

# JOURNAL OF ENGINEERING PHYSICS AND THERMOPHYSICS

A translation of *Inzhenerno-Fizicheskii Zhurnal*

## Volume 73, 2000

### Volume 73, Number 1 January–February, 2000

Foreword . . . . .	1	3
Will There or Will There not be a Hypersonic Airplane? – <b>Yu. V. Polezhaev</b> . . . . .	3	5
Mathematical Models of Radiative-Conductive Heat Exchange in Heat-Shield Materials of Shuttle Space Transportation Systems – <b>S. V. Reznik</b> . . . . .	9	11
Radiation Characteristics of Heat Protective Materials of the Buran Orbital Spacecraft – <b>V. S. Dozhdikov and V. A. Petrov</b> . . . . .	25	26
Two-Component Radiation-Gasdynamic Model of a Turbulent Fireball – <b>S. T. Surzhikov</b> . . . . .	29	31
Classification and Database of Thermophysical Characteristics of Heat Protective Materials – <b>K. B. Isaev, V. V. Kartuzov, and A. K. Lapteva</b> . . . . .	36	39
Theoretical Modeling of Systems of Combined Thermal Protection - <b>A. P. Kuryachii</b> . . . . .	41	44
Theoretical Principles of Design of Multilayer Swelling Heat Protection with Assigned Properties – <b>G. N. Isakov</b> . . . . .	49	52
Heat and Mass Transfer in the Destruction of Thermal Protective Materials with a Different Content of a Polymer Binder in a High-Enthalpy Gas Flow – <b>V. I. Zinchenko, V. V. Nesmelov, and G. F. Kostin</b> . . . . .	59	61
Complex Model of Interaction of Composites with Radiation and a Gas Flow – <b>V. I. Strakhov, A. A. Filipenko, A. V. Ostrik, A. V. Mitkevich, Vl. O. Kaledin, and M. N. Slitkov</b> . . . . .	65	67
Thermal Protection Based on Crystalline Hydrates – <b>A. K. Alekseev and M. P. Shuvalov</b> . . . . .	73	75
Use of Solar Furnaces under Orbital-Flight Conditions – <b>E. M. Ovsyannikov</b> . . . . .	78	80
Trajectories of an Unguided Probe with a Damping Cable – <b>S. A. Shargarovskii and A. N. Temnov</b> . . . . .	83	86
Algorithmic and Program Software for Combinatorial Simulation of the Thermal Regime of Space Objects – <b>V. S. Khokhulin</b> . . . . .	87	90
Combined Method for Calculating Temperature Fields in the Structure of Aircraft – <b>V. M. Yudin</b> . . . . .	98	101
Calculation of Radiative-Conductive Heat Transfer in a System Closed by a Semitransparent Envelope – <b>V. N. Eliseev</b> . . . . .	105	107
Mathematical Simulation of Heat Exchange in a Nonhermetic Instrumental Compartment of a Spacecraft – <b>V. A. Burakov, E. N. Korchagin, V. P. Kozhukhov, A. S. Tkachenko, and I. V. Schcherbakov</b> . . . . .	112	113

Analytical Methods of Investigation of the Thermal State of a Region with a Moving Boundary under the Conditions of Nonstationary Heat Transfer to the External Medium		
– <b>A. V. Attekov and I. K. Volkov</b> . . . . .	124	125
Use of Integral Boundary-Layer Theory for Solving Conjugate Problems of Heat Transfer in Channels of High-Power Plants – <b>B. B. Petrikevich, S. D. Panin, and A. V. Astrakhov</b>	131	131
Mathematical Modeling of Thermomechanical Processes in Aircraft Structures – <b>V. S. Zarubin and G. N. Kuvyrkin</b> . . . . .	138	138
Problems of Numerical Modeling of the Temperature and Stress Fields in the Structures of SFRE Nozzle Blocks – <b>N. N. Golovin and G. N. Kuvyrkin</b> . . . . .	145	145
Selectivity Functions and a Two-Contour Algorithm as a Tool Used in the Problems of Synthesis of Multilayer Constructions – <b>A. Yu. Bushuev and V. V. Gorskiy</b> . . . . .	155	155
Anomalous Aerodynamic Heating of a Dead-End Cavity in an Oncoming Flow		
– <b>V. I. Kuznetsov and D. D. Shpakovskii</b> . . . . .	160	160
Oscillations of a Rotary Fluid Flowing out of a Closed Vessel – <b>V. V. Orlov and A. N. Temnov</b>	165	165
Nonstationary Radiation-Gasdynamic Model of a Laser-Plasma Accelerator – <b>S. T. Surzhikov</b>	175	174
Interaction of Shock and Detonation Waves in Gas Media with Dispersed Materials and Solid Barriers – <b>E. V. Borisov, O. G. Martynov, V. N. Mironov, and E. F. Nogotov</b> . . . . .	181	180
Allowance for Mutual Effect of "Hot Spots" in Solution of Problems of Site Thermal Explosion		
– <b>A. V. Kotovich and G. A. Nesenenko</b> . . . . .	189	189
Parametric Analysis of Site Modes of Thermal Explosions by a "Geometrical-Optical" Asymptotic Method – <b>A. V. Kotovich and G. A. Nesenenko</b> . . . . .	193	193
Conditions for Producing the Liquid Phase of Carbon – <b>A. V. Kostanovskii and L. A. Zhilyakov</b>	198	198
Germanium-Film Resistance Microthermometers Intended for Operation within the Temperature Range of 0.03–300 K – <b>V. F. Mitin, N. S. Boltovets, V. V. Kholevchuk, and R. V. Konakova</b> . . . . .	202	202

