

Contents

PHYSICAL AND MATHEMATICAL SCIENCE

A. A. Kolokolov, T. V. Levanova, Yu. S. Pozdnyakov. Development and analysis of immune clonal selection algorithm for p-median problem	5
V. N. Tarasov, I. V. Boyarkina. The moment of inertia of the globe	9
V. N. Tarasov, I. V. Boyarkina. Determination of weight of mass unit and pressure in spherical layers and center of the earth	11
N. N. Zepnova, O. V. Kuzmin. Application of methods of discrete mathematics to solution of logical problems	14
P. A. Batrakov, O. S. Cherepanov. Investigation of estimates of scale parameter of weighed maximum likelihood method	18
E. M. Nazaruk. Lyapunov's direct method for non-autonomous neutral systems type in Sobolev's spaces H^1	23

MECHANICAL AND THEORETICAL ENGINEERING

V. V. Akimov, P. V. Petunin, O. Yu. Burgonova. Improvement of characteristics of high-speed steel cutting tools	27
P. D. Balakin, A. H. Shamutdinov, D. S. Zvezdin. Experimental study of the static stiffness of original part manipulator with six-degree of freedom	31
A. V. Borodin, Y. A. Ivanova, D. B. Grits. The influence of distribution of radial load on bearing pedestal resource of wagon	35
Yu. A. Burian, P. D. Balakin, V. N. Sorokin. Stabilization of vibrations amplitude of the mechanical system	38
E. N. Eremin, A. E. Eremin, Yu. O. Filippov, A. S. Losev, A. E. Matalasova. Development of flux-cored wire for welding of stop valves	45
B. A. Kalachevskiy, A. B. Yakovlev. Modeling of the processes in gas generator working on unicomponent fuel	48
V. I. Trushlyakov, D. B. Lempert, M. E. Belkova. Analysis of possibilities of implementation of gasification of rocket propellant residues in rocket stage tanks	52
L. N. Akhtulova, A. L. Akhtulov, V. A. Osit. Design of automation of design system of chain-driven ditcher	58
V. V. Gryaznov, A. Yu. Lupandina, N. O. Safonova. Three dimensional simulation of process of upset forging of head of part from relatively high blank	64
V. A. Konovalov, K. D. Savelyev, E. D. Vasilyev, N. S. Aleksandrova. Peculiarities of forming of marginal zone of cylindrical section in hollow samples with relatively thick wall compressed in conical matrix	68
N. F. Kolenchin. Improvement of anodization technology of aluminum using ozone	72
D. A. Negrov, E. N. Eremin, B. Yu. Putintsev, O. A. Peredelskaya, S. A. Andreeva. The effect of ultrasound exposure on the mechanical properties of polytetrafluoroethylene modified detonacionnymi superdispersed nano-diamonds	76
V. A. Penner, T. A. Tarasova. The optimization of pipeline operation taking into account control of oil viscosity	79
A. V. Tignibidin, O. P. Pastukhova, K. E. Belgebaeva. Advantages of using active control devices during labyrinth and sealing rings processing on surface grinding machines	83
N. N. Chigrik. Research of influence of error of means of measuring of parameters of grading and accuracy of technological process at measuring control of height of piston-rings of the automobile motor engine	86
N. N. Chigrik. Estimation of fidelity of results of measuring of boundary values of height of piston rings of a model series ZMZ-402, -406, -511, -513, -5234 and GAZ-24. Part 2	93
L. A. Shestel, Yu. A. Sayapin, V. A. Sokolov, D. A. Kutashov. Multipoint ultrasonic welding of hull structures of rigid plastics	99
V. V. Bokhan, A. A. Shvarts, A. V. Zubarev. Application prospect of conductive rubbers into rubber-cord constructions to measure the stress-strain state parameters	102
I. I. Koshukov. Non-coordinated finishing of flat closed type surfaces	108
I. I. Koshukov. The influence of flat polishing surfaces on the property and operational characteristics of movable connections	113
A. A. Portnova, S. V. Kotkin, V. S. Scsherbakov. Theoretical research results of articulated motor grader mathematical model	118
V. V. Pshenichnikova, M. A. Izhenyakova. Metrological assurance releasable pin connecting of compressor valve seats	122
V. V. Trifonov. Research of diffusion processes during overaluminizing	124
V. A. Shepetkov, E. S. Anikin, A. V. Zubarev, Yu. P. Komarov. Universal equation for curvature radius of the pneumatic shock-absorber rubber-cord cushion profile	126
A. N. Scherbo, O. A. Seryakov, E. A. Saraev. Rating wave sweeping observation instruments at floating machine conducting fight afloat	130
E. S. Tereshchenko, D. V. Shabalin, D. Y. Fadeev, O. V. Subbotin. Control system for a turbocharger with a receiver coil and vehicle diesel	133
D. V. Shabalin, E. S. Tereshchenko, S. V. Roslov, A. M. Smirnov. A method for increasing diesel pickups combined with the use of inertial energy storage	136
S. A. Korneev, V. S. Korneev, I. A. Penkov, M. I. Tribelskiy. The methodology and results of static research rubber-cord branch pipe	139
L. N. Akhtulova, A. L. Akhtulov, E. N. Leonov, N. N. Petukhova, S. I. Smirnov. Integration technologies at creation of small electrotechnical systems and complexes on the basis of methodology cogeneration	145

