РЕЗЮМЕ/ABSTRACTS

УДК 674.055

Rudak P. V., Kuis D. V., Rudak O. G., Kravchenko A. S., Baltrushaitis A., Kiaturakis G. Simulating the Process of Chip Particle Movement in the Chip Groove of the Milling Cutter during Slab Wood Material Working

The purpose of the study the results of which are presented in this work is establishing the regularities of movement of chip and dust particles leaving the zone of slab wood material cutting during milling in a wide range of cutting mode parameters based on simulating the process of chip particle movement in the chip groove of the milling cutter.

The objective of the study is to establish in a wide range of cutting mode parameters during milling: 1) the influence of edge inclination angle on chip flow angle 2) the influence of edge inclination angle on the velocity of chip movement along the blade and the velocity of leaving by the chip the zone of cutting; 3) the influence of rotational speed of the milling cutter on chip flow angle.

Comparison of chip flow angle values obtained after experiments with designed values according the model developed demonstrated their high precision.

УДК 658.012.011.56.005:681.3

Trokhova T. A., Stepanov S. Y. Applying Fuzzy Models of Knowledge Representation for Automation of Predicting Failures during Oil Well Drilling

The paper deals with the automation of predicting failures during oil well drilling and developing a fuzzy infological model of representation knowledge in a given subject area.

Major lines of automation of failure predicting are given, the structure of infological model of knowledge base is described and the software package is described implementing the method of oil-well analogues in failure prediction.

УДК 62-82-112.6(083.13)

Pinchouk V. V., Maroukhlenko A. V., Vorochkin D. G. The Design of Mounting Dimensions of the Components of Unit-Type Hydraulic Control Units of Hydraulic Drives of Technological Machines

Hydraulic drives of present-day machines include as a rule science intensive components: standard apparatuses and units serially produced by specialized plants. The main part in hydraulic systems of machine tools is played by hydraulic equipment designed for controlling direction , velocity and force of actuating mechanisms, providing control and monitoring functions in the hydraulic drive and of the whole cycle of actuator performance. During designing of the actuators of technological machines hydraulic control units are designed consisting of hydraulic valves connected according to principle hydraulic circuits. Hydraulic control units are sophisticated and costly subsystem of hydraulic drives of technological equipment and owing to this the problem of improving their efficiency is urgent for any machine building enterprise. Due to this technical level, quality and reliability of hydraulic drives of various equipment types to a considerable degree depend on the level, quality and reliability of hydraulic equipment of a given hydraulic drive. Design formulas have been worked out enabling to calculate and design the components of unit-type hydraulic control units satisfying the requirements of the equipment being completed.

УДК 539.4+620.1

Grabovskii A. P., Bondarets A. A. Deformation Models of the Kinetics of Damageability of Construction Materials during Plasto-Elastic Deformation

Specific features of evaluation of damage accumulation kinetics in equipment components during plasto-elastic stressing are revealed by means of changing the volume of a distinguished box unit which is represented by the change of elasticity module E_i plastic deformation ε_i (at axial loading), module of elasticity G_i and shear plastic deformation (torsion) $- \gamma_i$. Tensor

of damage accumulation kinetics in construction materials is considered which is transformed by linear and angular strain additional function tensor during plasto-elastic deformation. The parameter of damage rate is obtained expressed in terms of the parameter of deformation intensity at arbitrary direction of coordinates.

УДК 629.114.2-182.8

Popov V. B. Parameter Optimization of the Mounted Lifting Device of Multipurpose Power Unit UES 290/450 Polesie Unitized with Mounted Combine Harvester KNK-500

The problem of parameter optimization of the mounted lifting device of UES 290/450 unitized with mounted combine harvester KNK-500 is formulated. The methods of the formation of optimization mathematical functional model of the lifting mounted device of UES 290/450 are developed. Calculation of output parameters for the updated lifting mounted device and their comparison with the base modification of the mounted lifting device confirming practicability of multicriteria optimization is done. The solution obtained enabled to provide 15,9 % reserve of lifting capacity of the mounted lifting device, respective reduction of load in the rods of linkage mechanism and pressure in hydraulic cylinders. This provides improving operational reliability of some components of the mounted lifting device as well as of the whole mounted lifting device.

УДК 621.378.3

Shapovalov P. S., Drobyshevskii V. I. Interaction of Laser Beams with Violated Circular Symmetry in Nonlinear Waveguides

Using variational method in the class of elliptic Gaussian functions the interaction of two elliptical laser beams propagating in the medium with cubic nonlinearity is studied. For the parameters characterizing lateral dimensions of the light spot of beams the system of differential equations of the second order is obtained being generalization of the system of Ermakov for the case of four equations. Integral of motion was found for this system and using it critical power values of beam collapse have been calculated which depend on beam ellipticity.

Two modes of beam propagation are found. In the first mode oscillations of beam lateral dimensions occur and in the second case there are no such oscillations.

УДК 621.314.672

Medviedev K. M., Maximenko D. V. Modeling Single-Phase Office and Home Electro Receivers Consuming Sharply Nonsinusoidal Current

A mathematical model is presented enabling to calculate current and voltage curves of present day single phase office and home electro receivers consuming sharply nonsinusoidal current. The base of the model are analytical expressions resulting from the solution of differential equations describing the processes in the system of electric supply to the receivers considered.

