Contents

Summary

ENGINEERING GEOMETRY AND COMPUTER GRAPHICS

D. S. Korchagin, K. L. Panchuk
Rebuilding curves of the second order by orthogonal projections of its reference points

The problem of rebuilding the curve of the second order by projections of its reference points, based on the preliminary determination in the space of the plane of this curve is considered. Geometric diagram and algorithm of solution of this problem are proposed. The examples of the curves of the second order rebuilding are given.

Keywords: curve of second order, transformations of the coordinate systems, canonical equation.

A. A. Lyashkov
Computer technology for part surface forming

Computer technologies are used at different stages of part surface forming. It is shown that surface modeling can be used for different tasks, and it is the part of a more general algorithm of poly-surfaces forming. So when you use the methods of forming reel tool based on special surface models the form changes depending on the radius of tool. Solid body modeling phases as well as the processes use well known CAD tools and programming languages to automate tasks. Examples of the use of computer technology in modeling and forming surfaces of details are presented.

Keywords: geometric modeling, forming, inclined screw surface.

A. S. Niteisky, K. L. Panchuk
Design of linear surface based on projective pencil of lines

The task of design of linear surface on the basis of two projective pencil of lines of the first order is examined. An analytical algorithm for obtaining parametric equations of this surface is proposed. The surface order is defined and some special cases are considered.

Keywords: collineation, linear surface, parametric equations.

PHYSICAL AND MATHEMATICAL SCIENCE

G. G. Zabudsky, Yu. A. Burlakov
Optimal location of hazardous object on the plane with zones of different influence

The problem of location of an object on the plane with two sub-zones with a negative influence is considered. Combinatorial algorithm for solving the problem is developed. The model of integer linear programming is constructed and the results of computer experiments are represented.

Keywords: combinatorial algorithm, integer programming, location on plane, obnoxious object.

D. N. Zaporozhets, V. S. Zykin, A. V. Zykina, D. I. Kuyanov
Parallelizing of extragradient methods

The article shows how to parallelize extragradient methods for solving variational inequalities and problems with matrix operator. The minimum dimension of the problem and the optimal number of processors is estimated to achieve maximum acceleration.

Keywords: extragradient method, optimization, parallel programming

B. P. Ionov, A. B. Ionov, A. I. Mirnaya
The development of processing algorithms in spectral pyrometry

The main principles and approaches to development of processing algorithms in spectral pyrometry are explored. The features of the object's temperature estimation procedure based on its heat radiation spectrum analysis are shown. Three main approaches to development of such algorithms are introduced: non-parametric, prior parametric, posterior parametric. The simulation results show that the spectral pyrometry methods are perspective and it is required to develop them.

Keywords: pyrometry, radiation, spectrum.

I. D. Makarova, S. E. Makarov
Stability conditions of stationary mode in chemical reactor with boiling layer of the catalyst

The initial-boundary problem for the hyperbolic system, describing process in a chemical reactor with a boiling layer of the catalyst is considered. Sufficient stability conditions of boundary value problem in terms of parameters of the layer are obtained.

Keywords: the hyperbolic system, stationary decision, reactor, stability.

G. M. Seropyan, D. V. Fedosov, S. A. Sychev, E. A. Yashkevich, I. S. Pozygun, V. A. Davletkildeev
Ultrathin YBCO films with high conductivity

On the basis of experimental investigations the method for the growing of smooth ultrathin YBCO films with low specific resistance by laser ablation has been developed. The film specific resistance can reach values from $0{,}8 \cdot 10^{-6}$ to $1{,}1 \cdot 10^{-6}$ Om·m. These low specific resistance values can be explained by perfect film crystal structure and high reflectivity coefficient of the film outer boundary. Ultrathin films are formed in a narrow time span of the film evaporation 7 – 10 c on the single-crystal substrates $SrTiO_3$ (100) according to the definite processing characteristics of the film evaporation. A film thickness amounts to about 6 nm, it corresponds to five low-level cells of YBCO lattice along an axis ***c***.

Keywords: ultrathin films, laser ablation, atomic force microscopy, superconductivity.

V. A. Solovyev, R. T. Faizullin
Mathematical model of traffic flow with two time scales

The paper proposes to consider a microscopic model of traffic flow on the example of a big city. The model is basic scheme of following leader and the calculation is similar to predictor-corrector scheme in the theory of differential calculus. Taking into account various changes in the stream, the speed characteristics of vehicles, narrowing roads, changing traffic lights, random start vehicles with the given destination, the transit flow of vehicles through the city, etc are considered. To implement the model the method of parallelization on multiple processors, associated with areas of the city is developed. The results of tests show the effectiveness of a parallel version for simulation in real time, and the ability to control traffic with the number of vehicles of about 10^6.

Keywords: mathematical modeling, traffic flow, following the leader, time scales, traffic management.

V. N. Stepanov
Asymptotics of eigenvalues of equation of the first kind

In the present paper asymptotics of eigenvalues of an equation of the first kind on the n-dimensional sphere whose kernel depends on the inner product is obtained. The paper also deals with cases when the kernel belongs to different classes of function spaces.

Keywords: equation of the first kind, kernel, eigenvalues, asymptotics.

Yu. P. Chernov
Mathematical model of pharmacokinetics for frequentative non vascular medication's injection

Mathematical models of pharmacologic kinetics (pharmacokinetics) is presented in this work for one-shot and frequentative non vascular medication's injection to organism of the man or animal. The mathematical model pharmacokinetics for frequentative non vascular medication's entering is represented in the manner of combinations of the decisions of the differential equations for mathematical model of one-shot non vascular medication's injection.

Keywords: pharmacologic kinetics, concentration, medication, preparation, non vascular injection, mathematical model.