ELECTRICAL ENGINEERING. POWER ENGINEERING

V. R. Vedruchenko, N. V. Zhdanov, E. S. Lazarev. About the influence of the type of combustion chamber on the working process of diesel using alternative fuels	152
A. P. Popov, O. P. Kurakina. Ways to reduce costs of electric energy for switching current under inductive load with preset performance	156
I. A. Yanvaryov. Combined regulation of temperature modes of modular gas air cooling installations	161
G. V. Kvashnina. Assessment of reliability of electric power supply for consumers in temporary redundancy mode	165
M. A. Krivoshein. On the question of collaboration fans in the ventilation channeling of the ventilation systems of the residential buildings	169
T. A. Novozhilov, A. N. Novozhilov, V. I. Surikov, S. V. Biryukov. Definition of currents in windings of the single-phase transformer for relay protection at coil short circuit	174
P. A. Tretyakova. Modern approaches to modernization of district heating systems through introduction of heat pump systems	178
P. A. Tretyakova. Energy saving on the Kurgan CHPP-2 by utilizing low-potential heat	182
O. A. Yakovlev, Yu. V. Molokin, Ye. A. Chashchin. Electrostatic treatment of aerofuel mixture	184

INSTRUMENT ENGINEERING, METROLOGY AND INFORMATION MEASUREMENT SYSTEMS

Yu. N. Klikushin, V. Yu. Kobenko, D. P. Chupin. Method of linguistic interpolation measurement results	191
V. A. Penner, K. E. Andreeva. The device for gas flow metering	195
D. A. Lebedeva, A. A. Novikov, D. A. Negrov. Development of a new ultrasonic waveguide — a tool for revision cases	197
D. P. Chupin. Investigation of Bedini motor as a battery charger	200

INFORMATION TECHNOLOGIES

L. N. Bodryakova, O. M. Kashuba, O. V. Smirnova. Elaboration of main approaches to standard semi-finished fur	204
L. N. Bodryakova, A. A. Starovoytova. Development of software for automation of preparatory and cutting operations of furriery manufacture	209

<i>F. N. Boris, V. A. Makht, E. A. Boris.</i> The solution of problems of mass appraisal of real estate with application of the method of geocoding	214
<i>M. A. Ivashchenko, A. B. Korobova.</i> The mathematical model of optimization patterns combination in the course of the automated clothes design working out	217
<i>M. A. Ivashchenko, A. B. Korobova, A. G. Burtsev.</i> The perspectives of virtual fitting of zone products in automated mode	219
<i>M. A. Prilepko.</i> Creation model of laboratory operation with usage of automation designing of virtual simulators Network Lab	223

RADIO ENGINEERING AND COMMUNICATION

<i>N. D. Veshkurtsev.</i> Entropy of central moments of distribution	228
<i>A. V. Morozov.</i> The study of information security of wireless networks at combined models	232

PUBLISHING. POLYGRAPHY

<i>I. A. Sysuev, A. O. Nikolaenko, D. V. Kashinskiy.</i> Concerning the question of reducing costs of offset production	236
<i>I. A. Sysuev, A. Yu. Zakharov.</i> Special features of the page-proofs of scientific magazines (on the example of the magazine «Omsk scientific messenger»)	240
<i>Yu. A. Rudak, M. V. Batishcheva.</i> The influence of pattern printing form on quality of seal in case of production of LTCC boards	244

Summary

PHYSICAL AND MATHEMATICAL SCIENCE

A. A. Kolokolov, T. V. Levanova, Yu. S. Pozdnyakov
Development and analysis of immune clonal selection algorithm for p -median problem

Immune clonal selection algorithm for p -median problem with integer model is suggested in this article. The results of experimental investigation and comparison with an ant colony algorithm are provided.

Keywords: discrete factory allocation problem, immune clonal selection algorithm, integer linear model, p -median problem.

V. N. Tarasov, I. V. Boyarkina
The moment of inertia of the globe

The technique of determining the moment of inertia of the globe by the methods of theoretical mechanics is developed.

Keywords: spherical layer, moment of inertia, radius.

V. N. Tarasov, I. V. Boyarkina
Determination of weight of mass unit and pressure in spherical layers and center of the earth

The technique of determining the weight per unit of mass and pressure in spherical layers methods of theoretical mechanics is developed.

Keywords: ball segment, truncated ball, spherical layer, radius, density.

