

# New and Forthcoming

## Inequalities

A Mathematical Olympiad Approach

**Radmila Bulajich Manfrino**, Universidad Autónoma del Estado de Morelos, Mexico; **José Antonio Gómez Ortega**, Universidad Nacional Autónoma de México; **Rogelio Valdez Delgado**, Universidad Autónoma del Estado de Morelos, Mexico

This book presents classical inequalities and specific inequalities which are particularly useful for tackling and solving optimization problems. Most of the examples, exercises and problems that appear in the book originate from Mathematical Olympiad contests around the world.

2009. 220 P., SOFTCOVER  
ISBN 978-3-0346-0049-1 \$39.95

## Simplicial Homotopy Theory

**Paul G. Goerss**, Northwestern University, Evanston, IL, USA; **John F. Jardine**, The University of Western Ontario, London, ON, Canada

With the development of Quillen's concept of a closed model category and, in particular, a simplicial model category, this collection of methods has become the primary way to describe non-abelian homological algebra and to address homotopy-theoretical issues in a variety of fields, including algebraic K-theory. This book supplies a modern exposition of these ideas, emphasizing model category theoretical techniques. Discussed here are the homotopy theory of simplicial sets, and other basic topics such as simplicial groups, Postnikov towers, and bisimplicial sets. The more advanced material includes homotopy limits and colimits, localization with respect to a map and with respect to a homology theory, cosimplicial spaces, and homotopy coherence. Interspersed throughout are many results and ideas well-known to experts, but uncollected in the literature.

2010. XV, 510 P., SOFTCOVER  
ISBN: 978-3-0346-0188-7 \$49.95  
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## Mean Curvature Flow and Isoperimetric Inequalities

**Manuel Ritoré**, Universidad Granada, Spain; **Carlo Sinestrari**, Università di Roma "Tor Vergata", Italy; **Vicente Miquel**, Universitat de València, Spain; **Joan Porti**, Universitat Autònoma de Barcelona, Spain

Geometric flows have many applications in physics and geometry, while isoperimetric inequalities can help in treating several aspects of convergence of these flows. Based on a series of lectures given by the authors, the material here deals with both subjects fields of geometry, like hyperbolic manifolds.

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ADVANCED COURSES IN MATHEMATICS - CRM BARCELONA

## Mathematics for Multimedia

**Mladen Victor Wickerhauser**, Washington University, St. Louis, MO, USA

This textbook presents the mathematics that is foundational to multimedia applications. Featuring a rigorous survey of selected results from algebra and analysis, the work examines tools used to create application software for multimedia signal processing and communication. Key features include over 100 exercises with complete solutions; many sample programs in Standard C and illustrations based on data from real studies; suggestions for further reading at the end of each chapter; and a companion website providing the computer programs described in the book as well as additional references and data files, such as images and sounds, to enhance the reader's understanding of key topics.

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## Stochastic Models, Information Theory, and Lie Groups, Volume 1

Classical Results and Geometric Methods

**Gregory S. Chirikjian**, The John Hopkins University, Baltimore, MD, USA

The subjects of stochastic processes, information theory, and Lie groups are usually treated separately from each other. This unique textbook presents these topics in a unified setting, thereby building bridges among fields that are rarely studied by the same individuals. Volume I establishes the geometric and statistical foundations required to understand the fundamentals of continuous-time stochastic processes, differential geometry, and the probabilistic foundations of information theory.

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## The Center and Cyclicity Problems

A Computational Algebra Approach

**Valery Romanovski**, University of Maribor, Slovenia; **Douglas Shafer**, University of North Carolina at Charlotte, NC, USA

Using a computational algebra approach, this work addresses the center and cyclicity problems as behaviors of dynamical systems and families of polynomial systems. The text first lays the groundwork for computational algebra and gives the main properties of ideals in polynomial rings and their affine varieties followed by a discussion on the theory of normal forms and stability. The center and cyclicity problems are then explored in detail. Containing exercises as well as historical notes and algorithms, this self-contained text is suitable for an advanced graduate course in the subject as well as a reference for researchers.

2009. XVI, 330 P., 4 ILLUS., SOFTCOVER  
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