O. V. Lyakh, N. A. Prokudina, Vad. I. Surikov, Val. I. Surikov
Structure, kinetic and thermophysic properties of the pure and alloyed vanadium (III) oxide

The article deals with vanadium sesquioxide for which at rise in temperature in vicinities T_K ~ 170 K to in its phase transition metal - an insulator accompanied by structural transformations is observed. It is known that the temperature of phase transition vanadium oxide depends as on structure of the sample within homogeneity area, and an alloying a preparation atoms of other grade. Dependences of thermal capacity C_P and a electrical resistivity from temperature (80 – 300 K) for samples $V_{2\pm A}O_3$ and $V_{2\pm A}Me_{0{,}020}O_3$ (Me – Fe, Cr, Al) are investigated. Some parameters of phase transition of metal–insulator are defined and dependences of temperature of phase transition on volume of an elementary cell of the sample at phase transition, with another are established.

Keywords: heat capacity, electrical resistivity, vanadium sesquioxide

E. A. Tkachenko, D. V. Postnikov
Radiation damage of beryllium

For explanation of crack formation reasons on the surface of a beryllium sample by low-energy irradiation of high-current electronic bunches the simulation calculations of temperature fields and thermoelastic stresses under the influence of pulsed beam was carried out. The kinetic energy of the electrons was about 520 KeV, current density was 1 kA/cm^2 and a pulse duration was about 3 s. The results of the simulation showed that at the specified modes of exposure on beryllium sample the stress exceeding the limit of strength of material appears. It may be the basis for explanation of the crack reasons.

Keywords: high-current electron beams, temperature fields, thermoelastic stress, simulation.

O. T. Danilova
Calculation of plasma parameters of high-frequency induction discharge for practically important temperature range of 1,000 to 10,000 K

The article presents the sequence of calculating the basic characteristics of high-frequency induction plasma with the inclusion of elements of the theory model of a metal cylinder, which considers only the equations of electrodynamics and consists in likening of a plasma jet with a metal cylinder with a constant electrical conductivity and radius.

Keywords: plasma, high-frequency induction discharge, the balance of power, electrical conductivity of the plasma, cross-section of electrical conductivity

MECHANICAL AND THEORETICAL ENGINEERING

M. A. Zverev, Val. I. Surikov, Vad. I. Surikov, N. A. Prokudina
Process multiplicity of α-relaxation in composites based on polyphenylene sulfide

The dynamic shear modulus and internal friction in the range of composite materials based on the polyphenylene sulfide is studied in the process of mechanical glassing transition. Ultrafine cryptocrystalline graphite is used as a filler. The multiplicity of the glassing processes and the effect of filler on the processes of α-relaxation occurring in the polymer matrix were studied.

Keywords: polymer composites, shear modulus, glassing transition, filler, polyphenylene sulfide.

O. V. Kropotin, V. A. Egorova
Optimization of conditions of sintering of a composite material by a method of modeling of contact interaction taking into account viscoelastic properties of polymer

The certainly-element model of a polymeric composite material (PCM) in the course of sintering is developed. The comparative analysis of influence of modes of sintering on characteristics of contact interaction of «filler–polymer» is carried out. The optimum mode of sintering PCM is chosen.

Keywords: a polymeric composite material, sintering, firmly-phase synthesis, polytetrafluorethylene, graphite, structural updating.

E. N. Eremin, Yu. O. Filippov, G. N. Minnekhanov, V. F. Mukhin
The analysis of structural change in modifying heat-resistant nickel alloy
The influence of nanoparticle of titanium carbonitride on the structure and properties of heat resisting alloy is considered. It is shown that at modifying zones of transcrystallization in cast metal are eliminated, sizes of dendrites are abruptly decreased, the morphology and topography of phases providing increased high-temperature strength of metal and increasing structural stability and continuous toughness of the alloy.

Keywords: heat-resistant nickel alloy, modifying, nanoparticles, dendrite structure, mechanical properties, continuous strength.

V. A. Sokolov, L. A. Shestel, S. S. Volkov
Welding film of fluoroplastic for manufacture of cable

The problem of quality of welding of film from fluoroplastic is considered. It is used in industrial cables for isolation at manufacture of wire and cable of various purpose.

Keywords: wire, cable, isolation layer, polymer, fluoroplastic, welding.

V. F. Mukhin, E. N. Eremin
Modeling of electrical circuits low-powered welding rectifiers

The possibility of modeling program LTSPICEIV schemes of welding rectifiers or change the settings mode when transferring drops during welding is considered.

Keywords: electric arc welding, welding rectifier, modeling of electrical circuits, waveform, short circuit, the transfer of droplets.

A. G. Koltsov
Diagnostics of technical state of metal-cutting equipment

This article describes the background and objectives of technical diagnostic equipment, describes the parameters for determining the technical condition of cutting equipment. Manufacturers of diagnostic systems and recommendations of their choice are presented.

Keywords: precision machine tools, diagnostics, geometric accuracy, forecasting technical condition, RENISHAW.

K. V. Averkov, D. S. Rechenko, A. M. Lasitsa
Thermal processes at high-speed grinding

The article deals with the thermal processes in high-speed intermittent grinding of heat-resistant alloys. The authors develop a mathematical model of heat propagation in the medium on the basis of the heat differential equation. The article shows scanning electron microscopy, confirming the adequacy of the present model.

Keywords: abrasive, grinding, model, differential equation, seize, temperature.

N. N. Kochura
Resistance rollers for multipass rolling of large profile threads

Based on the research process thread rolling identified the main causes of the accumulated pitch error and found that the maximum pitch acme thread, which is available in 1 pass - 6 mm. Thread with higher pitch can be obtained by multipass thread rolling. When the number of passes the very possibility of rolling depends on the design of the intake rollers. Increasing the number of passes leads to a decrease in the hardening of workpiece and the contact pressure and as a consequence of the high stability of thread rolling rollers.

Keywords: Knurling rollers, multipass rolling, resistance rollers.

D. S. Makashin
The influence of cutting of cross-section edge on deviation from cylindrical form at drilling of titanic alloy

The analysis of influence of cutting of cross-section edge on deviation from cylindrical form at drilling of a titanic alloy is carried out. Geometry of cutting influences the process of chip formation. The presented results allow to choose a way of cutting of cross-section cutting edge for improvement of quality of an aperture after drilling of titanic alloys.

