

Table of Contents

Preface

Chapter 1: Numerical Simulation of Physical and Chemical Processes

Comparative Analysis of Calculation Models of Pulse Tube Thermoacoustic Refrigerator S.O. Nekrasova, D.A. Uglov and A. Shimanov	3
The Study of Inhibition of Atom-Atom Collisions Cascades by Ni-Al (100) Interphase Boundary G.M. Poletaev, D. Novoselova, M.D. Starostenkov, V. Tsellermaer and V. Kovalenko	8
Boundary Value and Optimal Control Problems for Nonlinear Convection-Diffusion-Reaction Equation R.V. Brizitskii and Z. Saritskaya	13
Multiscale Simulation of Cold Axisymmetric Deformation Processes D. Konstantinov and A. Korchunov	18
Control Problem for Unsteady Magnetohydrodynamic Flow of Viscous Heat Conducting Fluid D. Tereshko	23
Mathematical Modeling of the Technological Process of Residual Stresses Relief in Metals at Low-Temperature Exposure M.V. Polonik and E.E. Rogachev	27
Steady Flow of Incompressible Elastic-Plastic Medium in a Spherical Matrix at Variable Loads M.V. Polonik and E.E. Rogachev	32
Calculation of the Residual Stress Field of the Thin Circular Plate under Unsteady Thermal Action E. Dats, S. Mokrin and E. Murashkin	37
Numerical Analysis of Inverse Extremum Problems for the Nonlinear Nonstationary Diffusion-Reaction Equation O.V. Soboleva and A.Y. Fershalov	42
Pressure Losses of Power-Law Fluid Flow through an Axisymmetric Sudden Contraction E. Borzenko, K. Boyarkina and G.R. Shrager	47
The Mathematical Model of Reflection and Refraction of the Longitudinal Shock Wave at the Interface of Two Nonlinear Elastic Media O.V. Dudko and V.I. Shtuka	51
Numerical Analysis of 2D Cloaking Problems Using Homogeneous Materials G. Alekseev, A. Lobanov and Y. Spivak	56
Analysis on the Applicability of Diffusion Approximation for the Radiative Transfer Equation with Compton Scattering I. Yarovenko	60
Dynamics of Discrete Breathers in the Pt₃Al Crystal P.V. Zakharov, S.V. Dmitriev and M.D. Starostenkov	65
Simulation of the Acoustic Field of Antenna Arrays I.O. Bolotina, K.G. Kvasnikov, A.A. Steinbrecher, H.M. Kroening and G.E. Osokin	70
2D Electromagnetic Wave Scattering Problem for Cylindrical Cloak Incorporating PEMC-Layer G. Alekseev, O. Dyakonova, A. Lobanov and A. Yu. Fershalov	75
Numerical Approach to Solving Problems of Two-Phase Multicomponent Flow in Porous Medium Based on Finite Volume Method D.O. Dil and A.M. Bubenchikov	80
Burning Rate Calculation for a Frozen Nanosized Aluminum Suspension V.A. Poryazov, K.M. Moiseeva and A.Y. Krainov	85
Boundary Design of Reflection Properties of a Steady-State Complex Heat Transfer Model A.Y. Chebotarev and A.E. Kovtanyuk	90

