

ANNOTATIONS

A. Svits, Ja. Zubzhytski, M. Opyelyak. The method of selection of parts for production in FMS. *They have presented a method of definition of working in the Flexible Manufacturing System (FMS), without necessary of manufacturing process design; on their complexity account. In case if the complexity is bigger than limiting complexity, which is determined for manufacturing system when working is profitable.*

I. Baranowski, M. Lustkiv, L. Fil. Parallel correction of raster transformation for element of square form: an analytical method. *The task of correction of non-linearity of raster transformation which arises up at forming of relative area of raster element of square form is examined, as a result of change of its geometrical sizes, by means of introduction of parallel correcting link the parameters of which are determined by an analytical method.*

M. Bondar, M. Yeskin, S. Zaets, I. Maxymchuk. Diagnosis of processing by end mills, on milling machines with numerical control. *Reliability end mills milling process depends on the combination of the properties of the reliability and durability of the cutting tool, and to ensure the desired quality of the machined surface and its characteristics. Faultlessness and durability of the tool depends on the strength characteristics of the cutting tool, its durability, and operating modes. Efficiency of methods of diagnosing processing end mills case details of devices with aluminum alloy for milling machines with numerical control, subject to the prediction of disaster or emergency condition, the cutting tool. And the system of forecasting of machining processes for on the basis of diagnosis, which leads to an increase in the efficiency of processing of basic parts of aluminum alloys for CNC milling machines.*

D. Bondarchyk. Modeling and study of contact interaction of bulk substances from actuating mechanisms technological equipment. *Simulation of granular materials and research their interaction with executive mechanisms of technological devices. Discussed discrete modeling and research of interaction granular substances with executive mechanisms of technological equipment at the contact interaction of individual particles.*

B. Valetskyy. Optimization of warehouse and storage technologies. *The process of optimizing of warehouse technologies is represented in the article. The basic organizational and technological problems of its work are viewed. The ways of improving information technology support of Warehouse Management System are suggested.*

A. Gavrysh, T. Roik, Yu. Vitsyuk, V. Oleinyk, I. Dorfman. Technological modes of optimization thin grinding abrasive wear-resistant parts made of composites based on new aluminum for printing complex. *In the article the experimental research results concerning an influence of tool composition and fine abrasive grinding parameters on surface roughness of new composite friction parts on the base of aluminium for printing has been presented. The main regularities of surface roughness formation and their dependence on cutting parameters have been determined. It was discovered granulosity, diamond disc' vehicle material essentially influence on surface roughness parameter R_a . It was*

B. Durnyak, V. Senkivskiy, I. Pih. Information technologies prognostication and providing of quality publishing-polydiene processes (methodology of decision of problem). *Methodology of the forecast providing of quality is set forth publishing-polydiene processes on the basis of the use of informative conception, fuzzy logic and neural unlearnetworks in the construction of information technologies.*

V. Zablotskiy, S. rystupa, A. Dahnyuk. Evaluating the effectiveness of machining operations. *This article analyzes the various criteria of optimality technological machining operations which can be divided into economic and physical . The advantages and disadvantages of the currently known criteria. Two new criteria based on the principle of minimum energy, and which meet the following requirements: promptly adjust treatment regimens; undertake a comprehensive economic and technological optimization; can be used for all types of production; ease of use and minimum input.*

R. Zinko, O. Serkiz, N. Ivanykovych. Modeling of drum type washing machine. *Equations which determine influence of structural parameters of wash-tube and regime parameters of process of quetch of soft goods on the size of mental instability are in-process resulted. Calculations are conducted on the example of concrete model of washing-machine. Findings can be used for the choice of rational parameters of the system of vibroisolation of washing-machines, subject to both linear and angular vibrations at a quetch.*

R. Kazmirovych, O. Kazmirovych. The development of mathematical models for a new way of combining accuracy control and positioning of imprints onto a page. *A new theoretical trends and methods have been developed to control and manage the sheet printing quality according to the parameters of register precision and positioning of imprints onto a page. The results of verification development models with using mathematical software Maple has been offered.*

