

COMPUTER SCIENCE, COMPUTER TECHNOLOGY AND CONTROL**Pimenov I.V., Pimenov V.I.****METHODS FOR DATA ANALYSIS AND KNOWLEDGE ACQUISITION WHEN DESIGNING MULTI-DIMENSIONAL DESIGN OBJECTS**

A set of methods for multivariate analysis of the values of measurable features of objects-precedents in the field of design is considered. Knowledge extraction is presented as the formation of descriptions of typical design solutions through the meanings of their selected distinctive features.

Keywords: *design solution, object features, knowledge extraction, discriminant analysis, machine learning, decision rule.*

Drozdova E.N., Kovalenko A.N., Shavkunov V.S.**SOFTWARE IMPLEMENTATION OF RUSSIAN-SPEAKING INTELLIGENT ASSISTANT WITH EXPANSION SUPPORT**

The article is devoted to the development of a personal voice assistant capable of interacting with the operating system and Internet services. The implementation of access to audio recording devices is considered. The preparation of conditions for working with the Speech API is described. The connection of libraries for working with the network is discussed. The analysis of speech commands based on the naive Bayes classifier is investigated. The implementation of speech synthesis using the Ivona system is considered. The implementation of the interaction of an intelligent system with external APIs is shown.

Keywords: *voice intelligent assistant, artificial intelligence, voice control, voice synthesis, speech classification.*

Kondakov O.V., Kartashov R.V., Ivanov K.G.**OPTICAL TRANSITIONS OF ELECTRONS IN THE MACCLURE AND CHOY MODEL**

A quantum-mechanical calculation of the matrix elements of electron transitions between Landau levels is carried out within the framework of a two-band model for a semimetal in a magnetic field. Since the effective processes occur in the vicinity of the Fermi surface, the operator expansion in the Taylor series in x , y , z is carried out in the vicinity of the corresponding symmetry points. The paper considers the second order of the Taylor series. The matrix elements of the velocity operator for bismuth in the two-band approximation are obtained within the framework of the formalism of the McClure-Choi model, which is currently used for the analysis of experimental data, which does not require the inclusion of the effective mass tensor into consideration.

Keywords: *matrix elements of electron transitions, semimetal, two-band model.*

Bogdanov A.I., Rodionova Yu.V., Baisov I.M.**RESEARCH OF THE POWER OF TREND DETECTION CRITERIA IN TIME SERIES WITH THE HELP OF SIMULATION**

The article investigates the power of various criteria for identifying a trend in time series on models obtained using simulation of a process containing a trend (both linear and non-linear) and a random component with different process noise (variance of the random component). As a result of the study, recommendations were given on the areas of application of various criteria for identifying a trend.

Keywords: *simulation, time series, criteria for identifying a trend, power of the criterion*

Pereborova N.V.**METHODOLOGY OF COMPUTER MODELING OF DEFORMATION-RELAXATION PROCESSES OF POLYMER TEXTILE MATERIALS**

Analytical and computer methods for predicting deformation processes are developed on the basis of the methods of system analysis of the viscoelastic properties of polymeric textile

materials. The choice of the analytical version of the normalized relaxation function and the creep function is based on the criterion of optimality of the mathematical model of viscoelasticity.

Keywords: *polymers, textile materials, viscoelasticity, deformation processes, mathematical modeling, relaxation, computer forecasting, optimization.*

Rymkevich P.P., Golovina V.V., Makarov A.G., Romanova A.A., Shakhova E.A.

FEATURES OF THE INFLUENCE OF THE SUPERMOLECULAR STRUCTURE ON THE MECHANICAL PROPERTIES OF POLYMER TEXTILE MATERIALS

The paper proposes a model of a folded structure and its quantitative description. Within the framework of this model, kinetic equations are obtained that allow describing the stress-strain properties of polymer textile materials. A physical explanation is given for the phenomenon of "inhibition" of the recovery process in the load-unloading mode.

Keywords: *structural model, kuna segment, kinetic equation, stress-strain state, polymer textile materials.*

Mehdiev G., Ermina M.A.

EMBARCADERO RAD STUDIO

The article discusses the features and capabilities of the Embarcadero RAD Studio development environment. The advantages and disadvantages of using the development environment are considered. Delphi and C ++ environment is taken as the basis of a common solution. All examples in this article are based on real-world experience using the Embarcadero RAD Studio environment.

Keywords: *embarcadero rad studio, visual component library, firemonkey, firedac, multi-device applicationdevelopment, multi-device application development.*

CHEMICAL SCIENCES

Kashirsky D.A., Sashina E.S.