N. N. Zepnova, O. V. Kuzmin
Application of methods of discrete mathematics to solution of logical problems

This article is devoted to the methods for solution of logical problems. The methods of solution of different problems with application of methods of set theory, mathematical logic and graph theory is in focus. The article can be useful for students, who learn discrete mathematics and for teacher of mathematics.

Keywords: mathematics, methods of teaching, logical problems, mathematic logic, set theory, graph theory.

P. A. Batrakov, O. S. Cherepanov
Investigation of estimates of scale parameter of weighed maximum likelihood method

In the paper estimations of scale parameter are considered. The efficiency of estimates and comparison with classical estimations is conducted for number of typical distributions under Tukey model with symmetrical and asymmetrical outliers. The results of investigations demonstrate higher efficiency than the classical robust estimates.

Keywords: scale parameter, robust estimates, weighed maximum likelihood method.

E. M. Nazaruk
Lyapunov's direct method for non-autonomous neutral systems type in Sobolev's spaces H^1

For the titled class of linear systems there is proved exponential stability criterion in H^1 -topology by direct Lyapunov functional. There is shown an example.

Keywords: Sobolev space H^1 , H^1 -stability, Lyapunov functional.

MECHANICAL AND THEORETICAL ENGINEERING

V. V. Akimov, P. V. Petunin, O. Yu. Burgonova
Improvement of characteristics of high-speed steel cutting tools

This article examines the influence of heat treatment regimes on high speed steel leading to the increase of maximum heat resistance. There are studied microstructure steels after thermal treatment. According to experimental modes thermal treatment applied to cutters party which have been tested in real conditions of production showing positive results.

Keywords: high-speed steels, steel, thermal processing, microstructure of high speed steels.

P. D. Balakin, A. H. Shamutdinov, D. S. Zvezdin
Experimental study of the static stiffness of original part manipulator with six-degree of freedom

In this paper, experimental study of the static stiffness of the original part of manipulator with six-degree of freedom is done, its values are determined by the example of the layout when the load is within the range $P=0...2000$ H, which allows us to apply the operational capabilities of the equipment under specific conditions.

Keywords: original layout of the manipulator, stiffness of the support system, dynamometer, stiffness, elastic displacements.

A. V. Borodin, Y. A. Ivanova, D. B. Grits
The influence of distribution of radial load on bearing pedestal resource of wagon

There is proposed device with dual bearing with elastic rings, which reduces the uneven distribution of the load on the axle box details, increases the life time of the bearing pedestal.

Keywords: radial load, cylindrical roller bearing, bushing.

Yu. A. Burian, P. D. Balakin, V. N. Sorokin
Stabilization of vibrations amplitude of the mechanical system

The paper deals with the automatic control system, which provides stabilization mechanical system's vibrations amplitude for mechanical system with arbitrary parameters and the excitation frequency of oscillation.

Keywords: amplitude vibrations, automatic control, frequency, drive.

E. N. Eremin, A. E. Eremin, Yu. O. Filippov, A. S. Losev, A. E. Matalasova
Development of flux-cored wire for welding of stop valves

The durability of metal welding deposited with wires 2H13, 13H25T, 11H11N2V2MF, 2H14M2B is investigated. The loading parameters defining the working capacity of these steels in terms of working of the friction pair with reciprocating at different values of the surface pressure are estimated. The results of metallographic investigations of weld metal are introduced.

Keywords: valves, sealing surface welding, high-alloyed wire, hardness, structure.

B. A. Kalachevskiy, A. B. Yakovlev
Modeling of the processes in gas generator working on unicomponent fuel

In the article there is considered static and dynamic characteristics of the gas generator and control element of liquid rocket engine with pump system of giving and independent fuel for turbine food. The

equation of dynamics, which describes the processes in one-component gas generator together with the throttle gas is obtained. The mathematical model allows to carry out the analysis and to reveal the basic laws of influence of entrance sizes on the manageable size.

Keywords: liquid rocket engine, static characteristic, dynamic characteristic, unicomponent gas generator, throttle.

V. I. Trushlyakov, D. B. Lempert, M. E. Belkova
Analysis of possibilities of implementation of gasification of rocket propellant residues in rocket stage tanks

The point of research is one of technological and project-constructional direction aimed to find ways of reduction of technological impact on environment caused by space launch vehicles (SLV) that are equipped with liquid rocket engine (LRE). The process of the use of energy resources obtained from unused propellant residues left in tanks should be done by evaporation. That is represented by the process of hot gases feed into propellant tanks. The gasified products are supposed to be used during the process of ensuring of stated parameters of stage motion. There are selection criteria, alternatives and selection recommendations of gas-generating composition (GGS), also their thermo physical characteristics listed. Besides, estimation and calculation of desired GGS masses enough to evaporate unused residues and to reach stated pressure inside tanks is also represented for example, the second stage of the space launch vehicle «Soyuz-2.1.v».