O. Knysh. Transformation investigation of angle of sharpening of disk knife in the processing of book block by cross-way. *Dependences are shown out for determination of normal and tangent constituents of cutting speed and their influence is set on transformation of angle of sharpening of knife. Character is researched of changes of corner of intensifying of disk knife at treatment of book spine. Cutting angles are investigated at meeting movement of knife in relation to direction of moving of book block less, than for passing motion of knife. There are determined an influence of geometrical sizes of instrument and technological parameters of process on the change of cutting angle. Recommendations are worked out with the aim to minimization of cutting angles.*

O. Kolosov. Design of structural and technological parameters of nodes and dosed alluvium impregnation impregnation-drying complex, designed to obtain products from winding duroplastic of fiber polymer composites. *It was investigated that the basic processes named of impregnation and dosed application are the important parts of the production of prepreg for winding polymer composite materials (PCM). This is because the quality of the impregnation is dependent of such factors as the presence or absence of air inclusions (so-called "bottle effect") in the structure of the impregnated fibrous filler during its impregnation, the homogeneity and the viscosity*

Maple.

of the polymeric binder, good surface wettability of fibrous filler and so on. The essence of the developed energy-efficient technological methodics is based on the integrated use of ultrasonic for the basic processes of manufacture of prepregs to overcome the abovesaid drawbacks in their receiving. Investigations have shown that the effective effect of ultrasonic helps to improve the homogenization of the polymer binder, activation of fiberfill surface to improve its wettability with the polymer binder drainage structures fiberfill right before impregnation and to increase the productivity of the process of impregnation and dosed application of polymer binder by increasing the speed of a fiber-fill drawing with improving of properties of the final solidified PCM. Besides that, it was found out that the using of ultrasonic exposure to the impregnated fibrous filler in the impregnation bath and also to already impregnated fibrous filler may be regarded as an effective method for automatical maintaining of the required amount of containing of the binder polymer in the impregnated fibrous filler. As a result of the application of the developed technological bases and the equipment is the increase of productivity of the impregnation processes and dosed application of polymer binder, i.e. speed of drawind of the material and speed of removal of excess polymer binder in the preparation of a homogeneous impregnated material with virtually no air pockets. This allows to recommend the developed new technological methodics, including of three-stage ultrasonic processing, and the necessary equipment as a reliable means to maintain a predetermined value of the quantity (stabilization) of content of the polymer binder impregnated fabric filler. A number of case studies (including the use of impregnation-drying machine MPT-3M) with the developed technological methodics and equipment, providing energy saving process for processes of preparing a polymer binder, impregnating a fibrous filler and dosed application to them the polymer matrix using ultrasonic was investigated.

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O. Krestyanpol. Functional design packaging flexible manufacturing systems. Showing method of using information technology in the design of generalized tracks and group operations in the packaging industry

Ju. Kuznetsov, Guerra J.A. Hamuyela, Al-Refo Ibrahim Farhan Salman. Description and synthesis of clamping mechanism of mashine tools on different levels complicated structure. A genetic and morphological approach to the description and synthesis clamping mechanism for clamping machine tool parts such as bodies of revolution (rods, artificial pieces, lengthy parts, cutting tools with cylindrical shank). An example of the genetic and morphological approaches to clamping chucks, clamping mechanism and spindle assemblies with different environments and different power flows.

I. Lutsiv, V. Sharyk, M. Strembytsky. Alholrytm control in the process of fine turning using multiedge cutting heads. The paper deals with the control algorithm for adaptive processing multi edge cutting head with elastic guides, and design development of fine turning multi edge head of adaptive type with elastic guides in which the turning tool position control in the process of machining is performed by the bidirectional electromagnetic drive of tool holders with intellectual control system based on mic-

rocontrollers. It has been determined that the application of the developed head makes it possible to provide high sensitivity to instantaneous changes in the components of cutting forces on the turning tools, stabilizing the cutting forces. The head also gives the ability to control the tool feeds variations as well as the performing of vibration high precision cutting. The effectiveness of equalizing of cutting forces using the developed multi edge heads on the base of control algorithms is proofed. These algorithms provide stabilization of summarize axial components of cutting forces as well as summarize cutting elements displacements.