Keywords: drilling, alloys of the titan, rounding shoulder

A. G. Koltsov, V. B. Sukhinin
Checking geometric precision cutting equipment

This article describes methods of accuracy testing of machines with CNC. The phases of testing are shown. The example of accuracy assessment of machine tool Mazak Variaxis 500 using Ballbar QC-10 is given. Practical recommendations for the use of Ballbar QC-10 of RENISHAW company are developed.
Keywords: precision machine tools, test accuracy, roundness, RENISHAW, Ballbar QC-10.

A. P. Morgunov, K. N. Pantyukhova
The increase in efficiency of ionic implantation of undulating surface of profile joint

This article considers the increase of strength in elements and immobility of profile joint by alloying and modification by ionic implantation of conjugate surfaces. The topography of initial surface and penetration of ions to the surface and its distribution is studied.

Keywords: profile joint, undulating surface, ionic implantation, effect of long-range interaction, topography surface, microasperity.

V. A. Penner, A. P. Morgunov
Device for cleaning of the column of pump and compressor pipes from wax and tar

The structure of device for cleaning of the column of the pump and compressor pipes of the oil wells equipped with centrifugal electric pumps from wax and tar is represented.
The drawings of this device which include two extensible scrapers and weighting elements is developed.

Keywords: pump and compressor pipe, cleaning, scraper. .

S. A. Makeev, D. A. Kuzmin
Stability of element links in the structure of triple-layer thin metal shell

The algorithm of joint element thickness selection in the structure of the triple-layer cylindrical shell and flat panels from thin trapezoidal profile sheet by the criterion of connection elements stability is developed. The version of transition from thickness of the equivalent rod modeling a joint element to thickness of an actual connection structure is considered.

Keywords: thin cylindrical shell, joint element stability, equivalent rod, Щ-profile, critical force, finite elements method.

E. G. Kholkin, Z. N. Sokolovskiy
Experimental research of local loss of stability of thin-walled trapezoid profiles

In the article, the technique and results of experimental research of local loss of stability of the compressed thin-walled trapezoid profiles are resulted. Adequacy of the engineering design procedure of critical pressure of local loss of stability offered by authors in lamellar elements of a profile is shown. The experimental estimation of degree diminished is spent and recommendations for calculation of bearing ability of a profile with the account diminished are made.

Keywords: the thin-walled trapezoid profile, reduction, local loss of stability, admissible pressure.

V. E. Scherba, G. A . Nesterenko, E. Yu. Nosov, E. A. Pavlyuchenko, E. A. Lysenko, V. S. Vinichenko
Experimental research of thermal stress of the cylinder of a hydropneumatic hybrid of volumetric action

In the article the design of the test bench and results of experimental research of thermal stress of the cylinder of the hydro-pneumatic hybrid machine of volumetric action - the pump-compressor - on stationary operating modes is considered. Typical distribution of temperature along forming line of the cylinder and decrease in its thermal stress in comparison with usual compressor machines is shown.

Keywords: the piston pump-compressor, thermal stress.

V. E. Scherba, G. A. Nesterenko, E. Yu. Nosov, E. A. Pavlyuchenko, E. A. Lysenko, V. S. Vinichenko
The influence of frequency of rotation on characteristics piston the pump-compressor

In the article results of the numerical experiment on mathematical model of piston pump-compressor are described. The influence of the basic regime factors on characteristics of studied object is established. It allows the designer to set parameters of the drive of pump-compressor.

Keywords: the piston pump-compressor, frequency of rotation

G. S. Averyanov, V. N. Belkov, A. B. Korchagin, V. S. Balashov
Pneumatic vibroprotecting device with active magnetic fluid control of elastic damping performances

A pneumatic vibroprotecting device with the combined air-hydraulic damper system provides decrease of vibration to a car body and the torsion suspension unloading in static position of a vehicle is presented. An active magnetorheological fluid control of the elastic damping performances of a hydraulic part of the device for the purpose of perfection protecting from vibration properties of the device there is designed. Some equations describing parities of forces, operating in static position and at free fluctuations of a vehicle are resulted.

Keywords: air-hydraulic damper system, magnetorheologicai fluid, static position, free fluctuations.

Yu. A. Burjan, V. N. Sorokin, Yu. F. Galuza
The car active hydromechanical fluctuation damping system

Theoretical possibilities of a car linear and angular fluctuations damping with nonlinear guidance of an active hydromechanical suspension bracket are considered. The analysis of efficiency of an active suspension bracket at use of the information from gages of angular speed and linear vertical speed of suspended weights is given.

Keywords: damping, fluctuations, guidance, hydraulic actuator

V. I. Kuznetsov, A. A.Volovodova, A. V.Kochegarov, O. A.Fatkina
Calculation of characteristics of dual-flow turbojet engines

This equation closes loop of the mathematical model describing working process of a turbojet engine. The close-loop mathematical model will allow to calculate throttle, altitude-speed and climatic characteristics of turbojet without using of regulating laws and managing programs.

Keywords: characteristics, dual-flow turbojet engine, close loop mathematical model.

S. A. Korneyev, M. A. Fedorova
Analytical calculation of own and compelled fluctuations plate-mesh panel

The mathematical model of small fluctuations of the plate-mesh panel (PMP) used for sound insulation of various objects is offered. The analytical decision for a special case of arrangement PMP in the field of gravity is received by a new non-standard method, suitable for definition of amplitudes and own frequencies of small fluctuations of conservative systems with final number of degrees of freedom. Results of the conducted research are intended for the subsequent calculations PMP on vibration strength.

Keywords: the plate-mesh panel, the own fluctuations, the compelled fluctuations.

S. V. Petrochenko, A. A. Fedorov
Shock-acoustic treatment of the direct current electromotor collectors

In the article the entity of the shock-acoustic treatment (SAT) of the direct current electromotor collector are considered, the diagram of the device for SAT are presented, the treatment parameters for SAT are calculated, the matching of the dept and cold work degree between knurling and shock-acoustic treatment are presented, the results of the polish liquid for the commutation improvement availability research are presented, the conclusions of the SAT application as final polishing in locomotive depot expedient are concluded.

