

JOURNAL OF
APPLIED MATHEMATICS AND MECHANICS

PRIKLADNAYA MATEMATIKA I MEKHANIKA

LIST OF CONTENTS AND AUTHOR INDEX
VOLUME 58, 1994



PERGAMON

APPLIED MATHEMATICS AND MECHANICS

The *Journal of Applied Mathematics and Mechanics* is translated cover to cover (Russian original copyright: Nauka, 90 Profsoyuznaya ul., Moscow 117864) and has been published by Pergamon since 1958.

Translation Editors:

Professor G. HERRMANN, Stanford University, CA, U.S.A.

R. C. GLASS, City University, London, U.K.

Panel of Translators

R. C. GLASS, Yu. P. GUPALO, D. LOUVISH, E. L. SHORT, A. SUMBATOV,
T. J. ZASTAWNIAK, R. L. ZNAJEK

PRIKLADNAYA MATEMATIKA I MEKHANIKA

Russian Academy of Sciences

Editorial Board

V. V. RUMYANTSEV (Editor-in-Chief)
Yu. P. GUPALO (Deputy Editor)

F. L. CHERNOUS'KO
G. G. CHERNYI
K. V. FROLOV
S. S. GRIGORYAN
A. A. IL'YUSHIN
A. Yu. ISHLINSKII
P. Ya. KOCHINA
N. N. KRASOVSKII

I. F. OBRAZTSOV
Yu. S. OSIPOV
L. V. OVSYANNIKOV
L. I. SEDOV
N. S. SOLOMENKO
V. V. STRUMINSKII
G. A. TIRSKII

Editorial Advisory Board

V. M. ALEKSANDROV
S. A. AMBARTSUMYAN
I. I. BLEKHMAN
V. V. BOLOTIN
V. G. DEMIN
A. A. DORODNITSYN
A. L. GOL'DENVEIZER
D. D. IVLEV
A. V. KARAPETYAN
S. A. KHRISTIANOVICH
V. B. KOLMANOVSKII
V. V. KOZLOV
A. N. KRAIKO
A. G. KULIKOVSKII
V. B. LIDSKII
G. A. LYUBIMOV
V. M. MATROSOV

N. N. MOISEYEV
V. I. MOSSAKOVSKII
D. E. OKHOTSIMSKII
V. Z. PARTON
G. I. PETRASHEN'
B. E. POBEDRYA
G. Ya. POPOV
V. L. RVACHEV
V. N. RUBANOVSKII
O. S. RYZHOV
Yu. S. RYAZANTSEV
G. Yu. STEPANOV
A. I. SUBBOTIN
V. V. SYCHEV
I. I. VOROVICH
N. V. ZVOLINSKII

Copyright © 1995 Elsevier Science Ltd. Published 6 issues per annum.

Annual Institutional Subscription Rate 1995 (English translation of Vol. 59): North, Central and South America U.S.\$1230.00, Rest of World £825.00. Sterling prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance, and are subject to change without notice.

Subscription enquiries from customers in North America should be sent to: Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A., and for the remainder of the world to: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K. Tel. (01865) 843000. Fax. (01865) 843010.

Back issues of all previously published volumes, both in hard copy and on microform, are available direct from Elsevier Science offices (Oxford, New York).

Second class postage paid at NEWARK, NJ. Postmaster send address corrections to *Journal of Applied Mathematics and Mechanics*, c/o Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

