

## ABSTRACTS

**Section of «Metallurgy. Rolling production»**

UDC 669.184 Kulik A., Kascheev M., Pohvality A. ABOUT THE TECHNICAL EQUIPMENT OF THE TWO COMPETING TECHNOLOGIES AND THE EXPECTED DEVELOPMENT DIRECTIONS REDIVISION OF CONVERTER (*in order of discussion*). The analysis of the state of leading steelmaking technologies according to the level technical equipment of converter and EAF. One reason entrenched leadership of EAF - high level of technical sophistication. Is observed a 2-3-fold difference in the level the top structure equipment EAF and converter. Identified ways of improving the technology of converting.

*Keywords:* leading technology, level of equipment, upper and lower structure, ways of improving: dispersed stream, tuyere new generation, two-slag refining.

UDC 669.184.125 Sigarev E., Nedbaylo N., Borshevskiy R. UPGRADE SCULL LANCE SLAGGING LININGS. A significant effect of quality applied to the converter lining refractories in comparison with the change in the specific consumption of magnesia additives, sit down during melting, the duration of the campaign for the lining. The directions of modernization construction scull lance.

*Keywords:* scull lance, converter, refractory, repairing converter.

UDC 669.184.244.66 Panteykov S., Kiryanova M., Panteykova E. ON THE INFLUENCE OF SCRAP PREHEATING THE BLAST TO BOTTOM MIXING OF THE MELT IN CONVERTER. The results of numerical research of influence of preheating temperature gas (nitrogen) to bottom mixing of the melt in converter during blowing, scrap the filling metal oxygen converters. The influence of the equivalent of reducing gas consumption by its preheating on the possibility of increasing the proportion of recycled scrap. The dependence of the scrap rate changes (to 1 m<sup>3</sup> blow) in the preliminary heating of blast up to temperatures of 500-1400°C and at an equivalent reduction of gas mixing flow caused by its preheating to the temperature.

*Keywords:* bottom-blast is supplied, scrap metal, gas consumption, preheating, blasting device, purge.

UDC 669.02/09:669.14.018.29:669.18.046.58.001.8 Piptyuk V., Petrov A., Prikhodko E., Mopoz V., Poliacov V., Grekov S., Anosova A. INTERFACIAL TENSION IN SYSTEM STEEL-SLAG. Based on the analysis of the interfacial tension in the system of steel-slag and of the theory of directional communication with respect to the metal and molten slag established relation between the coefficient of interfacial tension  $\sigma_{st-shl}$  with difference parameters of interatomic interaction ( $\delta d$ ,  $\delta Z^Y$  and  $\delta tga$ ). a semi empirical model is offered for the analytical estimation interfacial tension steel-slag, depending on their composition and temperature. The applicability of this model to predict the interfacial tension in the smelting and finishing of steel in ladle under PJSC «Dniprovsky metcombinat im. F.E.Dzerzhinsky».

*Keywords:* surface tension, semi-empirical models, the integral parameters.

UDC 669.147 Sinegin E., Bojchenko B., Gerasimenko V., Molchanov L., Hotjun V., Orudjov R. PHYSICAL MODELING OF METAL FLOW BRAKING PROCESS BY ARGON BLOWING IN CCM TUNDISH. The subject of research is process of continuous casting of steel, which with the purpose to protect liquid steel from secondary oxidation, includes argon blowing through hollow stopper-injector directly in a smelt flow streams out. The object of research is steel flow braking process of liquid steel streams out from CCM tundish in

crystallizer. To define the laws of change of casting speed by argon jet, authors develop a technique of physical modeling which application has allowed receiving mathematical models for the description of modes of a gas jet interaction with a stream of liquid steel.

*Keywords:* modeling, flow braking, blowing, CCM.

UDC 621.771.01 Romanjuk R. STABILITY PROCESS OF ROLLING ON THE BASIS OF EXPLORATORY ORTHOGRAPHIC EPURES OF CONTACT VOLTAGES. Exploratory orthographic epures allocation of contact voltages became analyses at rolling and leads in resistant to and unstable regimes. It is shown, that parameter  $K_{cm}$  allows defining precisely stability of process of strain on theoretical and exploratory orthographic epures of contact voltages. Thus, the given method definition of stability is universal and can be used as a builder for calculations of parameters and optimization process of rolling.

*Keywords:* contact voltages, stability parameter, stretching voltages, stability in pitch of process.