MODERN CONCEPTS OF THE MECHANISM OF Dissolution of Cellulose in Nitrogen-Containing Ionic Liquids (REVIEW)

The review presents and systematizes the experimental and theoretical data on studies of the features of solvation and the mechanism of dissolution of cellulose in ionic liquids.

Keywords: *cellulose, ionic liquids, dissolution, solvation.*

Vasiliev M.P., Alekseeva G.A., Vasil'eva Yu.A.

OBTAINING AND RESEARCH OF COLLAGEN COMPOSITE MATERIALS FOR BONE PLASTIC

To obtain collagen materials for osteoplasty, a soluble collagen preparation was used, and calcium chloride and sodium phosphate were chosen as a model mineral system of the bone tissue. The conditions and process of obtaining collagen composite materials for osteoplasty are described. Their resistance to the action of microflora was investigated and the assessment of resorption in living tissue was carried out on a model liquid.

Keywords: *collagen, osteoplasty, bone tissue, collagen materials for osteoplasty.*

Ananyeva E.P., Sigareva L.P., Shamolina I.I., Ivanov V.A.

APPLICATION OF MICROWAVE RADIATION FOR DECONTAMINATION OF JUTE FABRICS

This article discusses the possibility of using microwave radiation (microwave radiation) for the treatment of biodegradable jute tissue in order to reduce the number of contaminating microorganisms. To study the microbiological purity, standard pharmacopoeial research methods were used. The possibility of using microwave radiation for decontamination of jute and the degree of exposure to microwave radiation on different types of microorganisms has been established.

Keywords: *jute, microwave radiation, bacteria, yeast.*

Rusova N.V., Astashkina O.V., Lysenko A.A., Kashirsky D.A., Myznikov L.V.

ON SOME PROPERTIES OF MODIFIED POLYOXADIAZOL FIBERS - PRECURSORS OF CARBON FIBER MATERIALS

The history of the development of research and technologies for the production of activated carbon fibers (ACF) is closely related to the history of the development of the production of carbon fibers (HC) in general. The scope of such materials is constantly expanding. At the same time, the search for promising precursors of carbon fibers is still relevant. The paper presents the results of studies of some properties of modified polyoxadiazole fibers-precursors of carbon fiber materials.

Keywords: carbon fiber, activated carbon fiber, polyoxadiazole, carbon black.

Evgenieva L.S., Vitkovskaya R.F., Rumianskaya I.G., Petrov S.V.

FIBERGLASS PHOTOCATALIZERS FOR DYE DESTRUCTION IN INDUSTRIAL DISCHARGES

A glass fiber photocatalyst containing titanium and copper oxides has been obtained. The physicommechanical and catalytic properties of metal-containing glass fiber catalysts have been investigated. The kinetic regularities of the process of photocatalytic oxidation of colored aqueous solutions have been studied.

Keywords: photocatalyst, titanium dioxide, copper oxide, dye, colored aqueous solution.

Zakharova A.V., Batarshina E.D., Tikhomirova N.A.

STUDYING THE MECHANISM OF INTERACTION IN THE ACID DYE-THICKENER SYSTEM

The possibility of using acid metal complex dyes 1: 1 with amphotericity and containing an active Cr atom for ChromoJet direct inkjet printing is considered. Regularities have been revealed on the basis of model experiments on the degree of interaction in the acid dye-thickener system depending on the pH of the medium. It was found that the use of acid metal complex dyes 1: 1 in printing compositions based on Na-CMC is more effective than in printing compositions based on an acrylic thickener.

Keywords: na-kmts, acrylic thickener, acid dyes, solution pH, interaction in the dye-thickener system.

ORGANIZATION OF PRODUCTION. QUALITY MANAGEMENT STANDARDIZATION

Tamisanont Ch., Nikitina L.N.

EVALUATION OF TECHNICAL EFFICIENCY OF PRIVATE ENTERPRISES FOR MANUFACTURING SPORTS CLOTHES IN BANGKOK

The aim of this study is to measure the technical efficiency and scale efficiency of a private sportswear manufacturing facility (ISIC code 14115) in Bangkok, Thailand. The statistics were obtained from the Business Development Department, where all private enterprises are registered and where their performance is assessed. The analysis was carried out by the AFF method (analysis of the functioning environment). The data obtained in 2013-2014 for 30 enterprises were used, but only for 19 of them the data were complete. Five variables were selected and used in graphical models: four input and one output. Input data: the cost of material costs, trading and administrative expenses, the amount of assets, the total amount of equity, output data: profit, total income.

Keywords: technical efficiency, scale efficiency, operational environment analysis, bangkok.

