PART I. THE GENERAL QUESTIONS OF SYNTHESIS AND ANALYSIS OF IN-FORMATION - MEASURING SYSTEMS

G.A. Abdenova

The article considers the task of forecasting of the level row meanings on the basis of adaptive calculation of dispersion of noise of the dynamics model and noise of the measurer's model well as the equations of the Kalman's filter. There is an algorithm of the procedure of the meanings forecasting of temporary row. Developed algorithm is approved on a test example.

Keywords: temporary row, dynamics model, measurer's model, forecasting, the Kalman's filter, dispersion of noise.

The Article Describes Principles of and Optimization of Distributed Systems. Authors Suggest Represent Distributed System as Network of Queues with Associated Event Processing Units. In Order to Model Specifics of Query Execution System Notion of Cache as Event Processor State is Introduced. Cache Behavior is Described Through Eviction Algorithm, Limit on Number of Blocks Stored and Size of Blocks.

Keywords: distributed System, Imitational Modeling, Network of Queues, Data Caching

V. V. Vasilevskiy

A frequency error tolerant symbol and frame timing recovery method is presented. It is based on pattern matching and seeking of the maximum opening of the eye diagram. Results of modeling presented allow estimation of optimal threshold level depending on signal to noise ratio, pattern type and length, and optimum criterion chosen. Application recommendations are given.

Keywords: continuous phase frequency shift keying, synchronization recovery, clock synchronization, frame synchronization.

T.A.Ismailov, O.V.Evdulov, D.V.Evdulov

In this article the existing static estimation models of the channel level devices are reviewed. The new alternative static estimation model of the channel level is presented. The new model is based on the physical characteristics of the designed system, making the estimation more accurate. **Keywords:** a channel level, the receiver, the transmitter, static model, the analysis.

A.N. Lepetaev, D.N. Klypin

The present issue represent of theoretical investigations of difficult wireless power and data transmission methods, subject to specific environment, such as bioimplantable devices. Results of investigations are: optimal wireless power transmission method fixing as inductive; optimal power transmission frequency range fixing as 0,1...1 MHz; mathematical model of transcutaneous wireless power transmission system and tool for it's design was be created. **Keywords:** wireless power transmission, modeling, magnetic fields

A.V. Maksimov

The problem of synthesis of information and control of the operator when the control object properties are not known precisely. We investigate the method of synthesis of information and control operators using the two models. The first model is a means of setting the parameters of the operator control and evaluate its effectiveness. The second, which is working - is a simplification of the problem of synthesis of a control system and is used in the operation of the system.

Keywords: control system, an information operator, an control operator, control system synthesis problem, mathematical model, the method of two models, the ideal operator, the ideal model

B.V. Matveev

Feedback system with reguest combinations30

This article describes fundamentals of the program systems module with feedback communications and the request combinations. As the result it presents main feedback characteristics during operations in the channels of low quality.

Key words: system, feedback, quality, module, trial, error, reguest, information, channel

V.L. Olenev

The algorithm for the transition from a specification of the communication protocol stack to the architectural diagram and the model core is proposed. Also I represent an algorithm for the verification of this architectural diagram for the clean model compilation.

Keywords: communication, protocols, modelling, verification.

E.N. Jablokov

In this article the existing static estimation models of the channel level devices are reviewed. The new alternative static estimation model of the channel level is presented. The new model is based on the physical characteristics of the designed system, making the estimation more accurate. **Keywords:** a channel level, the receiver, the transmitter, static model, the analysis.

A.O.Titsner, A.V. Balykov, A.S.Nazarov, .A.Tiatiukhin, M.Yu. Lerionov, V.N. Sedalischev

The article deals with new principles of multiple-primary meter-governmental converters based on the use of coupled oscillations of composite piezoelectric resonators. Devices of this type can be of practical use to measure and monitor various physical quantities.

Contents & Abstracts & Keywords

Keywords: composite piezoelectric resonators, the ensemble of interacting oscillators, coupled oscillations, multielement primary measuring transducer.

N.P. Vorobjev, Ju,V. Kandrin, V.A. Tsymbalist

The theoretical substantiation of features of designing of ultrasonic converters for the control of irregular fiber environments is resulted

Keywords: ultrasound, the converter, the control, irregular, fiber, acoustic, a wave, pressure, the receiver

PART II. MEASUREMENTS IN NATURAL SCIENCES AND THE TECHNICIAN

A.A. Bagayev, Ts.I. Kalinin, R.A. Kunitsyn

The ultrasonic device for research a merino wool.....56

We've analyzed current conditions of wool quality control in Russia and abroad. The base method of the tool control in the form of the ultrasonic analyzer of the raised accuracy is chosen.