Keywords: propellant residues, gas-generating compositions, evaporation.

L. N. Akhtulova, A. L. Akhtulov, V. A. Osit
Design of automation of design system of chain-driven ditcher

The analysis of chain-driven ditcher is led and a set of mathematical models of separate subsystems on the basis of which the generalized mathematical model of chain-driven ditcher is developed is presented.

Keywords: digging-transport machine, to undermine works, chain dredge, designing, operation, mathematical model, system of automation of design.

V. V. Gryaznov, A. Yu. Lupandina, N. O. Safonova
Three dimensional simulation of process of upset forging of head of part from relatively high blank

The results of research of the process of formation of head of workpiece by hot die forging are presented. The regularities of the distribution of stresses and strains are given. The estimation of power characteristics of the process is done. The data processed in the software application Qform 5.1.

Keywords: stamping draught, pressure treatment, the warhead, 3D-modeling, stress, strain.

V. A. Kononov, K. D. Savelyev, E. D. Vasilyev, N. S. Aleksandrova
Peculiarities of forming of marginal zone of cylindrical section in hollow samples with relatively thick wall compressed in conical matrix

There is completed pilot impact analysis of tool characteristics and reference workpieces forming parameters on the marginal zone of the cylindrical sample plots of thick-walled pipe compressed in the conical matrices. The quantitative assessment presents graphs that will help rationally design stamped products.

Keywords: crimping, cone, matrix, heavy-gauge tube, forming the edge of the zone.

N. F. Kolenchin
Improvement of anodization technology of aluminum using ozone

The structure is examined, thickness and wear of oxide coatings on aluminum alloy AL9 after anodization in water sulfuric acid solution via use of ozone are determined. The increase of crystalline component (γ -Al₂O₃) in the coating is determined. Anodization technology of gear-type pump body which reduces details wear in 7 times is developed.

Keywords: anodization, aluminum alloy, ozone, thickness, microhardness, wear.

D. A. Negrov, E. N. Eremin, B. Yu. Putintsev, O. A. Peredelskaya, S. A. Andreeva
The effect of ultrasound exposure on the mechanical properties of polytetrafluoroethylene modified detonacionnymi superdispersed nano-diamonds

The influence of ultrasonic vibrations on the mechanical properties of polytetrafluoroethylene modified detonacionnymi superdispersed nano-diamonds. It is shown that introduction of ultrasonic vibrations in the swage material leads to increased tensile strength and modulus of elasticity and elongation synthesized composite.

Keywords: polymer composite, polytetrafluoroethylene, mechanical properties, ultrasonic vibrations, detonacionnymi superdispersed diamonds, modification.

V. A. Penner, T. A. Tarasova
The optimization of pipeline operation taking into account control of oil viscosity

The dependence of viscosity on the temperature of the external environment is obtained. The scheme of connection of the heater and viscometer to the petroleum pipeline is developed.

Keywords: petroleum, viscosity, viscometer.

A. V. Tignibidin, O. P. Pastukhova, K. E. Belgebaeva
Advantages of using active control devices during labyrinth and sealing rings processing on surface grinding machines

A method of control of product such as labyrinth and sealing ring during processing on surface grinding machines by dint of wide-range active control device is described. The scheme of the device is shown and main advantages of its usage in aircraft engine manufacturing are listed. At the moment Omsk aviation manufacturing needs to increase its competitiveness, so the problem of aircraft engine parts quality is challenging task for Omsk enterprises.

Keywords: sealing ring, labyrinth ring, active control device, surface grinding.

N. N. Chigrik
Research of influence of error of means of measuring of parameters of grading and accuracy of technological process at measuring control of height of piston-rings of the automobile motor engine

On the basis of analysis of parts resorting, existent approaches of setting of norms of accuracy of measuring and control of linear sizes, applied methods of measuring and ground of rightness of choice of universal mean of measuring to GOST 8.051-81 and RD 50-98-86 in the article are considered. The questions related to the research of providing of accuracy of setting norms for gaining borders of maximum rejections of admittance of size of height of compression piston-rings of the automobile motor engine and influence of error of universal means of measuring on probability of wrong acceptance and resorting and also accuracy of technological progress of measuring are considered.

Keywords: error of measuring, exactness, measuring control, means of measuring, tolerance of size.