B. Palchevskiy. Construction expert system for automated design of process equipment. The features of the structure and use of expert systems for intelligent CAD process equipment. The features of the structure of the knowledge base in design technology machines.

B. Palchevskiy, T. Varanitskiy. Information support for structure optimization synthesis of flexible manufacturing modules of packaging. The article describes a system of methods and techniques for collection, storage, retrieval, processing, analysis, and data output about the structure of flexible packaging production modules by applying hardware and software in accordance with customer requirements. Information technology of computer-aided design of flexible manufacturing modules consists of organizational methods, containing models and systems for descriptions of packages, flexible production modules structure, structures of functional modules, evaluation criteria, as well as algorithms for directed step synthesis and by using the evolutionary techniques; software to perform the tasks of synthesis, evaluation, selection of flexible production modules of packaging layouts and database, that contains information on the characteristics of package and functional modules structure to support the computer-aided design, as well as hardware - computers for data storage and processing .

B. Palchevskiy, L. Krestyanpol. Applikation of information technology in optimizing the synthesis of protective packaging of alcoholic beverages. In this article the author constructed an automated system of accounting treatment and protection of alcoholic beverages, for it deals with the concept of security and working condition, and become failures at sites promoting alcoholic beverages. Also listed and described scheme of the automated system of information handling and protection of alcoholic beverages. The ability of the system and closures provided by the use of radio frequency identification technology.

V. Pasichnyk. Synthesis of reverse assembly sequence based model binary relations limited mobility. This paper deals with the development of the method of synthesis of reverse sequence assembly of machinery and clarify understanding of concepts of binary relations limits the mobility of elements. In detail the example of using this method for assemblies "node transmission." For example, the assembly of the product "Buffer" shows many variations selecting the type and quantity of process equipment and the possibility of optimization.

B. Prydalnyi. Synthesis schemes clamp actuators for high-processing method morphological analysis. *The obtained results are aimed to solve the problems of automatic lathes efficiency limitation through the effort loss of workpiece clamp with increasing frequency of spindle rotation. This problem is solved by creation of new structures of clamping mechanism drive maintaining stable efforts of workpiece clamp with various rotation frequencies of spindle unit.*

O. Prykhodko, Ia. Pasternak. 3-Dimensional stress-strain state of metal matrix composite materials with bulky elastic-plastic filament. *The paper presents an analytic technique for determination of stress-strain state and strength of materials containing elastic-plastic ellipsoidal inclusions, in particular, composite materials with bulky filament. This technique is based on the polynomial conservation principle and the assumption that the elastic-plastic deformation under the applied load is occurred in the inclusion only. Additionally, to account for the hardening of an inclusion's material, proposed technique incorporates Birger's technique of variable parameters, which allows to extend significantly the range of applications of the proposed approach. Several problems are considered for metal matrix composites with bulky and fusiform elastic-plastic filament. The stress strain state and stress intensity in the inclusion are obtained, and the strength of such composites are determined based on the theory of maximal normal stress. Key words: composite, elastic-plastic, stress, fracture.*

O. Redko. Means for reinforcing information technology training in modern conditions of technological complexes. *The mechanisms of didactics process are examined in the article, influencing on which it is possible to attain the substantial increase of efficiency and quality of general preparation of students of technical universities, and also high-quality and quantitative descriptions of process of studies and complex approach to his intensification.*

