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A.Yu. Parshin, Yu.N. Parshin. EDGE DETECTION OF FRACTAL OBJECT BY MAXIMUM LIKELIHOOD METHOD USING INDEPENDENT AND DEPENDENT SAMPLES

Key words: correlation dimension, optimal estimation, maximum likelihood estimates, independent samples, edge detection.

Algorithm of fractal object edge detection using correlation dimension as parameter by maximum likelihood method is proposed. Different variants of frame structures are observed, their comparison is done by means of detection characteristics. Sample dependence influence on detection quality is investigated.....3

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Key words: polyspectrum analysis, power spectral density (PSD), triple autocorrelation function (TACF), speech signal (RS), speech signal bispectrum, difficult noise conditions.

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Key words: direction finding, circular antenna array, rank reduction algorithm.

The method to eliminate false coordinates occurred in the process of bearing signal emitters (BSE) adopted by a uniform circular antenna array (UCA) using direction-finding rank reduction algorithm (ARR) is offered. The results of numerical modeling of three BSE having the most unfavorable for ARR mutual angular position bearing are given. The method proposed is shown to eliminate completely false coordinates.....16

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Key words: face recognition, Viola Jones method, neural network, face detection, principal component analysis, Gabor wavelet transform.

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Key words: spectral-efficient modulation, energy efficiency, GMSK, FQPSK, APSK-16.

The interaction of in-phase and quadrature signal components of linear (OQPSK and QAM-16) and spectral-efficient (FQSPK, GMSK and APSK-16) modulation types is studied. It is shown that the signals of spectral-efficient modulation types can be received in two steps where the first step is the formation of in-phase and quadrature components of the signal having linear modulation type and the second step is the appearance of non-linear coupling. Given algorithm allows to spend 40% less than the algorithm known and allows to receive FQSPK, GMSK and APSK-16 signals with the error less than 5° in angle and 6% in amplitude which corresponds to CCSDS requirements. The deviation from reference values of received radio signal peak factor doesn't exceed 0,06 and from frequency band – 1%25

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Key words: frequency-modulated level gauge, wavelet transformation, transformation of Fourier, influence of noise, influence of stirring reflections.

The algorithm to process difference frequency signal (DFS) of frequency-modulated (FM) level gauge on the basis of wavelet-transformation is offered and with the help of numerical modeling the estimation of methodical error, influence of noise and influence of stirring reflections in working zone is carried out. Comparison with widely used algorithm of DFS processing on the basis of its spectral density maximum search is given.....30

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Key words: ADC voltage, dynamic error, quantizer, sampler, measuring virtual instruments.

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Key words: unmanned vehicles, digital transceivers, Gaussian frequency shift keying, phase locked loop, PLL frequency synthesizer, transmitter efficiency, algorithm of radio exchange.

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Key words: computational modeling, nondestructive magneto induction study, internal structure of ferromagnetic articles, method of computer tomography.

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Key words: neural network converter, frequency, time slot, code, perceptrons, VHDL hardware description language.

Structures of converters of time-and-frequency signals parameters in a digital unitary and positional code of two variables on the basis of modified one-, two-, and three-layer perceptrons are offered. The structure of the neural network converter of time slot in a positional code of two variables on the basis of modified three-layer perceptron is implemented on VHDL hardware description language.....58

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Key words: ontological model, descriptive logic, document.

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Key words: natural language processing, machine translation, numeral processing, Internet network, linguistic resources.

We proposed a set-theoretic presentation of natural language cardinal numbers processing task. We solved numeral processing problem in Internet application. We presented and analyzed translation directions made by Internet application users from Russian Federation, Ukraine, European Union and United States of America. Analysis is based on statistics of Internet application use, consisting of more than 25 000 records of processing requests.....69

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Key words: sidewall, optimal geometric cover, design and technological restrictions, automated information system, 2D/3D – cutting map.

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V.N. Azarov, S.S. Fomin. VIRTUAL PRACTICAL WORKS AS THE MAIN LINK OF LIFE LONG LEARNING IN THE FIELD OF INFORMATION-TELECOMMUNICATION TECHNOLOGIESKey words: life long learning, distance learning, virtual practical work, virtual environment.

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O.V. Milovzorov, A.V. Aguzarov, D.Yu. Tarabrin. METHOD OF STRUCTURING DATA FOR ADAPTIVE REGULATION SYSTEMS OF MACHINE-BUILDING PRODUCTIONKey words: technological process rationing, adaptive system, computer-aided design, CAPP-system.