### **Section of «Electromechanics. Electrical engineering»**

UDC 62-52 Sheremet O., Sadovoy O., Sohina Ju. SYNTHESIS OF INTERRELATED AUTOMATED ELECTROMECHANICAL SYSTEM BASED ON DISCRETE TIME EQUALIZER. The article discusses a new approach to the construction of automated electromechanical systems interconnected with control. It is proposed to represent the control in the form of a multi-axis of the objective function, each of the coordinates which are defined separately with his electric discrete time equalizer. The advantage of this approach is the localization of electric drives, which with digital equalizer tuned to their own dynamic and static performance quality independently from the rest of the system.

*Keywords:* quantization, transitive function, regulator, error.

UDC 62-83:621.313 Klyushnik V. DETERMINATION OF GEOMETRICAL PARAMETERS OF ФОЛЬГОВЫХ ОБМОТОК OF ТРАНСФОРМАТОРНЫХ DEVICES WITH INTERNAL LONGITUDINAL CAPACITY INDEMNIFICATION. In the article the analysis of intercommunications is executed between the geometrical parameters of the winding of transikond, their electric descriptions, and also with the features of construction of the winding. Correlations, determining the numbers of coils of foil the winding, consisting of a few packages of ribbons of foil and isolation at successive connection of foil ribbons of these packages, are got. It is rotined that the incurrence of coils of such puttee does not depend on the order of winding of packages of ribbons, its constituents, although numbers of coils at winding each of packages depend on the order of winding of packages. Dependence is shown out for the calculation of width of ribbons of foil, formative a compensating capacity at which identical lengths have these ribbons.

*Keywords:* foil puttee, transformer device, longitudinal capacity indemnification, number of coils of puttee.

UDC 621.312.323 Chernoiivan V., Medechu M. IMPROVEMENT OF POWER INDEXES OF ELECTROMECHANICS OF DIRECT-CURRENT. In the article done the harmonic analysis of rectified voltage thyristor converter constant current and schemes designed counted for typical total harmonic distortion. The effect of the distortion of the rectified voltage to the power factor of the drive.

*Keywords:* electric drive, thyristor converter, harmonics of the rectified voltage, power factor.

UDC 62-83 Derets A., Sadovoy A. OPTIMIZATION OF FIFTH-ORDER CONTROL SYSTEM IN TIME DOMAIN BY N-i SWITCHES METHOD WITH CONTEXT OF THEOREM ABOUT N INTERVALS. Correlation for magnitude of performing input step with parameters of sliding mode control fifth-order system was obtained by the N-i switches method, which provides time-optimal transient. Steadiness of sliding mode was checked out in analytical way. The results of simulation were presented for synthesized control system.

*Keywords:* sliding mode control; N-i switches method; time-optimal transient.

UDC 621.313.322 Homenko V., Kolychev S., Nizimov V. COMPARATIVE ESTIMATION OF POWER AND OPERATIONAL INDICATORS OF STATIC ACTIVATORS OF SYNCHRONOUS MACHINES. In the given article power indicators and operational characteristics of static activators have been investigated. The comparative estimation of symmetric and asymmetrical bridge activators application has been made. The asymmetrical bridge scheme of the activator with the capacitor store of energy has been developed. Experimental researches have shown, that operation speed in a mode rate is 20 times higher, and time of field discharge is 3 times less with capacitor energy stores use.

*Keywords:* generating unit, excitation system, capacitor energy store, power indicators.

### **Section of «Heat-power Engineering. Heat Engineering»**

UDC 658.26 Klimov R. FUSION OF DISPERSED PARTICLES IN THE LIQUID MIXTURE. In the article the method of calculation parameters of particles of dispersion phase emulsion beginning to boil at their confluence and further formation of conglomerate is offered.

*Keywords:* emulsion, effervescence, crushing, acceleration, instability, thermal stream.

UDC 532.542.86.(088.8) Gotsulenko V., Gotsulenko V. MECHANISMS OF ASCENDING BRANCH ON PRESSURE CHARACTERISTICS DUE TO THE REDUCTION IN THE DENSITY FLOW. Found that the cause of self-oscillation excitation of longitudinal (surge) or thermoacoustic self-excited oscillations and self-oscillation vibration combustion, due to the change in the density of the medium flow. This leads to a negative local hydraulic resistance that generates ascending branch in the corresponding characteristic pressure vane supercharger or discharge characteristics of the heat.

*Keywords:* longitudinal self-oscillations, the mechanism of instability, negative resistance, the pressure characteristics.

