



# Mathematical Sciences 2009



## CONTENTS

- 1 General Interest
- 2 Annals of Mathematics Studies
- 4 Princeton Mathematics Series
- 5 London Mathematical Society Monographs
- 5 Princeton Series in Applied Mathematics
- 6 Princeton Graduate and Undergraduate Textbooks
- 11 Princeton Lectures in Analysis
- 12 Mathematical Sciences
- 14 Mathematics and Social Sciences
- 16 History and Philosophy of Science
- 18 General Interest
- 25 Books by Paul J. Nahin
- 26 Books by Julian Havil
- 27 Books by Eli Maor
- 28 Albert Einstein
- 29 Index/Order Form

### TEXT

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**Row 2:** Arlie Petters, Isadore Manual Singer, Maryam Mirzakhani, Curtis McMullen, John Willard Milnor

**Row 3:** John Horton Conway, Edward Nelson, Mikhael Leonidovich Gromov, Jean-Pierre Serre, Kate Adebola Okikiolu

**Row 4:** Avi Wigderson, William Alfred Massey, John N. Mather, William Timothy Gowers, Marina Ratner

**Row 5:** Sun-Yung Alice Chang, Adebisi Agboola, Terence Chi-Chen Tao, Michele Vergne, Andrew Browder

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New

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Edited by Timothy Gowers

June Barrow-Green & Imre Leader, associate editors

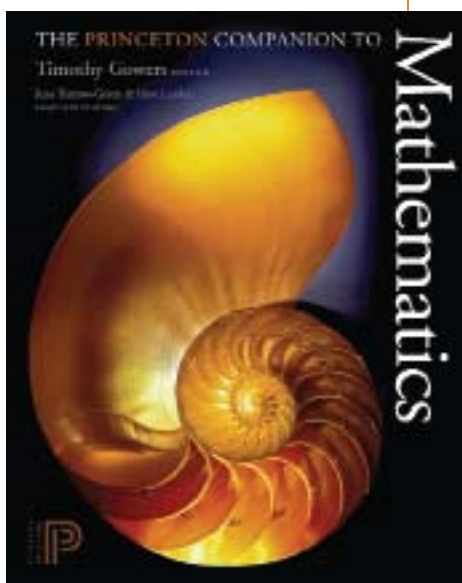
This is a one-of-a-kind reference for anyone with a serious interest in mathematics. Edited by Timothy Gowers, a recipient of the Fields Medal, it presents nearly 200 entries, written especially for this book by some of the world's leading mathematicians, that introduce basic mathematical tools and vocabulary; trace the development of modern mathematics; explain essential terms and concepts; examine core ideas in major areas of mathematics; describe the achievements of scores of famous mathematicians; explore the impact of mathematics on other disciplines such as biology, finance, and music—and much, much more.

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- Profiles more than 95 mathematicians who influenced those working today
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- Includes bibliographies, cross-references, and a comprehensive index

Timothy Gowers is the Rouse Ball Professor of Mathematics at the University of Cambridge. June Barrow-Green is lecturer in the history of mathematics at the Open University. Imre Leader is professor of pure mathematics at the University of Cambridge.

2008. 1056 pages. 20 halftones. 160 line illus.  
Cl: 978-0-691-11880-2 \$99.00 | £60.00



# Annals of Mathematics Studies

Phillip A. Griffiths, John N. Mather & Elias M. Stein, series editors

Princeton University Press is proud to have published the *Annals of Mathematics Studies* since 1940. One of the oldest and most respected series in science publishing, it has included many of the most important and influential mathematical works of the twentieth century. The series continues this tradition into the twenty-first century. To mark the continued success of the series, all books are available again in paperback. For a complete listing of all books in this series, please check our web site: [press.princeton.edu/math](http://press.princeton.edu/math)

## Forthcoming

### Higher Topos Theory

Jacob Lurie

Higher category theory is generally regarded as technical and forbidding, but part of it is considerably more tractable: the theory of infinity-categories, higher categories in which all higher morphisms are assumed to be invertible. In *Higher Topos Theory*, Jacob Lurie presents the foundations of this theory, using the language of weak Kan complexes introduced by Boardman and Vogt, and shows how existing theorems in algebraic topology can be reformulated and generalized in the theory's new language. The result is a powerful theory with applications in many areas of mathematics.

Jacob Lurie is associate professor of mathematics at Massachusetts Institute of Technology.

August 2009. 960 pages.

Pa: 978-0-691-14049-0 \$55.00 | £32.95  
Cl: 978-0-691-14048-3 \$95.00 | £56.00

## New

### The Hypoelliptic Laplacian and Ray-Singer Metrics

Jean-Michel Bismut & Gilles Lebeau

This book presents the analytic foundations to the theory of the hypoelliptic Laplacian. The hypoelliptic Laplacian, a second-order operator acting on the cotangent bundle of a compact manifold, is supposed to interpolate between the classical Laplacian and the geodesic flow. Jean-Michel Bismut and Gilles Lebeau establish the basic functional analytic properties of this operator, which is also studied from the perspective of local index theory and analytic torsion.

Jean-Michel Bismut is professor of mathematics at the University of Paris-Sud. Gilles Lebeau is professor of mathematics at the University of Nice Sophia-Antipolis.