УДК 628.984

Kravchenko A. I., Savkova T. N. Optimization of Designing Present-Day Lighting System of Industrial Enterprises.

Complex method of selecting an optimum shape of light intensity curve and optimum lighting plant for the industrial enterprise shop allowing for quantitative and qualitative characteristics of lighting plant is presented.

УДК 628.984

Evminov L. I., Kizeva V. S. Comparative Analysis of Various Light Sources and Evaluation of Electromagnetic Compatibility of Nonelectrode (Induction) Light Sources and LED Light Sources

Technical and economic assessment of applying nonelectrode (induction) lights as light units is provided.

It is shown that induction light sources compared with LED and gas-discharge light sources have some considerable advantages. Major ones of them are long guarantee period, absence of light flux pulsation, luminous efficacy , more natural light, lower cost.

УДК 536.24

Ovsiannik A. V., Shapovalov A. V., Volkova E. N., Yakimchenko V. G., Rodin A. V. The Study of Heat Exchange Process during Vaporization of Ozone Safe Refrigerants on Smooth Surfaces

The results of experimental study of heat exchange during boiling of refrigerants R 134a, R 404a and R 407c on smooth technically rough surface in the conditions of unrestricted motion in a large volume are presented. Empirical dependencies are obtained enabling to calculate heat transfer coefficient during refrigerant boiling in the range of heat fluxes of bearing surface of 3,7–48,8 kW/m^2 and saturation pressures of 0,39–1,25 MPa in the conditions of large volume.

УДК 628.931

Sobolev E. V., Dobrodei A. O., Poddenzhny E. N., Boika A. A. Modeling Photoluminescent Transformer Based on Nano Structured Phosphors for LED Lighting Units

The principles of modeling the process of luminescence and color rendering in the system of "blue LED diode – yellow phosphor" are developed for designing components of the design of photoluminescent transformers of LED colorless lighting units.

УДК 338.2

Khilo Y. P. Improving the Efficiency of Reproduction of Human Resource Potential of Research Sphere as One of the Components of Scientific and Technical System of the Republic of Belarus

The dynamics of research human resource potential as one of the fundamental components of the scientific and technical system of the Republic of Belarus is analyzed. The main aspects of applying the methods of modular express-diagnostics developed by the author are considered used for evaluating the level of the development of this component of the scientific and technical system of the country. A set of measures is proposed aimed at activization of human resource potential reproduction in scientific and innovation sphere of the Republic of Belarus.

УДК 568.018

Zoubritskii A. F. The Study of Selective Market and Competitiveness of International Trucking of the Republic of Belarus

In present day conditions it is very important for every enterprise to evaluate market situation to propose efficient business competition means which on the one part would correspond to existing in Belarus market situation with its progress trends and on the other part to specific features of a certain industry. Most difficult stages of this activity are analytical comprehension of the ways of gaining competitive advantages and working out on this basis measures on improving an enterprise competitive position in the market.

Applying the methods of evaluating selective market and competitiveness based on market competition mapping is possible on the basis of actual statistical data on the operation of motor transport sector of the Republic of Belarus.

Motor transport contractors providing international motor transportation occupy a certain place in the common market of transport services. There is a market niche where governmental enterprises operate. These are transportations with minimum cost and adequate quality. Studying the data it is possible to make up a conclusion about the increase of the volume of traffic provided by the enterprises of governmental pattern of ownership.

Specific features of selective market of the enterprise are defined by the type of competition in the market under study. In the opinion of experts the market of international motor transport is defined as a free competition. Since one of the major characteristics of selective market activity of the enterprise is the degree of competitor competitive activity in their fight for consumers and new market niches a key issue is competition intensity.

Assessment of the competition intensity is of global importance in the market analysis since it enables to reveal general attractiveness for introduction to the market, work out the strategy of service promotion and to preliminary evaluate the activity results.

УДК 338.532.4.025.24:674.5

Ivanovskaya I. V., Dragoun N. P. Horizontal Price Collusion in Belarus Commodity Markets: How to Cancel It and Prevent Its Formation

The methods of predicting the formation of commodity producer collusion and its stability in time are presented. The difference from the existing methods consists in establishing the list of factors of stability of a price collusion of commodity producers and indicators of the assessment of their values and also in developing formulas of calculation of threshold values of discount factor as the functions of structural factors of the market, characteristics of the participants of the collusion and macroeconomic conditions. After approbation of the methods it has been established that during the period of 2006-2010 plywood, woodchip and fibreboard markets in Belarus had a high liability to agreed price activity occurrence which is first of all explained by low actual loan capital rate of interest and small number of the market participants, high barriers to introduction and information transparency of the market, high rate of price adjustment, symmetry of costs and production capacity of producers and other. Practical recommendations on improving antimonopoly regulation of the Belarus markets of woodworking products are formulated based on preventing from distributing market shares between the producers proportional to their production capacities, reduction of the sphere of governmental control of the sale of woodworking products for export, applying in home and foreign markets the methods of regulating price behaviour of commodity producers allowing for national interests and other.