UDC (620.9 + 553.982.2):66(063):005:536.7 Tuchin V., Dolgoplov I., Sadovoy A., Ticshenko N., Bezshanko R. THE STRATEGY AND MANAGEMENT OF SYSTEM APPROACH TO PROBLEM OF ENERGY- AND RESOURCE-SAVING (part 2). The content of final stages system strategy of energy-and resource-saving physics-technological systems (FTS) is considered. The methodology of functional operator synthesis of FTS is given that grounded on topologoexergic methodology. The content of next stages is given “the verification and identification of under study FTS operators”, “exergoeconomic optimization and structure synthesis of “FTS”, “the definition of dynamic stability FTS” and “the selection of thermodynamical concepts of energy-and resource-saving FTS control”.

*Keywords:* energy-and resource-saving, physics-technological system, system analysis, topologoexergic methodology, exergoeconomic, control.

UDC 533.1:532.7 Kravchenko A. VAPOR PRESSURE: 2. EXPERIMENTAL DATA FOR THE EVALUATION OF NEW PRECISION TEMPERATURE DEPENDENCE. The ability to leverage a new dependency on the temperature of the vapor pressure over a wide range of temperature and pressure for substances of different composition, structure and properties, located in all states of aggregation to determine if the values of the coefficients that are to be found from the experimental data.

The analysis methods for obtaining these data allowed to select the actual data depending on the vapor pressure versus temperature for the organic and inorganic substances in the ranges of temperature and pressure from virtually zero to their critical values.

*Keywords:* vapor pressure, methods of the determination.

### **Section of «Mechanics. Engineering»**

UDC 676.163.022;62-932 Kamel G., Gritskevich A., Brazhnik S., Lyakh A. INFLUENCE OF HYDROSHOCKS ON FORMING OF WEAR IN DETAILS OF CONICAL TRIBOSYSTEM. The questions of influence of hydroimpacts are considered in a feeder of conical tribosystem on: a 1) amplitude of axial vibrations of rotor; 2) vibrooscillations of size of gap in a feeder; 3) a force entering of lye gap and extrusion of her from a gap; 4) wear under their action of the attended details of feeder of conical tribosystem.

*Keywords:* taper, anti-friction materials, rotor, hob, building, welding, grounds, middle bridges of rotor and corps.

UDC 676.163.022;62-932 Kamel G., Finchyk O., Shapoval M., Kritsckiy M. LAWS GOVERNING THE CHANGE OF THE CONICITY IN CONICAL TRIBOKNOTS WITH THE OPERATION. A complex of the constructive, technological and maintenance measures is given in this paper. It is directed to the elimination of the boundary lubrication of the basis and middle jumpers of the rotor and on the feeder bushes Camur by using the bush made of 10x12NDL-II steel instead of the expensive Monel metal bush.

*Keywords:* taper, antifriction materials, rotor, hub, building, welding, base, middle jumper of the rotor and housing.

UDC 676.163.022;62-932 Kamel G., Trybchanikova K., Kryukov Y., Suslova V. CHOICE OF MATERIAL OF ANTI-FRICTION PAIR FOR MAKING OF DETAILS OF CONICAL TREBOUNIT. The complex of the structural, technological and operating events sent to the removal of border friction on grounds and middle bridges of rotor and hob of feeder Kamyr with the use of hob from steel of 10X12HДJI-II instead of expensive from is considered. Rational technology of repair of rotor, including welding, modes of hard-facing and methods of renewal, is worked out and inculcated.

*Keywords:* taper, anti-friction materials, rotor, hob, welding, grounds, middle bridges of rotor and corps.

UDC 622.012.7.004.15:004.891.3 Bohatova K. RELIABILITY ASSESSMENT FOR MINING EQUIPMENT AND ITS DIAGNOSTICS. Increasing the reliability of mining equipment through early control failures of parts and units breakdown of road-headers and conveyors improves their operation ability. Analysis of downtime common factors of mining equipment allows to identify the origin of the failure in advance and in a due time to prevent downtime. This reduces the cost of maintaining the equipment in a good operation state.

*Keywords:* increase of reliability, the origin of failures, control.

UDC 621.867.2:664 Perfilyeva Y. EFFECT OF HOLES ON THE STRENGTH OF CONVEYOR BELT. In the article investigated effect of holes on the strength of the tape. As a result of studies found the dependence of mechanical properties of rubber conveyor belt with holes and the method of calculation of the stress-strain state of rubber conveyor belt with holes.

*Keywords:* stress-strain state, conveyor belts, holes, efforts, deformation.

UDC 681.2 Shkil V., Korobochka O. THE ERROR DETECTION MEASURING HEAD TOUCH IN AUTOMATED MODE. The article discusses the analytical determination of the error in the measurement of the sizes of details, which depends on the variance of the geometric shape of carrying elements of the head of touch, and in the automated mode using the graphical editor AutoCAD

*Keywords:* measurement, head of touch, geometrical shape, point of contact, error.

