

Key words: database, regular expression, search, query optimization.

Calculation efficiency of regular expression search in the database by the certain input word is being described. Usage of index table allowing to replace regular expression matching calculation with simple string comparison has been suggested. Calculation efficiencies of the base search and indexed one have been counted and compared. Experimental results showed search speed increase up to 10^3 times.....59

ELECTRONICS

V.I. Solovyev, V.A. Korotchenko, Zh.V. Solotenkova. RESEARCH CONCERNING CONDITIONS OF VACUUM SEALED CONTACTS ITERATED CIRCUITS OCCURRENCE AT CURRENT BREAK

Key words: ferreed contacts, “chatter” of contacts, iterated circuits, electric attraction

This work contains the results of the dynamic of break in vacuum sealed contacts of MKA-14103 type in electric circuits with active load. At the certain conditions circuit of contacts is shown to be accompanied by occurrence of serial of iterated circuits (which are similar to “chatter” of contacts at current break) with the frequency of 50 kHz. The duration of this process can be several milliseconds, it depends on the duration of the ruling impulse (in the range of 300 mcs) and increases with the growth of switched tension (to 250 volts), and with decrease of current speed of control coil.....65

V.K. Bazylev. GENERATION OF ULTRAVIOLET RADIATION BY MEANS OF LOW ENERGY ELECTRONS BRAKE

Key words: ultraviolet radiation, tungsten target, deceleration radiation of electrons.

The results of an experimental research of ultraviolet generation due to brake of low energy electrons (20 – 300 eV) on a tungsten target and radiation coupling through a quartz window are given. 4 microwatt integral intensity for 180 –319 nm waveband at 300 V tube voltage and at tube current equal to 4.5 mA was achieved. It is shown that as an electron beam power increases from 20 to 300 eV the efficiency of ultraviolet radiation power transformation decreases69

N.V. Grishankina, V.G. Litvinov, V.V. Gudzev, N.B. Rybin. THE INVESTIGATION OF Si AND a-Si:H DIODE-LIKE STRUCTURES BY CURRENT DEEP LEVEL TRANSIENT SPECTROSCOPY IN THE EMISSION AND CAPTURE MODE

Key words: CDLTS, CTSC, semiconductor barrier structure.

Current Deep Level Transient Spectroscopy (CDLTS) physical foundations working in the capture mode (CTSC) are developed. Results of deep levels (DLs) investigation of the semiconductor barrier structures with DLs – silicon p+-n structure with the Au-doped base and a-Si:H p-i-n structure by the CDLTS and CTSC methods are reported. The emission and capture processes of charge carriers temperature capture (emission) cross-section dependence are investigated. It was shown that the charge carrier capture process on the deep level is not physically equivalent to the emission kinetics.....72

V.G. Litvinov, V.I. Kozlovsky, O.A. Milovanova, N.B. Rybin. EMISSION TRANSITIONS MODELING IN QUANTUM-WELL STRUCTURES ZnCdS / ZnSSe WITH TYPE-II THE BAND DIAGRAM

Key words: heterostructure, quantum well, band diagram.

The simulation of emission transitions in quantum well structures ZnCdS/ZnSSe with the type-II band diagram taking into account energy band diagram dependence on the configuration of the layers forming the heterostructure, and the elastic strains that arise due to the lattice constants and thermal coefficient of linear expansion mismatches are shown. The comparison of simulation results with experimental cathodoluminescence spectra shows the consistency of theoretical and experimental values of emission energies at low density of e-beam current. The effect of a triangular quantum well for holes formation in the barrier layer in case of high concentrations of electrons in a rectangular quantum well is taken into account modeling the energy of the emission in the ZnCdS/ZnSSe structure80

MANAGEMENT

M.M. Shevyrev. FORECASTING OF INNOVATIVE GROWTH OF REGION

Key words: innovative factors of regional competitiveness, trend model of forecasting of innovative growth, innovative regional cluster

Questions of estimation and forecasting of major factors of innovative growth of territory to be used in system of indicative planning of regional economy growth are considered.....88

I.A. Sukhorukova. DEVELOPMENT OF QUALITY MANAGEMENT INSTRUMENTS PATTERN

Key words: innovation activity, quality management, quality management instruments.