Numerical Study of Combustion Regimes and Heat Radiation of Cylindrical Porous Burner F.S. Palesskiy	94
Optimal Control Problem of Complex Heat Transfer for SP_1 Approximation A. Sushchenko	99
Numerical Simulation of Melting of Phase Change Material in a Square Cavity with a Heat Source N.S. Bondareva and M. Sheremet	104
The Features of Parallel Program for 3-D Modeling of Dynamic Processes in Porous Objects with Heat-Evolution G. Tarasov	109
Two Approaches for Simulating the Burning Surface in Gas Dynamics L. Minkov, E.R. Shrager and A.E. Kiryushkin	114
Phenomenological Modeling of Rheological Properties of Polyetheretherketones Reinforced with High Modulus Carbon in the Machining Process by a Reversible Analysis Method A.I. Khaimovich, A.V. Balyakin and N. Galkina	119
Decay of Low-Barrier Metastable State: Middle Friction N.E. Aktaev	124
Corrections to Kramers Formula Describing the Decay Rate of a Metastable State N.E. Aktaev and K.A. Bannova	128
Bending Process Simulation of a Flat Workpiece with Various Cross-Sectional Mechanical Properties with PAM-STAMP 2G F. Grechnikov, Y. Gorshkov and Y.A. Erisov	133
Identification Method of Blast-Furnace Process Parameters L.S. Kazarinov and T. Barbasova	137
Optimality Conditions for Pareto-Optimal Solutions V. Gorbunov and E. Sinyukova	142
Initial Data Forming for Process Simulation in System “Intruder – Physical Protection System” A.V. Bukovetskiy, B.P. Stepanov and D.A. Tatarnikov	148
Numerical Modeling of Cyclone Machine for Cleaning Gas Generator Gases V.V. Biryuk, A.B. Tsapkova and A. Shimanov	153
Simulation of Conditions of Solid Fossil Fuels Formation for Underground Conversion Investigation S.M. Martemyanov, A.A. Bukharkin, I.A. Koryashov and O.S. Kvashnina	158
Numerical Study of Grain Evolution and Dislocation Density during Asymmetric Rolling of Aluminum Alloy 7075 A. Pesin, A. Korchunov and D.O. Pustovoytov	162
The End-to-End Computer Simulation of Casting and Subsequent Metal Forming Y.A. Erisov, S. Surudin, A. Shlyapugin and F. Grechnikov	167
Boundary Element Formulation for Numerical Surface Wave Modelling in Poroviscoelasticity L.A. Igumnov, S. Litvinchuk, A.A. Belov and A. Ipatov	172
Use of Lagrangian-Eulerian Computing Method for Systems with Phase Change at the Solution of Stefan Boundary Value Problem A.S. Ogorodnikov and M.V. Troshin	177
Finite Element Modeling of Influence of Roll Form of Vertical Scale Breaker on Decreased Formation of Surface Defects during Roughing Hot Rolling A. Pesin and D.O. Pustovoytov	181
Mathematical Simulation of Cramped Bending of Sheet Parts Using Finite Element Analysis E.V. Eskina and E.G. Gromova	186
Accounting Viscous Dissipation at Round Tubes Filling E. Borzenko, O.Y. Frolov and G.R. Shrager	191
Features of Difference Scheme for the Diffusion-Kinetic Problem of Ion Implantation with Intermetallic Phases Formation K. Asfandyar and A.G. Knyazeva	195
Thermal Activated Elements Redistribution between Two-Component Coating and Substrate O.N. Kryukova and M. Chepak-Gizbrekht	200

Modifications of the Mathematical Crisher Model for Effective Moduli of Two-Component Elastic Isotropic Composite A. Svetashkov, N. Kupriyanov and K. Manabaev	206
Solving Unsteady Boundary Value Problems Using Discrete-Analytic Method for Non-Iterative Simulation of Temperature Processes in Time V.N. Sidorov and S.M. Matskevich	211
Correct Numerical Methods of Analysis of Structural Strength and Stability of High-Rise Panel Buildings - Part 1: Theoretical Foundations of Modelling A.M. Belostosky, S.B. Penkovoy, S.V. Scherbina, P.A. Akimov and T.B. Kaytukov	217
Correct Numerical Methods of Analysis of Structural Strength and Stability of High-Rise Panel Buildings - Part 2: Results of Modelling A.M. Belostosky, S.B. Penkovoy, S.V. Scherbina, P.A. Akimov and T.B. Kaytukov	221
Spectral Analysis of Narrow Band Periodic Signals V.S. Avramchuk and E.M. Yakovleva	225
On Modelling of Creep and Plasticity in a Problem of Viscosimetric Flow of a Material A.S. Begun, L.V. Kovtanyuk and A.O. Lemza	230
Influence of a Porous Insert on the Fluid Flow inside the Gasifier Shaft P.V. Openyshev and M.A. Sheremet	235
Mathematical Simulation of Hydraulic Power Pulse Machine at Matlab M.V. Novoseltseva, E.N. Pashkov and I.A. Masson	240
The Numerical Study of a Dropwise Condensation Mode when Cooling Heat Transfer Surfaces A.V. Krainov, E.N. Pashkov, R.E. Lushnikov and V.A. Arkhipov	244
Non-Uniform Temperature Distribution in Multilayer Thermal Protective Coating with Curved Interfaces Y.A. Chumakov and A.G. Knyazeva	251
Numerical Simulation of Gas Evolution from Oil-in-Water Flow for Multistage Separation A.A. Khamukhin and E.V. Nikolayev	257
Classification of the Signatures for Doppler Radar from the Standpoint of Active Perception Theory V.E. Gai and A.M. Bogdan	262
A Three-Dimensional Boundary Element Approach for Transient Anisotropic Viscoelastic Problems L.A. Igumnov, I.P. Markov and A.V. Amenitsky	267
Convection Heat Transfer on a Vertical Surface in Porous Media A.A. Bocharova and I.V. Plaksina	272
One-Dimensional Wave Propagation in a Three Phase Poroelastic Column L.A. Igumnov, A. Petrov and I. Vorobtsov	276
Hydrodynamics and Heat Transfer in the Coolant Flows in the Elements of the Technical Designs of Industrial Systems A.V. Krainov, E.N. Pashkov, R.E. Lushnikov and V.A. Arkhipov	280
Study of Bone Tissue Stress and Strain State Aimed at Development of Intelligent Biomaterials for Osteoimplantation T.V. Kolmakova	284