T. Sass, Ya. Kolyano. Comparative analysis of transient behavior during the potential of thermal and moisture conductivity during convective drying wood and cardboard. *On the basis of studying of non-stationary task of thermal and moisture conductivity and by using the equation derived by Luikov A.V., an approach to studying of convective drying of printing materials and semi-finished products in time is suggested. Obtained formulas allow to build graphs of temperature and moisture contents distribution with time during convective drying of wet plate made of any capillary-porous colloidal material. Wood and cardboard are selected as the investigated materials. From the proposed graphs we can see appearing of gradients of temperature and moisture contents which can cause damage of drying material. Solving of this problem is useful for studying the drying process when the heat application is provided with combined method (conductive-convective, radiant-convective) for further automation. The mathematical model can be used to explore other methods of drying printed materials (conductive, radiation).*

G. Sementsov, O. Hutak. Identification of chaotic behavior of nonlinear control objects, which operate under conditions of uncertainty and the presence of barriers. *This paper investigates the theoretical and metho-*

dological bases of identification of chaotic behavior of nonlinear control objects, which operate under conditions of uncertainty and the presence of noise on the example of the process of drilling. The main obstacles to identifying behavior of the object, in particular, the development of the object in the time variable nature of the a priori unknown nonlinearities, stochastic nature of disturbances. The need to develop a method based on identifying disordered calculating Hurst. The algorithm and device for calculating Hurst to identify chaotic behavior of non-stationary objects.

V. Senkivskyy, I. Pih, I. Hileta, Y. Petriv. Function of the paper settings for flat offset printing. *Determined and calculated membership function parameters of paper that affect the quality of the printing process of copies using the term-set values and linguistic terms of parameters.*

Z. Stotsko, D. Rebot. The effect of granular environment dynamic motion on productivity of vibration separators. *In the article considered the scheme of vibration separator with vertical oscillations sieve for separation the elastic homogeneous material into fractions. During the research using the methods Krylov - Bogoliubov - Mitropolsky the mathematical model of loose environment that provides oscillating motion in the vertical plane is proposed. The equations of motion of an arbitrary layer of protection in vibration separator are built. In this free-flowing environment modeled as flat layers of elastic beams with a thickness much smaller than the length and come into contact with the walls of the container tightly or as hinged. Using a special device Ateb- functions and asymptotic methods of nonlinear mechanics obtained solutions of equations. The resulting solutions of basic dynamic characteristics of motion layer of loose environment allowed investigating the effect of a constant rate of movement along a vibrating sieve separator on the dynamic characteristics of the model layer of medium. The model of motion of environment layer and graphical dependencies allow determining the optimal value of the amplitude and frequency of granular media, which allows optimizing of structures separators and technological modes of separation materials.*

V. Strutynskiy, N. Havrushkevych, V. Polunychiev. Mathematical modeling of dynamic characteristics of parallel kinematics machines using the theory of fuzzy sets. *The urgency of the development of mathematical models of dynamic characteristics of parallel kinematics machines using the theory of fuzzy sets. The analysis of the structure of the machine and its dynamic model is developed. It is based on the idea of parallel kinematics machine as a set of partial dynamical systems. Platform for dynamic system introduced four partial dynamic subsystem. Three of them describe the translational movement of the platform in three directions, and spherical motion subsystem describes rotational movement of the platform relative to the pole. Dynamic subsystem rods allow variable length parameter distributions along the length of the rods. The structural mathematical model whose blocks correspond to individual partial dynamic subsystems. Platform for dynamic subsystems used mathematical models based on the idea platform as a solid and offered appropriate mathematical models. Considered partial subsystems rods of variable length. The spectrum of natural frequencies and mode shapes of rod as the rod moved on two pillars. The elastic properties of the rod asked to describe in terms of the theory of fuzzy sets.*

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Characteristic functions of fuzzy sets are defined on the basis of experimental measurements of stiffness rods. The found field displacement rod as the rod with distributed mass transfer function defined dynamical system rod. It has a seemingly endless amount of dynamic elements of the conservative type. Proposed to take into account the loss of energy in the system by replacing conservative links links oscillatory type. The parameters of the vibrational damping units. Developed mathematical models of structural rods of variable length, sensitive dynamic disturbances in bars from the drives and indignation on the hinge side of a base. As a result, a general mathematical model of a dynamical system of the machine. Mathematical modeling of dynamic processes in parallel kinematics machines in single and batch pulsed dynamic perturbations rods. Defined path of the platform in pulsed loads rods. Identified common characteristics of trajectories.

