Contents

MECHANICAL AND THEORETICAL ENGINEERING

ELECTRICAL AND POWER ENGINEERING

INSTRUMENT ENGINEERING, METROLOGY AN INFORMATION MEASURING SYSTEMS

INFORMATION TECHNOLOGIES

RADIO ENGINEERING AND COMMUNICATION

CHEMICAL TECHNOLOGY. CHEMICAL INDUSTRY

PUBLISHING. PRINTING

PHYSICS AND MATHEMATICS SCIENCES

ENGINEERING GEOMETRY AND COMPUTER GRAPHICS

Summary

MECHANICAL AND THEORETICAL ENGINEERING

Yu. K. Mashkov, I. L. Zakharov, V. V. Syrkin, A. V. Tyukin
Thermodynamics of tribological processes and wear resistance of metal – to – polymeric tribosistems

Relations of wear resistance and triboelectric properties of polymeric composite materials (PKM) to filler concentration and friction modes, and also thermodynamics of tribophysical processes developing in metal-to-polymeric tribosistems are considered.

Keywords: a polymeric composite material, triboelectric processes, thermodynamics, wear resistance.

D. A. Negrov, E. N. Eremin
Study of the process of hypersonic pressing of composite Teflon based material

In the paper the influence of parameters of hypersonic pressing on mechanical and tribological properties of composite Teflon based materials and technology of manufacturing of sleeve bearings is observed.

Keywords: sleeve bearings, production engineering of hypersonic pressing, mechanical properties, wear rate, coefficient of friction.

D. A. Negrov, E. N. Eremin
The influence of hypersonic oscillations on the structure of the polymeric composite material

In the paper the influence of parameters of hypersonic pressing on the structure of a polymeric composite Teflon based material is analysed.

Keywords: a composite material, hypersonic oscillations, structure, inoculation.

P. D. Balakin, I. P. Zgonnik
The algorithm of calculation of rigidity of the elastic element which is a part of the chain of control of a mechanical autovariator

The algorithm of calculation of rigidity of the elastic element which is a part of the chain of control of a mechanical autovariator is offered.

Keywords: algorithm, autovariator, rigidity, modification.

P. D. Balakin, E. A. Kuznetsov, P. A. Prozorov
Dynamic interaction of active surfaces of kinematical couple with a gap

The variants of bodies impact interaction modeling are considered in joints with gap. It is shown that the size of dynamic reaction in such connection can be considerable and it must be taken into account in project calculations. The technical solutions for reducing dynamic reaction in joints are offered.

Keywords: shock-absorber, bushing, impulse, reaction, deterioration.

I. L. Ryazantseva, A. V. Borodin
Concerning the means of increasing the carrying capacity of "gear to shaft" connection of traction motor

The results that demonstrate the possibility of increasing the carrying capacity of taper pressure coupling by modifying the joint surface of one of the details with grooves of shallow depth are presented.

Keywords: pressure coupling, carrying capacity, modification, contact pressure.

I. P. Zgonnik
Mechanical belt tension control for flat-belt autovariator

Recommendations on extension of overall gear ratio are given. Some recommendations on mechanical control of belt tension of flat-belt autovariator are presented.

Keywords: mechanical control, belt tension, autovariator, automatic regulator.

O. S. Dyundik, E. A. Dyundik
Study of vibrating activity of toothed gearings with automatically controlled bending rigidity of cogs

The technical solution for tooth gearing with automatic change of cog rigidity is presented depending on the level of power stream. Change of own frequency of such transfer for modes of operation from the resonant is investigated.

Keywords: a cogwheel, rigidity, gearing, a chain, management, own frequency, a power stream.

V. G. Khomchenko, E. S. Gebel, V. Yu. Solomin, V. V. Klevakin
Kinematical synthesis of slider-crank mechanisms of third class with output link dwell and preset slider position

The article considers slider-crank mechanisms of third class providing cyclogram with approximate dwell of the output link running along the preset slider. The graphical and kinematical synthesis of the mechanisms are developed for determination of free parameters values and kinematical error of output link when dwelling.

Keywords: slider-crank mechanism, kinematical synthesis, cyclogram, slider position.