Chapter 2: Mechanical Engineering Technology

Perspectives of Application of 3D Shape Memory Composite Materials for Peristaltic Transportation of Slurries M.A. Vasilyeva	291
Effect of Copper Additives on Mechanical and Tribotechnical Properties of Sintered Composites Al-Sn N.M. Rusin, A.L. Skorentsev and A. Gurskikh	295
On Zero-Order Optimization in Problem of the Pressure Computing in Finite Elastic-Creep Deformations M. Anop, E. Murashkin and M.V. Polonik	300
Deforming of Elastic-Plastic Medium with Self-Similar Restriction A.A. Mantsybora and M.M. Rusanov	305

Experimental Studies of Thermoelectric Characteristics of Plastically Deformed Steels ST3, 08KP and 12H18N10T	
A.I. Soldatov, A.A. Soldatov, M.A. Kostina and O.A. Kozhemyak	310
Effect of Surface Emissivity on Conjugate Turbulent Natural Convection in an Air-Filled Cavity with a Heat Source	
I.V. Miroshnichenko and M. Sheremet	315
Hydraulic Power of Vibration Test Stand with Vibration Generator Based on Switching Device	
A. Nizhegorodov, A. Gavrilin and B. Moyzes	320
Propellant Grain with Maximum Combustion Efficiency of Metal	
L. Minkov, E.R. Shrager and E.V. Pikushchak	325
Effect of Ultrasonic Impact Treatment on Microstructure and Mechanical Properties of Commercial Purity Titanium	
R. Hairullin, A. Kozelskaya and M. Kazachenok	330
Technique of Decomposition of Form Deviation for Freeform Surfaces	
V.A. Pechenin, M.A. Bolotov and N.V. Ruzanov	334
Strength and Stiffness Calculation of Small Diameter Gun Drills	
A. Babaev, B.A. Tukhfatullin and A.B. Kim	340
Efficiency of the Small-Sized System with Thermo-Electrical Conversion of the Heat from Gas Combustion	
T. Miroshnichenko, S. Minaev and K. Maruta	345
Reliability Evaluation of Integrated Modular Avionics Computational Structures for Different Hardware Configurations	
E. Kniga, I. Zharinov, A. Shukalov and V. Nechaev	350
Universal Reference Test Blocks for Liquid Penetrant Testing	
N.P. Kalinichenko, A.N. Kalinichenko, I. Lobanova and A.A. Zaitseva	355
Forming Effective Cycle of Round Grinding with Radial Feed	
I.V. Shmidt and A.A. Dyakonov	360
Model of Hydraulic Rotary Control Valve for Control of Pneumohydraulic Impact Unit	
V.N. Deryusheva, P.Y. Krauinsch, A.V. Ioppa, A.S. Bazarov and A.V. Zhukov	365
The Statistical Analysis of Granulometric Composition and Microgeometrical Indicators of Abrasive Grains of Grinding Wheels for Rough Machining	
A.A. Dyakonov and A.V. Sopeltsev	370
Technology Development of Large-Size Bodies Manufacturing from Thick Plate Materials Based on Combined Methods of Deformation	
A. Pesin, E. Drigun, D.O. Pustovoytov and I. Pesin	375
Improving the Quality of the Coating at Hot-Dip Galvanizing of Machine Steels in the Zinc Melt with Microadditives of Nickel	
O. Bondareva and A.A. Melnikov	380
The Research of Influence of Cold Rolling Conditions on Mechanical Properties Anisotropy of Sheets from Aluminum Alloy 8011A	
Y.A. Erisov and F. Grechnikov	385
Effect of Conjugated Heat Transfer Conditions on the Crystallization of the Composite Coating	
M.A. Anisimova	389
Investigation of Lamb Wave Based Ultrasonic Technique for AA2024 Evaluation at Static Tensile Loading	
A.V. Byakov, A.V. Eremin, M.V. Burkov, R.T. Shah, P.S. Lyubutin and S. Panin	394
Lamb Wave Based Ultrasonic Technique for AA2024 Fatigue Evaluation	
M.V. Burkov, A.V. Eremin, A.V. Byakov, R.T. Shah, P.S. Lyubutin and S. Panin	399
Particularly Selective Sintering of Metal Powders by Pulsed Laser Radiation	
V.G. Smelov, A.V. Sotov and S.P. Murzin	403
Research into Contact Interaction of an Elastic Tool during Rotational Pattern Cutting of Sheet Parts	
E.G. Gromova and A.G. Bakanova	408
Metal Surface Treatment with Particle Fluxes Taking into Account the Internal Boundary	
E.S. Parfenova and A.G. Knyazeva	413
Improving Reliability of Hot Plate Mill Electromechanical System	
A.A. Radionov, V. Gasiyarov and E.A. Maklakova	417