AUTHOR INDEX

- Abrarov, Ye. V. 825
Akulenko, L. D. 101, 197, 393
Aleksandrov, V. M. 143, 703
Alekseyeva, L. A. 109, 367
Alimov, M. M. 873
Amromin, E. L. 1095
Argatov, I. I. 303
- Baul, A. V. 1051
Beletskii, V. V. 11
Betyayev, S. K. 749
Blinov, A. P. 249
Bogatyrev, S. V. 849
Boikov, I. V. 425
Bolotnik, N. N. 841
Boyev, S. I. 313
Bratus', A. S. 1029
Budayev, B. V. 1097
- Chebakov, M. I. 539
Chekin, B. S. 487
Chigarev, A. V. 563
Chikrii, A. A. 583
Chugunov, V. A. 637
Chuyev, N. P. 267
- Deryabin, M. V. 1079
Deryabin, S. L. 267
Dinariyev, O. Yu. 755, 1021
Diyesperov, V. N. 1011
Dolotov, M. V. 343
Dunskaya, N. V. 905
- Eskin, L. D. 637
- Fedik, I. I. 335
Fil'shtinskii, L. A. 355
Fil'shtinskii, M. L. 355, 741
Finogenko, I. A. 945
Fokin, D. A. 59
Freigeit, M. R. 323
- Gadyl'shin, R. R. 477
Gaifullin, A. M. 749
Garnysheva, G. G. 575
Generalova, N. V. 1069
Georgievskii, D. V. 183
Germanovich, L. N. 343
Gol'denveizer, A. L. 1039
Gordeyev, S. V. 749
Gorshkov, A. G. 275
Grekov, M. A. 727
Grishin, S. A. 703
Grushevskii, A. V. 11
- Il'inskii, N. B. 59
Il'yushin, A. A. 545
Ivanov, A. P. 437, 777
- Karapetyan, A. V. 387, 825
Khairullina, O. B. 657
Khasanov, M. M. 117
Kholodovskii, S. E. 363
Kiiko, I. A. 545
Kill', I. D. 343
Kirgetov, A. V. 429
Kiselev, O. M. 669
Koibin, A. V. 941
Kolpakov, A. G. 293
Konashenkova, T. D. 403
Kornev, K. G. 873
Kosmodem'yanskii, A. A. Jr 551
Kostoglotov, A. A. 865
Kovalenko, Ye. V. 123, 1069
Kozlov, V. V. 787
Kraiko, A. N. 645
Krivoshei, F. A. 67
Kuntsevich, V. M. 815
Kuznetsov, Ye. B. 955
- Latyshev, A. V. 259
Lavit, I. M. 161
Lobas, L. G. 933
Lokshin, A. A. 171, 1111
Lunev, V. V. 31
Lyakh, V. V. 73
Lyapidevskii, V. Yu. 685
- Maneovich, A. I. 1061
Marchenko, A. V. 43
Markeyev, A. P. 445, 793
Matrosov, V. M. 945
Medvedkov, O. I. 91
Meleshko, S. V. 629, 857
Men'kov, G. B. 97
Mil'shtein, G. N. 971
Mineyev, S. P. 73
Mkhitarian, S. M. 133
Moiseyev, N. G. 713
Morozov, A. D. 413
Morozov, N. F. 889, 1097
Moshchuk, N. K. 403, 831
Mukhamadullina, G. L. 873
Myshkis, A. D. 21, 1085
- Narbut, M. A. 1097
Nazarov, S. A. 303
Nesterov, S. V. 101
Nikulin, V. V. 235
Novikov, M. A. 927
- Opanasovich, V. K. 335
Osmolovskii, V. G. 889
Ovsyannikov, L. V. 601
- Panferov, I. V. 177
Pen'kov, V. B. 919