Baisov I.M., Nikitina L.N., Bogdanov A.I., Shikov P.A.

OPTIMIZATION OF THE LOCATION OF THE WAREHOUSE OF THE TRADING COMPANY

The article discusses the issues of optimizing the location of the warehouse of a trading enterprise according to the criterion of the minimum cost of delivering goods to consumers. A system of two nonlinear equations is obtained, for the solution of which it is proposed to use Newton's method and the corresponding iterative algorithm. The comparison of the result of solving the optimization problem with the result of finding the location of the warehouse by the method of determining the center of gravity on a specific example, shows the significance of the

discrepancy between the calculation results.

Keywords: *warehousing, center of gravity method, optimization, system of nonlinear equations, Newton's method.*

Kasatkin B.P.

RISK MANAGEMENT ALGORITHM FOR A PRODUCTION ENTREPRENEURIAL PROJECT

Entrepreneurial activity occurs most often in conditions of uncertainty. Uncertainty lies in the emergence of all kinds of risks. To effectively manage an industrial enterprise, a comprehensive risk management system is required. It is necessary to economically justify the creation of a risk management system depending on potential losses and the size of the enterprise. The risk management process consists of risk identification, analysis, assessment and treatment. An integral assessment of each risk is calculated, risks are ranked, and risk maps and diagrams are drawn up. Depending on the risk factors, risks can be divided into risks of the first, second, third and subsequent levels. Knowing the likelihood of risks occurring at a certain level, it is possible to calculate the likelihood of risks of the entire system. Risk situations develop according to certain scenarios with different probabilities. The choice of the scenario with the most preferred outcome is the goal of working on the risks of the risk management system. The article proposes an algorithm for creating a risk management system at an enterprise, taking into account the formation of a policy, the organization of the structure of risk management, the issue of creating expert groups and the preparation of regulatory documents such as the standard of risk management. The process of making decisions and influencing risks is also described, options for assessing and analyzing business risks are proposed. Organization of the structure of risk management, the issue of creating expert groups and the preparation of regulatory documents such as the risk management standard. The process of making decisions and influencing risks is also described, options for assessing and analyzing business risks are proposed. Organization of the structure of risk management, the issue of creating expert groups and the preparation of regulatory documents such as the risk management standard. The process of making decisions and influencing risks is also described, options for assessing and analyzing business risks are proposed.

Keywords: *entrepreneurial project, uncertainty, risk, risk assessment, risk management, risk management, management standard.*

MECHANICS

Rokotov N.V., Smelkova V.V., Bepalova I.M.

CRITERIA FOR ESTIMATING THE UNIFORMITY OF THE DISTRIBUTION OF THREADS IN THE BODY OF THE PACKING

The article proposes a criterion for evaluating the uneven distribution of threads in the winding body. A method for evaluating unevenness based on determining the degree of equidistance of centers of cross-sections of threads using Delaunay triangulation is described.

Keywords: *precision winding, packing, winding structure.*

Shurygin D.A., Maezhov E.G., Vepruk D.A.

EVALUATION OF THE EFFECTIVENESS OF RECOMMENDATIONS FOR ADJUSTING THE DIGITAL TEMPERATURE REGULATOR

Recommendations for tuning a digital temperature controller based on the Ziegler and Nichols method are considered. Their refinement was carried out on the basis of analytical and experimental studies of real technological objects. The features of the digital regulator tuning have been taken into account.

Keywords: *digital temperature controller, settings, regulation quality indicators.*

Ivanov D.K., Ivanov K.G., Napreenkov A.A., Pastukhov A.Yu.

TWO PROBLEMS IN PHYSICS: FROM IDEA TO PRACTICAL USE

In the first task, the question of the interaction of the steel of the skates with the ice surface is considered. From simple physical considerations, it is shown that it is possible to reduce the coefficient of sliding friction of skates on ice. A modified skate was made to reduce the sliding

friction force. Experimental confirmation of the stated physical positions and the obtained expression for the coefficient of friction of the modified model of the ridge is carried out.

Keywords: *sliding friction coefficient, skates, ice, efficiency, stirling engine, flywheel.*

Rokotov N.V., Kolesnikov V.A., Markovets A.V., Molchanov K.I.

EXPERIMENTAL STAND FOR PRECISION WINDING

An experimental stand for precision winding of filamentary materials has been developed. The stand allows you to change the gear ratio during winding with high accuracy due to the use of controlled stepper motors and a differential gear. The main calculation formulas are obtained. Experimental package samples are wound.

Keywords: *experimental stand, high precision, packing*

FOR ANNIVERSARY OF AVINIR GENNADIEVICH MAKAROV