

**Kisielev M. G., Drozdov A. V., Yamnaya D. A. The Unit for Cutting Diamond Monocrystals with Imparting Periodic Circulatory Movement to a Workpiece**

An updated unit for cutting diamond monocrystals is described in the paper enabling periodic circulatory motion of the workpiece. With the use of photo camera trajectories of the movement of a point belonging to a workpiece are determined at imparting the node of rocking of the arm forced sinusoidal oscillation with the frequency of 6.6 Hz and amplitude 6 mm at different positions of the center of gravity of counterbalance node relative to the axis of the arm rocking. It is established that due to imparting forced oscillation to the node of arm rocking the point belonging to the workpiece moves in the plane of cutting describing a closed path and forming Lissajous figures i. e. performs periodic circulatory movement. It is shown that due to variation of oscillatory system parameters it is possible to purposely influence the view of the Lissajous figures which can be efficiently used to intensify the process of cutting diamond monocrystals and improving the quality of the surfaces of semi finished article cut.

**Turomsha V. I., Mischenko S. N. Modeling Tool Wear and Durability during Workpieces Machining at Variable Cutting Depth**

Mathematical models are developed enabling to determine tool life period and the degree of the tool wear during non-stationary cutting with variable cutting depth at NC machine tools for any analytically described contour including the contours required by splines. The analysis of modeling results with spherical, conical, elliptical and hyperbolic surfaces taken as the examples preset by the equation and approximation spline demonstrates high accuracy of the mathematical models developed. Error of calculating radial wear and durability period relative to experimental data does not exceed 10 % which confirms the adequacy of the mathematical models developed.

**Stasenko D. L., Layevski D. V. The Methods of Designing Gerotor Pumps with Epicycloidal Gearing**

Major units limiting reliability and life of hydraulic systems are hydraulic pumps. Main trends of hydraulic pump design development are minimization of weight, dimensions, improving efficiency, reliability and extending operation life at preset specifications which is provided by the units of this type.

The problems of specificity of designing epicycloidal profile of gear internal teeth, used in gerotor pumps are considered, and also the problems of determining tolerances for major profile dimensions and technological characteristics of their manufacture.

**Ovsiannik A. V. Heat Exchange Rate during Liquid Boiling on the Fins of Various Types and Profiles**

The problems connected with heat exchange processes during liquid boiling on finned surfaces in evaporators of refrigerating units, heat pump plants and heat-power units are considered and general dependencies for calculating heat transfer and heat flows coefficients on the fins of longitudinal and radial types located on tubular surface are obtained.

**Krotенок V. V., Bohan A. N. The Results of the Study of Transient Processes in Distribution Network with the Device for Deep Overvoltage Limitation**

A review of existing methods and circuits for protecting distribution 6–10 kV networks from internal overvoltage is done. A number of advantages and disadvantages of the existing

circuits protecting from internal overvoltage is determined. Circuit solution of the device for deep overvoltage limitation in the electric network is proposed. A number of experiments was conducted for determining the advantages of the device and validity of the results of the device simulating. The results of the investigation of transient processes in the distribution network with the use of the device for deep overvoltage limitation are presented.

**Filipchik Y. D., Kalentionok E. V. Mathematical Simulation of Electromechanical Transient Processes in Energy System with Emergency Shortage of Active Power and Operation of Emergency Automation Equipment**

To analyze emergency operation with active power imbalance a mathematical model of frequency change in energy system is proposed allowing for various types of electric power plants, various regulator devices and the operation of emergency control relay means. Based on the mathematical model proposed the study of emergency operation in energy region with frequency non-stability is conducted. Based on the calculations it is established that deep reduction as well as considerable increase of frequency in the energy system are possible even up to emergency automation operation at electric power plants.

**Izotov P. P. Amendment of the Method of Voltage-to-Frequency Converter Calculating**

The method of the voltage-to-frequency converter calculating at preset values and the frequency of the input signal is considered.

The amended methods of the voltage-to-frequency converter calculation are proposed. The dependence of the input signal frequency on the value of input signal is determined allowing for pulse width in steady state of the voltage-to-frequency converter operation. The condition of selecting feedback resistor is clarified. It is shown that at increasing pulse width of the frequency-to-voltage output signal it is advisable to apply amended methods of the voltage-to-frequency converter calculation, since calculating error in this case is reduced.

**Sobolev E. V., Poddenezhny E. N. Computer Simulation of Light Engineering Part of LED Lighting Systems**

A general algorithm for calculating the light engineering part of LED lighting systems is developed. The problem of calculating the illumination due to LED modules of arbitrary shape is formulated and solved in the paper. A program for creating and analyzing photometric data files of lighting devices is developed.

**Doroschenko I. V. Mechanical Characteristics of Automation Electromechanical Testing Stand Based on Asynchronous Valve Cascade Converter**

The influence of the zone of discontinuous current on the change of mechanical characteristics of automation electromechanical test stand based on asynchronous valve cascade converter in the range of operating slips is considered. Based on experimental study with the stand of 5 kW power the adequacy of the expressions of mechanical characteristics was checked.

**Karpov V. A., Rostokina O. M. Sensitivity and Error of the Bridge Circuit with One Measuring Element**

The paper deals with determining analytical relation between nonlinear error, sensitivity and the relation of electric resistances of the bridge circuit with one sensitive element.

**Lasitsa M. V., Lizakova R. A. Improving Cost Management Effectiveness Based on CVP Analysis**

In the conditions of present-day economy the degree on non-stability of economic action of the market entities is rather high. In connection with this special importance is taken on by advanced methods of long term analysis based first of all on making a clear picture of the performance of this or that economic player. The analysis of the ratio Cost –Volume-Profit is one of the most powerful instruments in cost management which enables to define without complicated analytical calculations expected and actual cost level, to objectively define the tendencies of their change and based on this to correct development plans.

**Dragun N. P. Methodic Basis for Managing Economic Sustainability of Processing Enterprises**

The paper deals with methodological fundamentals and methodic basis for economic sustainability of product processing enterprises of agroindustrial complex. Basic methods of investigation are monographic, modeling business-processes according to Standard IDEFO, managerial analysis. The results obtained are original in several respects. Novel methodological principles of functioning of the mechanism of economic sustainability management of processing enterprises of agroindustrial complex which consists in target regulation of the reserves of economic sustainability and the level of competitiveness in the market as key factors of economic sustainability of the enterprise corresponding to concrete conditions of its functioning are developed. It is suggested to use functional (process) approach as a form of technologisation of economic sustainability management, methodological basis of which is the concept of strategic management, and the processes of implementation of some functions of management are formalized in the form of business-process implementation regulations according to the standard IDEFO. Business processes of the implementation of two major functions of managing economic sustainability – evaluation of level, determining internal factors and evaluation of economic sustainability reserves of processing agroindustrial complex enterprises are presented.

**Parhomenko N. V. Specific Features and Basic Elements of the Mechanism of Improving Agricultural Organizations Competitiveness on the Basis of Integration**

Economic nature of the mechanism of improving agricultural organization competitiveness on the basis of integration is considered. Specific features of its formation and basic structural elements are revealed, the conditions of its efficient performance are validated. Simulation of the consumer behavior in the process of making a decision about a product purchase is performed. The results obtained enable to systematize the processes of creation, performance regulation and competitiveness evaluation of integrated formations and their products. They can also serve as the basis for further developing and conducting more intensive research work in this area.