- Petrov, N. N. 593
 Pobedrya, B. Ye. 81
 Pokotilo, V. G. 815
 Polenov, V. S. 563
 Polonskii, D. G. 691
 Polyakova, I. B. 313
 Popov, G. Ya. 713
 Potetyunko, E. N. 241
 Pozharskii, D. A. 143, 539, 913
 Privalov, V. A. 223
 Prokopovich, P. V. 583
 Pryakhina, O. D. 323
 Puro, A. E. 569
 Pyatnitskii, Ye. S. 905
 Repin, S. I. 149
 Rumyantsev, V. V. 373
 Samsonov, V. A. 223
 Sedov, L. I. 189, 759
 Shalashilin, V. I. 955
 Shanin, A. V. 531
 Shapiro, A. A. 691
 Shukurov, A. M. 275
 Sidorov, A. F. 657
 Solov'yeva, O. E. 971
 Sosnitskii, S. P. 1089
 Subbotin, A. I. 575
 Sveshnikova, Ye. I. 521
 Taran, V. N. 865
- Taras'yev, A. M. 207
 Tarlakovskii, D. V. 275
 Tereshchenko, V. Ya. 897
 Timofeyev, A. V. 983
 Tirskii, G. A. 493
 Tisovskii, L. O. 335
 Tkhai, V. N. 1
 Tonkonog, S. L. 637
 Tret'yakov, P. V. 559
 Ukhobotov, V. I. 997
 Utyuzhnikov, S. V. 493
 Vasil'yev, V. V. 283
 Verbitskii, V. G. 933
 Vinogradov, Yu. I. 97
 Volokh, K. Yu. 1101
 Voronin, A. A. 963
 Vorotnikov, V. I. 457
 Vorovich, I. I. 313, 539
 Yensebayeva, M. Z. 21
 Yushkanov, A. A. 259
 Zakir'yanova, G. K. 367
 Zelenev, Yu. V. 91
 Zhirov, V. S. 507
 Zhluktov, S. V. 493
 Zhuravlev, V. M. 1003
 Zingangareyeva, L. M. 669
 Zotov, Yu. K. 983

E. N. POTETYUNKO: Plane waves on a liquid surface with harmonic perturbations of boundary components	241
A. P. BLINOV: The shape of the surface of a fluid under conditions of weightlessness	249
A. V. LATYSHEV and A. A. YUSHKANOV: An analytic solution of the problem of the temperature jumps and vapour density over a surface when there is a temperature gradient	259
S. L. DERYABIN and N. P. CHUYEV: Spherically symmetric escape of a self-gravitating ideal gas into a vacuum	267
A. G. GORSHKOV, D. V. TARLAKOVSKII and A. M. SHUKUROV: Unsteady vibrations of an elastic medium bounded by two eccentric spherical surfaces	275
V. V. VASIL'YEV: Mechanical sweep method for calculating the non-linear deformation of a cylindrical panel	283
A. G. KOLPAKOV: The stiffness of elastic cylindrical beams	293
I. I. ARGATOV and S. A. NAZAROV: Asymptotic solution to the problem of an elastic body lying on several small supports	303
S. I. BOYEV, I. I. VOROVICH and I. B. POLYAKOVA: Some properties of the dynamics of a punch-layer system: an energy analysis	313
O. D. PRYAKHINA and M. R. FREIGEIT: The solution of unsteady contact problems in the presence of coupling forces	323
V. K. OPANASOVICH, L. O. TISOVSKII and I. I. FEDIK: The temperature field and thermoelastic state of a plate with a periodic system of thin elastic inclusions	335
L. N. GERMANOVICH, M. V. DOLOTOV and I. D. KILL': The dynamic problem of thermoelasticity for a half-space with distributed heat sources in the case of axial symmetry	343
L. A. FIL'SHTINSKII and M. L. FIL'SHTINSKII: Green's function for a composite piezoceramic plane with a crack between phases	355
S. E. KHOLODOVSKII: Integral representation of potentials in media with adjoining annular cracks and screens	363
L. A. ALEKSEYEVA and G. K. ZAKIR'YANOVA: Dynamic analogues of Somigliana's formula for unsteady dynamics of elastic media with an arbitrary degree of anisotropy	367
Contents of next issue	1