Keywords: sheep, wool quality, acoustic fluctuations, ultrasound, reflecting ability.

V.I. Bukaty, P.I. Nesteryuk

The work focuses on the results of the experimental study in the pH value dynamics and specific conductivity of distilled water after the exposure to constant magnetic field (CMF) with the magnetic density of 1.5 Tl and 0.12 mTl, the exposure to laser irradiance with the wave-length of 632.8 nm and power density 1.25 mW/cm2, and after ultrasound with power 280 W. Separate twenty-minute exposure to CMF with the magnetic density of 1.5 Tl and to laser irradiance resulted in the increase of pH and the specific conductivity of the tested water. The exposure to CMF with the magnetic density of 0.12 mTl did not change the above mentioned characteristics. In experiments with ultrasound and there was an increase of these parameters.

Keywords: constant magnetic field, laser radiation, distilled water, ultrasound, pH value, electrical conductivity.

A.E. Goldstein, E.V. Yakimov

At the article there are described principle of measuring of drill pipes and welding locks concentricity and features of concentricity control system designed for open jointstock company «ZBO Drill Industries», Inc. (Russia, Orenburg).

Keywords: drill pipe, welding lock, concentricity, control system.

P.Yu.Gulyaev, V.I.Zelensky, Yu.V.Saharov,

P.E.Troyan

Problem of the control and measurement current-voltage characteristics with a site of negative differential resistance N-type are considered during formation of thin-film structures "metal-dielectric-metal". The mechanism of electric formation in amorphous dielectric film is shown. Keywords: nanostructures, metal-dielectric-metal, current-voltage the characteristic

V.A.Kaladze, V.N. Shaposhnikov

Exposition and estimation of the grain of products methods of statistical dynamics71

In work problems of shaping of the initial information for calculation of values of the performances used in the software of machine tools with ChPU, and statistical exposition of outcomes of handling of a surface of a product are solved. Exposition and data processing it is spent with use dynamic predictor models, as mode of mathematical exposition of nonstationary casual processes. Outcomes allow to spend the operative prognosis of outcomes machining for updating of quality of a product.

Keywords: a grain, a profile, cascade filter, predictor, dynamic model, computing experiment

E.A. Mikhaylova

The control of process of destruction of composite materials on the basis of change of frequency of pulse electromagnetic radiation at loading......77

In article research of change of frequency of the pulse electro-magnetic radiation arising at mechanical loading of phenoplasts and textolites, and also possibility of use of the received results for the control of destruction of composite materials.

Keywords: the control, destruction process, electromagnetic radiation, composite materials, frequency

L.I.Suchkova

In article the architecture of the automated system of operative temperature monitoring is considered. The solutions providing reliability of delivery of the information, flexibility and expandability of the monitoring system are offered. **Keywords:** monitoring, temperature mode, programmable control unit

Yu.K. Shelkovnikov, A.V. Tyurikov, M.R. Tarasov, P.V. Gulyaev, S.R. Kiznertsev

Method of automatic building membership functions for stm-profilogram prompt identification83

This paper proposed a methodology of automated building the membership functions for the fast STMprofilogrames identification. It is showed that at the stage of fuzzification using the model in which the choice of implementation function parameters are objective and automated is more appropriate. This method was compared with an expert method for constructing membership functions and it was found out that more correlative vector of conformity of the sample and model images was obtained at the base of the methodology proposed. This fact gives the opportunity to claim that the proposed method can be used at the fuzzification stage of real STM-images.

Keywords: scanning tunnel microscope, STM-profilogram identification, fuzzy logic, membership functions

A.V. Yurchenko, A.N. Novikov

In this paper a method for measuring the resistivity and recombination lifetime carriers in silicon wafers used to manufacture photovoltaic cells is described.

Аннотации, содержание и ключевые слова

Keywords: autodyne sensor, a microwave method, structurally inhomogeneous materials.

A.G.Yakunin, I.M.Zjiharev, A.L. Nenashev

Features of processing of the signal, caused by character of observable scenes of images of systems of the technical sight intended for calculation and identification under production conditions of objects, moving on conveyor lines are discussed. One of possible approaches to working out of algorithmic maintenance of such systems is described

Keywords: system of technical sight, computer modelling, the operative quality monitoring, identification of products, pseudo-regular structures, non-linear algorithm

G.A.Chugunov, M.N.Agapov, A.I.Tishchenko Power quality parameters monitoring97

Efficiency of application electric power quality parameter devices is considered in this article. It is offered to use large quantity of inexpensive devices for a separate power supply system monitoring. Functional blocks of the device, methods for measurement of electric power quality parameters, algorithm of device work are described.