V. S. Kushner, A. N. Zhavnerov
The influence of conditions of thermomechanical loading on structure and wearing of wolfram and cobalt alloys

The analysis of structure of wolfram and cobalt alloys under heavy conditions of loading of a cutting blade is presented at processing nickel based alloys. On the basis of the thermomechanical approach the sample calculation of change of wear rate from conditions of loading of a cutting blade is developed.

Keywords: wolfram and cobalt alloys, the thermomechanical approach, cutting.

V. S. Kushner, O. Yu. Bourgonova, A. A. Vorobiev
The influence of irregularity of milling and temperatures on surfaces of cutting blades on rational parameters of the cutter and a cutting mode

The influence of cutting mode and cutter construction on the efficiency of milling of profiles of railway carriage wheels is analyzed. Technological restrictions on roughness and deviations for the processed surface, and as physical restrictions on temperatures, forces and irregularity of milling are considered. Recommendations for optimal modes of cutting and cutter structure are produced.

Keywords: milling, forces of cutting at milling.

E. V. Artamonov, S. S. Chujkov
Changeable hard-alloy plates working capacity improvement with help of internal stress relief

It is developed a new technique the principls of which based on the improvement of working capacity of replaceable hard-alloy tools with the help of stress relief in tool hard alloys after its prior heating in the beginning of cutting process and also presented the ways of its practical realization.

Keywords: working capacity, the tool, internal stress, temperature, cutting.

D. I. Chernyavsky, P. N. Lastovsky
Functional system of automated control of processing errors of thin-walled parts of rotation

In the process of cutting there is friction during the processing of thin-walled detail of rotation on front and back surfaces of the cutting tool correspondingly . As a result, the tool wears out and loses cutting ability. It causes the errors of processing of parts and increases the force of cutting. The developed functional system of automated control allows to prevent early wearing of the tool, and, hence, and occurrence of errors.

Keywords: wearing of the tool, automated control system, thin-walled parts of rotation.

V. I. Leun, E. V. Nikolaeva
The efficiency of grinding technology for cutting and control tools with active control devices

Technologies of manufacturing and precision mechanical engineering are insufficiently informed about potential opportunities of accuracy and productivity increasing for grinding technology products by active control devices. The article shows the opportunities of total error reduction in 3to 5 times for grinding products by compensating most of elementary systematic and random technological errors with minimal costs and with a simultaneous increasing in productivity in 1,5 ... 2 times at abrasive machining.

Keywords: component of total error in the abrasive processing, active control devices.

A. V. Tignibidin
Technological accuracy of circular grinding machine tools for tool manufactures

Technological analysis accuracy of circular grinding machine tools exhausted in Russia, the CIS countries and abroad is carried out. The reached accuracy of processing of cylindrical details on exhausted machine tools corresponds: a deviation of a cross-section of a longitudinal section 1 ... 8 microns at length to 300 mm, a deviation from rotundity 0,2 ... 1,6 microns. The further increase of accuracy and productivity depends on improvement of technological features, equipment of machine tools by active devices control and systems of numerical programmed control.

Keywords: accuracy of circular grinding machine tools, tool manufacture, active control device

D. B. Martemyanov, P. A. Lisin
The efficiency of dried milk dust collection ability in the cyclone with longitudinal slots

There has been designed a cyclone with air cleaning ability by intensification of particles separation from an air stream.

Keywords: a cyclone, clearing, air, a stream, a particle.

V. B. Sukhinin
Ways and conditions of accuracy provision in technological equipment

In the article the ways and conditions of accuracy provision for precision machine tools with NPM are described. Mandatory phases are shown for carrying out starting-up and adjustment works and the subsequent operation. Standards of accuracy according to standards JSO and MAZAK STD are considered. Recommendations about application of gauges RENE-SHAW are given.

Keywords: metal-cutting machine tools, control and measuring car, precision equipment, machine tool geometrical accuracy, norm of accuracy.

