

COMPUTER SCIENCE AND ENGINEERING AND MANAGEMENT

Ermolaeva N. N., Kurbatova G. I.

NON-STATIONARY SEA ICE BUILD-UP MODEL

A model of the dynamics of multi-layer cylinder glaciation reflecting the saline water glaciation feature and a method for calculating the average thermal characteristics of growing sea ice over the layer are proposed. Calculations of the nonstationary problem are presented using a numerical solution algorithm with explicit allocation of the glaciation front and an ordinary differential equation modeling the glaciation of a multilayer cylindrical surface in the quasi-stationary approximation. An analytical solution of the quasi-stationary version of the glaciation model in the thin-layer approximation is presented.

Keywords: *sea ice, multilayer surface, glaciation dynamics, numerical solution with explicit freezing front selection, analytical solution, estimation of the permissibility of the quasi-stationary approximation.*

Balonishnikov A.M.

LIMITING DRAG LAWS FOR TAYLOR-COUETTE FLOWS AND IN A STRAIGHT ROUND TUBE AT HIGH REYNOLDS NUMBERS

The first two terms of the asymptotic expansion of the well-known Prandtl-Karman resistance law are obtained as the number tends Reynolds to infinity. These asymptotics can be used to calculate the resistance of developed turbulent flows in smooth pipes and Taylor flows-The Couette.

Keywords: *prandtl-Karman resistance laws, large reynolds numbers.*

Bogdanov A. I., Orekhov D. V.

ON THE ISSUE OF BUILDING AN AUTOMATED PROCESS FORECASTING SYSTEM BASED ON TIME SERIES ANALYSIS

The article offers a general algorithm for the functioning of an automated system for predicting economic processes based on the analysis of their time series, which involves the use of both a class of Box-Jenkins models and a bank of mathematical models obtained using various nonlinear monotonic transformations. This algorithm was tested on time series representing the dynamics of the stock price of various enterprises.

Keywords: *forecasting, modeling, time series, model adequacy, Box-Jenkins models, partial autocorrelation function, criterion Darbin-Watson, variance of the forecast error.*

Pereborova N. V., Egorova M. A., Shvankin A.M.

METHODOLOGY OF MATHEMATICAL MODELING OF DEFORMATION PROCESSES OF POLYMER TEXTILE MATERIALS

A methodology for modeling the deformation processes of polymer textile materials based on the application of the theory viscoelasticity of polymer viscoelasticity is proposed. The given variants of mathematical models of deformation processes of polymer textile materials contain the minimum allowable number of physically justified parameters. The implementation of the proposed methodology for modeling the deformation processes of polymer textile materials is facilitated by their computer implementation.

Keywords: *polymers, viscoelasticity, deformation processes, mathematical modeling, relaxation, creep, computer prediction.*

Kondakov O. V., Ivanov K. G.

SCATTERING OF "HOT ELECTRONS" UNDER MAGNETIC QUANTIZATION CONDITIONS

This paper presents a number of experimental results on the transmission of laser radiation with a wavelength of 10.6 microns through a waveguide consisting of two single crystals of bismuth semimetal separated by a gap comparable to the radiation wavelength. This planar waveguide is placed in a pulsed magnetic field. Quantum oscillation effects associated with the electron transition at Landau levels are observed in the experiment. The paper shows that the magnetic field significantly affects the relaxation time. The last parameter is crucial when creating an inverse population of energy levels.

Keywords: Landau levels, waveguide, relaxation time, quantum oscillation effects.

Pereborova N. V., Shvankin A.M., Kovtun M. A.

PREDICTION OF COMPLEX DEFORMATION PROCESSES OF POLYMER MATERIALS USED FOR FOOTWEAR PRODUCTION

*The use of one of the variants of mathematical modeling of nonlinear hereditary viscoelasticity of polymer materials is considered on the example of the deformation-recovery process of dacron thread used for shoe stitching *вязкоупругости*. Comparison of the calculated values of deformation with experimental values allows us to conclude that it is advisable to use the considered methods of computational forecasting of deformation processes in scientific research.*

Keywords: polymer materials, viscoelasticity, deformation processes, mathematical modeling, relaxation, creep, computer prediction.

Krasov A.V., Sharikov P. I.

METHODOLOGY FOR PROTECTING THE BYTECODE OF A JAVA PROGRAM FROM DECOMPILATION AND THEFT OF THE SOURCE CODE BY AN ATTACKER

Software protection is an urgent task. The article explains the need to protect the java application bytecode, and analyzes existing ways to protect the Java bytecode. The advantages and disadvantages of each method are considered. Based on the analysis of existing methods, a conclusion is drawn about the use of specific methods in the methodology.