N. N. Chigrik
Estimation of fidelity of results of measuring of boundary values of height of piston rings of a model series ZMZ-402, -406, -511, -513, -5234 and GAZ-24. Part 2

On foundation of allocation under the law of the Gauss of plotted lines of values of middles of intervals (x_{j0}) from frequency of hit in each spacing (n_j) results of measuring of boundary values of altitude of piston compression rings the micrometer lever MP 25 to the GOST 4381-87 in justifying according to GOST 8.051-81 and RD 50-98-86 rightness of its selection as a universal means of measuring, at a total number of measuring of party number $n = 102$ in the view of escaping values for the limiting sizes and adopted among suitable, held data analysis about auxiliary assigning of members of geometrical model of the piston compression ring, self descriptiveness and frame of references of primary inaccuracies justifies process of formation of deflections from plainly-parallelism of a true profile of end surfaces of piston compression rings on altitude at their warp, also is established. The deflection of the shape of a true profile of end surfaces of results of measuring of the least altitude of piston compression rings concerning limiting deflections of nominal size compounds 60 % of tolerance of the size, $2D\phi_l(TFl) = 0,6 ITl$ and his allocation corresponds to normal geometrical fidelity established by positions the GOST 24643-81 on proportions between tolerance of the shape (TF) and tolerance of the size (IT).

Keywords: supply of unity of measuring, mean of measuring, tolerance, deflection from a parallelism of plains, deflection from flatness, general tolerance of a perpendicularity and flatness

L. A. Shestel, Yu. A. Sayapin, V. A. Sokolov, D. A. Kutashov
Multipoint ultrasonic welding of hull structures of rigid plastics

There is considered the question of development of technology and equipment for multipoint ultrasonic welding of hull structures of rigid plastics.

Keywords: multipoint welding, ultrasonic, hull structures, technology, equipment, rigid plastic.

V. V. Bokhan, A. A. Shvarts, A. V. Zubarev
Application prospect of conductive rubbers into rubber-cord constructions to measure the stress-strain state parameters

Rubber-cord constructions are widely disseminated. Observation of stress-strain state parameters of a product at operation is important for an experimental reliability assessment. The review of applications of conductive rubbers is carried out. The opportunity of usage of conductive rubbers into rubber-cord constructions to measure the stress-strain state parameters is shown.

Keywords: rubber-cord construction, conductive rubbers, transducer, stress-strain state

I. I. Koshukov
Non-coordinated finishing of flat closed type surfaces

This work is devoted to the process of abrasive machining of flat surfaces of closed type, belonging to the details of small stiffness; flat surface of thin plates, made of nonmagnetic material; surfaces of ring grooves of press forms used in production of rubber-technical components. The mechanism of the planetary movement of flat components in the condition of free (non-coordinated) base is opened.

Keywords: non-coordinated base, basic space, diametric clearance, planetary movement.

I. I. Koshukov
The influence of flat polishing surfaces on the property and operational characteristics of movable connections

The subject of research is based on the technology of finishing machining of flat surfaces of precision details of fuel equipment. Special attention is paid to the process of macroprojection formation of flat rotating surfaces in three-dimension space; subject of question in the target formation macrogeometry of mating rotating surfaces increasing the property of Gauss curvature in technical documents.

Keywords: polishing, macrogeometry, macroprojection, Gauss curvature.

A. A. Portnova, S. V. Kotkin, V. S. Sscherbakov
Theoretical research results of articulated motor grader mathematical model

This paper presents the results of theoretical research of articulated motor grader mathematical model. The regression model describing the dependence articulated frame turning angle from the front steering wheels turning angle and the base ratio is obtained, and the regression model describing the dependence turning radius from the front steering wheels turning angle and the base ratio is obtained with the compulsory condition that the front steering wheels and back wheels move on the same track.

Keywords: articulated motor grader, turning angles, turning radius, regression model, base ratio.

V. V. Pshenichnikova, M. A. Izhenyakova
Metrological assurance releasable pin connecting of compressor valve seats

A solution to the problem of redundancy-based compressor valve seats is presented.

Keywords: pin joint, metrological support, base, geometric model.

V. V. Trifonov
Research of diffusion processes during overaluminizing

The article provides an experiment by the diffusion saturation of the rotor blades of the turbine with different thickness. There is made estimation of the received data. There are made conclusions on the possibility to conduct coating repair operations by overaluminizing.

Keywords: diffusion, aluminizing, experiment.

V. A. Shepetkov, E. S. Anikin, A. V. Zubarev, Yu. P. Komarov
Universal equation for curvature radius of the pneumatic shock-absorber rubber-cord cushion profile

It gains the result of analytical dependences for the curvature radius calculation of the pneumatic shock-absorber crimp profile at the various types of guiding fittings.

Keywords: curvature radius, pneumatic shock-absorber, rubber-cord cushion.

A. N. Scherbo, O. A. Seryakov, E. A. Saraev
Rating wave sweeping observation instruments at floating machine conducting fight afloat

This article discusses the issue of visibility crew floating armored car when using it in a marine environment. The technique and results of experimental studies to determine the nature of flooding and splashing water sighting devices and surveillance. The analysis of these results is done and it puts forward proposals to increase visibility.

Keywords: wave sweeping, surveillance devices, the relative duration of visibility goal; guards; air spraying.