V. F. Egorov, M. I. Stupakov, M. L. Bosnyak
Loadings of scissors with the displaced axis of shaft rotation at transmissions with variable gear ratio

It is offered the way of alignment of loadings of a drive at the expense of a variation of transfer number not requiring participation of inertial weights and artificial increase of their moment of inertia. The opportunity of alignment of loadings of the drive of scissors is considered using transmission with variable gear ratio. The analysis of influence of variable gear ratio on the conditions of distribution of loading, value of the maximal and dynamic moments is calculated.

Keywords: scissors with the crank lever mechanism of cutting, loading of a drive, alignment of loadings by variable gear ratio.

G. S. Garibyan, O. A. Shuikin, M. G. Mkhitaryan
The process of outflow of compressed air from receivers sand-blower and pulse valve at pulse sand blowing process

The results of the theoretical analysis of process of a filtration of air are obtained and the usage of system of differential equations is proved for designing of sand blowers.

Keywords: sand blower, filtration, condensation, form.

G. S. Garibyan, V. P. Rasschupkin, I. V. Zyuzko
The influence of phosphorus on the structure and properties of eutectic silumins

The results of research of influence phosphorus on structure and properties of eutectic silumins are obtained, the greatest effect is observed at applicqtion of phosphorus aluminium and microhardness of crystals of primary silicon rises.

Keywords: modifying, phosphorus, eutectic silumins, microhardness

V. G. Shtele, I. V. Markechko, V. V. Gryaznov, A. Yu. Popov, A. Yu. Pankov
Working out progressive technology of thick nuts punching

The technology of hot punching and the description of the tool for manufacturing of thick nuts in accordance with GOST 9064-75 is presented. The offered technology allows to solve a problem of quality of a surface of lateral sides of a half-finished product and instrument wear at pushing out from a stamp. The results of skilled punching and the recommendation about designing of technology and die tooling are obtained.

Keywords: thick nuts, hot stamping, quality facet, sectional die.

M. V. Medvedev, V. G. Shtele, S. A. Makeev, V. I. Saks
Development of mathematical model of combined sleeve extrusion with stepped external surface

The sequence of developed mathematical model describing a number of processes cold forging (the combined, direct extrusion and backward extrusion to one and a multistage die) is presented. The developed mathematical model allows defining a power mode, final and flowing forming billet at cold extrusion of sleeve with stepped surface.

Keywords: extrusion, mathematical model, full capability deformation, specific force on a punch, metal hardening.

I. V. Markechko, V. V. Gryaznov, M. V. Medvedev, S. A. Makeev
Technology and tools for manufacturing of ventilating louvers

The results of product design and production technology as initial information are presented for technological design of sheet-metal stamping operations for ventilating louvers and technical solutions for die tool designing. The offered technical solutions can be used both for production of similar items, and for acceptance of design solutions by preparation of production other specificity use and appointment.

Keywords: bending, computer simulation, die tooling, production preparation.

V. A. Sokolov, E. A. Bondarenko
Equipment for butt welding of plastic pipelines

The problems of ensuring the quality of welded joints of polyethylene pipes for welding on installations with manual control are considered, improvements of such systems applied by construction of water-conducting networks are proposed.

Keywords: water conduit, polymers, centralizer, heating element, welded joint, degree of automation.

B. E. Lopaev, A. V. Golovchansky
The improvement of mechanical and magnetic properties of electrical steel after electroslag remelting

In this article chemical composition, macro- and microstructure, mechanical and magnetic properties of electrical steel after electroslag remelting are investigated. The reduction of the quantity of non-metallic inclusion, the improvement in macrostructure and the buildup of mechanical and magnetic properties were established.

Key words: electroslag remelting, flux, crystallizer pan, bar, microstructure, induction.

N. A. Zazhivikhina, E. L. Kolbina
Optimisation of modes of welding of polymeric barrier films in the course of manufacturing of flexible food packing

Research is conducted for packing materials on the basis of stuck together and co-extrusion multilayered polymeric film.
On the basis of preliminary experiment factors influencing durability of a welded seam are defined. By means of experiment planning the mathematical model is made and optimum modes of welding are defined at a various combination of factors.

Keywords: packing materials, welding of polymeric films, multilayered barrier packing films, welding modes, optimisation parametres, contact thermal welding.