**Volume 73, Number 2 March–April, 2000**

Experimental Investigation of the Special Features of Heat Transfer through Glass Packets		
– <b>O. G. Martynenko, N. I. Lemesh, L. N. Novichenok, and L. A. Senchuk</b> . . . . .	205	209
Hydrodynamics and Heat Transfer in Cooling Systems with Intersecting Channels. 3. Effect of the Angle of Flow and the Number of Stages – <b>Yu. I. Shanin, O. I. Shanin, and V. A. Afanas'ev</b> . . . . .	209	214
Heat Transfer and Hydraulics Resistance in Channel Cooling Systems with a Discontinuous Wall		
– <b>Yu. I. Shanin, O. I. Shanin, and V. A. Afanas'ev</b> . . . . .	220	224
Effect of Prolonged Stay of the Heat-Transfer Surface in Water on the Critical Heat Flux under Steady and Stepwise Heat-Release Conditions – <b>S. G. Obukhov</b> . . . . .	227	232
Analytical Theory of Regenerative Heat Transfer and Study of Its Thermodynamic Efficiency		
– <b>B. N. Okunev and M. S. Safonov</b> . . . . .	232	237
Heat Transfer in Pool Boiling of Propane under the Conditions of Different Saturation Pressures		
– <b>A. S. Zhuravlev</b> . . . . .	238	244
Analysis of the Processes of Heat Transfer with Periodic Intensity with Allowance for Temperature Fluctuations in the Heat Carrier – <b>Yu. B. Zudin</b> . . . . .	243	250
Determination of the Characteristics of Droplets Generated in a Jet Printer – <b>Yu. B. Zudin</b> . .	248	255
Boiling of a Liquid on Surfaces with Porous Coatings – <b>V. M. Polyaev and B. V. Kichatov</b> . .	253	260

Stochastic Modeling of the Development of the Taylor Instability in Liquid Filtration in a Porous Medium – <b>M. D. Noskov and A. V. Rylin</b> . . . . .	259	267
Regularities and Special Features of Filtration of Microbubble Gas-Liquid Solutions in Porous Media – <b>A. O. Bogopol'skii, A. N. Ivanov, and A. A. Fatkullin</b> . . . . .	266	274
Energy Characteristics of Mass Transfer in Porous Solids – <b>V. V. Beloborodov</b> . . . . .	274	283
An Approximate Method of Evaluating the Temperature Field of a Sample in Thermal Vacuum Measurement of the Moisture Content of Loose Materials – <b>V. I. Malarev</b> . . . . .	279	288
Stabilization of the Speed of Pumping-out the Chamber in the Dynamic Thermovacuum Method of Hydrometry of Loose Materials – <b>V. I. Malarev, R. M. Proskuryakov, and O. M. Bol'shunova</b> . . . . .	285	293
Hydrodynamics of a Spouting Bed with an Active Near-Wall Zone – <b>P. V. Akulich</b> . . . . .	288	296
Gasdynamic Stimulation of Combustion of Lean Fuel Mixtures. 1. Experimental Study – <b>O. V. Achasov, T. Kageyama, S. A. Labuda, T. Taillefet, and F. Fisson</b> . . . . .	293	302
Gasdynamic Stimulation of Combustion of Lean Fuel Mixtures. 2. Evaluation of Thermodynamic Parameters and the Magnitude of Heat Losses – <b>O. V. Achasov, T. Kageyama, S. A. Labuda, T. Taillefet, and F. Fisson</b> . . . . .	299	309
Oscillatory and Monotonic Instability at the Boundary of the Transition "Molecular Diffusion–Concentration Convection" in Ternary Gas Mixtures – <b>V. N. Kosov, V. D. Seleznev, and Yu. I. Zhavrin</b> . . . . .	303	313
Theory of the Near-Probe Layer in Electronegative Gases – <b>S. A. Gutsev</b> . . . . .	311	321
Comparative Analysis of Turbulence Models – <b>E. P. Sukhovich</b> . . . . .	318	328
"Optical Turbulence" in Laser Radiation Problems – <b>I. B. Krasnyuk</b> . . . . .	330	340
Numerical and Physical Modeling of a Low-Velocity Air Flow in a Channel with a Circular Vortex Cell – <b>S. A. Isaev, S. V. Guvernyuk, M. A. Zubin, and Yu. S. Prigorodov</b> . . . . .	337	346
Special Features of Hypersonic Flow over Blunt Bodies with Excitation of Internal Degrees of Freedom in the Gas – <b>G. A. Tarnavskii and S. I. Shpak</b> . . . . .	345	354
Motion and Force Equilibrium of a Local Process (a Soliton) in a Continuous Fluid Medium – <b>L. G. Kaplan</b> . . . . .	349	358
Resonance Oscillations of a Gas in a Shut-End Tube in the Region of Transition to Shock Waves – <b>R. G. Galiullin, R. G. Zaripov, E. R. Galiullina, and R. I. Davydov</b> . . . . .	362	370
Experimental Investigation of the Effect of the Gasdynamics of the Discharge Chamber on the Power Characteristics of Vortex Plasmatrons with an Interelectrode Insert – <b>N. A. Kostin</b> . . . . .	368	376
Free Convection with a Nonlinear Dependence of Density on Temperature: Plane Problems – <b>V. N. Korovkin and A. P. Andrievskii</b> . . . . .	373	381
Thermal Processes in Semimoment Asymmetric Hydrodynamics and the Method of Characteristics – <b>M. D. Martynenko and S. M. Bosyakov</b> . . . . .	380	387
Velocity of Motion of Bodies with Tossing on a Vibrating Surface – <b>N. A. Dokukova and M. D. Martynenko</b> . . . . .	384	390
Equation for Stochastic Thermal Fields – <b>I. A. Solov'ev</b> . . . . .	390	396
Evaluation of the Radiation Contribution in Short-Duration Measurements of Thermal Conductivity by a Nonstationary Method of Hot Filament – <b>G. G. Spirin, E. A. Strekalova, and D. V. Vasilevskii</b> . . . . .	396	401