S. Strutynskiy. Development of dynamic inertial actuators with ferromagnetic fluid for moving of octahedral type spatial mechanism. The relevance of the mobile spatial mechanisms of octahedron type with elastically deformed bellows actuators is substantiated. To implement the specific types of spatial movement of mechanism in the form of rotation around the edges (tilting) the special inertial magnetic drives with ferrofluid are offered. The actuator has a body of non-magnetic material with a spherical cavity which is partially filled with ferrofluid, in which the magnetic sphere is placed. In the center plane of the cavity along the periphery of the housing the electromagnets, which are governed by special laws of mechatronic systems control are mounted. Schematics and designs of mechanisms and drives through the manufacturing and testing of spatial mechanisms and inertial actuators are developed, their performance is confirmed. The dynamic models of drives that are mounted in different vertices of the spatial mechanism are developed. It has been shown that the dynamic action is to acquire more kinetic drive energy when it is triggered, which depends on the magnitude of the magnetic force produced between the electromagnet and the magnetic sphere. The conditions of the position changing of the mechanism, which is the rotation of the mechanism relatively to one of the edges of octahedron were established.

V. Sychuk, O. Zabolotnyi. A research of air permeability of porous samples with the purpose to identify optimal parameters. To reduce wear on the inner most responsible surface of a part (a nozzle of abrasive blasting machine) authors of the paper suggest to create an air layer on the mentioned above surface, this layer will act as a barrier between the abrasive and the working surface of the nozzle. As a consequence, part of the nozzle must be produced porous one. In this article we show the process of a research of the air permeability of porous powder samples with a porosity of 30%, 40%, 50% made of titanium powder PTH-1. Fractional composition of the powder of two types: -1mm...+0,63mm and -0,63mm...+0,4mm. There were researched properties and level of influence of fractional composition of powder and porosity of powder sample on pressure drop P , which

30%, 40%, 50%
-1.
: -1 ...+0,63 -0,63 ...+0,4

occurs when the flow of air pass through the porous element.

A. Tseiko, A. Zabolotnyi, V. Rud'. *Designing RTC using CAD/CAM/CAE systems as a solution to complex engineering problems. The aim is to analyze the prospects for the development and use of technological systems, as well as the usefulness of CAD products in their manufacture.*

CAD/CAM/CAE

O. Shevchenko, A. Yashnyk. **The development of vibration of the cantilevered instrument in boring process on the lathe.** *In article the directions of heightening of a chatter stability of boring bars are considered at turning. The scheme of a dominating vibratory system of boring process is developed for the theoretical analysis of oscillating processes at machining by the cantilevered instrument and using of the mathematical model of the closed dynamic system of the lathe which allows to define influence of design factors of the cantilevered boring bars on a chatter stability of boring are build. Experimental researches of dynamic characteristics of the cantilevered instrument are carried out at the stand which gives the chance to define frequency characteristics in an elastic-system of the instrument by a method of harmonic excitation. Guaranteeing of the conditions of vibrational proof machining on the lathe can be carried out for cantilevered instrument by the rational sampling of its design factors taking into account matching orientation of principal axes of stiffness of an elastic-system of the instrument in relation to a cutting force direction and sampling of a rational relationship of the stiffness of the boring bar along these axes.*

Y. Sholoviy, N. Tymoshenko, N. Maherus. **The behavior modeling of fine granular materials under vibration in conical hole of the hopper using the Lorentz system.** *The transformation methodology of the Navier-Stokes equations, which describe the motion of fine disperse material under vibration in the conical hole of the dispenser, to the Lorentz model, which is a base for the graphical dependencies, that allow to predict the material behavior during the phase of the dispensing equipment designing, and thus to influence it changing the intensity of the vibration and dispensing hole parameters, is described in the article.*