V. V. Shalay, A. S. Nenishev, A. G. Mikhailov, D. S. Romanenko
The processes of heat and mass transfer and combustion of liquid fuels in the small boiler furnace

The article considers engineering ways of describing mathematical models of evaporation of liquid fuel. The problem of turbine heat transfer in a small volume of the boiler furnace combustion on liquid fuel is formulated and solved.

Keywords: evaporation, heat transfer, combustion, droplet, fireplace.

R. N. Khamitov, A. B. Korchagin, M. A. Radchenko, G. S.Averyanov
Dynamics of the damped object with passive damping system of the angular fluctuations at non-stationary impacts

Angular movements of the damped object on elastic spring with passive damping system are investigated. The approached decisions for non-stationary seismic influence are considered and results of numerical modeling of transients by means of applied program Matlab are obtained.

Keyword: angular movements, passive damping system, shock-absorber.

V. N. Blinov, N. N. Ivanov, V. V. Kositsin, V. I. Ruban, V. V .Shalay
Ammonia micro propulsion system analysis by means of full-scale tests

Design of ammonia micro propulsion system and its full-scale test is considered. All the tests are carried out on a spacecraft under deep vacuum conditions.

Keywords: propulsion system, full-scale tests, electrical-thermal micro engine, specific impulse

P. V. Tischenko, V. N. Blinov, N. N. Ivanov, E. G. Mikula, R. M. Khusainov
To the choice of main project-constructional parameters of a single-stage launch vehicle of a light class
The questions of choosing the main project-constructional parameters of a single-stage launch vehicle of a light class which is based on the missile components are discussed.

Keywords: methodic, optimization, project parameters, missile components.

V. I. Trushlyakov, V. Yu. Kudentsov
Working out criteria for estimation of parameters of the process of gasification of liquid rocket fuel under conditions of low gravitation

The criteria are developed for estimation of power parameters of process of low-temperature gasification of the liquid rests of rocket fuel in conditions of low gravitation and uncertainty of boundary position. The estimation of power parameters of low-temperature gasification of fuel for various boundary conditions of position of a liquid is done.

Keywords: criteria, small gravitation separating part, carrier rocket, residual of liquid fuel, gasification, boundary conditions, mathematical models

V. L. Yusha, N. A. Raykovskiy
Techniques of determination of tribological characteristics and thermal condition of lubrication free bearings of centrifugal compressors

When compression- processing equipment and compression-power units, which were made for using in Siberia and far North, are constructed, the problem of minimization or full liquidation of lubrication system (by using self-lubricated constructional material) is coming up.
Tribological characteristics and thermal state of lubrication free bearings depend on temperatures of faces of their rubbing parts.
The present article describes the mathematical model of running a lubrication free chilled support bearing of centrifugal compressor set and techniques of definition of tribological characteristics and thermal state of such bearing.

Keywords: mathematical model, friction bearing, centrifugal compressor, heat transmission, antifriction material, software support ANSYS.

A. D. Vanyashov, A. V. Zherelevitch, A. V. Grekhnev, D. Ya. Dudev
The results of tests of high- pressure centrifugal compressor stage including radial axis impellers and inlet regulator

Some results of tests of high- pressure centrifugal compressor stage including open axial- radial impellers, vaned diffuser and inlet regulating apparatus are represented. The review of flow swirling effect before operating wheel provided by inlet regulating apparatus and rotational speed change influencing the rotor gas- dynamic characteristics of the stage is reduced.

Keywords: centrifugal compressor stage, inlet regulating apparatus, gasdynamic characteristics.

L. O. Shtripling , M. G. Popov
Development principle of selection of software products for united information system of mechanical engineering enterprise

On the example comparisons of the most wide-spread CAD/CAM systems, the most valuable functions of the software are registered. The developed approach determines useful systems for a given enterprise. This approach simplifies selection of systems forming UIA (united information ambience) of enterprises and satisfies requirements of production.

Keywords: CAD/CAM systems, PDM, principles of the choice, factors to value.

Yu. K. Korzunin, V. P. Rasschupkin, D. A. Zhurkan
The increase of operational properties of multipurpose track machine

The capacity and durability of plasma coatings of details and the influence of modifying on structure and property steel is studied.