Efficiency of Microcombustion System with Thermoelectric Generator Combined with Countercurrent Heat Exchanger	
N. Belyakov, I. Terletskii, S. Minaev, S. Kumar and K. Maruta	422
Strength of Cutting Tool in Titanium Alloy Machining	
V. Kozlov and J.Y. Zhang	427
Physical Justification of an Increase in the Efficacy of Radiofrequency Systems for Myocardial Ablation	
A.V. Evtushenko, V.V. Evtushenko, A.N. Bykov, V.S. Sergeev, V.I. Syryamkin, Y.V. Kistenev and Y. Anfinogenova	432
Estimation of Combustion Engine Rotation Speed Based on Vibration Signal Analysis	
V.S. Avramchuk and V.P. Kazmin	436
Friction Influence on the Accuracy of the Rotors Automatic Balance	
G.R. Ziyakaev, M.V. Gorbenko, T.I. Gorbenko and O.P. Ivkina	441
Methodological Aspects of Evaluation of Foundry Technologies Effectiveness	
I.B. Ardashkin, N.V. Martyushev and Y.Y. Drozdov	445
The Influence of the Pouring Temperature on the Structure and Properties of Copper Metal Alloys	
A.V. Korchmit, N.V. Martyushev and Y.Y. Drozdov	450
Lead Distribution in Centrifugal-Cast Billets Made of Quinary Tin-Base Bronze Depending on the Mould Spin Rate	
A.V. Korchmit, N.V. Martyushev and Y.Y. Drozdov	455
Casting Quality Enhancement of Bushings Made of Foundry Aluminium Bronzes	
A.V. Korchmit, N.V. Martyushev and Y.Y. Drozdov	459
Sampling Control Planning on the Base of Operating Characteristics and with a Grapho-Analytical Method	
S.G. Gomboeva, I.F. Shishkin, D.N. Hamhanova, E.A. Vasendina, I. Plotnikova and O.N. Efremova	463
Thermodynamic Analysis of the Effect of ZhS6U Alloy Doping Elements on the Process of Circular Chrome-Aluminizing	
K. Bakhrunov	467
Thermodynamic Analysis of the Formation of Aluminum and Chrome Halides for Circular Chrome-Aluminizing	
K. Bakhrunov	473
SLS Setup and its Working Procedure	
R.G. Ahmetshin, V.V. Fedorov, K.S. Kostikov, N.V. Martyushev, V.A. Ovchinnikov, A.V. Razin and A.N. Yakovlev	477
Evaluation of the Effect of LED-Lamp Spectral Content on the Development of Greenhouse Tomato	
A.N. Yakovlev, S.B. Turanov, I.N. Upadysheva and V.I. Korepanov	482
The Possibility of Manufacturing Long-Length Metal Products with Ultra-Fine Grain Structure by Combination of Strain Effects	
M. Chukin, M. Polyakova, A. Gulin and O.A. Nikitenko	487

Chapter 3: Advanced Materials and Alloys, Nanomaterials and Nanotechnology

Design of Composite Wire for Arc Welding and Ni₃Al-Based Alloys Surfacing	
Y. Dubtsov, I. Zorin, G.N. Sokolov, A.A. Artem'ev and V.I. Lysak	495
Influence of Granulation of Powder Charge of Titanium-Boron on Regularities of Self-Propagating High-Temperature Synthesis of Porous Materials	
D.I. Andriyanov, A.P. Amosov and A. Samboruk	500
Wear-Resistant Coatings Reinforced with TiB₂ Micro-Particles and TiCN Nano-Sized Particles	
A.A. Artem'ev, G.N. Sokolov, V.I. Lysak, I. Zorin, Y. Dubtsov and S.N. Tsurikhin	505
Two-Step Synthesis of Tungsten and Molybdenum Disulfides	
Y. Irtegov, V. An, K. Machekhina and N. Lemachko	511
Morphology of Aluminum Nanopowder Combustion Products in a Magnetic Field in Air	
A.V. Mostovshchikov, A.P. Ilyin and I.K. Zabrodina	516