VOLUME 58

1994

NUMBER 3

V. V. RUMYANTSEV: On the Poincaré–Chetayev equations	373
A. V. KARAPETYAN: Specific features of the application of Routh's theory to systems with differential constraints	387
L. D. AKULENKO: Asymptotic analysis of dynamical systems subjected to high-frequency interactions	393
T. D. KONASHENKOVA and N. K. MOSCHCHUK: Stochastic mechanical systems with a non-retaining constraint	403
A. D. MOROZOV: Resonances and chaos in parametric systems	413
I. V. BOIKOV: Aizerman's problem	425
A. V. KIRGETOV: The problem of constructing Lyapunov's reducing transformation	429
A. P. IVANOV: The dynamics of systems near to grazing collision	437
A. P. MARKEYEV: An investigation of the stability of the periodic motion of a rigid body when there are collisions with a horizontal plane	445
V. I. VOROTNIKOV: The control of the angular motion of a solid with interference. A game-theoretic approach	457
R. R. GADYL'SHIN: Systems of acoustic resonators in the quasistationary mode	477
B. S. CHEKIN: The inclined entry of a thin wedge into an incompressible fluid	487
S. V. ZHLUKTOV, G. A. TIRSKII and S. V. UTYUZHNIKOV: A thermally non-equilibrium viscous shock layer past slender blunted cones	493
V. S. ZHIROV: Optimization of the mass of a wing	507
Ye I. SVESHNIKOVA: Shock waves in a weakly anisotropic elastic incompressible material	521
A. V. SHANIN: Application of the theories of representations to the problems of the excitation and reflection of wedge waves	531
I. I. VOROVICH, D. A. POZHARSKII and M. I. CHEBAKOV: The thermoelasticity of a moving punch when the heat release from friction is taken into account	539
A. A. IL'YUSHIN and I. A. KIIKO: A new formulation of the problem of the flutter of a hollow shell	545

VOLUME CONTENTS

VOLUME 58

1994

NUMBER 1

V. N. TKHAI: Some problems of the stability of a reversible system with a small parameter	1
V. V. BELETSKII and A. V. GRUSHEVSKII: The evolution of the rotational motion of a satellite under the action of a dissipative aerodynamic moment	11
M. Z. YENSEBAYEVA and A. D. MYSHKIS: The kinematics of the rolling of a rigid body along two lines	21
V. V. LUNEV: Meromorphic solutions of the equations of motion of a heavy solid with a fixed point	31
A. V. MARCHENKO: A model of a drifting ice cover	43
N. B. IL'INSKII and D. A. FOKIN: The design of cavitation-free hydroprofiles based on the solution of a mixed inverse boundary-value problem	59
F. A. KRIVOSHEI: A model of the two-velocity motion of a barotropic two-phase medium	67
V. V. LYAKH and S. P. MINEYEV: Mathematical modelling of the action of vibrations on a gas-saturated coal seam	73
B. Ye. POBEDRYA: The problem in terms of a stress tensor for an anisotropic medium	81
Yu. V. ZELENEV and O. I. MEDVEDKOV: On the description of the stress-strain state of a wedge-shaped plate	91
Yu. I. VINOGRADOV and G. B. MEN'KOV: Functional normalization for the solution of boundary-value problems for cylindrical shells	97
L. D. AKULENKO and S. V. NESTEROV: Parametric oscillations of a membrane in an alternating electric field	101
L. A. ALEKSEYEVA: Somigliani's formulae for solving the elastodynamic equations for travelling loads	109
M. M. KHASANOV: Scale-invariance of time hierarchies in viscoelastic media relaxation processes	117
Ye. V. KOVALENKO: Modelling the contact interaction between rough bodies in the presence of a lubricant	123
S. M. MKHITARYAN: The impression of a strip-like punch into a half-space which deforms exponentially	133
V. M. ALEKSANDROV and D. A. POZHARSKII: Contact stresses at the apex of a wedge-shaped punch pressed upon the edge of an elastic three-dimensional wedge	143
S. I. REPIN: The solutions of problems in the mathematical theory of plasticity with discontinuities in the displacement fields	149
I. M. LAVIT: Boundary integral equation for a curvilinear boundary crack	161
A. A. LOKSHIN: The head wave at the boundary of two hereditary-elastic half-spaces. The case of a linear source	171
I. V. PANFEROV: The deformation of a cone of transversally isotropic material by the action of temperature and an axial force	177
D. V. GEORGIYEVSKII: The stability of a plane ideal rigid-plastic Couette flow	183
Contents of next issue	I

