New Publications Offered by the AMS

Forthcoming from the AMS!

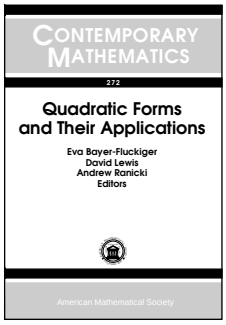
Triangle of Thoughts

Alain Connes, **André Lichnerowicz**, and **Marcel Paul Schützenberger**

In these "conversations", Connes, Lichnerowitz and Schützenberger, all members of the French Academy, closely examine the relationships that connect mathematics, physics and philosophy. The book may make you think again about things that you thought were familiar.

June 2001, approximately 234 pages, Hardcover, ISBN 0-8218-2614-X, LC 00-065064, 2000 *Mathematics Subject Classification*: 00A30, **All AMS members $24**, List $30, Order code TOTN

Algebra and Algebraic Geometry



Quadratic Forms and Their Applications

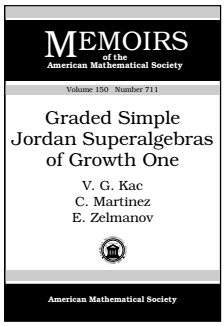
Eva Bayer-Fluckiger, *CNRS, Université de Franche-Comte, Besançon, France*, **David Lewis**, *University College, Dublin, Ireland*, and **Andrew Ranicki**, *University of Edinburgh, Scotland*, Editors

This volume outlines the proceedings of the conference on "Quadratic Forms and Their Applications" held at University College Dublin. It includes survey articles and research papers ranging from applications in topology and geometry to the algebraic theory of quadratic forms and its history. Various aspects of the use of quadratic forms in algebra, analysis, topology, geometry, and number theory are addressed. Special features include the first published proof of the Conway-Schneeberger Fifteen Theorem on integer-valued quadratic forms and the first English-language biography of Ernst Witt, founder of the theory of quadratic forms.

Contents: E. Bayer-Fluckiger, Galois cohomology of the classical groups; **A.-M. Bergé**, Symplectic lattices; **J. H. Conway**, Universal quadratic forms and the Fifteen Theorem; **M. Bhargava**, On the Conway-Schneeberger Fifteen Theorem; **M. Epkenhans**, On trace forms and the Burnside ring; **A. Fröhlich** and **C. T. C. Wall**, Equivariant Brauer groups; **D. W. Hoffmann**, Isotropy of quadratic forms and field invariants; **O. Izhboldin** and **A. Vishik**, Quadratic forms with absolutely maximal splitting; **A. F. Izmailov**, 2-regularity and reversibility of quadratic mappings; **C. Kearton**, Quadratic forms in knot theory; **I. Kersten**, Biography of Ernst Witt (1911–1991); **M. Knebusch** and **U. Rehmann**, Generic splitting towers and generic splitting preparation of quadratic forms; **M. Mischler**, Local densities of hermitian forms; **V. Powers** and **B. Reznick**, Notes towards a constructive proof of Hilbert's theorem on ternary quartics; **W. Scharlau**, On the history of the algebraic theory of quadratic forms; **V. P. Snaith**, Local fundamental classes derived from higher K-groups: III; **R. G. Swan**, Hilbert's theorem on positive ternary quartics; **C. T. C. Wall**, Quadratic forms and normal surface singularities.

Contemporary Mathematics, Volume 272

January 2001, 311 pages, Softcover, ISBN 0-8218-2779-0, LC 00-053584, 2000 *Mathematics Subject Classification*: 11Exx, 01Axx, **Individual member $47**, List $79, Institutional member $63, Order code CONM/272N



Graded Simple Jordan Superalgebras of Growth One

V. G. Kac, *Massachusetts Institute of Technology, Cambridge*, **C. Martinez**, *Universidad de Oviedo, Spain*, and **E. Zelmanov**, *Yale University, New Haven, CT*

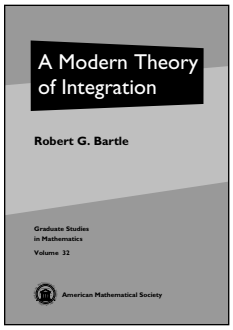
Contents: Introduction; Structure of the even part; Cartan type; Even part is direct sum of two loop algebras; A is a loop algebra; J is a finite dimensional Jordan superalgebra or a Jordan superalgebra of a superform; The main case; Impossible cases; Bibliography.