Critical Curves in Mixtures of Carbon Dioxide with Ethane and Ethylene Based on a Generalized Fluctuation Form of the van der Waals Equation of State – <b>V. B. Rogankov and E. D. Terzi</b> . . . . .	403	407
Elasticity Moduli and Polytropic Indices in Processes of Change of States of Real Gases and Liquids – <b>V. P. Dobrodeev, N. A. Mochalova, and A. V. Dobrodeev</b> . . . . .	410	414
Technology of Controlled Hardening of Dies – <b>M. S. Zheludkevich</b> . . . . .	415	418
Mathematical Simulation of the Temperature Field in Hardening Gears by Induction Heating under a Layer of Water – <b>P. S. Gurchenko and M. L. German</b> . . . . .	420	423
Computer Thermal Model for Hardening Grinding – <b>V. D. Efremov, M. S. Zheludkevich, and M. L. German</b> . . . . .	428	430
Dimension of the Local-Plasticity Zone as a Correlation Length of the Structure of Polymers under Inelastic Deformation – <b>G. V. Kozlov, V. V. Afanov, and Yu. S. Lipatov</b> . . . . .	436	439
Dosimetric Properties of Tungsten-Containing Complexes of Carboxymethyl Cellulose – <b>V. V. Komar'</b> . . . . .	440	443
Thermal Regimes of Anisotropic-Thermoelement Thermal Converters – <b>I. M. Pilat, B. G. Shabashkevich, S. I. Pirozhenko, A. D. Shevchenko, and A. M. Gelich</b> . . . . .	444	447
A New Possibility of Building up Thin Diamond Films in Precipitation of Carbon from the Gaseous Phase – <b>L. O. Meleshko</b> . . . . .	451	454