The method and unified data model that can be the basis of adaptive system for route-operating technological processes regulation are developed. Main principles of structuring data taken in engineering handbooks are revealed. The model of regulation directories description allows to create adaptive system of rationing, which can be the component subsystem of such CAPP-systems and ensure the operation of enterprise on the basis of their own time norms, implemented in the form of enterprise standards88

ELECTRONICS*A.V. Ermachikhin, V.G. Litvinov, N.B. Rybin, Y. V. Vorobyov.* RESEARCH OF BISMUTH INFLUENCE ON MICROSTRUCTURES NOISE PROPERTIES ON THE BASIS OF (Ge₂Sb₂Te₅) 1-xBi_x COMPOUNDKey words: low-frequency noise spectroscopy, chalcogenide glassy semiconductors, power spectral density, doping, phase state.

The influence of Bi impurity on electrical properties of Ge₂Sb₂Te₅ thin films was studied: current-voltage characteristics, dependence of power spectral density of low-frequency noise on Bi content, dependence of spectral power density of low-frequency noise on temperature.95

A.N. Vlasov, M.V. Dubkov, M.A. Burobin, A.B. Manoshkin, S.V. Zhimoloskin. MODERNIZATION OF SETUP "INGIR-MEGA-15" TO OBTAIN 400 kA PEAK CURRENTKey words: "INGIR-Mega-15" setup, 400 kA current, plasmoid, thin films.

The purpose of "INGIR-Mega-15" modernization is justified, calculations showing technical feasibility of enhancing its peak current of 35 kA to a value of 400 kA are given. The results of setup testing in test mode showing its efficiency and ability to be used for the formation of long-lived plasmoids and detonation spraying of thin films are presented. 100

V.S. Litvinova, S.M. Milyukov. DEVELOPMENT OF SLOW SPEED ELECTRIC GENERATOR ON NEODYMIUM MAGNET FOR SMALL WIND POWER GENERATIONKey words: small wind power generation, generator, magnetostatics.

Calculation of 800W slow-speed electric generator on neodymium magnets was made. The generator is designed for building wind power installation which can be used in conjunction with solar energy converters in households..... 103

D.S. Vorunichev, M.V. Pokrovskaya. LEAD-FREE TECHNOLOGY: RISKS AND PROSPECTS FOR THE RUSSIAN MARKET OF ELECTRONICSKey words: lead-free, safety and risks.

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Key words: electrical conductivity, Maxwell relaxation, recombination, relaxation time, screening length, drift length, ballisticity length.

The analysis of existing theoretical models for the description of relaxation processes in semiconductors and semiconductor barrier structures is given. The criteria that allow to use transport models of nonequilibrium charge carriers in relaxation or recombination semiconductors are formulated. It is shown that space charge region of semiconductor barrier structure under reverse bias can be considered a relaxation of semiconductor, in which the relaxation time of charge carriers is determined by time span while maintaining recombination properties of semiconductor by the base where the electric field is absent. 114

BRIEF REPORTS

V.K. Sveshnikov, A.F. Bazarkin. OXIDE CATHODE ELECTROCONDUCTIVITY IN SODIUM ADSORPTION

Key words: electrical conductivity, sodium, barium oxide, algorithm, mobility, concentration, heterogeneous reaction.

A mathematical model of electrical conductivity of oxide coating during the adsorption of sodium with donor levels volume is offered. An algorithm to calculate temperature dependence of electrical conductivity is made. Calculation of electrical conductivity for barium cathode taking into account sodium effects is carried out. Given method to calculate barium cathode can be extended to the cathodes with other types of coatings. 119

D.S. Kusakin, V.S. Litvinova, V.G. Litvinov, Y.V. Vorobyov, N.B. Rybin. METHOD OF LOCAL MEASUREMENT OF ELECTRICAL CAPACITANCE IN fF RANGE OF POINT-LIKE METAL-SEMICONDUCTOR BARRIER CONTACT

Key words: diode structure, capacitance-voltage characteristic, point-like barrier contact, atomic force microscopy.

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Key words: storage battery, self-discharge compensation.

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Yu.M. Stryuchkova, G.P. Gololobov, D.V. Suvorov, S.A. Kruglov. THE INFLUENCE OF ELECTROCHEMICAL MODIFICATION OF GLASS CARBON SURFACE UNDER CONDITIONS OF CHEMISORPTION OF FLUORINE-CONTAINING NANOSCALE GROUPS ON ITS ELECTROPHYSICAL PROPERTIES

Key words: glassy carbon, chemisorption, scanning probe microscopy.

By means of scanning probe microscopy electrophysical properties of glassy carbon surface before and after electrochemical modification in the conditions of chemisorption of fluorine-containing nanoscale are studied. On the basis of local spectral dependences of tunneling current from tunnel voltage the values of coefficients that characterize local (on atomic level) electrophysical properties of the surface are calculated. As a result of glassy carbon surface fluorination the change of ratio of its donor-acceptor atomic characteristics, acceleration of electrode processes and increase in total tunneling activity of local areas was found..... 128

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Key words: thin-film cathode, arc discharge.

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Key words: health condition express estimation, information model.

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