Keywords: direct current electromotor, collector, shock-acoustic treatment.

A. G. Mikhailov, P. A. Batrakov
The use of refractory materials in the furnaces of small boilers

The problems of choice of refractory materials for intensifiers of heat transfer in furnaces small boilers. The classification scheme similar materials is developed.

Keywords: turbulator, combustion, boiler, classification, cermet.

A. V. Borodin, M. I. Kovalev
The influence of increased axial load on performance of axle bearings of a freight car

The article discusses performance of axle bearings of freight car with the planned increase in axle load. The criterions of bearing evaluation are the values of deflection and angle of rotation of the section of the cervix wheel pair, which are compared with permissible.

Keywords: flexural rigidity, axle, roller bearing, axle box, freight car.

A. I. Volodin, L. Yu. Mikhaylova
Calculation of the parameters of injected liquid fuel of diesel engines

The method of selecting of a diameter and number of atomizer nozzles in fuel injectors in diesel engines is given, the algorithm of calculation of the quality of liquid fuel atomization with examples is given, relation of parameters of flame length and ignition delay is shown.

Keywords: nozzle, nozzle exit section, foul dispersion, flame length, ignition delay.

A.P. Bujnosov, V.A. Tikhonov
Definition of a maximum permissible difference of diameters of bandages of wheelpairs of traction rolling stock by a method of sectional-linear approximation

The method is developed and the technique of definition of a maximum permissible difference in diameters of bandages of a wheelpair of electric locomotives in operation by a method of sectional-linear approximation for various depots and series of a traction rolling stock is stated. It is shown that values of a maximum permissible difference of diameters of bandages of a wheelpair of one series of a traction rolling stock of one series in various service conditions can to differ considerably. Results of calculations are resulted. At operation of bandages of wheelpairs it is necessary to be guided by the calculated values and not to suppose an exit of a difference of diameters for limiting values, otherwise the between-repairs period will limit deterioration of a ridge owing to what expenses on repair will increase, and run before turning will decrease.

Keywords: Traction rolling stock, wheelpair, bandage, difference of diameters, method, maximum permissible size.

A. P. Bujnosov, I. M. Pyshnyj
The increase in life cycle of bandages of wheelpairs of industrial diesel locomotives

In the article results of the comparative analysis of outwearing of bandages of wheel pairs diesel locomotives TGM4 and ТГМ23 depot the Perm motors and Motovilikha of Joint-Stock Company «Railwayman» are resulted. Bandages of wheel pairs industrial diesel locomotives have been ground on profiles of GOST 11018 – 2000, fig. 2, DMetI type LP. On the basis of methods of the probability theory and the mathematical statistics proceeding from criterion of the maximum resource of bandages of wheel pairs before turning for diesel locomotives TGM4 depot the Perm motors effectively application of a profile in accordance with GOST 11018 – 2000 whereas for bandages of wheel pairs diesel locomotives TGM23 depot Motovilиha – profile DMetI of type LP.

Keywords: diesel locomotive, wheel pair, bandage, profile, deterioration, controllable parameters, resource, estimation.

A. V. Goriaga, A. M. Dobrenko, V. S. Serdjuk, O. A. Tsorina
Models of exploitation of the systems of protecting from the factors of risk at production processes

In the work are proposed the mathematical models of exploitation of the protecting systems from the risk factors of production processes in the normal regime of work. The basic result of work is development of algorithm of optimum strategy of carrying out maintenance and repair work during exploitation of the indicated systems from the economic point of view.

Keywords: production process, models of exploitation of the protecting systems, algorithm of the choice for the protecting systems the optimal strategies for their exploitation.

ELECTRICAL AND POWER ENGINEERING

A. P. Popov, K. A. Klimenko
Analisys of electromagnetic field of system «bus with current – ferromagnetic core with short-circuited conductive ring»

In the article are presented results of calculation of electromagnetic field of system «bus with current – ferromagnetic laminated core from electrotechnical steel» by software application Elcut. Calculation is made for definition of the influence of the short-circuited conductive ring on electromagnetic processes in the system considered.

Keywords: magnetic field induction, magnetic flux, superficial effect, system «bus with current – ferromagnetic laminated core from an electrotechnical steel», software Elcut.

A. P. Popov, A. O. Chugulev
The motion detector of ferromagnetic objects in cylindrical steel pipe

The motion detector of ferromagnetic metal objects inside a steel pipe, which shielding effect is repeatedly reduced at the expense of deep

magnetic saturation of the pipe section by a constant magnetizing current in the area of placing the signal winding, is offered. Numerical calculation of a magnetic field of the detector, taking into account the nonlinearity of the magnetic characteristics of the pipe material, and the estimation of level of its signal are executed.

Keywords: motion detector, ferromagnetic, steel pipe, magnetic field, magnetic saturation.

K .I. Nikitin
The analysis of change of current phase of asynchronous motor at its start-up, experiment and synthesis of the device of relay protection (2 part)

The comparative analysis of techniques of definition of a phase of starting current of the motor with experimental data is given. The block diagram of the device of relay protection with improved tuning out from self-start is offered.

Keywords: self-start, short circuit, relay protection, the asynchronous electric motor, a current phase.

G. V. Nikonova
The optimization method of the pump unit power consumption control mode

This paper covers design and justification for controlled-velocity electric drive model and considers the existing concepts of the systems and apparatuses of pump unit efficiency automatic control.

Keywords: controlled-velocity electric drive, pump unit, power consumption, slip energy, operating costs

K. A. Klimenko
Analysis of the influence of construct parameters of a short-circuited ring on the electromagnetic field of system «bus with a current – ferromagnetic closed core»

In the article results of investigation of construction parameters of a short-circuited ring of flows and the scattering phase relationships between the main magnetic flux of the core and the current of bus in software system Elcut are presented.

Keywords: magnetic flux, the phase shift, the core, Elcut.