Keywords: durability, wear, resistance, plasma coatings, modifying RZM.

V. I. Ivanov, A. N. Cheboksarov
Grounds of requirements to means of diagnostic of engines of road-building machines taking into account its possible modernization

The capacity and reliability of the technical diagnostics largely depends on reliability of an operator, from co-operating of a machine with an operator. Development of methods of reliable evaluation of technical condition of units and parts of technological machines and complexes takes into account reliability of the operator is an important task.

Keywords: diagnosing, reliability, operator, function of distribution.

Yu. V. Krasnoschokov, A. A. Komlev
Ceiling constructions with arched steel profiled sheets

There is area of improving effective constructions of ceilings of multistory building on the basis of the analysis. One of directions is perfection constructive forms of ceilings by spherical dimensions. The constructive system and design model of ceilings with low cylindrical (vaulted) surface is more effective than traditional flat constructions.
Keywords: dimensional ceiling, the arched design model, arc action.

L. N. Akhtulova, O. V. Dezhurova
Improvement of the method of audit of quality of serial production processes

In the article the method of realization of audit of a control system in serial processes within the limits of functioning system of a quality manage-

ment is considered. The method is founded on the results of analysis of effectiveness of management of serial processes of manufacture in organizations of Omsk region.

Keywords: system of quality management, discrepancy, audit, management of discrepancies.

Yu. I. Bityukov
Computation of characteristics of tape laying scheme at winding of casings made of composite materials using geometrical modeling with plain reflection of a rectangle in space

The given article is devoted to obtaining computational formulas for characteristics of tape laying scheme at winding of casings made of composite materials using geometrical modeling with plain reflection of a rectangle in space.

Keywords: winding, geodetic, corner of geodetic deviation.

A. S. Losev, E. N. Eremin, Y. O. Filippov
The analysis of boride effect on improving the maraging steel

The results of analysis of the structure and properties of deposited metal of maraging steel of Fe-Ni-Mo-Cr-V-Si-Ti-Al type alloy, hardened by boron compounds are demonstrated. It's proven that this type of metal are more heat, which allows to recommend it to be used for hardening of working surfaces of stamping tools.

Keywords: deposited metal; maraging steel; boride; improving; thermal stability; stamping tool.

D. P. Prozorov
Automation control of armored vehicles and weaponry models

Based on the results of the government tests of domestic tank armament models as well as accumulated experience in the development of military automated control systems some proposals are made about composition and structure of information control systems for advanced tank armament models.

Keywords: on-board information management systems, soft hardware

E. A. Kuznetsov, D. P. Prozorov
Operating control of electro mechanic transmission with molecular energy storage system

The proposals aimed at the equipment of electro-mechanical transmissions of tracked vehicles with a molecular energy accumulator are developed. The proportions of generator variables, capacitance energy accumulator and propulsion motor providing required level of the tracked vehicles propulsion performance properties under the definite external moving conditions are defined.

Keywords: combined actuator, energy storage system, power flux.

ELECTRICAL AND POWER ENGINEERING

E. G. Andreeva, A. A. Tatevosyan
Three-dimensional simulation modeling by means of software package ANSYS for design of linear magneto-electric engine

The questions of three-dimensional simulation of the linear magneto-electric engine with constant magnets by means of software package ANSYS are considered. The results of simulation and experimental research of magnetic induction on the skilled model sample of the engine are produced.

Keywords: simulation modeling, software package ANSYS, a three-dimensional magnetic field, linear magneto-electric engine.

A. P. Popov, A. O. Chugulev
Forced switching of inductive impedance with magnetic field energy recuperation

Methods of transient processes forcing when switching inductive impedance are examined. Energy efficiency of these methods is analyzed. There is offered forced switching for systems containing additional high-voltage source with recuperation of magnetic field energy.

Keywords: inductive impedance, transient process, recuperation of energy.

