

# New and Forthcoming

## Advanced Algebra

**Anthony W. Knap**, State University of New York, Stony Brook, USA

*"This textbook is a sequel to the author's textbook Basic Algebra... This reviewer finds the author's writing style extremely engaging, and shares his propensity for aiming whenever possible at an interesting and important theorem which illustrates the theory... This is a beautiful book, which should serve well as a basic graduate textbook in algebra."*

—Mathematical Reviews

2008. XXIV, 730 P. 10 ILLUS. HARDCOVER  
ISBN 978-0-8176-4522-9 \$69.95  
CORNERSTONES

## Modern Differential Geometry in Gauge Theories

Volume II: Yang–Mills Fields

**Anastasios Mallios**, University of Athens  
Panepistimioupolis, Athens, Greece

Modern differential geometry from the author's perspective is used in this work to describe physical theories of a geometric character without using any notion of calculus (smoothness). Instead, an axiomatic treatment of differential geometry is presented via sheaf theory (geometry) and sheaf cohomology (analysis). This unique approach in general furthers new perspectives and calculations that generate unexpected potential applications. *Modern Differential Geometry in Gauge Theories* systematically applies a sheaf-theoretic approach to such physical theories as gauge theory. *Volume 1* focused on Maxwell fields. In *Volume II*, the author extends the application of his sheaf-theoretic approach to Yang–Mills fields in general.

2009. APPROX. 305 P. SOFTCOVER  
ISBN 978-0-8176-4379-9 CA. \$119.00

VOLUME I: MAXWELL FIELDS  
2006. XVII, 293 P. SOFTCOVER  
ISBN 978-0-8176-4378-2 \$125.00

## The World as a Mathematical Game

John von Neumann and  
Twentieth Century Science

**Giorgio Israel**, Università di Roma 'La Sapienza', Rome, Italy; **Ana Millán Gasca**,  
Università Roma Tre, Rome, Italy

This book provides the first comprehensive scientific and intellectual biography of John von Neumann, a man who perhaps more than any other is representative of twentieth century science. With the help of his boundless mathematical capacity, von Neumann developed a conception of the world as a mathematical game, a world globally governed by a universal logic driven by individual consciousness. This vision conducted him from set theory to quantum mechanics, to economics and to his theory of automata (anticipating artificial intelligence and cognitive science).

2009. XII, 207 P. HARDCOVER  
ISBN 978-3-7643-9895-8 \$119.00  
SCIENCE NETWORKS – HISTORICAL  
STUDIES, VOL. 38

## Tropical Algebraic Geometry

Second Edition

**Ilya Itenberg**, Université Louis Pasteur,  
Strasbourg, France; **Grigory Mikhalkin**,  
University of Toronto, ON, Canada;  
**Eugenii Shustin**, Tel Aviv University, Israel

Tropical geometry is algebraic geometry over the semifield of tropical numbers, i.e., the real numbers and negative infinity enhanced with the (max,+) arithmetics. Geometrically, tropical varieties are much simpler than their classical counterparts, yet they carry information about complex and real varieties. This book presents an introduction to tropical geometry and contains some applications of this rapidly developing and attractive subject.

2009. 2ND ED. APPROX. 110 P. 30 ILLUS.  
SOFTCOVER  
ISBN 978-3-0346-0047-7 \$29.95  
OBERWOLFACH SEMINARS, VOL. 35

## Topics from the Theory of Numbers

**Emil Grosswald**

*"The book... has plenty of well-chosen exercises at the end of every chapter. This is a book written with love for the subject and with the presence of its readers (students) in mind all the time."*

—MAA Reviews

2009. 2ND ED. 1984. REPRINT  
XVIII, 333 P. 8 ILLUS. SOFTCOVER  
ISBN 978-0-8176-4837-4 \$49.95  
MODERN BIRKHÄUSER CLASSICS

## Combinatorial Number Theory and Additive Group Theory

**Alfred Geroldinger**, University of Graz,  
Austria; **Imre Z. Ruzsa**, Hungarian  
Academy of Sciences, Budapest, Hungary

Additive combinatorics is a relatively recent term coined to comprehend the developments of the more classical additive number theory, mainly focussed on problems related to the addition of integers. Some classical problems like the Waring problem on the sum of  $k$ -th powers or the Goldbach conjecture are genuine examples of the original questions addressed in the area. One of the features of contemporary additive combinatorics is the interplay of a great variety of mathematical techniques, including combinatorics, harmonic analysis, convex geometry, graph theory, probability theory, algebraic geometry or ergodic theory. This book gathers the contributions of many of the leading researchers in the area.

2009. APPROX. 345 P. SOFTCOVER  
ISBN 978-3-7643-8961-1 \$54.95  
ADVANCED COURSES IN MATHEMATICS -  
CRM BARCELONA

Approved by ISI for Journal Citation Reports:

## Journal of Fixed Point Theory and Applications

Editor-in-Chief: **Andrzej Granas**, Université de  
Montréal, Canada

ISSN 1661-7746 (online)  
ISSN 1661-7738 (print)