E. S. Tereshchenko, D. V. Shabalin, D. Y. Fadeev, O. V. Subbotin
Control system for a turbocharger with a receiver coil and vehicle diesel

A brief analysis of the dependence of excess air ratio and the diesel engine with turbocharged acceleration in the transition mode, and control the operation of the system is represented by a turbocharger with a receiver coil and transport diesel engine that delivers enhanced engine efficiency in a transitional mode of dispersal.

Keywords: turbocharged, receiver, diesel, control system.

D. V. Shabalin, E. S. Tereshchenko, S. V. Roslov, A. M. Smirnov
A method for increasing diesel pickups combined with the use of inertial energy storage

The paper proposes a solution to reduce the combined pickup engines due to the inertia of the turbocharger. To reduce the negative effects of pressurization proposed method of increasing the combined diesel pickup based on the idea of kinetic energy recovery inertial batteries.

Keywords: compressor, turbine, energy storage, flywheel inertia.

S. A. Korneev, V. S. Korneev, I. A. Penkov, M. I. Tribelskiy
The methodology and results of static research rubber-cord branch pipe

Test bench and methodology for static testing of rubber-cord branch pipe have been described. Empirical power characteristics and axial stiffness of rubber-cord branch pipe was specified for zero and working excessive pressure.

Keywords: test bench, rubber-cord branch pipe, spacer force, axial stiffness.

L. N. Akhtulova, A. L. Akhtulov, E. N. Leonov, N. N. Petukhova, S. I. Smirnov
Integration technologies at creation of small electrotechnical systems and complexes on the basis of methodology cogeneration

The analysis of existing technologies is resulted at creation of small electrotechnical systems and complexes on the basis of methodology cogeneration, opportunities and prospects of their wide use in local systems warmly both electrosupply and a condition of development of the market of technologies microcogeneration are considered.

Keywords: the combined manufacture electric and thermal energy, engine of Stirling, a fuel element, microcogeneration

ELECTRICAL ENGINEERING. POWER ENGINEERING

V. R. Vedruchenko, N. V. Zhdanov, E. S. Lazarev
About the influence of the type of combustion chamber on the working process of diesel using alternative fuels

The features of the use of alternative fuels in diesel are analyzed and ways of technical realization of such events are shown. The analysis of the impact of different types of mixing, due to the shape of the combustion chamber, in diesel engines for various purposes on the performance engines is performed.

Keywords: alternative fuel, diesel combustion chamber, mixing, a work-flow engine, exhaust gas toxicity, economic efficiency.

A. P. Popov, O. P. Kurakina
Ways to reduce costs of electric energy for switching current under inductive load with preset performance

The article considers various ways for accelerating of switching current under inductive load with admitted amount of electricity.

Keywords: performance switching current, costs of electricity, inductive load, the energy of the magnetic field.

I. A. Yanvaryov

Combined regulation of temperature modes of modular gas air cooling installations

Structure and features of optimum work of gas air cooling installations (GACIs) at compressor stations (CS) depends on lines of factor, among which it is possible to allocate the way of regulation of temperature modes (discrete, frequency). Application of six-fan GACIs at discrete regulation allows to provide higher accuracy, decrease in power consumption engines. In some cases for six-fan GACIs application of the combined discrete - frequency way of regulation of temperature modes of gas air cooling installations can be expedient. The analysis shows, that application of the combined discrete-frequency way of regulation for six-fan GACIs is connected to change of a time of recovery of outlay within the range of 10 – 25 %.

Keywords: gas air cooling installation, mode of cooling, K-drive, economy of energy.

G. V. Kvashnina

Assessment of reliability of electric power supply for consumers in temporary redundancy mode

The existing methods of reliability provide for the introduction of excess capacity. This leads to growth of the volume of energy consumption and operating costs. The description is based on the mathematical apparatus of the theory of random impulse flows. The example of calculation of parameters of the scheme with the installation of an accumulator is given. The correspondence of the calculated and theoretical parameters is analyzed; the received results are estimated. The results allow to monitor the following: the changing influence of temporal redundancy for reliability of power supply for various parameters of the system; the drive and length of failures.

Keywords: temporary redundancy, power supply system, accumulator, reliability.

M. A. Krivoshein

On the question of collaboration fans in the ventilation channeling of the ventilation systems of the residential buildings

The paper gives an algorithm for determining the modes of fans when they operate in combination in ventilation channeling of multistoried buildings. There are represented examples of solutions of specific targets according to this algorithm and analyzed some possible cases of collaboration fans.

Keywords: ventilation system, decentralized ventilation, collaboration fans, coefficient of local resistance

T. A. Novozhilov, A. N. Novozhilov, V.I. Surikov, S.V. Biryukov
Definition of currents in windings of the single-phase transformer for relay protection at coil short circuit

In this article there are described simple mathematical model for definition of currents in windings of the single-phase two-winding transformer at coil short circuit in one of its windings, and a simple method of experimental check of modeling's results with the use of additional winding.