Keywords: electrical grid, measuring device, measurement methods, electric power quality parameters, electric current frequency, power-supply system.

U.F. Davyedov, G.M. Gorbova

Optical System Design for Control of the Sulfuric Acid Concentration During its Production Process is Developed in the Paper. The Investigation of the Concentration Distribution, with Setting of Separator Into Design and Without it is Fulfilled and Optimal Construction Dimensions of the System have been Chosen here.

Keywords: concentration, Optical Sensor, Sulfuric Acid Production.

D.E. Krivobokov

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Schemes of realization of measuring transformations in inductive contact-free conductometric pin-type control devices are considered.

The analysis is made and advantages and disadvantage of measuring schemes are presented, the compensating variant of measuring transformations is offered.

Keywords: conductometer, the primary measuring transducer, compensation, measurement error, the control device

Yu.K. Shelkovnikov

Selection the multiscan video signal with deploy voltage modulation106

The paper discusses the formation of the video signal from a multi-element photodetector of multiscan by applying modulated voltage of deploy. It is shown that by modulating the examination voltage multiscan current differentiation happens inside skanistor structure, and to highlight the video signal a special differentiating device is not required that can decrease the accuracy of its selections. It is revealed that the selection of the variable component of output multiscan current is appropriate by summation of output current with its inverted "copy" delayed by a quarter period of the modulation frequency. Keywords: multiscan, skanistor structure, video signal, deploy voltage, modulation, synchronous detection

PART III. NEW DEVICES AND METHODS OF MEASUREMENTS

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Substitution Questions of Poly-dispersive Two-phase Flows of Sulfuric Acid Wastages on Mono-dispersive Ones are Considered in the Paper. It can be Reached by Including into Optical Sensor Design of a Separator, which Provides the Linear Output Signal. Also an Empirical Depending of Sulfuric Acid, SO2 and SO3 Concentration on Temperature Conditions the Main Processes of Sulfuric Acid Production has been Received.

Keywords: Linear Sensor, Mono-dispersive Two-phase Flow, Ecological Control.

P.V. Gulyaev, M.R. Gafarov, E.Yu. Shelkovnikov, A.V. Tyurikov, N.I. Osipov

The method of preemptive scanner management in a scanning tunnel microscope114

In the work is being solved the task of increasing productivity scanning tunnel microscope with use of forecasting the perturbations and a preemptive signals management at the base of predictive estimations. In order to increase prediction accuracy the method of consistent recursive calculation of errors of higher degrees was offered in form of finite difference with the same function prediction. It is showed that a preemptive impact should be synchronized with a predicted perturbation, and that, even with presence of prediction errors the increase of intensity of perturbation treatment is observed.

Keywords: scanning tunnel microscope, adaptive management, function of prediction, Circuit simulation

S.F. Dmitriev, D.N. Ljashchenko, A.V. Novozhenov, A.V. Ishkov

In article features of implementation of the hardware of the measuring hardware-software complexes implementing a method of eddy currents surveyed. Results of solution of the task of response eddy currents transducer, the optimized constructions of subminiature sensors, the candidate solution of the task of compatibility specialized software of virtualized devices with an arbitrary sound card of the PC for a case of measurement of conductance of materials are resulted.

Keywords: the virtualized measuring device, the eddy currents - method, the subminiature eddy currents transducer, the hardware curve, conductance.

A.S. Dyubov

The description of the device for estimation of highfrequency balanced communication cables internal discontinuities quantitative and static characteristics is given. The operation of the device is based on the pulse method (the time domain reflectometry) and statistical backflow signal processing in the time domain.

Contents & Abstracts & Keywords

Keywords: cable, discontinuity, impedance, reflection coefficient, the pulse method, time-domain reflectometer

A.V. Egorov, V.V. Polyakov, S.V. Ivakov

The method of definition of magnetic permeability and electrical conductivity long electrical conductor on the basis of a method of eddy currents is offered. The measuringcomputer complex is developed and its testing is held.

Key words: electrical conductivity, magnetic permeability, method of eddy currents

Yu. A. Osokin

Movement Control Features in subcritical phases.131

The paper is devoted to movement features of complex structures in subcritical phases on the verge of substandard situations.

Great importance should be attached to performance data of anti-hunt devices and to interactivecontrol in particular.

Keywords: interactive control, dampening, movement features, anti-hunt devises.