**Volume 73, Number 3 May–June, 2000**

Hydrodynamic Characteristics of Magnetically Fluidized Beds Consisting of a Mixture of Magnetic and Nonmagnetic Materials – <b>V. L. Ganzha and S. C. Saxena</b> . . . . .	455	471
Modification of the Adsorption Properties of the Dispersed Phase of Magnetorheological Liquids – <b>S. R. Gorodkin, V. N. Makatun, S. V. Matveichuk, and Z. A. Novikova</b> . . . . .	460	476
Study of the Operation of a Gas-Liquid Atomizer with a Porous Mixing Element – <b>V. M. Polyaev, V. M. Zhdanov, and B. V. Kichatov</b> . . . . .	465	482
Unsteady Wave Flows of a Gas Suspension with Account for Phase Changes – <b>P. V. Akulich, P. S. Kuts, and E. F. Nogotov</b> . . . . .	470	487
Investigation of a Pulsating-Combustion Chamber – <b>P. V. Akulich, P. S. Kuts, V. K. Samsonyuk, V. S. Severyanin, and V. D. Slizhuk</b> . . . . .	477	493
Modeling of Transfer of Particles of Different Size by a Two-Phase Filtration Flow – <b>D. P. Nikan'shin and A. I. Nikiforov</b> . . . . .	481	497
Mathematical Modeling of Mass Transfer and Removal of Droplet-Film Moisture in Inertia-Gravity Separators of Moist Vapor – <b>A. V. Lagerev</b> . . . . .	486	501
Wall-Thickness Effect on the Thermohydraulic Stability of a Homogeneous Two-Phase Flow – <b>Yu. B. Zudin</b> . . . . .	496	510
Comparison of the Efficiencies of Rectification Trays in Countercurrent Motion of Phases with Allowance for Liquid Mixing – <b>V. N. Pavlechko</b> . . . . .	500	514
Problem Concerning the Injection of a Solvent into a Porous Medium Subjected to "Sclerosis" – <b>V. Sh. Shagapov and G. Ya. Khusainova</b> . . . . .	507	520
Mathematical Modeling of a Cylinder with a Sorbent and Natural Gas – <b>V. A. Babenko and L. E. Kanonchik</b> . . . . .	516	529

Weak Evaporation (Condensation) with an Arbitrary Evaporation Coefficient in Gases with a Constant Frequency of Molecular Collisions – <b>A. V. Latyshev and A. A. Yushkanov</b> . . . . .	528	542
Heat and Mass Transfer under the Conditions of the External Problem for Processes Occurring with a Decrease in the Pressure of the Medium – <b>V. A. Lashkov, R. G. Safin, V. P. Andrianov, and S. G. Kondrasheva</b> . . . . .	536	550
Evaluation of the Potential Hazard of Secondary Radioactive Contamination of Underground Water by Sewage Works – <b>V. V. Skurat, N. M. Shiryaeva, A. V. Basharin, A. A. Vishnevskaya, and I. I. Ivanovskii</b> . . . . .	544	557
Nonstationary Model of Heat and Mass Transfer in Electrochemical Systems – <b>V. G. Anisimovich, N. N. Grinchik, V. A. Zhuk, S. I. Sakovets, A. A. Khmyl', and V. A. Tsurko</b> . . . . .	548	561
Passage of an Electromagnetic Pulse through a Layer of Homogeneous Plasma (Exact Solution) – <b>A. A. Khrushchinskii and D. Yu. Churmakov</b> . . . . .	554	567
Numerical Modeling of a Gas-Discharge CO <sub>2</sub> Laser with Diffusion Cooling – <b>R. S. Galeev and A. A. Fedosov</b> . . . . .	563	575
Reduction of Aluminum Oxide in a Nonequilibrium Hydrogen Plasma – <b>V. A. Lyubochko, V. V. Malikov, O. G. Parfenov, and N. V. Belousova</b> . . . . .	568	580
Derivation and Numerical Solution of a Closed Equation for the Specific Ioscalar-Surface Area in a Turbulent Reactive Flow – <b>V. A. Sosinovich, V. A. Babenko, and Yu. V. Zhukova</b> . . . . .	573	585
Numerical Investigation of the Effect of Viscosity on Separated Flow Past an Automobile Profile in the Presence of a Mobile Screen – <b>S. A. Isaev</b> . . . . .	589	600
Numerical Analysis of the Influence of Rotary Rear Cylinders on a Nonstationary Wake behind an Elongated Body – <b>P. A. Baranov, S. A. Isaev, and A. E. Usachev</b> . . . . .	595	606
Turbulent Free-Convective Jets: Numerical Solution of Model Equations of Transfer – <b>V. N. Korovkin and A. P. Andrievskii</b> . . . . .	602	614
Three-Dimensional Mathematical Modeling of the Initial Stage of a Fire within a Building – <b>S. V. Puzach</b> . . . . .	609	621
Optimization of the Processes of Treatment of Materials with Supplementation of the Definition of Unknown Random Initial Characteristics – <b>M. B. Gitman, P. V. Trusov, and S. A. Fedoseev</b> . . . . .	615	627
Nonstationary Temperature Fields in an Isotropic Half-Space under Mixed Boundary Conditions Characteristic of Technologies of Laser Therapy in Medicine – <b>V. P. Kozlov and P. A. Mandrik</b> . . . . .	625	637
Mathematical Simulation of the Process of Cooling and Freezing of Bodies with Variable Thermophysical Characteristics – <b>A. G. Ionov, V. A. Naumov, and V. N. Erlikhman</b> . . . . .	634	645
Steady Cooling Effect of an Anisotropic Thermoelectric Refrigerator – <b>V. G. Okhrem and E. A. Okhrem</b> . . . . .	639	650
Averaging of the Heat-Transfer Coefficient in the Processes of Heat Exchange with Periodic Intensity – <b>Yu. B. Zudin</b> . . . . .	643	654
Use of Controlled Heat Transfer in Thermal Hardening of Wedge-Shaped Workpieces – <b>M. S. Zheludkevich</b> . . . . .	648	659
Surfaces of Weak Discontinuity for Cubically Anisotropic Solid Bodies – <b>S. M. Bosyakov and O. N. Sklyar</b> . . . . .	651	662