The Influence of Aluminium Nanopowder Density on the Structure and Properties of its Combustion Products in Air A.P. Ilyin, L.O. Root and A.V. Mostovshchikov	521
Influence of Severe Plastic Deformation on Physicomechanical Properties of Ti-40 mas % Nb Alloy Z.G. Kovalevskaya, M.A. Khimich, A.V. Belyakov and I.A. Shulepov	525
Developing Nanomaterials with Given Properties Based on Aluminum Oxyhydroxide E.N. Gryaznova, L.N. Shiyan and Y.A. Irtegov	530
Interaction Potential of Open Carbon Nanotube with Natural Gas Molecular Components E. Tarasov	534
Use of Zinc Oxide Nanopowder as an Additive in a Tribotechnical Composite Based on Refractory Metal Disulfide E. Anisimov, Y. Irtegov, V. An, V.P. Druzyanova, N. Burtsev and M.B. Khaskelberg	539
Strains Determination at the Joints of Cylindrical Glass-Metal Composite Shell Layers A. Ratnikov	543
Influence of Filling Agent Quantity on Characteristics of Polymeric Composites R.E. Vitske, A. Kondratyuk and V.P. Nesterenko	548
Microwave Composite Absorbers Based on Barium Hexaferrite/Carbon Nanotubes for 0.01-18 GHz Applications O. Dotsenko and K. Frolov	553
Obtaining Nanopowder Ligature Briquettes Ni-(SiC+Si₃N₄) for Modification of Aluminum Alloys A.A. Kuzina and V.S. Ruchkina	558
Electrochemical Activity of Methionine at Graphite Electrode Modified with Gold Nanoparticles D. Perevezentseva, K.V. Skirdin, E.V. Gorchakov and V.I. Bimatov	563
Electrical Properties of Carbon Nanotube-Reinforced Polymer Composites S.M. Lebedev, O.S. Gefle, E.T. Amitov, M.R. Predtechensky and A.E. Bezrodny	569
Investigation of Deformation Mechanisms for High-Purity Aluminium at Various Fatigue Stages O.Y. Vaulina, A.N. Durnovtseva and E.V. Shvagruckova	574
Self-Propagating High-Temperature Synthesis of Composite Nanopowder AlN-BN from Systems "Sodium Azide – Halides of Aluminum and Boron" L. Shiganova, G. Bichurov, I. Kerson, V. Novikov and A. Ermoshkin	578
The Feasibility of Usage TiN and CrN Barrier Sublayers for Improving the Adhesion of Polycrystalline Diamond Films on WC-Co Hard Alloys S.A. Linnik, A.V. Gaydaychuk and E.Y. Barishnikov	583
The Effect of Cu–Mo–S Coatings on Wear Resistance of Copper Friction Pair V. Sergeev, S.Y. Zharkov, M.P. Kalashnikov and A.R. Sungatulin	587
Effect of Aluminum Content on the Performance of Coatings Based on Al-Si-N I.A. Bozhko, E.V. Rybalko, M.P. Kalashnikov, M.V. Fedorishcheva and V. Sergeev	591
Property Investigation of Pt-Rh Alloy Nanopowders Obtained by Conductor Electric Explosion Method S.P. Zhuravkov, A.V. Pustovalov, N.A. Yavorovsky, A.V. Korshunov, M.N. Vlasyuk and L.V. Nadeina	596
The Influence of Hydrogen on the Process of Plastic Flow Self-Organization in Ti A. Lunev, M.V. Nadezhkin, S. Barannikova, L.B. Zuev and N.A. Ionova	601
Microstructure and Properties of the Composite on the Basis of Copper and Diamond A.S. Ivashutenko, N.V. Martyushev and Y.Y. Drozdov	607

Chapter 4: Optical Technology

Estimation of Orientation and Optical Properties of Plane Crystals by Polarization Characteristics of Lidar Returns O.V. Shefer, O.V. Rozhneva and V.V. Loskutov	613
Optical Model of Medium for the Numerical Imitation of Wave Surface Forming High-Intensity Reflected Radiant Energy O.V. Shefer, V.V. Loskutov and O.V. Rozhneva	618