D.G. Kalnoy, S.P. Pronin

The Article Simulated the Process of Monitoring the Size and Concentration of Small Particles on the Optical Image of the Test Object. There Is Experimental Study Is to Test the Possibility of Applying such a Model.

Keywords: Control of Size and Concentration of Small Particles on the Optical Image of the Test Object, the Optical Contrast, the Function of the Scattering Medium.

V.I Zamiatin, S.A. Otmorsky

Devices for inspection of moving of the light line on the photosensitive surface of the matrix 138

This article gives an overview of algorithms used in devices for measuring light source's movement.

The author compares the errors of the algorithms which uses one and several video signal rows.

Keywords: measuring devise, image sensor, central algorithm, linear light source

E.M. Fyodorov, A.E. Goldstein, V. Redko

Proposed optical methods of production control the outer diameter electroinsulation shell electric cable, algorithms, signal conversion of the primary measurement data, converter design.

Keywords: control diameter, projection measurement method, the method of measurement in a diverging beam.

A.V. Volgin, A.V. Yurchenko, A.V. Kozloff A.V., Kitaeva M.V.

Automatic control and operation system of solar energy complex......148

This article describes a system for monitoring of photovoltaic modules and energy systems on their basis, photoelectric sensor and system orientation to the sun. The results of field tests of photovoltaic modules in the Siberia and the Far East is presented. **Keywords:** photovoltaic modules, systems monitoring, system orientation.

D.E. Krivobokov

Schemes of realization of measuring conversions in inductive contact-free conductometric pin-type control devices are considered.

The analysis is made and advantages and disadvantage of measuring schemes are presented, the compensating variant of measuring conversions is offered.

Keywords: Conductometer, the primary measuring transducer, compensation, measurement error, the control device

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Triangular co-ordinates definition system for a sound source......158

This article investigates possibility of creation of coordinates definition system for a sound source. Functional diagram of device and calculation method of co-ordinates is offered. In practice efficiency of the trial sample is checked up. Influence of sensors number on precision was investigated.

Keywords: co-ordinate, sound source, microphone

PART IV. MEASURING, MODELLING AND MANAGEMENT IN ECOLOGY, SCI-ENCES OF A HUMAN AND A SOCIETY

P.I. Balabanov, O.V. Golovan

In paper the original method of measurement of characteristics of the art texts, set up on installation of quantitative parameters of the functional link between frequency and a rank of words in the text circumscribed. The description of the program complex for research of frequency characteristics of texts (software LangFracDim, C-Analysis and databases DB Language Fractal Dimension) and results of researches of authoring and cultural - language features of texts of V.M. Garshin is instanced by this method.

Keywords: mathematical linguistics, frequency and a rank of a word, Zipf-curve.

T.A. Ismailov, O.V. Evdulov, T.A. Ragimova

The design of the experimental stand for measurement of performance data of the thermoelectric device for local freezing of fabrics of a throat is considered. Results of measurements are resulted.

Keywords: a throat, cooling, the thermoelectric device, the experimental stand

S.A. Zavyalov, K.V. Murasov

In article were considered features acoustic perception of man, qualities reproduction musical signals by power amplifier influencing subjective sensation, also were considered some nuances work of a negative feedback loop, research the single-ended vacuum tube amplifier on conformity to criteria quality is carried out by a formed man organ hearing.

Keywords: aural harmonics, masking, harmonious distortion, intermodulation distortions, noise correlated with a signal, the transfer characteristic.

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System for locating and monitoring of submerged divers......175

Conventional systems for technical support and tracking of divers, main parameters of these systems and methods of enhanced them are discussed in this issue. Novel system for locating, monitoring of physiological state of divers group and generating of automatic alarm is offered.

Keywords: diver, group, absolute coordinates, physiological state monitoring, automatic alarm generating.

A.V. Kroshilin, S.V. Kroshilina

The formalization of the expertise

Keywords: decision support system, semantic network, modeling, fuzzy logic.

N. Oskorbin, A. Maximov, An. Sorokin

The paper presents a systemic problem of co-synthesis of information and control operators.Consider its decomposition and classification of technical control systems in different hypotheses of information provision.

Keywords: control systems, operator control, information management, the task of synthesis.

Pronin S.P., Kononova E.S., D.G. Kalnoy

Methodical and technical maintenance of local system of ecological monitoring of atmosphere....... 188

In article the well-founded choice of an indicator of quality of atmosphere on the weighed particles is carried out, working out of a method and a control device of the weighed particles is shown, experimental researches are executed and the technical decision of the control of atmosphere in streets and street crossroads of cities is offered.