**Volume 73, Number 4 July–August, 2000**

Efficiency of Recirculation in Mass-Transfer Processes – <b>V. V. Zakharenko and E. O. Amadi</b>	655	667
Model of Tritium Dispersion by Ground Water – <b>A. V. Golubev, S. V. Mavrin, and A. V. Sten'gach</b>	661	673
Model of Colmatage-Suffosion Filtration of Disperse Systems in a Porous Medium – <b>B. Kh. Khuzhaerov</b>	668	680
Extraction of Water from a Capillary Specimen in an Acoustic Field – <b>V. N. Glaznev, Yu. G. Korobeinikov, and N. V. Terpugov</b>	674	686
Transfer Processes in Porous Catalysts in a Microwave-Radiation Field – <b>H. Y. Kim, H. C. Kim, V. V. Levdanskii, J. Smolic, and P. Moravec</b>	676	688
Mathematical Modeling of Displacement of Oil by Water under a Cyclic Action on the Cracked-Porous Stratum – <b>V. M. Konyukhov, A. V. Kosterin, and A. N. Chekalin</b>	683	695
Experimental Study of Friction Stress on the Wall of a Cylindrical Tube in an Oscillating Turbulent Flow of a Liquid – <b>E. D. Barashov, B. F. Glikman, and A. A. Kazakov</b>	692	704
Response of a Pliable Coating to Turbulent Pressure Pulsations – <b>V. M. Kulik, S. L. Morozova, and S. V. Panov</b>	699	712
Numerical Analysis of the Influence of the Angle of Attack on a Turbulent Flow of an Incompressible Fluid past a Profile of Large Thickness with Vortex Cells – <b>P. A. Baranov, S. A. Isaev, Yu. S. Prigorodov, and A. G. Sudakov</b>	705	719
Flow of a Liquid about a Nonuniformly Heated Droplet with Arbitrary Temperature Differences in Its Vicinity – <b>N. V. Malai</b>	713	728
Special Features of Propagation of Hydrogen in a Building – <b>S. V. Puzach</b>	725	739
Reduction of a Class on Inverse Heat-Conduction Problems to Direct Initial/Boundary-Value Problems – <b>V. T. Borukhov, P. N. Vabishchevich, and V. I. Korzyuk</b>	730	744
Sturm–Liouville Problem for a Differential Equation of Second Order with Discontinuous Coefficients – <b>B. V. Averin, D. I. Kolotilkin, and V. A. Kudinov</b>	735	748
Systems of Coordinate Functions in Heat-Conduction Problems for Multilayer Bodies – <b>V. A. Kudinov, R. Zh. Gabdushev, V. A. Obukhov, and V. V. Nekrylov</b>	741	754
Calculation of the Unsteady Thermal State of a Slab Heated by a Moving Source – <b>S. V. Osovets, E. V. Toropov, A. V. Prokhorov, and V. L. Kirillov</b>	745	757
Variety of the Representation of the Nonstationary Temperature of Fuel Elements Depending on the Form of the Distribution of the Heat Sources – <b>P. V. Tsoi</b>	749	761
Motion of a Curvilinear Net on Normal Localized Impact – <b>A. S. Kovenya and M. D. Martynenko</b>	762	773
Growth Rate of a Vapor Bubble in an Underheated Liquid – <b>Yu. B. Zudin</b>	768	778
Sedimentation Constant of Magnetorheological Liquids – <b>S. R. Gorodkin, V. I. Kordonskii, E. V. Medvedeva, and Z. A. Novikova</b>	771	781
Flow of a Heavy Viscoplastic Fluid in a Gap between Rotating Rollers – <b>V. M. Shapovalov and I. V. Stepanov</b>	776	787
Rheological Properties of the whole Blood of Rheumatological Patients – <b>S. V. Vilanskaya, V. A. Mansurov, and N. P. Mit'kovskaya</b>	782	792
An Axisymmetric Exposure Accelerator with a Conical Recess Filled with Powder – <b>O. V. Roman, S. K. Andilevko, and O. A. Dybov</b>	787	797