UDC 669.013.002.5:531.3 Beygul O., Korniychuk N., Lepetova A. THE BASS OF CROSS CONDITION FOR ARTICULATED CONTAINER TRUCK WITH U-SIMILAR FRAME UNDER DISTURBANCE MOTION. The mathematical model of articulated container truck with U-similar frame disturbance motion by asymmetrical kinematics disturbance of uneven technological roads has been worked out. The condition of cross stability for container truck under disturbance motion by methods of analytical mechanics has been receiver and based for selection conditions of container truck motion on the technological roads.

*Keywords:* mathematical model, disturbance motion, articulated container truck, U-similar frame, cross, stability.

UDC 622.271 Bondarenko A. GROUND OF PARAMETERS OF COMPLEX FOR FINE-GRAINED SANDS PROCESSING. As a result of review and analysis of devices for sands processing, applied at the hydraulic mining, rationality of application, and also structural and technological parameters of classifiers, is grounded hydraulic horizontal in composition technological complexes, applied at processing of fine-grained sands.

*Keywords:* sand, hydraulic classifier, technological complexes.

### **Section of «Mathematical problems of the technical mechanic»**

UDC 539.3 Bezverhy O. ABOUT ONE METHOD OF RESEARCH OF AXISYMMETRICAL HARMONIC VIBRATIONS OF ELECTRO ELASTIC. The method of reduction of equalizations of harmonic electro-elastic vibrations is offered in cylinder co-ordinates to the system of ordinary differential equalizations of the first order on the basis of Hamilton formalism on a radial coordinate and difference approximations on an axial coordinate.

*Keywords:* electroelastic vibrations, piezoceramic cylinder, hamilton formalism, difference approximations.

UDC 539.3 Kirilyuk V. CONTACT ELECROELASTICITY PROBLEMS ON STAMPING OF TWO RIGID PUNCHES OF CIRCULAR SECTION TO THE PIEZO-ELECTRIC HALF-SPACE. The approximate analytical solutions for problems of contact interaction of two rigid circular (planar and nonplanar) punches with electroelastic half-space were given. The contacts problems were reduced to the solving of the potential theory problems. The expressions for the finding of contact pressure, displacement under the punches, relations for the finding the contact region of the nonplanar punches were obtained in the explicit form. The influence of connectivity of force and electric fields was studied.

*Keywords:* electroelasticity, piezoelectric half-space, rigid punches, circular section.

UDC 539.3 Lugovoy P., Prokopenko N. ABOUT DISPERSION CURVES OF HARMONIC WAVES PROPAGATING ALONG LONGITUDINALLY REINFORCED CYLINDRICAL SHELLS ON ELASTIC FOUNDATION. The influence of discrete arrangement of ribs and Pasternak coefficients of elastic foundation on the number and shape of dispersion curves of the waves propagating along the cylindrical shell reinforced with longitudinal ribs are studied. The case of shell deformation is examined when ribs are twisted only. The wave profile in circular direction has flexural nodes on the ribs. The results of carried out investigation the influence of Pasternak elastic foundation coefficients and the number of stiffening ribs on the wave parameters show that with growth of coefficients of Pasternak elastic foundation and the number of ribs the blocking frequencies increase and the shape of dispersion curves is changed.

*Keywords:* cylindrical shell, longitudinal ribs, harmonic waves, dispersion curves, blocking frequencies, Pasternak elastic foundation.

UDC 539.3 Bagno O., Bagno I. EFFECT OF INITIAL STRESSES ON FREQUENCY SPECTRUM OF WAVE PROCESS IN PRELIMINARY DEFORMED COMPRESSIBLE ELASTIC LAYER INTERACTING WITH LAYER OF IDEAL COMPRESSIBLE LIQUID. Statement of the problem about propagation of normal harmonic waves in preliminary stressed compressible elastic layer, which interacts with layer of ideal compressible liquid is presented. Numerical investigation was performed, dispersion curves were constructed and we ascertained dependencies of wave speeds on initial stresses for wide range of frequencies.

*Keywords:* elastic layer, liquid layer, initial stresses, harmonic waves.

UDC 534.075 Dovzhyk M., Nazarenko V. FRACTURE OF COMPOSITE MATERIALS COMPRESSED ALONG THE NEARSURFACE PENNY-SHAPED CRACK WHEN DISTANCES BETWEEN THE CRACK AND THE FREE SURFACE IS SMALL. A axisymmetric problem of destruction of composite materials compressed along the surface of the crack is solved. The numerically analytic method proposed in [5, 6] was used. The values of the critical stress for the composite material for large and small distances between the crack and the free surface was found.