Keywords: the control, aerosol density of the atmosphere, the weighed particles, optical contrast, a specific indicator of easing.

PART V. MODERN INFORMATION TECHNOLOGY

M.V. Afonin

The developed program, through interaction with a virtual interactive laboratory stand, allows investigating the laws of precession and nutation oscillations, measure the parameters of the model during the experiments, and observe the emulation of physical processes.

Keywords: virtual laboratory stand, 3D-visualization, measure module.

V.V. Vasilevsky, V.A. Panyushkin, P.I. Puzyrev

An optimization of TMS320VC55XX digital signal processor series program code of symbol synchronization scheme of software defined radio is discussed. A detailed description of optimization process is delivered, optimized program code of Farrow interpolator and numerically controlled oscillator is given.

Keywords: optimization, digital signal processing, numerical efficiency, symbol synchronization recovery, software defined radio.

S.F. Dmitriev, D.N. Ljashchenko, A.V. Novozhenov, A.V. Ishkov

Based approaches at development of the specialized software of virtualized measuring devices ...199

Authors work out the based approaches underlying creation of the specialized software of virtualized measuring devices. This approaches at development of instrument applications set up on usage of the interface of a low level for access to the buffer with the data in the wave-format, mixer subsystems of a OS Windows for a control of parameters of the sound device and a modular principle of construction of algorithm of the virtualized device. The description of algorithms and main functions of the waveunit, the unit of initialization and gauging and the unit of a basis cycle of devices *U*OHM-20M and BBT-2M is instanced.

Keywords: the virtualized measuring device, the software, the interface of a low level, the mixer subsystem, the program unit.

V.M. Kalachev, N.N. Reshetnikova

The algorithm which allows to regulate dynamically level of detailed elaboration of three-dimensional models of difficult measuring devices is offered. Visual artefacts at simplification of polygonal grids do not arise.

Keywords: 3D-object, polygonal models, dynamically level of detail, interactive scene.

S.M.Staroletov, E.N. Kruchkova

Providing the on-line testing of software on the basis on constructed model211

Described the model of modern distributed software systems, the approach of testing programs based on models, place the model in the software development process, as well as methods of dynamic testing of program by its model **Keywords:** software testing, modeling, distributive systems

A.M. Lipanov, A.V. Tyurikov, A.S. Suvorov, E.Yu. Shelkovnikov, P.V. Gulyaev

Application of genetic algorithm for neural network for the problem of identification of STM images216

The application genetic algorithm to training neural network for the task of identification STM-images is oserved in the paper. It is an algorithm of search for global extremum for multy -extremal function, namely, the parallel processing of many alternative solutions, with the search focused on the most promising of them. It is showed that using the genetic algorithm at stage of training the neural network would exclude shortcomings of method of contrary errors and improve the processing speed.

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Contents & Abstracts & Keywords

Keywords: scanning tunnel microscope, ultrafine particles, image identification, neural networks

A.Zh. Abdenov , Leonov L.S.

The blind method of detection of the embedding steganographic information in digital images is constructed. As a vector of signs are used statistical moments of histogram of 3-level wavelet subband in frequency domain. Classification of a training database was spent by means of neural networks

Keywords: Steganography, steganalysis, neural networks, RBF-networks, discrete fourier transform, wavelet transform.

Zarkumova R. N.

An integrated database as interconnected aggregate of a database, a knowledge base and model base is considered in the article. These bases are used for a estimation of a information security level. Kalman filtering is used for a estimation of reliability's quality of integrated database elements.

Keywords: database, knowledge base, model base, information reliability, Kalman filter

A.A. Lagutin, M. A. Yakunin

This work presents method of measurement of fractal dimension of cloud boundaries using MODIS/Terra data. Cloud boundaries were determined by MOD35 cloud mask. 50 satellite cloud scenes were processed for fractal dimension. Finding data is quite similar for fractal dimension of clouds measured in other experiments with ground-based equipment in areas of $3 \times 10^3 - 1.9 \times 10^5$ km.

Keywords: fractal dimension, mass dimension, MODIS spectroradiometer, cloud mask, hierarchical data format HDF

A. A. Gribanov, S.O. Khomutov

The article deals with the task of creating a mathematical description of processes occurring in the diagnosis of power transformers by the method of low-voltage pulses. Particular attention is paid to the modeling of wave damping oscillatory process in the windings and the expansion of the diagnostic signal in the spectrum.

Key words: diagnostic signal, power transformer, wave oscillations are damped oscillations, spectral analysis