Skew Plane Shock Wave at the Interface between Two Polytropic Gases. A Heavy–Light Gas System – <b>S. K. Andilevko</b> . . . . .	792	802
Effect of Increased Compacting Pressures on the Physicomechanical Characteristics of Metal-Filled Polyvinyl Chloride – <b>Yu. B. Mukha, B. S. Kolupaev, and B. I. Mukha</b> . . . . .	797	807
Structural Synthesis in Design of Technological Complexes for Highly Efficient Treatment – <b>L. M. Akulovich, L. M. Kozhuro, M. L. Kheifets, and E. Z. Zeveleva</b> . . . . .	802	813
Effect of a Nonuniform Magnetic Field on the Time of Longitudinal Relaxation $T_1$ of a Flowing Liquid – <b>V. V. Davyдов</b> . . . . .	807	819
Kinetics of Formation of Charge Clusters in Flow-Conductivity Liquids – <b>Yu. M. Rychkov and A. E. Vasilevich</b> . . . . .	811	823
Cluster Structure of the Near-Electrode Layer in Liquid Dielectrics – <b>Yu. M. Rychkov, S. A. Zaikova, and A. E. Vasilevich</b> . . . . .	815	827
Nonlinear Effects in Media Heated by Electromagnetic Radiation – <b>I. L. Khabibullin</b> . . . . .	820	832
Mathematical Model of Quasistationary Conditions of Mass Transfer in an Electrodialysis Cell – <b>M. N. Khanmamedov</b> . . . . .	827	839
Evolution of Aerosols in Large Pressurized Spaces – <b>V. V. Smirnov, A. D. Uvarov, A. V. Savchenko, and S. N. Zaitsev</b> . . . . .	832	844
Problems of the Radiation Theory of Heat and Mass Transfer in Solid and Liquid Media – <b>N. I. Nikitenko</b> . . . . .	840	851
A Quantum Basis for the Relativistic Doppler Effect for Light – <b>Daniel L. Alkon</b> . . . . .	849	860
Some Special Features of the Le Chatelier–Braun Principle – <b>E. I. Nesis and Yu. N. Skibin</b> . . . . .	859	871
Analysis of the Process of Onset and Growth of a Liquid Phase in Contact of Dissimilar Crystals – <b>A. A. Akhkubekov</b> . . . . .	863	875

### Volume 73, Number 5 September–October, 2000

A. V. Luikov's Scientific Legacy (on the 90th Anniversary of His Birth) . . . . .	869	883
Thermal Conductivity of a Silica Gel + Calcium Chloride System: the Effect of Adsorbed Water – <b>Yu. Yu. Tanashev and Yu. I. Aristov</b> . . . . .	876	893
Method of Paired Integral Equations with $L$ -Parameter in Problems on Nonstationary Heat Conduction with Mixed Boundary Conditions for an Infinite Plate – <b>P. A. Mandrik</b> . . . . .	884	902
Polynomial Solutions in Problems of Controlling the Heating of Solids – <b>I. B. Sorogovets, É. I. Goncharov, and V. B. Artem'ev</b> . . . . .	889	907
Solution of the First and Second Boundary-Value Problems of Nonstationary Heat Conduction for a Triangular Region – <b>A. D. Chernyshov and O. P. Reztsov</b> . . . . .	894	911
Numerical and Physical Modeling of the Thermal Regime in a Metro Track Tunnel with Fire in a Moving Train Carriage – <b>P. A. Baranov, A. D. Golikov, S. A. Isaev, and A. Yu. Snegirev</b> . . . . .	901	918
Calculation of the Dimensions and Dynamics of the Formation of Local Explosion-Hazardous Zones in Propagation and Combustion of Hydrogen within a Building – <b>S. V. Puzach</b> . . . . .	905	922
Simulation of Rheometric Flow of a Newtonian Fluid by the Method of Finite Elements – <b>I. A. Makarov</b> . . . . .	910	927
Investigation of the Dynamic Properties of the Cellular Structure of a Gas-Detonation Wave – <b>O. V. Achasov and O. G. Penyaz'kov</b> . . . . .	915	932