Luminescence of LiF Crystals Doped with Metal Oxide Impurities V.I. Korepanov, P.V. Petikar and G.H. Ge	623
Stimulated Emission in CdHgTe Structures with Quantum Wells under Optical Pumping D.I. Gorn and A.V. Voitsekhovskii	627

Chapter 5: Discharge and Plasma-Beam Technology

Oligomerization of Carbon Monoxide in Plasma of the Dielectric Barrier Discharge E. Litvishko, M. Goreshnev and L. Maletina	635
The Energy Stored in the Aluminum Nanopowder Irradiated by Electron Beam A.V. Mostovshchikov, A.P. Ilyin, A.A. Azanov and I.S. Egorov	639
The Deposition of Silicon-Carbon Coatings in Plasma Based Nonself-Sustained Arc Discharge with Heated Cathode A.S. Grenadyorov, K.V. Oskomov, A.A. Solovyev, S.V. Rabotkin and N.F. Kovsharov	643
Removal of Iron Colloid Substances from Aqueous Solutions Using Pulsed Corona Discharge E.N. Gryaznova, S. Preis, J.I. Kornev, K. Machekhina, L.N. Shiyan and S.O. Magomadova	648
Dissipation of Pulsed Electron Beam in Hydrogen and Oxygen in High Pressure A. Tabaev, G. Kholodnaya, R. Sazonov and D. Ponomarev	653
Study of the Mechanism of Interaction of Microwave Plasma Discharge with Solutions of Organic Substances L.N. Shiyan, A.G. Zherlitsyn, S.O. Magomadova and C.S. Lazar	657
Study of Destruction of Organic Substances in Water Solutions by Pulsed Electrical Discharges in the Iron Granules Layer G.L. Lobanova, T. Yurmazova, L.N. Shiyan and S.O. Magomadova	662
Multicapillary Carbon-Epoxy Tubes as a Cathode Material for a Pulsed Electron Accelerator A.V. Poloskov, I.S. Egorov, V. Ezhov and G. Remnev	667
Treeing Morphology in Oil Shale A.A. Bukharkin, I.A. Koryashov, S.M. Martemyanov, E.V. Shvagrjukova and A.A. Isemlerlinova	672
Influence of the Plasma of Nanosecond Diffuse Discharge in Air at Atmospheric Pressure on the Electrophysical Properties of Epitaxial CdHgTe Films K.A. Lozovoy, D.V. Grigoryev, V.F. Tarasenko and M.A. Shulepov	676
The Study of Properties Characterizing Aluminum Hydroxides Produced by Electric Discharge S.P. Zhuravkov, G.L. Lobanova, J.I. Kornev, O.S. Lutoshkina and Y.P. Khristunova	680
Model of Powder Material Plastic Transformation during Plasma Coating Application V.I. Bogdanovich and M.G. Giorbelidze	685
Coating Composition Evolution during the Deposition of Al and N from Plasma on a Cylindrical Substrate S.A. Shanin, A.G. Knyazeva and O.N. Kryukova	690
Electron Beam Coatings with SHS Composite Powders "TiC - Cast Iron Binder" Synthesized in Air E.N. Korosteleva, G.A. Pribytkov, S.S. Kalambaeva, V.V. Korzhova and V.G. Durakov	695
The Analysis of the Mechanisms for Plasticization of Boron Carbide Ceramics Irradiated by an Intense Electron Beam Y.F. Ivanov, O.L. Khasanov, V.V. Polisadova, M.S. Petukevich, T.V. Milovanova, A.D. Teresov, Z.G. Bikbaeva, M.P. Kalashnikov and A. Bratukhina	700
Mobile Electric-Discharge Blasting Unit for Splitting off and Destruction of Rocks and Concrete N. Voitenko and A.S. Yudin	705
Production of Powders by the Method of Electrospark Dispersion S.P. Zhuravkov, J.I. Kornev, A.S. Ivashutenko and N.V. Martyushev	710
Regularities of Structure and Phase Composition Formation of Surface Layer of Silumin Subjected to Electron-Beam Treatment A.V. Tkachenko, E.A. Petrikova, Y.F. Ivanov and A.D. Teresov	715
Structure and Properties of Electron-Beam Coatings, Overlaid of SHS Composite Powders "TiC - Ti", Synthesized in Air M.G. Krinitcyn, G.A. Pribytkov and V.G. Durakov	719

