

## New and Noteworthy from Springer

### Elementary Dirichlet Series and Modular Forms

G. Shimura, Princeton University, New Jersey

The main topics of the book are the critical values of Dirichlet L-functions and Hecke L-functions of an imaginary quadratic field, and various problems on elliptic modular forms. As to the values of Dirichlet L-functions, all previous papers and books reiterate a single old result with a single old method. After a review of elementary Fourier analysis, the author presents completely new results with new methods, though old results will also be proved. Other notable features include new results on classical Eisenstein series, a discussion of isomorphism classes of elliptic curves with complex multiplication in connection with their zeta function and periods, and a new class of holomorphic differential operators that send modular forms to those of a different weight.

2007. Approx. 150 p. (Springer Monographs in Mathematics) Hardcover ISBN 978-0-387-72473-7 ► **approx. \$59.95**

### Piecewise-smooth Dynamical Systems

#### Theory and Applications

M. di Bernardo, University of Bristol, UK; University of Naples Federico II, Italy; C. Budd, University of Bath, UK; A. Champneys, University of Bristol, UK; P. Kowalczyk, University of Bristol, UK; University of Exeter, UK

The primary purpose of this book is to introduce a coherent framework for understanding the dynamics of piecewise-smooth and hybrid systems. An informal introduction asserts the ubiquity of such models with examples drawn from mechanics, electronics, control theory and physiology. The main thrust is to classify complex behaviour via bifurcation theory in a systematic yet applicable way. The key concept is that of discontinuity-induced bifurcation, which generalises diverse phenomena such as grazing, border-collision, sliding, chattering and the period-adding route to chaos.

2007. Approx. 504 p. 234 illus. (Applied Mathematical Sciences, Volume 163) Hardcover ISBN 978-1-84628-039-9 ► **\$99.00**

### Braid Groups

C. Kassel, V. Turaev, Université Louis Pasteur - CNRS, Strasbourg, France

Braids and braid groups form the central topic of this text. The authors begin with an introduction to the basic theory highlighting several definitions of braid groups and showing their equivalence. The relationship between braids, knots and links is then investigated. Recent developments in this field follow, with a focus on the linearity and orderability of braid groups. This excellent presentation is motivated by numerous examples and problems.

2007. Approx. 320 p., 60 illus. (Graduate Texts in Mathematics) Hardcover ISBN 978-0-387-33841-5 ► **approx. \$59.95**

### An Introduction to Echo Analysis

#### Scattering Theory and Wave Propagation

G. Roach, Strathclyde University, UK

This introduction reviews the principal mathematical topics required for approaching wave propagation and scattering problems, and shows how to develop the required solutions. The emphasis is on concepts and results rather than on the fine detail of proof. Each chapter ends with a bibliography pointing to more detailed proofs.

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### Wave Propagation and Time Reversal in Randomly Layered Media

J. Fouque, North Carolina State University; J. Garnier, Université de Paris VII, Paris, France; G. Papanicolaou, Stanford University, California; K. Solna, University of California, Irvine

This book gives a systematic and self-contained presentation of wave propagation in randomly layered media using the asymptotic theory of ordinary differential equations with random coefficients.

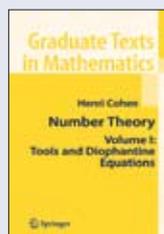
2007. X, 440 p. (Stochastic Modelling and Applied Probability, Volume 56) Hardcover ISBN 978-0-387-30890-6 ► **\$79.95**

### Advanced Linear Algebra

S. Roman, Irvine, California

For the third edition, the author has: added a new chapter on associative algebras that includes the well known characterizations of the finite-dimensional division algebras over the real field (a theorem of Frobenius) and over a finite field (Wedderburn's theorem); polished and refined some arguments; upgraded some proofs; added new theorems, including the spectral mapping theorem; corrected all known errors; enlarged the reference section considerably.

3rd ed. 2007. Approx. 520 p. 25 illus. (Graduate Texts in Mathematics, Volume 135) Hardcover ISBN 978-0-387-72828-5 ► **approx. \$69.95**



### Number Theory

**Volume I: Tools and Diophantine Equations**

**Volume II: Analytic and Modern Tools**

H. Cohen, University of Bordeaux, France

The central theme of this book is the solution of Diophantine equations, i.e., equations or systems of polynomial equations which must be solved in integers, rational numbers or more generally in algebraic numbers. This theme, in particular, is the central motivation for the modern theory of arithmetic algebraic geometry. In this text, this is considered through three of its most basic aspects.

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