K. R. Khalikov
Method of calculation of catenaries and several current collectors interaction in case of their simultaneous operation

In the article features of catenaries and several current collectors interaction on electric railways are considered. New method of calculation of current collection devices vertical mechanical interaction in sections of electric railways containing transitional spans based on discretization of parameters of catenaries to points of contact with current collectors is worked out. Comparison of results of experimental and theoretical research is made.

Keywords: electric railways, catenary, current collector, method of calculation.

A. S. Noskov, A. V. Lovtsov, A. V. Khait
Mathematical simulation of Ranque-Hilsch energy separation effect for increasing of vortex tube energy efficiency

The description of the numerical model of gas flow appearing in Ranque-Hilsch vortex tube is made. This model was created for optimizing of geometry dimensions and operational characteristics of the vortex tube. Based on the results of performed numerical calculations the optimal length and the cone angel of double circuit vortex tube energy separation chamber was found: L = 3D ... 4D, б = 0° ... 4 °. Also it was found that maximum value of the isentropic energy efficiency of vortex tube corresponds to hot flow portion 20 %.

Keywords: vortex tube, Ranque-Hilsch effect, optimization calculation, isentropic energy efficiency.

V. L. Yusha, E. V. Sukhov
Theoretical analyze of processes of heat exchange and hydrodynamic into the spiral-coiled channels with nonround cross-section

The article reviews to the questions about increasing efficiency of cooling elements based on the spiral-coiled channels with triangular and square cross-sections, which are oriented to the rotation axis. There is presented that the heat and power efficiency of the spiral-coiled channels $(Nu_{ЗМ}/Nu_{ГЛ})/(o_{ЗМ}/o_{ГЛ})$ depends on a kind of channel profile and its orientation around the rotation axis. There is represented the numerical modeling results of the heat and hydrodynamic processes into the spiral-coiled channels of a complex cross-section by means of k-щ turbulence model in the program package ANSYS CFX.

Keywords: heat exchange, hydrodynamic, spiral-coiled channel, numerical modeling

N. G. Rovkina, V. Z. Kovalev, A. A. Zyabkin
The uninterrupted monitoring system of power transformers windings parameters on the basis of the imitation dynamic working conditions

The article is dedicated to the tracking of internal faults in power transformers. It represents well-known methods of parameters identification of electrical machines. In order to increase the speed of known abroad on-line control systems of power transformer parameters, the article offers to use canonical numerical methods for the dynamics of a monitored object.

Keywords: power transformers, parameters identification, protection and monitoring systems, canonical integration methods of differential-algebraic equations systems.

D. V. Rysev, V. K. Fedorov
Stability of the turbine-generator-load power system at occurrence of an electromechanical resonance

Stability of power system with real parameters is considered at occurrence of an electromechanical resonance (EMR) within the limits the turbine-generator-load power system mathematical model.
Existence of complex self-raised fluctuations of the loaded turbine rotor of the generator which phase portraits are limiting cycles and two-period quasiperiodic attractors is revealed.
Effect of damping windings on occurrence EMR is analyzed. The attention to possibility of lose of synchronism of generators in electrical networks of a series capacitor compensated transmission line is paid.

Keywords: attractor, limiting cycles, power system, stability.

V. V. Shalay, A. A. Popov
Mathematical model of method of individual account of consumption of heat in apartment house

In the article the conclusion of the equation of individual consumption of heat by apartment in the many-storey house is considered. The analysis working out the equations of thermal balance of a building is carried out. The system of the equations is resulted, allowing to calculate average on the house factor of return of warmth of radiators and size of individual consumption of heat.

Keywords: the equation of thermal balance of building, individual heat consumption, the account of consumption of heat.

O. A. Ibragimova
Features of calculation of thermal loadings at the teamwork organization at thermal power station and a regional boiler-house

The question of definition of temperature of external air for inclusion in work of a peak boiler-house and calculation of thermal loadings is considered at the organization of teamwork at thermal power station and a regional boiler-house for comparison with the data of the enterprise of 2009. The scheme of teamwork of thermal power station and regional boiler-house, and also calculation of temperatures in pipelines of sources of heat is offered.

Keywords: cogeneration plant, peak-load district-heating plant, thermal loading, peak operating mode, development.

I. V. Boldyrev, L. V. Vladimirov, V. A. Oschepkov
Localization of faults in electricity transmission air-lines in distribution circuits

This article considers distance localization of faults of line-to-ground short circuit in circuits 6 – 35 kV by standing wave method. Calculation of line intrinsic resonance frequency, plotting graph of current distribution lengthwise line by origin standing wares is carried out. The block diagram of the device for localization of faults and algorithm of search is presented.

Keywords: localization of faults, standing wave method.

L. V. Vladimirov, V. A. Oshchepkov, V. I. Surikov
Algorithm and search technique for localization of faults in distribution circuits of electro power system by standing wave method

This article considers the problem of remote localization of faults by standing wave method and line-to-ground short circuit in lines of 6-35 kV. The algorithm of the device for search and localization of faults is presented. The search technique for localization of faults by standing wave method is presented.

Keywords: search technique by standing wave method, algorithm of search.

V. N. Goryunov, K. I. Nikitin, M. M. Sarychev
Advancing automatic standby activation in electrical power stations and substations

The way of advancing automatic standby activation (ASA) in electrical power stations is offered. The sequence of work of ASA is the following: the starting element measures the resistance of isolation of the feeding cable when the resistance of isolation becomes lower than setting limit, ASA switches on the switch of a reserve power then ASA disconnects the switch of the working power. The purpose of such ASA is to prevent the power break on electrical power stations and substations.

Keywords: predicting protection, isolation service life, dead time, interruption time, automatic standby activation.

S. Yu. Dolinger, V. N. Goryunov, A. A. Plankov, O. A. Sidorov
Schemes of active filtering of current in four-wire three-phase network for improving power quality

This paper is devoted to the problem of power quality that is paid more and more attention. Three schemes of active filters for four-wire three-phase network are considered. The problem of unbalanced voltage on capacitors of the active filter is considered with the scheme with separated capacitors. In the paper it is presented the scheme of the active filter solving the problem of unbalanced voltage. Thus, there is a possibility of independent control of the power bridge shoulders. This will allow to create simple and fast algorithm of control on the basis of the theory of instant power.