Properties of WC-6Co Hard Alloy Powders Obtained by the Method of Spark Plasma Dispersion	
S.P. Zhuravkov, A. Pobol, G.L. Lobanova, G. Goranskyi and F. Saprikin	724

Chapter 6: Chemical Engineering and Technology

The Application of Electrochemical Technology in the Production of Ethylenediamine	
N.A. Bykovsky, L.N. Puchkova and N.N. Fanakova	731
Influence of Ultra-Violet Radiation on Sublimation Energy of Silver Chloride (AgCl)	
A.V. Mostovshchikov, A.P. Ilyin and N.S. Barabash	735
Comparative Characteristics of Voltammetric Methods Determination of Platinum in Mineral Raw Materials	
E.M. Ustinova and E.V. Gorchakov	739
Extraction of Oil Heteroatomic Compounds Using Metal Powders	
E.B. Golushkova, A.P. Ilyin and A.V. Mostovshchikov	743
Investigation of the Influence of Matrix Components of Gold Mineral Resources on the Electrochemical Determination of Pt and Re	
E.M. Ustinova, Y.A. Oskina and E.G. Pakrieva	748
Synthesis and Characterization of Transition Metal Complexes of 1,2-Bis(3,5-Dimethylpyrazol-1-yl)-1,2-Ethanediol	
G.A. Anosova, V.V. Matveevskaya, N.A. Pirmanova and A.S. Potapov	754
Calculation of Equilibrium Concentrations of Calcium Ions for Calcium Bicarbonate Removal from Water Solution with Ammonium Hydroxide	
S.P. Zhuravkov, M.Y. Kataev, N. Malanova and S.A. Marinin	759
Dehydrogenation of Methylbutenes with Intermediate Oxidation of Hydrogen	
E.K. Karimov, O.K. Karimov, L.Z. Kasyanova, E.M. Movsumzade and Y.K. Dmitriev	764
Fe Reduction by Carbon during Self-Propagating High-Temperature Synthesis of Fe-TiC Composite	
I.V. Yatsenko, V.V. Yatsenko, A.P. Amosov and A. Samboruk	768
Oxidative Conversion of Methane into Syngas Using Porous Catalysts Prepared by Combustion Synthesis	
A.I. Kirdyashkin, A.S. Maznoy, V.D. Kitler, A.V. Vosmerikov, L.N. Vosmerikova, Y.E. Barbashin, O.I. Sidorova and Y.A. Knysh	772
Deposition of a Thin-Film CGO Electrolyte for Solid Oxide Fuel Cells	
A.A. Solovyev, A.N. Kovalchuk, I.V. Ionov, S.V. Rabotkin, A.V. Shipilova and D.N. Terentev	776
Analysis of Oil Shale Applicability for Gasification Using TGA Results	
I.A. Koryashov, A. Ivanov, A.A. Bukharkin and S.M. Martemyanov	781
One-Pot Amide Synthesis via Thermal Decomposition N-Acylureas under Microwave Irradiation	
N.S. Soldatova, K.V. Orlova and T.A. Sarycheva	785
Chemical Reaction Front Propagation between Inert Materials with Different Properties Taking into Account the Reagent Melting	
K.A. Aligozhina and A.G. Knyazeva	789
Influence of Mineral Salts on the Production of Antibiotics Phenazine Series from Pseudomonas Aeruginosa	
Y.S. Palchevskaya	794
Synthesis and Study of Norfloxacin Labeled with Technecium-99m as a Potential Imaging Agent of Bacterial Inflammations	
N.V. Varlamova, V.S. Skuridin, A.E. Sazonov, S.I. Sazonova, E.A. Nesterov and L.A. Larionova	798

Chapter 7: Information Technology, Data and Signal Processing

Reliability Model of Fault-Tolerant Dual-Disk Redundant Array	
P.A. Rahman, E.A. Muraveva and M.I. Sharipov	805
Computer-Aided Modelling of a Latch Die Cutting in Deform - 2D Software System	
S. Zvonov and Y. Klochkov	811

