

## New books on physics and related sciences

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**Brandt N B, Kul'bachinskii V A** *Quasiparticles in Physics of Condensed State* (Moscow: Fizmatlit, 2005) 632 pp. ISBN 5-9221-0564-7.

Quasiparticle constitutes a particular long-lived many-particle complex widely utilized in condensed matter physics, which allows excitations in an ensemble of strongly interacting particles to be described as a weakly nonideal gas of elementary excitations. In this book, the concept of quasiparticles and a variety of its applications are examined in a unified framework. Along with the classical quasiparticles — phonons, excitons, plasmons, etc. — the book also focuses on lesser-known new-generation quasiparticles such as holons, spinons, and vortexons, fractional-statistics and fractional- and variable-charge quasiparticles, as well as hybrid and compound quasiparticles. The intended audience is undergraduate and graduate students, physics faculty, research workers, and specialists in condensed matter physics. (Fizmatlit Publ.: 117997 Moscow, Profsoyuznaya ul. 90; tel. (7-095) 334-74-21; fax (7-095) 334-7620; e-mail: fizmat@maik.ru; URL: <http://www.fml.ru/>)

**Bardzokas D I, Zobnin A I, Senik N A, Fil'shtinskii M L** *Mathematical Modeling in Coupled Field Mechanics Problems* Vol. 1 *An Introduction to the Theory of Thermopiezoelectricity* Vol. 2 *Static and Dynamical Problems of Electroelasticity in Multiply Connected Compound Bodies* (Moscow: Editorial URSS, 2005) Vol. 1, 312 pp. ISBN 5-484-00071-8; Vol. 2, 376 pp. ISBN 5-484-00072-6.

Covering the fundamentals of the mechanics of coupled fields, this monograph directs our attention to the general relations of the mechanics of deformable bodies interacting with an electromagnetic field, paying particular emphasis on constructing the theory of piezoelectric material shells and plates. It presents a state-of-the-art exposition of mathematical methods of solution for a wide range of 2D electroelasticity problems for multiply connected bodies, and discusses static and dynamical problems for piecewise uniform compound piezoceramic plates weakened by cracks and holes. The application of the method of boundary integral equations to electroelastic wave diffraction from various types of inhomogeneities are fairly well covered. Special attention is given to strength and fracture characterization of defect-bearing materials. Finally, some inverse electroelasticity problems of optimally (in some sense) controlling a material's strength and fracture parameters are posed and solved. The monograph is intended for specialists in mechanics of continuous media, acoustics, and flaw detection, as well as for graduate and undergraduate students in mechanics, mathematics, physics, engineering, and similar departments.

(Editorial URSS Publ.: 117312 Moscow, prosp. 60-letiya Oktyabrya 9, office 203 at the RAS Institute for Systems Analysis; tel./fax (7-095) 135-44-23, 135- 42-16; e-mail: [urss@urss.ru](mailto:urss@urss.ru); URL: <http://www.urss.ru/>)

**Rozenblat G M** *Dynamic Systems with Friction* (Moscow-Izhevsk: IKI, 2005) 156 pp. ISBN 5-93972-413-2.

This book examines some static and dynamical problems for a rigid body on a rough plane in the presence of dry (Coulomb) frictional forces. The contact of the body with the plane can be either continuous (contact spot) or discrete (pointlike). Necessary (but sufficient) conditions for the stability of such systems are derived. Some dynamic effects in the motion of a rigid body are studied for various kinds of contact between a body and a rough plane — leading to simple quadrature solutions in some particular cases. The book should be of interest to specialists in dynamics of rigid bodies and in analytical mechanics, as well as to undergraduates and graduate majors in mechanics. (Institute for Computer Studies: 426034 Izhevsk, ul. Universitetskaya 1; tel./fax: + 7 (3412) 50-02-95; e-mail: [borisov@ics.org.ru](mailto:borisov@ics.org.ru); URL: <http://www.ics.org.ru/>)

**Malinetskii G G** *Mathematical Foundations of Synergetics: Chaos, Structures, Computational Experiments* 4th ed. revised and enlarged (Moscow: Editorial URSS, 2005) 312 pp. ISBN 5-484-00106-4

This introduction to nonlinear dynamics, synergetics, and other areas of 'nonlinear science' provides bridges between traditional natural-sciences disciplines, courses in mathematics, and the fundamental problems of today. Clear and vivid in presentation, the book is heavily illustrated and contains about a hundred problems of varying complexity. The basis of the book is the nonlinear dynamics and mathematical modeling courses that have been running at Moscow State University and Moscow Institute of Physics and Technology for a number of years, as well as the experience of a group of scientists at the M V Keldysh Institute of Applied Mathematics, Russian Academy of Sciences. The book is designed for undergraduate and graduate students, specialists in related fields, and for all those interested in the ideas, prospects, methods, and problems of synergetics. (Editorial URSS Publ.: 117312 Moscow, prosp. 60-letiya Oktyabrya 9, office 203 at the RAS Institute for Systems Analysis; tel./fax (7-095) 135-44-23, 135-42-16; e-mail: [urss@urss.ru](mailto:urss@urss.ru); URL: <http://www.urss.ru/>)

**Zhukovsky N E** *Mechanics of a System: Rigid Body Dynamics* (University courses series) 2nd reprinted ed. (Moscow: Editorial URSS, 2005) 296 pp. ISBN 5-484-00033-5

A sequel to the earlier published *Kinematics, Statics, and Particle Dynamics* by N E Zhukovsky (1847–1921), the now

presented book covers the material in the author's characteristically simple, rigorous, and clear style. The basic principles of mechanics are illustrated with examples and problems, each meticulously worked out by the author. This rarity book is a valuable resource for students and faculty in classical mechanics. (Editorial URSS Publ.: 117312 Moscow, prosp. 60-letiya Oktyabrya 9, office 203 at the RAS Institute for Systems Analysis; tel./fax (7-095) 135-44-23, 135-42-16; e-mail: [urss@urss.ru](mailto:urss@urss.ru); URL: <http://www.urss.ru/>)

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