*Keywords:* compression, nearsurface penny-shaped crack, critical stress, composite.

UDC 534.21 Kovalenko A., Shekera M. APPLICATION ITERATIVE TECHNIQUE FOR STUDYING THE TRANSITION IN A SYSTEM OF ELASTIC PIPELINE - LIQUID LONGITUDINAL DYNAMIC SHOCK LOADING. Consider an elastic pipe with the liquid at the longitudinal impact loading at the end. The pipeline is modeled semi-infinite cylindrical shell. Liquid is considered in the acoustic approximation. In the image space, the Laplace-Carson problem is reduced to a system of ordinary differential equations. By the method of iterations found an approximate analytic solution in the image space.

*Keywords:* elastic pipeline, fluid, transients.

UDC 539.3 Bystrov V., Dekret V., Zelensky V. NUMERICAL INVESTIGATION OF STABILITY OF A PLATE WITH A CENTRAL CRACK AT UNIAXIAL COMPRESSION. The numerical solution of the problem of stability for a layered composite material under uniaxial compression in the plane of the layers of filler reinforcement was obtained. The dependence of the form of the loss of stability from heterogeneity of the initial state for buckling was investigated. The static method of three-dimensional theory of stability was applied to the problem decision.

*Keywords:* layered composite material, uniaxial compression, inhomogeneous initial state, the three-dimensional linearized theory of stability.

UDC 539.374 Babeshko M. TO A CALCULATION OF THE AXISYMMETRIC ELASTOPLASTIC STATE OF THIN SHELLS IN THE PROCESSES OF VARIABLE LOADING WITH ALLOWANCE FOR THE REPEATED PLASTIC STRAIN AND THE TYPE OF STRESS STATE. The procedure for the numerical investigation of the elastoplastic axisymmetric stress-strain state of thin shells in the deformation processes along the trajectories of small curvature with allowance for the repeated plastic strain and the third invariant of the stress deviator is elaborated. The procedure approbation is given.

*Keywords:* elastoplastic stress-strain state, repeated plastic strain, third invariant of the stress deviator.

UDC 539.374 Savchenko V. THE THERMOVISCOPLASTIC STATE OF BODIES OF REVOLUTION UNDER NON-AXISYMMETRIC THERMO-FORCE LOADING WITH ALLOWANCE FOR A MATERIAL DAMAGE AT CREEP. The technique for numerical investigation of non-elastic stress-strain state of the machinery construction elements as bodies of revolution under non-axisymmetric thermo-force loading with allowance for a material damage at creep is presented. The properties of material are given as the experimental data on the thermomechanical surface, the creep diagrams and the diagrams of the long-term strength.

*Keywords:* non-axisymmetric thermoviscoplasticity, material damage at creep, bodies of revolution.

UDC 539.3 Levchuk O. CONTACT INTERACTION OF ELECTROELASTIC HALFSPACE WITH RIGID CONCAVE PUNCH, THE SURFACE OF WHICH IS DESCRIBED BY INVERSE POWER FUNCTION SUMMARY. The contact electroelasticity problem about stamping of concave rigid punch, the surface of which is described by inverse power function, with electroelastic transversally isotropic half-space with nonelectroded surface, was considered. The contact parameters, which depend on stamping force, punch geometry, electroelastic properties on half-space materials were found. The influence of punch stamping force on contact region size was investigated.

*Keywords:* electroelasticity, contact problem, concave rigid punch, piezoelectric half-space, contact region.

UDC 539.3 Semenyuk N., Zhukova N., Ivanova N. NON-LINEAR DEFORMATION OF FIBERS COMPOSITE SHELLS AT NONCOINCIDENCE OF DIRECTIONS OF REINFORCEMENT WITH COORDINATE AXIS. The incremental approach to the solution of the problem of non-linear shells deformation at loads which correspond to pre-buckling, buckling and post-buckling states is worked out. For the solution of a boundary value problem the method of a discrete orthogonalization is used at equal rights of unknown functions and load. The example of the solution of stability and post-buckling behavior problem for an anisotropic spherical shell under initial pressure is considered.

*Keywords:* Timoshenko-Mindlin shell theory, nonlinear deformation, the method of a discrete orthogonalization, stability of shells, post-buckling behavior.