VOLUME 58

1994

NUMBER 2

L. I. SEDOV: Properties of the invariant components of the Weyl tensor implied by the Bianchi identities	189
L. D. AKULENKO: The perturbed time-optimal problem of controlling the final position of a material point by means of a limited force	197
A. M. TARASYEV: Approximation schemes for constructing minimax solutions of Hamilton-Jacobi equations	207
V. A. PRIVALOV and V. A. SAMSONOV: Comparison of the stability properties of two autorotating motions	223
V. V. NIKULIN: A hollow vortex with an axial velocity in a tube of variable radius	235

A. A. KOSMODEM'YANSKII Jr: Calculation of the boundary derivatives of the solutions of the first and second boundary-value problems for Poisson's equation	551
P. V. TRET'YAKOV: The diffraction of an arbitrary acoustic wave by a block	559
V. S. POLENOV and A. V. CHIGAREV: Propagation of waves in an inhomogeneous viscoelastic medium with initial stresses	563
A. E. PURO: The use of the method of integrated photoelasticity to determine the stresses in a cubic single crystal	569
Contents of next issue	I

VOLUME 58

1994

NUMBER 4

Announcement to authors and readers of the <i>Journal of Applied Mathematics and Mechanics</i>	573
G. G. GARNYSHEVA and A. I. SUBBOTIN: Strategies of minimax aiming in the direction of the quasigradient	575
P. V. PROKOPOVICH and A. A. CHIKRII: A linear evasion problem for interacting groups of objects	583
N. N. PETROV: Existence of the value of a many-person game of pursuit	593
L. V. OVSYANNIKOV: The "PODMODELI" program. Gas dynamics.....	601
S. V. MELESHKO: Group classification of the equations of two-dimensional motions of a gas	629
S. L. TONKONOG, V. A. CHUGUNOV and L. D. ESKIN: Methods of group-theoretic analysis in the problem of the sliding motion of a spreading thin film of non-linearly viscous liquid.....	637
A. N. KRAIKO: The asymptotic features of the unsteady expansion of an ideal gas into a vacuum	645
A. F. SIDOROV and O. B. KHAIRULLINA: Shock-free conical compression and expansion of a gas	657
L. M. ZINGANGAREYEVA and O. M. KISELEV: Calculation of the cavitating flow around a circular cone by a subsonic stream of a compressible fluid	669
V. Yu. LYAPIDEVSKII: Blocking of the flow of a two-layer mixing liquid around an obstacle	685
D. G. POLONSKII and A. A. SHAPIRO: Stability of the discontinuity front in multiphase multicomponent displacement	691
V. M. ALEKSANDROV and S. A. GRISHIN: Dynamics of a conical shell containing supersonic gas flow.....	703
N. G. MOISEYEV and G. Ya. POPOV: The antiplane problem of a crack with edges touching planes where the constants of elasticity change	713
M. A. GREKOV: The plane problem for a crack between two linearly elastic media	727
M. L. FIL'SHTINSKII: The unsteady dynamic problem of electroelasticity for an unbounded medium with curvilinear tunnel cracks	741
S. K. BETYAYEV, A. M. GAIFULLIN and S. V. GORDEYEV: The point-circle vortex	749
O. Yu. DINARIYEV: The pressure build-up curve for a fractal cracked porous medium. Linear theory	755
Contents of next issue	I

VOLUME 58

1994

NUMBER 5

L. I. SEDOV: Comoving and inertial frames of reference	759
A. P. IVANOV: The effect of small resistive forces on relative equilibrium	777
V. V. KOZLOV: The asymptotic motions of systems with dissipation	787
A. P. MARKEYEV: Third-order resonance in a Hamiltonian system with one degree of freedom	793
A. P. SEIRANYAN: Collision of eigenvalues in linear oscillatory systems	805
V. M. KUNTSEVICH and V. G. POKOTILO: Invariant set stability in discrete non-linear systems	815
Ye. V. ABRAROVA and A. V. KARAPETYAN: Steady motions of a rigid body in a central gravitational field	825
N. K. MOSHCHUK: The motion of a randomly perturbed Chaplygin sledge	831
N. N. BOLOTNIK: Inertial motion of an absolutely rigid body on a two-degrees-of-freedom joint	841
S. V. BOGATYREV: Slow motions in problems of the dynamics of a solid with a cavity filled with a viscous liquid	849