Keywords: power quality, active filtering, imbalance voltage.

I. N. Krasnokutskiy, V. L. Yusha
Algorithms and control of electrical power supply systems in the lighter installations based on fuzzy logic methods

The given article is devoted to the problem of electrical power supply system control in lighting installations. The control structure is considered for the system of electrical power supply to lighting installations. In the article the explanation of fuzzy logic application for control of electrical power supply system for external illumination is given.

Keywords: lighting installation, control of electrical power supply systems, method of fuzzy logic.

E. V. Petrova, A. A. Bubenchikov, N. V.Kirichenko, E. V. Ptitsyna
Working out of the losses calculation algorithm in the isolated and not isolated wires of air-lines taking into account operation mode and climatic factors

In the article the problem of energy losses calculation in isolated and not isolated wires taking into account of the wire temperature is considered. The losses calculation algorithm (a component of software «Om1») is developed. Program «Om1» provides approaches of air-line losses calculation in electro power systems taking into account the lead of a cable temperature. The short description of the developed software Om1 is given.

Keywords: an air-line, algorithm, capacity losses, convection, radiation, temperature.

A. A. Plankov, D. S. Osipov, A. V. Bubnov, S. Yu. Dolinger
The effect of power consumers distorting the sinusoidal waveform of voltage and current to the value of critical voltage at stability assessment of the unit with asynchronous load

The article is devoted to the relevance of the objectives of the study the static stability of the unit with asynchronous load. The most common criteria of stability, its comparative analysis was considered. The effect of power consumers distorting the sinusoidal waveform of voltage and current to the value of critical voltage at stability assessment of the unit with asynchronous load is analyzed.

Keywords: quality of electrical energy, non-sinusoidal current, non-sinusoidal voltage, criteria of stability, asynchronous load, the critical voltage.

S. S. Siromakha, D. S. Osipov, V. V. Kharlamov
Wavelet analysis of power quality parameters as an alternative to the Fourier transform

The development of techniques and technologies in industry and everyday life has specific requirements for quality, but to follow these requirements without the consumption of energy resources is impossible. In turn, the quality requirements imposed on the energy (in particular - electric power), and the increased in recent years the number of customers have to analyze quickly and accurately the parameters of electrical energy. The solution of this problem is possible using the wavelet transform.

Keywords: wavelet analysis, Fourier transform, quality of electric energy, higher harmonics.

V. K. Fedorov, P. V. Rysev, S. V. Biryukov, R. K. Romanovskiy
Instability and chaos in power systems

The possibility of chaotic modes in power systems is proved. Modes of power systems at which there is a loss of stability with bifurcation are investigated. Ways of transition of power systems to chaotic modes are considered.

Keywords: chaos, power system model, bifurcation, instability.

INSTRUMENT ENGINEERING, METROLOGY AND INFORMATIONAL MEASURING SYSTEMS

A. V. Nikonov
Modeling of information-measuring part of geographically-distributed production complex

The article covers simulation of measuring processes in geographically-distributed production complex designing. It also provides methods of the received model application and several illustrations of the process of obtaining an optimal solution.

Keywords: informational measuring processes, distributed complex, objective function, interpolation, existence domain

A. A. Kuznetsov, O. B. Meshkova, V. A Slepterev
Investigation of factors influencing the spectral lines intensity measuring results in spectral analysis of materials

This article contains information about the physical representation of factors that can vary during the spectral analysis of materials. The analytical expressions with which it is possible to quantify the change of the measured parameter — the intensity of spectral lines, which carry information on materials quantity composition during their spectral analysis

Keywords: measuring intensity of radiation, influencing factors, the physical model, spectral analysis of materials.

A. V. Nikonov, V. A. Nikonov
The coherence of signals in the systems of control and diagnosis of objects beyond reach

The article offers analysis and evaluation of various methods of securing the coherence of signals in phase systems of RF-return. It also suggests methods of generation of in-phase signals and shows its potential and results.

Keywords: angle of phase shift, PLL, ultrawideband probing, astaticism, phase assignment error.

R. A. Akhmedzhanov, A. V. Tikhonov
Mathematic model of magnetic field of magnetizing device designed by V.V. Gekker

In the article are presented the results of mathematic modeling of components dispensation in magnetic field of saddle-shaped magnetizing device designed by V.V. Gekker. Fractional error of normal and tangential field components does not exceed 3—5%.

Keywords: mathematic model, saddle-shaped magnetizing device, magnetic field, current turn, magnetic powder control.

INFORMATION TECHNOLOGIES

A. V. Zykina, O. N. Kaneva, U. N. Kulbida
Expert system for positioning and definition of advertizing strategy of a brand

In the article the model of Rossitera-Persi allowing stage by stage advertizment positioning of a trade mark is considered. On the basis of this model it is offered to create expert system for the aid to the manager on advertizing. The so-called statement for a position of a trade mark which to lie down in a basis of creative advertizing strategy of a trade mark should be result of work of such system. The description of realization of the first stage of model is resulted.

Keywords: expert system, positioning, advertizing, a trade mark.

S. S. Gritsutenko, A. S. Sidorenko
Creating effective FFT computation algorithm for NVCom-01 processor

This paper describes how to implement high-performance FFT computation algorithm for NVCom-01 processor. There are several paths to achieve this: effective using of processor computation units, avoiding pipeline blocking, using some algorithmic features. Also highest theoretical performance is calculated here that cannot be exceeded.
The goal of the paper is to describe programming tricks, which can provide extremely increasing of computation performance of high speed algorithms.

Keywords: Fast Fourier Transform, digital signal processor, pipeline, twiddles.

L. A. Denisova
The event-driven simulation of digital control system

The approach of the analysis of the control system with variable parameters means of the event-driven simulation is suggested. The mathematical model of the automatic control system which was implemented with MATLAB/Simulink/Stateflow is represented.