O. A. Lysenko, A. S. Solodyankin
Research of dynamic characteristics of electromechanical complex: centrifugal pump – asynchronous motor

A method is proposed for modeling the system asynchronous motor - acentrifugal pump (AM-CP) considering its behavior in the dynamics, which is based on joint consideration of mechanical, hydraulic and electrical subsystems that make up the complex as a whole.

Keywords: modeling, asynchronous motor, centrifugal pump

V. A. Maksimenko, A. N. Fot
About conversion of compressor refrigerating plants to combined cooling of condensation unit

Traditionally at large refrigerating plants are equipped with water coolers. Combined cooling of condensation unit at operating and projectable large cold stores is reasonable at conditions of modern tendency of deficit and cost increase of cooling water. Combined cooling of condensation unit allows keeping low pressure of cooling water.

Keywords: combined cooling, condensation unit, water cooling, air cooling.

P. P. Galkin
Information streams in networks of automation and telemetry complexes of energy supply objects

The issues of ensuring the information structure integrity and improving the data transmission reliability in the energy control system network are considered.

Keywords : Data transfer network, data exchange protocol, conductor link, reliability.

V. R. Vedruchenko, V. V. Krainov, N. V. Zhdanov, M. V. Kulkov
About schema selection and technical solution for diesel fuel supply systems of alternate and heavy oil fuels. Part 1

In the article the analysis of prospects of oil extraction and usage of raw oils as the fuel of combustion engines is considered. Importance for searching oil fuel alternatives is shown. Detailed analysis of fuel supply system schemas for diesel engines that work on unconventional (alternative) fuels was implemented. New technical and technological solutions for using of light and heavy fuels in diesel engines are submitted.

Keywords: unconventional fuels, diesel, fuel supply, injector, injection and control system

INSTRUMENT ENGINEERING, METROLOGY ANINFORMATION MEASURING SYSTEMS

Yu. N. Klikushin, K. T. Koshekov, A. A. Gorshenkov
The phenomenon of incoherent signal interference

The technique, tools and results of simulation of the evolution of signals, resulting in the observed phenomenon of incoherent interference oscillation are described. This phenomenon is appeared in the fact than the linear summation of the components of a binary mixture of signals, the signal waveform of the mixture changes, depending on the relation of the amplitudes of added components.

Keywords: phenomenon of incoherent interference oscillation, interference, coherent waves, interference, coherent sources.

A. A. Kuznetsov, O. B. Meshkova, D. E. Zachateiskiy
Building invariance calibration curves of metals and alloys quantitative composition in AES automated systems

In this paper the method of increasing calibration graphs stability in the analysis of metals and alloys by atomic-emission spectral analysis method is considered. We propose solutions to ensure the required level of precision in the continuous monitoring of changing production conditions affecting the measurement results.

Keywords, spectral analysis, calibration curves, influencing factors, optimization, objective function, nonlinear programming.

A. M. Minitaeva.
The integral evaluation of ecological safety of transport engines on hazard criterion

The article considers general characteristics of techniques of the control of ecological safety of transport engines and the rates of emissions of harmful substances in transport engines concerning the control for smoking of exhaust gases of diesel engines and also the integrated estimation of harmful substances by criterion of hazard of transport engines.

Keywords: drive cycle, Euro, hazard rating, exhaust gas emissions, Diesel engine, and ecology.

INFORMATION TECHNOLOGIES

V. Yu. Yurkov
Computer tutorial system based on the visual thinking and controlling algorithm

This paper is devoted to the formalized algorithm of developing and controlling of visual thinking. The algorithm is based on the theory of fuzzy sets. Each of thinking objects is described by mean of fuzzy object existing in the visual space.

Keywords: visual space, visual thinking, fuzzy sets, fuzzy conditions.

V. N. Zadorozhnyi
Prerequisite for the establishment of the fractal queuing theory

The analytical and simulation research of the peculiarities of modern tele-

traffic packet switching communications networks is offered. Prerequisite for the establishment of the fractal queuing theory and its main task are discussed.

Keywords: fractal traffic, queuing network, simulation, optimization.

E. B. Yudin
Generation of random graphs by preferential bonds

The accelerated algorithms for generating graphs by the preferential bonds is presented. Calibration of algorithms by degree distribution on real data of large networks is illustrated. The algorithm of separable calibration graphs at a clustering coefficient is discussed.