UDC 539.3 Proshchenko T. MECHANICAL STRESSES CONCENTRATION NEAR AN ELLIPTICAL HOLE IN A PIEZOCERAMIC PLATE UNDER UNIFORM TENSION. On the basis of method of functions expansion in Fourier series on Legendre polynomials of thickness coordinate and method of shape boundary perturbation the solution of the problem of determining the mechanical stresses concentration near an elliptical hole in a piezoceramic plate is found. It is assumed that the surface of the cavity is free from electrical and mechanical actions, and at infinity plate is under comprehensive permanent tension.

*Keywords:* piezoceramic plate, hole, stress state.

UDC 539.3 Khoroshun L., Shikula E. DEFORMATION AND LONG-TERM DAMAGEABILITY OF PHYSICALLY NONLINEAR MATERIALS. A model of deformation and long-term damageability of physically nonlinear materials is suggested. Process of damageability of a material is modeled by appearance stochastically located micropores. For the any moment of time the equation of balance damageability of physically nonlinear material is formulated. Algorithms of calculation of dependences of microdamageability of material from time. Influence of nonlinearity of a material on its curve macrodeformations and damageability is investigated.

*Keywords:* physical nonlinearity, stochastic structure, long-term damageability, effective characteristics, balance equation of porosity.

UDC 539.3 Homa I., Dashko O., Kovalenko I. STRESS STATE TRANSVERSELY ISOTROPIC PLATE WITH REINFORCEMENT ELLIPTIC HOLES. Using perturbation technique forms the boundary [3] in this paper we consider the problem of the stress state of transversely isotropic plate with an elliptic hole, the boundary surface is supported by a thin film is formed by an incompressible; away from the orifice plate in the field full of tension.

*Keywords:* transversely isotropic plate boundary shape perturbation technique, Fourier series.

UDC 539.3 Kirilyuk V., Levchuk O. STRESS STATE OF ELASTIC ORTHOTROPIC BODY WITH ELLIPTICAL CRACK UNDER INTERNAL PRESSURE (WITH REGARD TO THE CRACK ORIENTATION). The problem on the stress distribution in an elastic orthotropic material with an elliptical crack (under inner pressure) with taking in account its orientatation was considered. There were used the triple Fourier transforms and Fourier image of Green's function for the anisotropic space. Analysis of numerical results was carried out. Regularities of distribution of stress intensity factors along crack front were established. The effects of the crack orientation in the material were shown.

*Keywords:* orthotropic medium, elliptical crack, inner pressure, stress intensity factors, orientation effect.

UDC 539.3 Steblyanko P., Kravchuk T. THE CONSTRUCTION OF THREE-DIMENSIONAL SPLINE BASIS FOR SOLVING PROBLEMS OF MATHEMATICAL MODELING. This work deals with the problem of constructing a type of spline functions, namely the construction of a three-dimensional spline basis. It provides a perspective view of a three-dimensional spline as the product of three third-order polynomials. The essence of the work is to find the twelve unknown coefficients of the spline. It must be emphasized, the construction of three-dimensional spline basis is not complicated and cumbersome in the calculations, and in addition, the solution of problems of mathematical modeling with the use of this spline is sufficiently high accuracy.

*Keywords:* spline interpolation, three-dimensional spline basis, multi-dimensional spline functions, polynomial, spline.

UDC 539.3 Petrov A. CALCULATION OF FIELDS PLASTIC DEFORMATION AT THERMOPOWER LOADING. Determination of thermal stresses in the structural elements in most cases is complex and time-consuming task. This is due to the influence of the temperature state of the complex body, including cyclic loading that may occur in it and to develop the plastic deformation. Existing numerical methods that are used in such tasks usually leads to large computational difficulties, which are caused by large systems of algebraic equations. In this regard, rational use software package that allows to quickly solve large



amounts of computation. In this work is presented, ANSYS is used to compute the finite element method.

*Keywords:* thermal-loading complex ANSYS, finite element method.

UDC 539.3 Dzyuba V., Steblyanko P. CONSTRUCTION METHOD OF HIGH ACCURACY PROBLEM FOR A CYLINDRICAL SHELL VARIABLE THICKNESS BASED ITERATIVE METHODS. This paper proposes a new variant of the method of high accuracy calculating problems for cylindrical shells of variable thickness using finite-difference approximations of derivatives.

*Keywords:* iterative circuit matrix method Seidel, the system of equations.

UDC 519:378.147 Nikulin A. MODELING AND CONTROL OF HIGHER MATHEMATICS TRAINING. According to the results of computational experiments with stochastic models for evaluating the success of training in higher mathematics for the semester found the possible range of high-quality and overall performance. The dependence of these limits not only on the level of training of students, but also from applied schemes of assessment. The important role of the teacher as an expert in the evaluation process, controlling the sustainability of the results of the testing and evaluation in general.