Keywords: mathematical model, event-driven simulation, transfer functions containing variable parameters, digital control system, variable sampling period.

A. V. Maystrenko, A. A. Svetlakov, R. O. Cherepanov
The analysis of properties of Hilbert matrix and the reasons for its weak conditionality

In the given article the analysis of the main properties of matrixes of Hilbert is carried out, and two prospective reasons for their weak conditionality are formulated. Some results of the experimental research executed for the purpose of confirmation or refutation of hypothetical reasons of weak conditionality of given matrixes are resulted.

Keywords: matrix, norm, element, scaling, representation of numbers.

T. Yu. Salikhova, I. V. Kartseva, I. I. Shalmina
Development of CAD models of the structure of conceptual design of fur clothes

The article is devoted to study approaches to development of computer-aided conceptual design of the clothing of fur semis. The components of the structure of the CAD schematic design.

Keywords: automation, stage of development, workstation.

V. A. Gerasimov
About defect severity accounting during software reliability modeling

This article is about defect severity evaluation during software reliability modeling. The author provides a way to modify original reliability-growth models to take into account severity of software defects.

Keywords: software reliability-growth models, software reliability, defect severity.

V. M. Gordeev, K. V. Gordeeva
Measures of controllability and observability of interacting control systems

The paper presents a method for estimation of interaction of channels of control linear system with time-variable coefficients or smooth nonlinear control system. The method is based on the construction of gramians for the fundamental matrix of a canonical system.

Keywords: gramian, controllability, observability, control system, quantification of the interaction.

B. I. Efimov
The prospects of using existing tools of risk analysis in decision-making systems with experts

The main requirements for information security of decision-making systems with experts have been defined. The basic methods of risk assessment are described and classified. The possibility of using the tools of risk analysis in decision-making systems with experts has been studied.

Keywords: analysis of risks, threats, information security, decision-making systems, experts, distributed systems.

V. A. Kulbida
Digital data transmission system with adaptive of error-correcting coding

The paper describes designed by the author a system of digital data transmission, based on the patented method transmitting digital messages with the multiparameter adaptation. Also, a study proposed by the author of universal continuous vector code for the adaptation of error-correcting coding in the designed system.

Keywords: transmission system, unjammable code, coding, adaptation, universal code.

A. B. Osipov
Synchronous and asynchronous models for hard disk throughput in data scheduling

The analytical model for hard disk throughput estimation in case of parallel request flows operating in synchronous or asynchronous mode is presented. Simulation results to verify the analytical model are obtained. Analytical model offered has high potential for analytical research in data scheduling.

Keywords: task planning, computer, storage, hard disk, data transmission speed, parallel operating.

RADIO ENGINEERING AND COMMUNICATION

A. N. Lepetaev, A. V. Kosykh, S. A. Zavyalov, K. V. Murasov
Integrated ASIC quartz generator with hybrid analog-digital temperature compensation

In the article the block diagram of the integrated quartz generator with hybrid analog-digital temperature compensation is considered. Variants of operation of the circuit with various combinations of types of compensation are considered which essentially raises universality of the circuit. Variants of realization of the block programmed polynomial coefficient and a synthesizer of temperature compensating function are analyzed.

Keywords: synthesizer of temperature compensating function, polynomial coefficient, quartz generator, temperature compensation.

A. N. Lyashuk, S. A. Zavyalov
Surface acoustic wave generator with wide frequency tuning range

In the article different variants of radio frequency generators based on surface acoustic wave (SAW) structures (SAW resonator, SAW delay line) are analyzed, also possibility to make voltage controlled SAW generators (VCSOs) on their base is analyzed. The criteria in VCSO analyzing are the following ones: realizable frequency tuning band, simplicity and manufacturability of generator circuit. Technical decision for making SAW filter based generator is proposed; filter used in proposed VCSO has low insertion loss in filter passband (about 2 dB) and linear phase frequency characteristic.

Keywords: surface acoustic wave, SAW, generator, resonator, filter, voltage controlled generator.

E. V. Boltunov
Neural network based method for dynamic range upscaling of digital radioreceiving device

There are considered modern approaches of digital radio receiver designing and limitations inherent in the classical approach. The method for upscaling of the dynamic range of digital radioreceiving device based on neural network data processing is developed. The results of imitational modeling of algorithm of dynamic range upscaling are obtained.

Keywords: analog-to-digital converter, digital radio receiver, field-programmable gate arrays, artificial neural networks.

P. I. Puzyrev, V. V. Vasilevskiy
Selection the type of interpolator for symbol synchronization schemes and analysis of influence of interpolation in phase-shift keyed signal reception immunity

In the article presented justification and selection of the interpolator for synchronizer of the digital phase demodulator. The results of simulation are presented and showed the influence of interpolation on the noise immunity of the reception phase-shift keyed signals.

Keywords: interpolation, symbol synchronization, phase shift keying

CHEMICAL SCIENCE, CHEMICAL TECHNOLOGY, CHEMICAL INDUSTRY

T. V. Lukisha, L. N. Adeeva, V. F. Borbat
Studying kinetics sorption of ion scandium from chloride solutions chelating resins Purolite S-957

The regularities of the kinetics of sorption of scandium from chloride solutions chelating resins Purolite S-957 are analyzed. The results of the experiments of internal diffusion kinetics are established. The diffusion coefficients at various temperatures and activation energy are obtained.

Keywords: sorption scandium, chelating resins.

I. V. Mozgovoy, E. V. Mironova, E. I. Mozgovoy
The interaction of ultrasound with the environment of raw rubber mixtures

The impact of ultrasound on crude rubber mixture based on the results of research affect the change is evaluated: the physical properties of the material environment, the chemical properties of the environment in general and the ingredients separately.

Keywords: raw rubber mixture, ultrasonic energy, destructive processes, chemical crosslinking, the molecular weight of rubber extraction.