Keywords: single-phase transformer, coil short circuit, relay protect, mathematical model, experimental check.

P. A. Tretyakova

Modern approaches to modernization of district heating systems through introduction of heat pump systems

The paper presents the main problems of district heating based on CHP and gives an overview of current approaches solving problems identified through the introduction of heat pump systems.

Keywords: district heating system, heat pump, heat networks, energy saving.

P. A. Tretyakova

Energy saving on the Kurgan CHPP-2 by utilizing low-potential heat

The article analyses the secondary energy resources of the Kurgan CHPP-2. Calculated characteristics of a heat pump, are introduced in the scheme of CCGT-CHP. The aim of the study is a review of secondary energy resources of combined-cycle thermal plant to assess the feasibility of its use in the recycling of heat pump installation.

Keywords: combined cycle heat and power, heat pumps, secondary energy resources.

O. A. Yakovlev, Yu. V. Molokin, Ye. A. Chashchin

Electrostatic treatment of aerofuel mixture

A method of increasing combustion fullness in all operational modes of the internal combustion engine by electrostatic treatment of fuel mixture has been described. Electric circuit of the electrostatic treatment unit has been proposed as well as the algorithm based on calculation of singlet oxygen concentration in the aerofuel mixture. There is shown the possibility to increase effective power and torque up to 10 %, with simultaneously reduction on 9 – 12 % of carbon monoxide concentration in to exhaust gases.

Keywords: internal combustion engine; fuel mixture; electrostatic treatment; increasing of combustion effectiveness.

**INSTRUMENT ENGINEERING, METROLOGY
AND INFORMATION MEASUREMENT SYSTEMS**

Yu. N. Klikushin, V. Yu. Kobenko, D. P. Chupin

Method of linguistic interpolation measurement results

The method of interpolating the results of the linguistic dimension, which takes into account the effect on the result of all the fixed points of the scale is provided. The algorithm develops three models of the list, two of which are directly and inversely ordered sequence of names of reference points that define the limits of measurement. The third list, formed under the influence of the input variable is the name of a disordered sequence of reference points. If you measure the degree of disorder (chaos) the third list, you can get numerical estimates of the uncertainty of the measurement result.

Keywords: measuring, interpolation, chaos of position, classification properties, linguistic model, scale, vagueness of result.

V. A. Penner, K. E. Andreeva

The device for gas flow metering

In this paper there is considered contact types of flowmeters (tachometric, turbine, heat, flowmeters and other) of liquids, gases and vapours have a significant drawback: complexity in manufacturing, low operating pressures, relatively high measurement precision.

The authors of the article, after analyzing the existing problems, propose to install a vortex flowmeter Proline Prowirl 72.

Keywords: gas, the flow meter.

D. A. Lebedeva, A. A. Novikov, D. A. Negrov

Development of a new ultrasonic waveguide — a tool for revision cases

The study is done, designed and manufactured ultrasonic surgical waveguide — a tool that provides the necessary amplitude of the oscillations of the working tip at high load capacity while removing the acetabular component of the prosthesis. Using a waveguide-tool allows you to extract a cup endoprosthesis after preliminary «rocking» with little bone loss and reduce retrieval time.

Keywords: high load capacity, revision arthroplasty, atsetobulyarny component waveguide — a tool.

D. P. Chupin

Investigation of Bedini motor as a battery charger

The analysis of Bedini motor as a battery charger is done. The results of research are presented in the waveforms of voltage and current measured in charger circuit. The calculations of charger in/output currents and powers are obtained. The calculations of device efficiency are done.

Keywords: battery, Bedini motor, power balance, charger efficiency.

INFORMATION TECHNOLOGIES

L. N. Bodryakova, O. M. Kashuba, O. V. Smirnova

Elaboration of main approaches to standard semi-finished fur

The article gives a brief analysis of existing systems of automatic regulation and Nabiki skins articles of fur semi-finished, identify their weaknesses, not allowing to solve the entire complex of problems of automation of the process. It offers one of the possible solutions to the problem of automation of process of choice of layout templates on the patterns fur screa, with a maximum percentage of the area and with minimal visual inconsistency is situated near skins.

Keywords: Ituno fur semi-finished product; properties of fur semi-finished; valuation method; database; automated placement process templates.

L. N. Bodryakova, A. A. Starovoytova
Development of software for automation of preparatory and cutting operations of furriery manufacture

In the fur industry, most manufacturing operations set-cutting production are carried out manually. Operations such as sorting fur and semi product, performed by multiple sorting and comparing the characteristics of semi-fur and are the most time consuming. In this regard, the task of developing and implementing information technologies for pre-cutting and semi fur is relevant for today's enterprises. Paper refers to the creation of a database, including quantitative information about the properties of the skins and the development of software to determine the most significant properties of semi fur.