*Keywords:* higher mathematics, stochastic modeling, testing, success of training.

#### **Section of «Radioelectronics»**

UDC 621.391 Zakharov D., Wroblewski I., Kulik M., Ignatkin V. LABORATORY STAND FOR RESEARCH OF LCD DISPLAYS. Proposed version of the laboratory stand for research of LCD displays. A laboratory stand for research of liquid crystal displays. Analyzed are the foundations of institutional control algorithms displays in the environment of Proteus and AVR Studio. Selected approach, the conductive components and for the implementation of this device.

*Keywords:* algorithm of control, LCD, interruption  $t_0$ , time delays, the band frequencies, ATmega.

UDC 621.386 Meshchaninov S., Khrebto A. INVESTIGATION OF THE INFLUENCE OF THE FREQUENCY RANGE OF X-RAY OF RADIATION COMPUTED TOMOGRAPHY HUMAN. In their research paper treats the problem to investigate the effect of frequency range X-ray computed tomography human. The result was obtained that the reduction in radiation exposure to patients during computer tomography studies need complete and accurate information about the size doses.

*Keywords:* computed tomography, X-rays, the attenuation coefficient of, effective dose, pitch.

#### **Section of «Information Technology»**

UDC 519.233.3 Avramenko V. STATISTICAL INVESTIGATE CHARACTERISTICS OF PEARSON GOODNESS MEASURE. In the article with the use of statistical modeling methods the characteristics of Pearson goodness measure have been investigated. Consequences independence from grouping algorithm has been shown. It was recommended to draw a conclusion for average values of criteria for a few random samples.

*Keywords:* Pearson goodness measure, Monte Carlo method.

UDC 004.031.43:681.5:658.5(078) Lytvyn A. SIMULATION OF PRODUCTION ACTIVITY BUSINESS WITH INTEGRATED INFORMATION SYSTEM. As part of an integrated information system implemented a simulation model of management in production activity with various levels of management and information flows. For the production of bread simulated work process control, inventory management and raw materials, the highest decision-making level of the enterprise management

*Keywords:* simulation model, HMI-interface, integrated information system.

**Section of « Chemistry. Biotechnology. Ecology »**

UDS 548.736:546.562:541.49 Kovalenko A., Brezhe A. THERMAL STEADINESS OF COMPLEX COMBINATIONS OF COPPER (II) WITH ALIPHATIC AMINOS. Complex combinations of copper (II) salt with aliphatic aminos in unwater solvent are received. The complexes are investigated by means of electron methods and IK-spectrum investigation. Their composition is determined. The thermal steadiness of received combinations are studied.

*Keywords:* aliphatic aminos, copper (II), complex combinations, thermal steadiness.

UDC 681.3:65.014.1 Gulyaev V., Kornienko I., Radchenko E., Stasyuk Y.O. STUDY OF THE PROCEDURE OF THE ISOLATION OF THE PLANT FERMENT OF PEROXIDASE FOR THE PURPOSE OF THE CREATION OF CONTROL AND MEASURING EQUIPMENT (BIOSENSOR). The given article was devoted to the study of non-reagent of analytical methods based on the use of various biochemical sensors as diagnostic tests. Development of biosensors is one of the priority directions in area of biotechnology. The receipt of extract was conducted from the rhizomes of radish. Immobilization of extract and juice of radish is carried out. Biosensor on the basis of glass electrode with tape (immobilized enzyme), measuring of values of pH of electrode potentials is made. It was comparatively peroxidase activity in such vegetable objects as a carrot and cucumbers. It is educed that the higher level of activity of peroxidase is observed at the leaves of carrot and roots of radish.

*Keywords:* peroxidase, biosensor, guajacolum, the glass electrode, extract, enzymes, immobilization, substrate, hydrogen peroxide, ion meter.

UDC 615.2 Gylyaev V., Golovei O., Kibkalo N., Raskova Y. STUDY OF BIOLOGICAL ACTIVITY AND THE POSSIBILITIES OF USING ANTRAHINONOVIIH DERIVATIVES OF NATURAL ORIGIN. Investigated the biological activity of infusions of medicinal plant raw material for the growth of pathogenic microflora, for example, the spring water. Established effective methodology and recommended for use in the pharmaceutical and food industry.

*Keywords:* antracenspohidni, plant, culture medium, breeding, method of determination.