PUBLISHING, POLYGRAPHY

S. N. Litunov, E. B. Kolmakov
Determination of basic device parameters for drying the printing cylinder of printing machine

Air flow in the channel of the drying device is modeled. Several configurations of the air channel device are designed. With the help of computational experiments selection of the optimal shape of the air channel on the basis of the requirements of the lack of circulation flows is carried out.

Keywords: offset printing, drying the printing cylinder, viscous liquid.

A. S. Borisova, L. G. Varepo, O. A. Kolozova
Modeling of the ink receptivity value on the basis of surface profile analytical presentation

The mathematical model is designed, which allows to value analytically the ink receptivity of closing absorbed material. The model conformity is regarded.

Keywords: ink receptivity, model, the combined material, surface microgeometry.

I. A. Sysuyev, E. V. Shipov, V. M. Vdovin
Optimization reproduction of tones digital photos in operative polygraphy

The article considers the possibility of optimization reproduction of tones of digital images upon receipt of prints by risography.
During research modes of optimum reproduction of gradation on a risograph have been established. Recommendations are developed for various kinds of digital images reproduction.

Keywords: risography, reproduction of tones, correction of gradation.

V. Yu. Kobenko, S. Z. Ikhlazov, A. V. Golunov
Determination of paper surface quality by method of fractal analysis

A method for evaluation of paper surface quality using fractal theory is developed. The method analyzes the shape of cut paper (profilogram) with a fractal dimension of the cell and the magnitude of the coefficient of surface roughness. Proposed Quality Paper Q is a complex indicator, which reflects the micro and macro roughness of the surface material.

Keywords: roughness, quality, surface, paper, fractal, coefficient.

I. A. Sysuyev, N. E. Frants
The method for estimation of quality of composition and layout of print publications (for example, district newspapers of Omsk region)

The article considers issues, which are associated with estimation of quality of composition and layout of print publications. Six district newspapers of Omsk region have been examined. During research imposition errors have been revealed, ranging of most often repeating errors of composition and layout in editions is done, the technique of its assessment is developed. It is offered to use the reduced indicator for an estimation of publication related to the fixed volume of the publication.

Keywords: composition and layout of print publications, quality of composition and layout, the reduced indicator of quality.

В ПОМОЩЬ СОИСКАТЕЛЯМ И АСПИРАНТАМ: СОВЕТЫ ПО ЗАЩИТЕ ДОКТОРСКИХ И КАНДИДАТСКИХ ДИССЕРТАЦИЙ В ОМСКЕ (информация с сайта ВАК на 10.06.11г.)

Организация, при которой действует совет	Шифр совета	Специальности совета
Омская государственная медицинская академия	Д 208.065.01	14.01.17-14 14.01.01-14 14.01.01-14
Омская государственная медицинская академия	Д 208.065.02	14.01.14-14
Омская государственная медицинская академия	Д 208.065.03	14.02.01-14 14.02.02-14
Омская государственная медицинская академия	Д 208.065.04	14.01.04-14 14.03.02-14 14.03.03-14
Омский государственный педагогический университет	Д 212.177.02	13.00.01-13 13.00.08-13
Омский государственный педагогический университет	Д 212.177.03	09.00.01-09 09.00.13-09
Омский государственный педагогический университет	ДМ 212.177.04	07.00.02-07
Омский государственный педагогический университет	ДМ 212.177.05	03.02.04-03 03.02.08-03
Омский государственный педагогический университет	К 212.177.01	13.00.02-13
Омский государственный технический университет	ДС 212.014.01	05.07.02-05 05.07.06-05
Омский государственный технический университет	Д 212.178.01	05.11.13-05 05.12.04-05
Омский государственный технический университет	Д 212.178.02	05.04.03-05 05.04.06-05 05.14.04-05
Омский государственный технический университет	ДМ 212.178.03	05.09.01-05 05.09.03-05
Омский государственный технический университет	Д 212.178.05	05.02.08-05
Омский государственный технический университет	Д 212.178.06	01.02.06-05 05.02.02-05 05.02.18-05
Омский государственный технический университет	Д 212.178.09	05.04.13-05
Омский государственный технический университет	Д 212.178.10	05.16.09-05 05.02.13-05
Омский государственный технический университет	Д 212.178.11	02.00.04-02
Омский государственный технический университет	Д 212.178.12	05.14.02-05
Омский государственный технический университет	Д 212.278.13	05.07.06-05 05.07.07-05
Омский государственный университет им. Ф.М. Достоевского	Д 212.179.01	08.00.05-08
Омский государственный университет им. Ф.М. Достоевского	ДМ 212.179.02	10.02.01-10 10.01.01-10
Омский государственный университет им. Ф.М. Достоевского	Д 212.179.04	01.04.02-01 01.04.07-01
Омский государственный университет им. Ф.М. Достоевского	ДМ 212.179.05	01.04.03-01 01.04.04-01
Омский государственный университет им. Ф.М. Достоевского	ДМ 212.179.07	01.01.06-01 05.13.18-01
Омский государственный университет им. Ф.М. Достоевского	Д 212.179.08	09.00.11-09
Омский государственный университет им. Ф.М. Достоевского	Д 212.179.09	08.00.05-08
Сибирская государственная автомобильно-дорожная академия	Д 212.250.01	05.23.11-05
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Сибирская государственная автомобильно-дорожная академия	ДМ 212.250.03	05.01.01-05 05.13.12-05
Сибирская государственная автомобильно-дорожная академия	ДМ 212.250.04	08.00.05-08
Омский государственный университет путей сообщения	Д 218.007.01	05.22.07-05
Омский государственный университет путей сообщения	ДМ 218.007.02	24.00.01-09,07
Омский государственный аграрный университет	ДМ 220.050.01	06.01.01-06 06.01.04-06 06.01.05-06
Омский государственный аграрный университет	Д 220.05.03	06.02.01-16 06.02.02-16
Сибирский государственный университет физической культуры и спорта	Д 311.001.01	13.00.04-13 13.00.08-13
Омская академия МВД России	Д 203.010.01	12.00.08-12 12.00.09-12