Keywords: bytecode, bytecode protection methods, steganography.

Pereborova N. V., Shvankin A.M., Kozlov A. A.

METHODS FOR MODELING THE VISCOELASTICITY OF POLYMER FIBROUS MATERIALS OF COMPLEX STRUCTURE

Nonlinear hereditary mechanics of polymers with the use of the relaxation function normalized arctangent of the logarithm of the reduced time, which covers an extended relaxation spectrum, are used to solve problems of predicting deformation processes of fibrous materials of complex macrostructure belonging to the class of textile materials.

Keywords: polymers, fibrous materials, viscoelasticity, deformation processes, mathematical modeling, relaxation, computer prediction.

CHEMICAL SCIENCES

Belkovich V. V., Mikhaylidi A.M., Kotelnikova N.E., Vlasova E. N.

PHYSICO-CHEMICAL AND MORPHOLOGICAL PROPERTIES OF FIBERS EXTRACTED FROM WASTE PAPER AND CARDBOARD

The process of debarking waste paper of two different types was studied to assess the possibility of obtaining powdered cellulose from it. The influence of pretreatment of waste paper mass during boiling in distilled water, alkaline treatment and bleaching on the physicochemical properties of fibrous products is analyzed. Appreciated changes in the transverse dimensions of the fibers were estimated optically, and the functional composition of the obtained samples was estimated using Fourier-transform IR spectroscopy.

Keywords: newsprint, cardboard

Aitova A. N., Burinskaya A. A.

IMPROVING THE TECHNOLOGY OF PRINTING PROTEIN TEXTILE MATERIALS USING INTENSIFYING ADDITIVES

The effect oxidatively of the redox system (ammonium persulfate-thiourea) and complexon additives on the printing properties of wool and silk fabrics, on the preservation of substrates and the rigidity of prints was studied. It has been established that the best results on sorption of acidic and active dyes by protein textile materials are achieved by combining the redoxsystem and the sodium ethylenediaminetetraacetic acid complexon.

Keywords: wool, natural silk, printing, redoxsystem

MECHANICAL ENGINEERING AND MACHINE SCIENCE

Drozdov V. N., Shefer E. A.

COMPENSATION OF THE INFLUENCE OF DEFECTS IN THE SHAPE OF PRINTED CYLINDERS ON THE QUALITY OF THE PRINTED IMPRESSION BY CHANGING THE SIZE OF THE RASTER POINT AT THE PREPRESS STAGE

One of the side effects of offset printing is spreading - a change in the area of printed elements, which leads to a change in the quality of printed impressions. The article deals with the procedure of spreading modeling, which makes it possible to compensate for the influence of various defects of printing cylinders on the quality of printed impressions.

Keywords: digital rasterization

Gruzdeva I. G., Kudrin Yu. V.

INVESTIGATION OF COLOR COMPOSITIONS WITH PROTECTIVE PROPERTIES BASED ON PHOSPHORS OF THE CHALCOGENIDE GROUP (PART 2)

The article describes the second stage of research of color compositions based on ready flexographic - made UV-cured flexographic inks with the addition of phosphors from the chalcogenide group to protect label and packaging products from falsification. The work is devoted to determining the optimal phosphor concentration while maintaining an acceptable degree of luminescence of the composition.

Keywords: phosphor, chalcogenides, UV-curable paints, flexography, concentration, luminescence degree

Arapov S. Yu., Dubinin I. S., Arapova S. P., Solodova M. S., Tyagunov A. G.

READING THE COLOR PROFILING SCALES OF THE MULTISPECTRAL PHOTO PRINTING PROCESS

An experiment was carried out on multispectral imaging of prints with a scale designed for constructing icc-profiles of printing devices. Pulsed lighting was used. The scale was scaled down by area by 4 and 16 times. Factors affecting the random and systematic error in determining the reflection spectra and color coordinates of fields on scales are considered. It is shown that multispectral imaging is a promising direction for creating control and measuring equipment for graphic arts.

Keywords: multispectral survey, icc - profile, reference scale, reflection spectrum, spectrum reconstruction, color coordinates, color difference

ORGANIZATION OF PRODUCTION: STANDARDIZATION AND QUALITY MANAGEMENT

Tamisanont Ch., Nikitina L. N.