Memoirs of the American Mathematical Society, Volume 150, Number 711

March 2001, 140 pages, Softcover, ISBN 0-8218-2645-X, LC 00-053582, 2000 *Mathematics Subject Classification*: 17C70, 17B70; 17B60, 17B65, 17B66, 17B68, **Individual member $29**, List $49, Institutional member $39, Order code MEMO/150/711N

Analysis

Recommended Text



A Modern Theory of Integration

Robert G. Bartle, *Eastern Michigan University, Ypsilanti*, and *University of Illinois, Urbana*

The theory of integration is one of the twin pillars on which analysis is built. The first version of integration that students see is the Riemann integral. Later, graduate students learn that the Lebesgue integral is "better" because it removes some restrictions on the integrands and the domains over which we integrate. However, there are still drawbacks to Lebesgue integration, for instance, dealing with the Fundamental Theorem of Calculus, or with "improper" integrals.

This book is an introduction to a relatively new theory of the integral (called the "generalized Riemann integral" or the "Henstock-Kurzweil integral") that corrects the defects in the classical Riemann theory and both simplifies and extends the Lebesgue theory of integration. Although this integral includes that of Lebesgue, its definition is very close to the Riemann integral that is familiar to students from calculus. One virtue of the new approach is that no measure theory and virtually no topology is required. Indeed, the book includes a study of measure theory as an application of the integral.

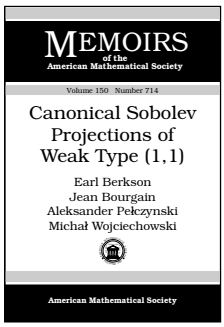
Part 1 fully develops the theory of the integral of functions defined on a compact interval. This restriction on the domain is not necessary, but it is the case of most interest and does not exhibit some of the technical problems that can impede the reader's understanding. Part 2 shows how this theory extends to functions defined on the whole real line. The theory of Lebesgue measure from the integral is then developed, and the author makes a connection with some of the traditional approaches to the Lebesgue integral. Thus, readers are given full exposure to the main classical results.

The text is suitable for a first-year graduate course, although much of it can be readily mastered by advanced undergraduate students. Included are many examples and a very rich collection of exercises. There are partial solutions to approximately one-third of the exercises.

Contents: *Integration on compact intervals:* Gauges and integrals; Some examples; Basic properties of the integral; The fundamental theorems of calculus; The Saks-Henstock lemma; Measurable functions; Absolute integrability; Convergence theorems; Integrability and mean convergence; Measure, measurability, and multipliers; Modes of convergence; Applications to calculus; Substitution theorems; Absolute continuity; *Integration on infinite intervals:* Introduction to Part 2; Infinite intervals; Further reexamination; Measurable sets; Measurable functions; Sequences of functions; Limits superior and inferior; Unbounded sets and sequences; The arctangent lemma; Outer measure; Lebesgue's differentiation theorem; Vector spaces; Semimetric spaces; Riemann-Stieltjes integral; Normed linear spaces; Some partial solutions; References; Index; Symbol index.

Graduate Studies in Mathematics, Volume 32

April 2001, approximately 448 pages, Hardcover, ISBN 0-8218-0845-1, LC 00-065063, 2000 *Mathematics Subject Classification*: 26-01; 26A39, 26A42, 28-01, **All AMS members $47**, List $59, Order code GSM/32N



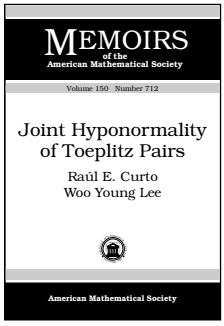
Canonical Sobolev Projections of Weak Type $(1,1)$

Earl Berkson, *University of Illinois, Urbana*, **Jean Bourgain**, *Institute for Advanced Study, Princeton, NJ*, and **Aleksander Pełczynski** and **Michal Wojciechowski**, *Polish Academy of Sciences, Warszawa*

Contents: Introduction and notation; Some properties of weak type multipliers and canonical projections of weak type $(1,1)$; A class of weak type $(1,1)$ rational multipliers; A subclass of $L^\infty(\mathbb{R}^2)\backslash M_1^{(w)}(\mathbb{R}^2)$ induced by $L^\infty(\mathbb{R})$; Some combinatorial tools; Necessity proof for the second order homogeneous case: A converse to Corollary (2.14); Canonical projections of weak type $(1,1)$ in the $\mathbb{T}^n$ model: Second order homogeneous case; The non-homogeneous case; Reducible smoothnesses of order 2; the canonical projection of every two-dimensional smoothness is of weak type $(1,1)$; References.