The article defines the role of quality management in terms of innovation development of enterprises. The fields of quality improvement are chosen. The article also formulates the mathematical model of quality management instruments choice problem. In the final part of the article classification of quality management instruments is determined.....92

BRIEF REPORTS

A.E. Chizhikov, S.B. Ilyichev, A.A. Povorinsky. INVESTIGATION OF UNDISTORTED P-N JUNCTION CURRENT-VOLTAGE CHARACTERISTIC MEASURING POSSIBILITY

Key words: p-n junction, semiconductor structure, undistorted current-voltage characteristic.

Results of diode and triode structures transient analysis are presented. The possibility of undistorted p-n junction current-voltage characteristic measuring on the basis of voltage investigation at the end of current pulse has been shown. Contact potential differences measured for silicon diodes D242B, D226VP, germanium diodes D304, D7ZH and for the silicon transistor D805B correspond with reference data. Results could be used for calculations of

semiconductor structure electrophysics parameters both at manufacturing stage and with finished devices97

S.N. Buzykanov. THE ALGORITHM OF SIGNAL QUANTIZATION NOISE REDUCING IN WEIGHTED SOBOLEV SPACE

Key words: signal quantization noise, weighted Sobolev space W_2^1 , digital signal processing.

The algorithm of digital signal representation in the weighted Sobolev space W_2^1 is offered. It allows to reduce noise using low capacity of quantization. It is showed that experimental signal noise quantization can be reduced threefold and more at a constant sampling number 100

Yu.V. Myakishev MATHEMATICAL MODELS OF ELECTRON BEAM INFLUENCE ON THE METAL

Key words: mathematical model, electron beam, metal, oscillation regime.

Two-dimensional mathematical models as systems of ordinary differential equations are proposed. Analytical and computer analysis of oscillation regimes with the interaction of electron beam with metal is presented 103

O.O. Basov, M.V. Ilyushin, A.V. Zatsepin. COMMUNICATIVE INTERACTION MODELS AND THEIR APPLICATION IN INFOCOMMUNICATIONS

Key words: communicative interaction, monologue, dialogue, polybroad gull, speech signal, statistical redundancy.

Models of basic communicative interaction forms are formalized. Because of available discrepancies in various data according to pauses of speech signal our own experimental research is made. On the basis of received results a model of monologic form of communication is specified, potentially possible compression factor of speech signal at the expense of blocking of pauses of speech for dialogue and polybroad gull is defined. Questions of statistical redundancy of speech signal usage in various infocommunication appendices are considered 106

E.Ya. Chernyak, N.N. Bisyarin. INVESTIGATION OF ION SOURCE OF CORONA DISCHARGE WITH CONTROL GRID

Key words: ion source, ion mobility spectrometer, reactant ions, molecular complex, corona discharge.

Parameters of ion source with control grid based on corona discharge for ion mobility spectrometer are considered. Mechanism of molecular complexes formation at atmospheric pressure and a criterion of their stability are given. Ion current in air at atmospheric pressure and room temperature is investigated. It is shown that this design creates a source of ionic currents that satisfy the requirements of ion mobility spectrometer, i.e. ion current decreases from 6nA to 0,2nA. The amplitude of cutoff voltage of ion current for negative and positive coronas is determined. 109

E.S. Dyuba. MATHEMATICAL MODEL OF ECONOMIC SYSTEM «GENERAL COMPANY – JOINT VENTURE» DEVELOPMENT

Key words: share of market, investment, liquid and proceeds of credit, profit, management, functional.

Mathematical model of economic system: the general company - a joint venture development is offered, which is described by system of differential equations. The existence of the most favorable conditions of economic system development is shown. It is established that in case of management expenses change on 0,04 standard units the profit will decrease approximately for 13 % 112

INFORMATION ABOUT THE AUTHORS (Russian) 115

INFORMATION ABOUT THE AUTHORS (English) 117