THAILAND'S COMPETITIVENESS IN TEXTILES AND CLOTHING PRODUCTION

According to the data COMTRADE UN about customs tariffs in the harmonized system of description and coding of goods (HS, analogue HS), textiles and clothing correspond to the HS codes 60-63, where 60 - Knitted fabric or crocheted, 61 - articles of apparel and clothing accessories, knitted or crocheted, 62 - articles of apparel and clothing accessories, not knitted or crocheted, 63 - other made up textile articles; sets; clothing and textiles that were in use; rags. Using analytical tools such as TC, MS, RCA and NEPR indicators, this paper assesses Thailand's competitiveness in the textile and clothing industry for the period from 2006 to 2015. The obtained result of the study will demonstrate the insufficient level of competitiveness of the studied industry in Thailand. At the end of this article, we recommend that the Government of Thailand prioritize industrial development through political support and training of appropriate professionals to ensure that the competitiveness of this industry is constantly growing.

Key words: Thailand, textile and clothing industry, competitiveness.

Lebedeva A.V., Freidkina E. M.

PRINCIPLES OF FORMING AN EFFECTIVE SYSTEM OF LABOR REMUNERATION AT ENTERPRISES OF AUTOMOBILE URBAN PASSENGER TRANSPORT

The article deals with the issues of building an effective motivation system at the enterprise of urban public transport. To build a system of personnel motivation, it is proposed to integrate the balanced scorecard system into the company's management system as a whole. Using this mechanism, the company's strategic goals are specified to the level of the performer, and through key performance indicators, personnel are motivated and stimulated to achieve their goals.

Keywords: *public transport companies, goal management, strategic process map, balanced scorecard, key performance indicators*

MECHANICS

Shurygin D. A., Monina N. A., Bobrenko A. S.

ON EQUALIZING THE TEMPERATURE FIELD OF HEATED TRANSPORT CYLINDERS

The use of two inductors to increase the uniformity of the temperature field along the working surface of a heated transport cylinder (OTC) is considered. Mathematical modeling of thermal processes in OTC is performed on the basis of the lumped element method.

Keywords: *heated transport cylinder, inductor, temperature field, mathematical model.*

Sokolov V. P., Makarenko V. V.

OPTIMIZATION OF THE PROCESS OF NON-CONTACT MEASUREMENT OF SURFACE ROUGHNESS BASED ON THE USE OF TELEVISION AND COMPUTER TECHNOLOGY

The article deals with the problem of optimizing the process of measuring the surface roughness parameters of parts by a non-contact method based on the use of a mini-camera and computer technology. The purpose of this work is to simplify setup and measurement, provide visualization of the image on the screen, and improve the quality of the educational process.

Keywords: *surface roughness, non-contact measurements, ocular screw micrometer, double micro-scopmis-11, computer technology, TV camera, educational process*

V. T. Sergeev

INVESTIGATION OF THE TENSION OF THE MAIN THREADS DEPENDING ON THE LOCATION OF THE THREADS ALONG THE HEIGHT OF THE BOBBIN IN THE MANUFACTURE OF MULTILAYER HOLLOW FABRIC FROM QUARTZ AND CARBON THREADS

The article presents the results of a study of the tension of the main threads in the manufacture of multi-layer combination of a hollow fabric depending on the location of the Creel at the height of the filling as the main yarns used quartz and carbon filament large linear density. Have determined: increase the tension of the main threads in the extreme ranks of all the racks of Creel; more uniform and less on the value of f in the middle ranks of Creel from 4 till 13-th; increased tension and its fluctuations to a greater extent from carbon warp, especially in the upper fabric the hollow fabric; statistical analysis confirms the assumption.

Keywords: *multi-layer fabric, quartz and carbon threads, warp tension, bobbin, height.*

Sergeev V. T., Nikolaev S. D.

INVESTIGATION OF TENSION OF CARBON AND QUARTZ THREADS IN THE MANUFACTURE OF MULTILAYER HOLLOW FABRIC

The article presents the results of a study of the tension of weft threads in the manufacture of multilayer combined hollow fabric. The actual tension values of carbon and quartz weft yarns show that in both types of yarns, the tension increases almost 2-fold during the winding process from the beginning to the end of packing. Statistics of data on the tension of weft threads are obtained, which allows predicting the stress-strain state of weft threads on a loom.

Keywords: *multi-layered fabric, quartz and carbon threads, weft threads tension, tensogram, multi-layered fabric, quartz and carbon threads, weft threads tension, tenzogramma*