Keywords: cutting-production set-area skin, hair length, linear filtering, approximated dates change in length of guard hair and fluff.

F. N. Boris, V. A. Makht, E. A. Boris
The solution of problems of mass appraisal of real estate with application of the method of geocoding

We investigated the problem of automation of various stages in mass appraisal of real estate by means of recent informational technologies in order to reduce labor costs and shorten time it takes to complete performance of mass appraisal. After analyzing the algorithms in existing online geocoding systems the methods applied to use it for real estate objects. We received the list of all stops of public transport in Omsk and executed clustering of real estate objects with respect to these stops. An algorithm for the automatically consideration of the impact of analogues for an appraisal of a real estate object was developed and qualified.

Keywords: mass appraisal of real estate, geocoding, clustering, algorithm, internet technologies.

M. A. Ivashchenko, A. B. Korobova
The mathematical model of optimization patterns combination in the course of the automated clothes design working out

In the article it is considered prospects of construction of universal designs on figures of girls-teenagers, formation of mathematical model for calculation of optimum combination of designs of a product of trousers.

Keywords: construction of the universal design; the automated designing; optimum combination; three-dimensional visualization.

M. A. Ivashchenko, A. B. Korobova, A. G. Burtsev
The perspectives of virtual fitting of zone products in automated mode

In the article there are considered the perspectives of uses of three-dimensional design, modules and work's principle of software product for carrying out virtual fitting of zone products in the automated mode.

Keywords: transformation of technical drawings, creation of the design, the automated design, carrying out virtual fitting, libraries of s of the interface element libraries of GTK.

M. A. Prilepko
Creation model of laboratory operation with usage of automation designing of virtual simulators «Network Lab»

The article is dedicated to applicability of virtual simulators due to information technology development in education area, usage of virtual laboratory practicum for online education in order to increase its efficiency level. Also present a detailed review of generation model for virtual laboratory operations within the system of automation designing of virtual simulators «Network Lab», and model of its execution in simulation mode.

Keywords: virtual simulator, CAD system, LAN, online education, Network Lab, model.

N. D. Veshkurtsev
Entropy of central moments of distribution

The problem of entropy determination of central moments of distribution of stationary random processes has been solved. The results confirm the basic elements of information theory and correlation analysis. The application of the results is illustrated by example with experimental data obtained earlier.

Keywords: entropy, central moments of distribution, probability, statistical law, probability density, orthogonal polynomials, scale of values.

A. V. Morozov
The study of information security of wireless networks at combined models

The article presents information on the quantitative estimation of the information security of wireless networks. It is shown that the most effective way of analysis that allows to objectively evaluate information security of information, is the combined use of several techniques. Specific recommendations apply the existing mathematical and program device to ensure safety.

Keywords: wireless networks, information security, quantitative assessment, critical path, method of critical vertices, technique combined assessment.

PUBLISHING. POLYGRAPHY

I. A. Sysuev, A. O. Nikolaenko, D. V. Kashinskiy
Concerning the question of reducing costs of offset production

The article is devoted to the issue of overspray during the offset printing. An algorithm for calculating the required amount of ink for the copies used by "MM Polygraphy Decor Packaging" is given. One of the possible overspending problems, namely the properties of printed materials-cardboard is considered. Absorption of cardboard was tested by the Cobb's method in the case of one sided wetting. It is found that absorption capacity does not affect overspray. On the basis of the research, algorithm for calculating the amount of ink required to print copies is updated.

Keywords: offset printing, costs of production, cardboard, absorption, overspending of ink.

I. A. Sysuev, A. Yu. Zakharov
Special features of the page-proofs of scientific magazines (on the example of the magazine «Omsk scientific messenger»)

The questions related to the modern technologies of the production of such specific products of printing industry as printed publications especially magazines are regarded in the article. Their peculiarity is considered to be in preprinting preparation which is made with the help of the author electronic version of the article, that causes the necessity of their typographic editing alongside with the process of page-proofs itself. The groups of difficulty of typographic editing and creating charts and formula are set, complexity of technological processes of preprinting preparation is found, the comparative analysis of complexity calculations of print-proofs and existed norms is made. Standard time for creating scientific magazines on the basis of the necessity of typographic editing of author materials taking into account their group of difficulty is set.

Keywords: scientific publications, preprinting preparation, print-proofs, typographic editing, groups of difficulty of typographic editing and print-proofs, standard time.

Yu. A. Rudak, M. V. Batishcheva
The influence of pattern printing form on quality of seal in case of production of LTCC boards

In this article the influence of a pattern printing form on process of the seal and receipt of high-quality drawing of topology on ceramic LTCC boards is considered. Calculation of reversible lengthening of a mesh cliché is made and conclusions by results of the obtained data are formulated.

Keywords: screen printing, screen printing form, LTCC-board, reversible elongation.