Keywords: algorithms, large networks, preferential attachment.

E. E. Shmulenkova
The automated checkup and correction of the fragments of assembly drawings of printed-circuit-boards

In this paper the methodology of automated design of an assembly drawing of a printed-circuit-board is viewed. The given technique checks and changes texts and names of elements on the printed-circuit-board. The position of text characters is shifted. The given tool allows to save up to 20 % of time for assembly drawings development.

Keywords: assembly drawing of the printed-circuit-board, the automated checking and updating of imageries, functions of access to geometric objects.

RADIO ENGINEERING AND COMMUNICATION

N. I. Alekseeva
Prospect areas for semiconductor nanoelectronics

The article provides an analysis of current state and prospects of semiconductor nanoelectronics, the example of the leading manufacturing companies in the world of microprocessors.

Keywords: nanoelectronics, microprocessor, transistor, chip.

E. A. Biberdorf, S. S. Grizutenko, K. A. Firsanov
The method of ADC dynamic range Expansion

The method of ADC dynamic range expansion is described in this article. The method is based on interpolation of an irregular sampled signals. Firstly, the theory of this method is discussed. Then a problem of rounding in calculation is examined. Finally some examples of such interpolation are adduced.

Keywords: ADC dynamic range, irregular sampling frequency, interpolation, rounding error.

V. V. Vasilevskiy, S. A. Zavyalov
Data transmission method for centralized wireless security systems

Data transmission methods for centralized wireless security systems are analyzed in the article. Data transmission method is proposed that allows raising reliability, capacity, range and economic efficiency of a security system. Simulation modeling results are given compared to the closest analogue showing lower error probability of the method proposed.

Keywords: frequency hopping spread spectrum, wireless security system, spectral efficiency, multichannel processing.

S. A. Goncharov, V. B. Malinkin
The improvement of design and calculation of technical features balanced transformer UHF range

The article is dedicated to the problems of constructive improvement of the known transformer scheme. For determination of the technical features it is offered the matrix method of analysis which can be easily used in different CAD.

Keywords: UHF transformers, microstrip transformers, balun transformer, microwave range.

B. D. Zhenatov
The method of suppression 3rd order intermodulation interference in digital receivers

The method of strobe pulse length selection of integrating sample and hold of circuit is proposed. Formulas taking into account strobe pulse length impact on the total 3rd order intermodulation interference suppression are derived.

Keywords: digital receivers, intermodulation interference, sample and hold circuit.

V. A. Munin, G. N. Lobova
The increase of efficiency of technical diagnostics of an electric equipment and automation of armoured machinery on the basis of SADT-technology

In the work some features of technical diagnosing of electric equipment and automation of armoured machinery and arms are considered. The order of development of the algorithm of diagnostic maintenance on the basis of SADT-technology is resulted. The model of process of system engineering of diagnosing by means of construction SADT of the diagram is offered. Consideration of this points in question especially actually for a number of the enterprises of a city of Omsk, the state orders from the Ministry of Defence.

Keywords: diagnostics, efficiency, algorithm, technology, system.

CHEMICAL TECHNOLOGY. CHEMICAL INDUSTRY.

O. S. Lomova, L. N. Oleynik, E. I. Yakovleva
Principles of modernization of catalyst cracking installations

In the article it is considered development of catalyst cracking installations. The replacement by modern equipment of outdated reactor-blocks according to technical and economic requirements is described. It will allow eliminating low productivity of catalyst cracking. For this purpose it is offered updated equipment (new separation devices, cyclones, atomizers) and introduction of new technologies providing possibility of involving oil residuals in the process.

Keywords: catalyst cracking, separation devices, cyclones, atomizers.

O, S.Lomova, E. I.Yakovleva
Production of fuels and liquid gases on the combined units of petrochemical plants

In the article the variants of oil processing with complex catalytic and thermal processes are considered. The application of the combined units with the block of catalytic cracking for the production of fuels and raw material of petro chemistry is offered with the purpose of the use of heat and energy of chemical reactions for the production of maximal quantity of products with the best quality.