Special Features of the Dynamics of Heating of Moving Media by Electromagnetic Radiation – <b>I. L. Khabibullin and F. F. Nazmutdinov</b> . . . . .	921	939
Calculation of the Integral Optical Characteristics of a Sodium Plasma – <b>S. S. Katsnel'son</b> . . . . .	927	945
Energy Balance in the Discharge Circuit of an Electric-Discharge Laser – <b>B. A. Barikhin and Yu. I. Kryshalovich</b> . . . . .	935	953
Energy-Dynamic Modification of the Inhomogeneous Surface of Loose Bodies under the Effect of Seismics – <b>I. N. Aliev, O. V. Gur'yanova, and G. V. Podguzov</b> . . . . .	942	961
Plasma-Thermal Processing and Incineration of Wastes in a Shaft Incinerator with a Combustible Filtering Material – <b>V. A. Kalitko and A. L. Mossé</b> . . . . .	945	964
Electric-Field Strength in a Cascade Argon Arc – <b>V. G. Karolinskii, M. I. Sazonov, E. I. Yurinok, and O. I. Yas'ko</b> . . . . .	953	973
Modeling of Suffosion of Water-Bearing Strata – <b>A. I. Nikiforov</b> . . . . .	959	979
Numerical Modeling of Mechanical, Rheological, and Strength Properties of Disperse Systems – <b>G. P. Brovka and V. A. Sychevskii</b> . . . . .	966	986
Simulation of Thermal and Moisture-Content Conditions on the Upper Layer of Peat Soils – <b>G. P. Brovka, I. V. Dedyulya, and V. A. Sychevskii</b> . . . . .	977	999
Condition of Dynamic Similarity in Fluidized Beds – <b>Yu. S. Teplitskii</b> . . . . .	983	1006
Heat and Mass Transfer in Chemically Reacting Media with Decrease in Partial Pressures of Vapor – <b>V. A. Lashkov, R. G. Safin, and S. G. Kondrasheva</b> . . . . .	989	1012
Characteristics for Generalized Thermomechanical Fields in Viscous Fluid Media – <b>S. M. Bosyakov</b> . . . . .	998	1021
Surfaces of Discontinuity for a Cubically Anisotropic Body in the Micropolar Thermoelasticity Theory – <b>M. D. Martynenko and S. M. Bosyakov</b> . . . . .	1004	1027
Description of a Set of Solutions of a Dissipation Inequality for Third-Order Relaxation Systems – <b>V. T. Borukhov and D. M. Zelenyak</b> . . . . .	1010	1033
Stressed-Strained State of a Hollow Cylinder in Thermal Diffusion of Carbon into Its Wall – <b>S. M. Shlyakhov and A. V. Minov</b> . . . . .	1019	1042
Motion of Particles through the Interface of Different-Density Metal Specimens under the Conditions of Superdeep Penetration – <b>S. K. Andilevko, O. V. Roman, and S. S. Karpenko</b> . . . . .	1027	1050
Parameters of Superdeep Penetration of a Copper Powder into Steel – <b>O. V. Roman, S. K. Andilevko, S. S. Karpenko, and G. P. Okatova</b> . . . . .	1033	1056
Mechanism of Initiation of Acoustic Emission in Crystallization and Melting of a Substance. I. – <b>M. K. Zhekamukhov and Kh. B. Shokarov</b> . . . . .	1040	1064
Mechanism of Initiation of Acoustic Emission in Crystallization and Melting of a Substance. II. – <b>M. K. Zhekamukhov and Kh. B. Shokarov</b> . . . . .	1049	1073
Designing of Technological Complexes of Highly Efficient Electromagnetic and Thermomechanical Treatment – <b>L. M. Akulovich, L. M. Kozhuro, M. L. Kheifets, and E. Z. Zeveleva</b> . . . . .	1057	1080
Aging of Pliable Coatings – <b>V. M. Kulik</b> . . . . .	1065	1088
Experimental Investigation of the Propagation of Heat Waves of Energy Conversion in Blown-through Porous Media – <b>G. A. Fateev, M. A. Silenkov, and Kyu-jong Kim</b> . . . . .	1069	1093
Magnetic Field Effects on Mixed Convection between Rotating Coaxial Disks – <b>M. F. Dimian and A. H. Essawy</b> . . . . .	1082	1109