UDC 664.66.019 Gulyaev V., Kornienko I., Kryukovska O., Pereladova S., Khomych N. MICROBIOLOGICAL STUDIES OF QUALITATIVE CHARACTERISTICS OF BREAD. Were researched the basic causes of spoilage of bread and identified microorganisms that contribute to its causes and to the disease of bread. Were analyzed microbiological and physicochemical properties of bread made from wheat, rye flour, and rye bread with malt. Defined terms and conditions of its keeping. Was proposed microbiological methods to improve these properties of bread.

*Keywords:* diseases of bread, microbiological properties, acidity, storage life.

UDC 628.163 Ivanchenko A., Dupenko O., Kryvorot M., Voloshin N. RESEARCH OF TECHNOLOGIES BIOCHEMICALLY WASTEWATER TREATMENT COMPANY «DNIPRODZERZHINSKIY CP». In this work investigated the technology of biochemical wastewater treatment COMPANY «DNIPRODZERZHINSKIY CP», using an industrial plant. Made analysis of the quality of incoming and treated wastewater for summer 2013. It is shown that the main problems in data treatment plant there are inefficient removal of thiocyanate and phenol from wastewater, as well as drop the pH in the aeration tanks. It is suggested that the process of lowering the pH occurs at the expense passing of the process of nitrification in the aeration tank and this fact needs further research, particularly determination the concentration of nitrite and nitrate in the effluent.

*Keywords:* biochemical treatment, industrial wastewater, aeration tanks, phenols, thiocyanate, pH, nitrite, nitrate.

UDC 628.31:669.1 Avramenko S., Nenasheva O., Sidorova I. INVESTIGATION AND EVALUATION OF PURIFICATION PROCESSES OF POLLUTED SEWAGE WATER WITH OIL-PRODUCTS. Specific gravity of oils has been defined; solubility in water at different conditions has been investigated. The analysis of water purification methods from oil-products with sorbents has been carried out. Recommendations on the improvement of water purification methods in metallurgical manufacturing has been offered.

*Keywords:* oil-products, purification methods, sewage water, sorbents, oils.

UDC 628.4.038 Avramenko S., Plohaya T., Ismailova H. MEASURES OF EFFECTIVE MANAGEMENT, PROCESSING AND PLASTIC MATERIALS RECYCLING. The analysis of ecological problems connected with waste products and ways of their processing and utilization has been carried out. Recommendations on processing and utilization of drinking-water packing plastic materials and their application have been offered.

*Keywords:* waste products, plastics, processing, utilization, application, polyethylene terephthalate.

UDC 621.794.42.002.8 Protsenko A., Shestozub A., Dmitrikov V. INVESTIGATION AND DEVELOPMENT OF TECHNOLOGY OF RECYCLING OF ETCHING SOLUTIONS TO PRODUCE AMMONIUM SULFATE (message I). Investigated deposition ferum hydroxides with simultaneous ferrum(II) to ferum(III) oxidizing by air at development of technology of recycling of waste of sulfur-acide pickling solutions neutralization of free residual acid by water solution of ammonia to yield useful end products of ferum(III) hydroxide and solution of ammonium sulfate. Mathematical dependences of deposition time ferum(III) hydroxide from the temperature and intensity of mixing are received.

*Keywords:* waste acid pickling solutions, utilization, neutralization, ferum(III) hydroxide, deposition, oxidation.

### **Section of «Life Safety»**

UDC 669...85.001.57 Gasilo Yu., Levchuk K., Pluzhnik I. THE METHOD OF MATHEMATICAL MODELING OF WAREHOUSES OF THERMAL BARRIER COATINGS AND METHODS OF STUDIES OF THEIR EFFECTIVENESS. Questions thermal insulation on the production become more important, because modern technology is characterized by highly intensive processes occurring at high parameters of heat exchange. The method design of compositions heatcover coverages is worked out on the basis of descriptions

## *Abstracts*

refractive ability of materials, radiated energy of sources, cost materials and their amount. Approbations of design results are conducted on the experimental setting.

*Keywords:* design, method, heatcover coverages, efficiency, research.

UDC 629.039.58 Makhovskiy V., Kryukovska O. ANALYSIS OF EMERGENCY SITUATIONS AND FAILURES OF AMMONIA REFRIGERATOR SETTING ON ENTERPRISES OF FOOD RETAIL AND PROCESSING INDUSTRY. The analysis of possible emergency situations and failures is resulted in the article, and also their consequences which can happen during exploitation of refrigerator options on the enterprises of food retail and processing industry taking into account the followings factors: properties of ammonia, values of parameters of technological process, structural features of equipment and equipment, actual state of equipment, economic and organizational feasibilities of personnel on the whole and on warning of emergency situations.

*Keywords:* ammonia refrigerator setting, emergency situation, consequences of failures, area of destructions, area of defeats.