Keywords: the combined units, vacuum distillation, rectification, viscosity breaking.

PUBLISHING. PRINTING

V. Yu. Yurkov, S. N. Litunov
Development of methods of analysis of devices fixing UV varnish

The planar case of the problem of obtaining a uniform illumination on the illuminated surface is solved. The proposed method allows us to go to the problem of light given intensity. The results can be used for design and manufacture of copier equipment and devices, UV-fixing in the printing process.

Keywords: reflector, illuminated surface, UV-fixing colors.

A. S. Vorobyeva, Yu. S. Grigorova, O. A. Zyryanova, I. A. Sysuev, O. A. Timoschenko
Software-instrumental method of determination for the text composition saturation in printed and electronic publications

This article considers software-instrumental method of determination for the text composition saturation in printed and electronic publications using the program toolbox by creating and processing Photoshop screen graphic. The notion of parameter «text composition saturation» is introduced. It characterises the gray colour tone created by text on a publication page. The technique of determination for the text composition saturation is performed by means of instruments «Histogram» and «Info» according to the brightness level (0 – 255) and the quantity of black (0 – 100 %). Dependencies of the text composition saturation on sizes and leading for screen and polygrafical fonts are demonstrated.

Keywords are: the text composition, «colour of the fonts», the gray tone, saturation of text composition.

V. V. Ofitserov
The ways of perfection of principles of preparation of engineers-mechanics for printing industry

The effectiveness of the professional service chief mechanic depends not only on the knowledge of machines and mechanisms for devices that perform manufacturing operations, but also on the understanding of the process.

Keywords: equipment, process materials and process technology.

PHYSICSAND MATHEMATICS SCIENCES

A. A. Kolokolov, A. V. Yarosh
Computer-added design of complex products using discrete optimization and information technologies

This paper is a survey of the results in computer added design obtained by using discrete optimization and information technologies. Formulation of the problems and mathematical models, information on methods and computational study are presented.

Keywords: computer-added design, discrete optimization, information technologies, complex product.

I. D. Makarova, S. E. Makarov
Numerical analysis of the model of chemical reactor at the reactions of zero and first orders

The initial-boundary problems for the hyperbolic system, describing the process in a chemical reactor with a motionless layer of the catalyst are considered. The problem of quantity of stationary solutions of the given problems is studied and the procedure for such solutions is offered.

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

V. K. Fedorov
Quantum cosmogony and quantum cosmology: physical and mathematical aspects of theoretical model of the origin and development of the Universe

In the offered work the analysis of the fundamental space-time and power correlations describing creation and evolution of the Universe, the physical phenomena aimed at the search and laws presented in macro-and megascope scales is carried out. The theoretical hypothesis about occurrence of the Universe, representing alternative of model of the Big Bang is entered in consideration. On the basis of the offered hypothesis the concept of step-type behavior of physical Space and Time is obtained. The concept is directly connected to the model of creation of the Universe in the mode of determined chaos with its subsequent compulsory synchronization as the result of which there was possible an occurrence of the ordered material structures. Rather simple mathematical models contain a complex spectrum non equilibrium dissipative structures. It is shown, that on the allocated class of open and nonlinear environments may arise and metastability to be supported in the limited space complex non equilibrium dissipative structures.

Keywords: determined chaos, the Big Bang, discreetness, a continuity, quantum of Time, quantum of Space, physical vacuum, a diffusion, non equilibrium dissipative structures.

ENGINEERING GEOMETRY AND COMPUTER GRAFHICS

K. L. Panchuk
About modelling linear congruence of straight lines

The ability of simulation of two-parametrical sets of straight lines representing congruence first order and first class in the method of Monge is considered. It is shown, that such set of straight lines defines square-law conformity of two fields of straight lines on Monge drawing and can be modeled by this conformity.

Keywords: geometrical modeling, congruence, square-law conformity.

O. B Ilyasova
The algorithm of linear interpolation of experimentally obtained surface of a plough

A new linear algorithm for interpolation on the basis of computational geometry for simulation of mathematical model of experimentally obtained surface of a plough is offered.

Keywords: design, linear surface, algorithm, mathematical model.