2008. 376 pages. 4 line illus.

Pa: 978-0-691-13732-2 \$45.00 | £26.95  
Cl: 978-0-691-13731-5 \$70.00 | £40.95

## New

### Classifying Spaces of Degenerating Polarized Hodge Structures

Kazuya Kato & Sampei Usui

In 1970, Phillip Griffiths envisioned that points at infinity could be added to the classifying space  $D$  of polarized Hodge structures. In this book, Kazuya Kato and Sampei Usui realize this dream by creating a logarithmic Hodge theory. They use the logarithmic structures begun by Fontaine-Illusie to revive nilpotent orbits as a logarithmic Hodge structure.

Kazuya Kato is professor of mathematics at Kyoto University. Sampei Usui is professor of mathematics at Osaka University.

2009. 352 pages. 58 line illus.

Pa: 978-0-691-13822-0 \$55.00 | £32.95  
Cl: 978-0-691-13821-3 \$80.00 | £46.95

New

## The Structure of Affine Buildings

Richard M. Weiss

In *The Structure of Affine Buildings*, Richard Weiss gives a detailed presentation of the complete proof of the classification of Bruhat-Tits buildings first completed by Jacques Tits in 1986. The book includes numerous results about automorphisms, completions, and residues of these buildings. It also includes tables correlating the results in the locally finite case with the results of Tits's classification of absolutely simple algebraic groups defined over a local field.

Richard M. Weiss is the William Walker Professor of Mathematics at Tufts University and Honorary Professor in the School of Mathematics and Statistics at the University of Birmingham in the United Kingdom.

2009. 384 pages. 8 line illus. 8 tables.

Pa: 978-0-691-13881-7 \$49.95 | £29.95  
Cl: 978-0-691-13659-2 \$99.50 | £59.95



## Mathematical Aspects of Nonlinear Dispersive Equations

Edited by Jean Bourgain,  
Carlos E. Kenig & S. Klainerman

2007. 312 pages.

Pa: 978-0-691-12955-6 \$45.00 | £26.95  
Cl: 978-0-691-12860-3 \$105.00 | £62.00

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Richard Evan Schwartz

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János Kollár

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Cl: 978-0-691-12741-5 \$72.50 | £42.95

## Discrete Orthogonal Polynomials

Asymptotics and Applications

J. Baik, T. Kriecherbauer,

K. T.-R. McLaughlin & P. D. Miller

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*New*

### **Elliptic Partial Differential Equations and Quasiconformal Mappings in the Plane**

**Kari Astala, Tadeusz Iwaniec & Gaven Martin**

This book explores the most recent developments in the theory of planar quasiconformal mappings with a particular focus on the interactions with partial differential equations and nonlinear analysis. It gives a thorough and modern approach to the classical theory and presents important and compelling applications across a spectrum of mathematics: dynamical systems, singular integral operators, inverse problems, the geometry of mappings, and the calculus of variations. It also gives an account of recent advances in harmonic analysis and their applications in the geometric theory of mappings.

Kari Astala is the Finnish Academy Professor of Mathematics at the University of Helsinki. Tadeusz Iwaniec is the John Raymond French Distinguished Professor of Mathematics at Syracuse University. Gaven Martin is the Distinguished Professor of Mathematics at Massey University.

2009. 696 pages. 2 halftones. 17 line illus.  
Cl: 978-0-691-13777-3      \$85.00 | £50.00

*Journal*

### **Annals of Mathematics**

**Edited by Jean Bourgain, David Gabai, Nicholas M. Katz, Peter Sarnak, Yakov Sinai & Gang Tian**

Associate Editors: Mladen Bestvina, Tobias Colding, Gregory Margulis, Gopal Prasad, Bernd Sturmfels & Kari Vilonen

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J.W.P. Hirschfeld is professor emeritus of mathematics at the University of Sussex. G. Korchmáros is professor of mathematics at the University of Basilicata in Italy. F. Torres is professor of mathematics at the University of Campinas in Brazil.

2008. 720 pages. 7 line illus. 16 tables.  
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This book provides an introduction to the mathematical principles and tools needed to model, analyze, and design feedback systems.

Karl J. Åström is professor of automatic control at the Lund Institute of Technology in Sweden.

Richard M. Murray is professor of control and dynamical systems at the California Institute of Technology.

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Stephen L. Campbell is professor of mathematics and director of the graduate program in mathematics at North Carolina State University.

Richard Haberman is professor of mathematics at Southern Methodist University.

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Cl: 978-0-691-12474-2 \$95.00 | £56.00

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Wassim M. Haddad is professor of aerospace engineering at the Georgia Institute of Technology. VijaySekhar Chellaboina is associate professor of mechanical, aerospace, and biomedical engineering at the University of Tennessee.

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Costas M. Soukoulis is Distinguished Professor of Physics at Iowa State University.

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Rubin H. Landau is professor of physics at Oregon State University. Manuel José Páez is professor of physics at Universidad de Antioquia in Colombia. Cristian C. Bordeianu is vice principal at Technological High School 1 in Suceava, Romania.

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Predrag Cvitanović is the Glen P. Robinson Professor of Nonlinear Science at the Georgia Institute of Technology.

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