**Volume 73, Number 6 November–December, 2000**

Heat Exchange and Hydrodynamics of Two-Phase Media under Conditions of Forced Motion in Porous Structures – <b>Yu. A. Zeigarnik and V. M. Polyaev</b> . . . . .	1093	1125
Electrostatic Method of Determining the Exterior Specific Surface of Soils – <b>V. N. Lazutin and V. G. Onishchenko</b> . . . . .	1102	1135
Evaluation of the Rate of Change of Transfer Potentials in Porous Solid Bodies – <b>V. V. Beloborodov</b> . . . . .	1108	1142
Thermal Processes in Capillary-Porous Bodies with Internal and External Heat Sources – <b>N. G. Kokodii and V. I. Kholodov</b> . . . . .	1111	1145
Some Aspects of Treatment of Plastic Powders by Skew Shock Waves – <b>S. K. Andilevko</b> . . . . .	1118	1152
Angle of Total Refraction in the Interaction of a Plane Skew Shock Wave with the Interface of Two Media – <b>S. K. Andilevko</b> . . . . .	1132	1167
Numerical Calculation of the Turbulent Flow of a Gas Suspension in a Tube – <b>A. V. Starchenko, A. M. Bubenchikov, and E. S. Burlutskii</b> . . . . .	1135	1170
Heat Transfer in Plug Flow of a Fibrous Suspension in a Tube – <b>V. A. Babkin</b> . . . . .	1146	1181
Process of Cooling of a High-Temperature Two-Phase Flow – <b>V. I. Volkov and M. A. Utemesov</b> . . . . .	1152	1187
Thermal Calculation of the Furnace Chamber of a Fire-Tube Boiler with a Dead-End Furnace – <b>M. L. German, V. A. Borodulya, and E. F. Nogotov</b> . . . . .	1156	1191
Radiative Properties of Light-Transparent Metallized Coatings – <b>V. I. Bol'shakov, Ya. G. Zhivilo, L. G. Kudrova, and S. V. Novikov</b> . . . . .	1166	1202
Thermal Radiation on Liquid Metals – <b>K. B. Panfilovich and V. V. Sagadeev</b> . . . . .	1170	1207
Temperature Dependence of the Delay in Pulse Radiation of an Injection Laser – <b>K. N. Korostik</b> . . . . .	1176	1213
Conduction and Radiation of a Xenon Plasma in Electric-Discharge Pumping Sources – <b>B. A. Barikhin and Yu. I. Kryshalovich</b> . . . . .	1182	1220
Operating Efficiency of an Electric-Discharge Source of Erosion Plasma from a Dielectric Material – <b>V. B. Avramenko</b> . . . . .	1191	1229
Homogeneity of the Electric-Discharge Plasma in a Coaxial Flash Lamp – <b>B. A. Barikhin and Yu. I. Kryshalovich</b> . . . . .	1195	1234
Magnetic-Field Effect on Heat Transfer within a Cathode Arc Spot – <b>A. M. Esipchuk, A. Marotta, and L. I. Sharakhovskii</b> . . . . .	1205	1245
Velocity of Electric-Arc Motion between Coaxial Electrodes in a Magnetic Field – <b>A. M. Esipchuk, L. I. Sharakhovskii, and A. Marotta</b> . . . . .	1214	1255
Unsteady Energy Transfer by Soliton-Like Waves in a Solid Body after Exposure to a Laser Pulse – <b>E. M. Kudryavtsev, V. I. Emel'yanov, and M. Autric</b> . . . . .	1220	1261
Enhancement of a Magnetic Field in a Perfectly Conducting Medium on Penetration of a High-Velocity Jet into It – <b>S. V. Fedorov, A. V. Babkin, and S. V. Demidkov</b> . . . . .	1226	1268
Quasistationary Forms of Crystal Growth in Locally Nonequilibrium Diffusion of Impurity – <b>P. K. Galenko and D. A. Danilov</b> . . . . .	1236	1278
Problem of the Appearance of Acoustic Waves in Dissolution of Substances – <b>Kh. B. Shokarov</b> . . . . .	1247	1289
Theory of Thermophoresis of Moderately Large Drops of Concentrated Solutions in Binary Gaseous Mixtures – <b>Yu. I. Yalamov, O. N. Zenkina, and M. F. Barinova</b> . . . . .	1254	1295
Thermophoresis of Large Volatile One-Component Drops – <b>Yu. I. Yalamov and A. L. Lebedeva</b> . . . . .	1265	1306

Molecular-Statistical Description of Nonuniformly Deformed Specimens. 1. Formulation of the Problem and Method for Solving It – <b>I. I. Narkevich and A. V. Zharkovich</b> . . . . .	1272	1313
Selection of the Temperature Regime of Metal Heating by an Oxidation Minimum Based on the Method of Main Optimization – <b>V. I. Timoshpol'skii, V. B. Kovalevskii, V. M. Ol'shanskii, S. M. Kozlov, and I. A. Trusova</b> . . . . .	1278	1320
Thermal Processes in Nonsymmetric Heating of Ingots and Billets before Rolling – <b>V. I. Timoshpol'skii, I. A. Trusova, and S. M. Kozlov</b> . . . . .	1282	1324
Continuous Subduction of a Lithospheric Platform near an Oceanic Trench – <b>S. V. Solov'ev and V. K. Bulgakov</b> . . . . .	1287	1329
Study of the Temperature Fields in Oil and Gas Strata with Water Injection Based on the Perturbation Method – <b>A. I. Filippov, O. I. Korkeshko, and P. A. Chiganov</b> . . . . .	1298	1340
Improvement of the Convergence of Fourier–Hankel Series in Solving Two-Dimensional Heat-Conduction Problem – <b>Yu. A. Kirsanov</b> . . . . .	1310	1352
Approximate Methods for Solving Problems of Nonstationary Heat Conduction in Inhomogeneous Media – <b>T. V. Vasil'eva, Yu. I. Dudarev, A. P. Kashin, and M. Z. Maksimov</b> . . . . .	1317	1358
An Approximate Method of Calculating the Heat Transfer Coefficient in Metal Bars – <b>M. L. Cancillo, J. J. Morales, M. C. Gallego, J. M. Vaquero, J. A. Garcia, A. Serrano, and V. L. Mateos</b> . . . . .	1323	1364
 INDEX		
Author Index, Volume 73, 2000 . . . . .	1335	
Tables of Contents, Volume 73, 2000 . . . . .	1339	