S. V. MELESHKO: Homogeneous autonomous systems with three independent variables	857
A. A. KOSTOGLOTOV and V. N. TARAN: The use of the predictive-model method to solve inverse problems of gas dynamics	865
M. M. ALIMOV, K. G. KORNEV and G. L. MUKHAMADULLINA: The equilibrium shape of an ice-soil body formed by liquid flow past a pair of freezing columns	873
N. F. MOROZOV and V. G. OSMOLOVSKII: The formulation and an existence theorem for a variational problem on phase transitions in continuous medium mechanics	889
V. Ya. TERESHCHENKO: Modelling the singularities in the solution of problems in the theory of elasticity	897
N. V. DUNSKAYA and Ye. S. PYATNITSKII: Synthesis of a generating system in the problem of controlling an elastic rod	905
D. A. POZHARSKII: A spatial problem for an elastic wedge with a strip cut	913
V. B. PEN'KOV: On a closing crack	919
M. A. NOVIKOV: On the stability of the permanent rotations of a rigid body about a fixed point in Brun's problem	927
V. G. VERBITSKII and L. G. LOBAS: Bifurcations of steady states in systems with rolling under constant force perturbations	933
A. V. KOIBIN: Torsional vibration in an elastic rod with external dry friction	941
Contents of next issue	I

VOLUME 58

1994

NUMBER 6

V. M. MATROSOV and I. A. FINOGENKO: The solvability of the equations of motion of mechanical systems with sliding friction	945
Ye. B. KUZNETSOV and V. I. SHALASHILIN: The Cauchy problem for mechanical systems with a finite number of degrees of freedom as a problem of continuation on the best parameter	955
A. A. VORONIN: Asymptotic properties of the solutions of the equations of motion of gyroscopic systems	963
G. N. MIL'SHTEIN and O. E. SOLOV'YEVA: The construction of filters in non-linear deterministic systems	971
Yu. K. ZOTOV and A. V. TIMOFEEV: Methods of stabilizing the motions of reversible dynamic systems using non-linear canonical transformations	983
V. I. UKHOBOTOV: Domain of indifference in single-type differential games of retention in a bounded time interval	997
V. M. ZHURAVLEV: A new representation of the two-dimensional equations of the dynamics of an incompressible fluid	1003
V. N. DIYESPEROV: Some solutions of Karman's equation describing the transonic flow past a corner point on a profile with a curvilinear generatrix	1011
O. Yu. DINARIYEV: Multicomponent steady flows in porous media with phase transitions	1021
A. S. BRATUS': The properties of solutions of a class of isoperimetric problems of stability optimization	1029
A. L. GOL'DENVEIZER: Algorithms of the asymptotic construction of linear, two-dimensional thin shell theory and the St Venant principle	1039
A. V. BAUL: The effect of the Batdorf parameter on the post-critical behaviour of an axially compressed imperfect cylindrical shell.....	1051
A. I. MANEVICH: Interaction of coupled modes accompanying non-linear flexural vibrations of a circular ring	1061
N. V. GENERALOVA and Ye. V. KOVALENKO: On the contact interaction between a strip-shaped punch and a linearly-deformable base through a covering of variable thickness	1069
M. V. DERYABIN: The realization of unilateral constraints	1079
A. D. MYSHKIS: Systems with after-effect and relaxation	1085
S. P. SOSNITSKII: Hamilton action as a function of phase variables.....	1089
E. L. AMROMIN: An estimate of the radius of the viscous core of a vortex	1095
B. V. BUDAYEV, N. F. MOROZOV and M. A. NARBUT: Torsion of a circular cone with static and dynamic loading	1097
K. Yu. VOLOKH: On the classical theory of plates	1101
A. A. LOKSHIN: Non-linear reflection of a plane wave in an elastic medium	1111
Contents of next issue	I
Volume Contents/Author Index to Volume 58	III