Simulation of Multidimensional Non-Linear Processes Based on the Second Order Fuzzy Controller	
K.A. Solovev, E.A. Muravyova, O.I. Soloveva, R.G. Sultanov and P.N. Charikov	816
Information Technologies in Industrial Enterprises Production Assets Management	
R. Kovin, A. Kudinov, N.G. Markov and E. Miroshnichenko	823
Adaptive Algorithm of Sensor Polling for Device Used for the Dam Condition's Diagnostics	
F.V. Savrasov, E.A. Pershin, R.V. Meyta and A.A. Shamin	828
Development of Intelligent Algorithm for Positioning a Vehicle on a Route	
F.V. Savrasov, E.A. Pershin, R.V. Meyta and A.A. Shamin	833
Simulation of Telephone System with Reserved Communicational Channels and Automatic Correction of Transmission's Delay of the Audio Stream	
F.V. Savrasov, E.A. Pershin, R.V. Meyta and A.A. Shamin	838
Architecture of Enterprise Information Systems Based on the Semantic Web Technologies	
I.A. Zaikin, A. Tuzovskiy and V.Z. Yampolskiy	843
Method of Evaluation of Social Network User Sentiments Based on Fuzzy Logic	
E.E. Luneva, P.I. Banokin, A.A. Yefremov and T. Tiropanis	847
Effective Method for Constructing Pseudo-Random Vectors Uniformly Distributed in Cone	
V. Reizlin and A.A. Nefedova	852
Optimal Methods of Segmentation of Tomographic Volume Searching System: A Preliminary Review	
I. Skirnevskiy and A. Korovin	857
Integration of Heterogeneous Company Information Resources Using Semantic Technologies	
A. Chernii, A. Kaida and A. Tuzovskiy	863
Distributed Information System for Processing and Storage of Meteorological Data	
V.S. Sherstnyov, A.I. Sherstnyova, I.A. Botygin and D.A. Kustov	867
Content-Based Image Retrieval Using Color, Texture and Shape Features	
A. Ponomarev, H.S. Nalamwar, I. Babakov, C.S. Parkhi and G. Buddhawar	872
Source Code Analysis: Current and Future Trends & Challenges	
A. Ponomarev, H.S. Nalamwar and R. Jaiswal	877
Software Traceability – A Key to Improve Software Evolution	
A. Ponomarev and H.S. Nalamwar	881
Resource Allocation Algorithm Modeling in Queuing System Based on Quantization	
A. Raspopov and Y.Y. Katsman	886
Flexible Process Model Design	
M.N. Rudometkina, A.V. Chekhonadskikh and P.A. Kakovkin	892
Fast Search for Intra Prediction Mode in H.265/HEVC Video Compression	
M.P. Sharabayko and N.G. Markov	897
Algorithm of the Alternatives Generation in the Design of the Geological and Engineering Operations	
V.A. Silich, A.O. Savelev and A.Y. Cherkashin	902
Development of the Decision-Making Algorithm on the Geological and Engineering Operations Based on the Infrastructure of the Digital Oil Field	
V.A. Silich and A.O. Savelev	907
Simulation of Discrete-Continuous Process via E-Network	
D. Tarakanov, S. Tsapko, R. Buldygin and I. Eremin	912
Real-Time Recovery of Functions and their Derivatives by Variation Splines	
E.A. Kochegurova and E.S. Gorokhova	920
Uniform Model of Representation Heterogeneous Data Hydrometeorological Observations	
V.N. Popov, I.A. Botygin and N.V. Koshelev	925
Formalized Approach in Relational Database Design	
V.V. Osipova, I.L. Chudinov and A.S. Seidova	930
Development of a Queuing System with Dynamic Priorities	
X.N. Apachidi and Y.Y. Katsman	934
Discrete-Event Approach to Simulation of Queueing Networks	
A. Moiseev, A. Demin, V. Dorofeev and V. Sorokin	939
Using Parallel Computing in Queueing Network Simulation	
R. Mesheryakov, A. Moiseev, A. Demin, V. Dorofeev and V. Sorokin	943

Development of Graphical Interface for Determination of Optimal Cutting Parameters in Turning Operations	
M.N. Bogoljubova, O.V. Sumtsova and D.V. Doschinsky	948
Allocation of Clusters of Objects on Topological Graphs of High Cardinality	
A. Pogrebnoy and A. Pogrebnoy	952
System for Visualizing and Analyzing Multivariate Data of Medico-Social Research	
O.M. Gerget, O.V. Marukhina and Y.A. Cherkashina	957
Local High-Accuracy Plate Analysis Using Wavelet-Based Multilevel Discrete-Continual Finite Element Method	
P.A. Akimov, M.L. Mozgaleva, M. Aslami and O.A. Negrozov	962
Generation of the Dynamic System Control Signal According to Characteristic of the Transient Process	
A. Ponomareva and Y. Shalaev	967