Memoirs of the American Mathematical Society, Volume 150, Number 714

March 2001, 75 pages, Softcover, ISBN 0-8218-2665-4, LC 00-053580, 2000 *Mathematics Subject Classification*: 26C15, 42B15, 46E30, 46E35, 47F05; 42B10, 46F10, **Individual member $26**, List $43, Institutional member $34, Order code MEMO/150/714N



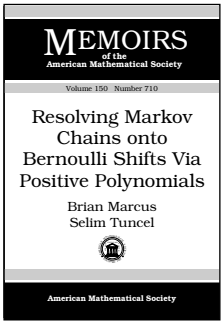
Joint Hyponormality of Toeplitz Pairs

Raúl E. Curto, *University of Iowa, Iowa City*, and **Woo Young Lee**, *Sung Kyun Kwan University, Suwan, Korea*

Contents: Introduction; Hyponormality of Toeplitz pairs with one coordinate a Toeplitz operator with analytic polynomial symbol; Hyponormality of trigonometric Toeplitz pairs; The gap between 2-hyponormality and subnormality; Applications; Concluding remarks and open problems; References; List of symbols.

Memoirs of the American Mathematical Society, Volume 150, Number 712

March 2001, 65 pages, Softcover, ISBN 0-8218-2653-0, LC 00-053583, 2000 *Mathematics Subject Classification*: 47B20, 47B35, 47A63; 47B37, 47B47, **Individual member $24**, List $40, Institutional member $32, Order code MEMO/150/712N



Resolving Markov Chains onto Bernoulli Shifts via Positive Polynomials

Brian Marcus, *IBM Almaden Research Center, San Jose, CA*, and **Selim Tuncel**, *University of Washington, Seattle, WA*

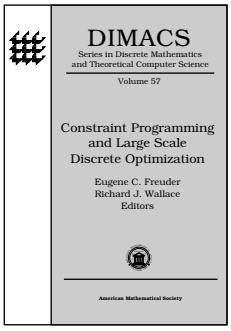
This item will also be of interest to those working in probability.

Contents: *Part A. Resolving Markov Chains onto Bernoulli Shifts:* Introduction; Weighted graphs and polynomial matrices; The main results; Markov chains and regular isomorphism; Necessity of the conditions; Totally conforming eigenvectors and the one-variable case; Splitting the conforming eigenvector in the one-variable case; Totally conforming eigenvectors for the general case; Splitting the conforming eigenvector in the general case; Bibliography; *Part B. On Large Powers of Positive Polynomials in Several Variables:* Introduction; Structure of $\mathbf{Log}(p^{\mathbf{n}})$; Entropy and equilibrium distributions for $\mathbf{w} \in \mathbf{W}(\mathbf{p})$; Equilibrium distributions and coefficients of $(p^{\mathbf{n}})$; Proofs of the estimates; Bibliography.

Memoirs of the American Mathematical Society, Volume 150, Number 710

March 2001, 98 pages, Softcover, ISBN 0-8218-2646-8, LC 00-053581, 2000 *Mathematics Subject Classification*: 28D20, 11C08; 05A10, 94A17, **Individual member $27**, List $45, Institutional member $36, Order code MEMO/150/710N

Applications



Constraint Programming and Large Scale Discrete Optimization

Eugene C. Freuder and **Richard J. Wallace**, *University of New Hampshire, Durham*, Editors

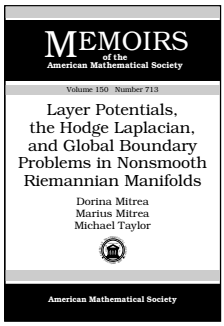
Constraint programming has become an important general approach for solving hard combinatorial problems that occur in a number of application domains, such as scheduling and configuration. This volume contains selected papers from the workshop on Constraint Programming and Large Scale Discrete Optimization held at DIMACS. It gives a sense of state-of-the-art research in this field, touching on many of the important issues that are emerging and giving an idea of the major current trends. Topics include new strategies for local search, multithreaded constraint programming, specialized constraints that enhance consistency processing, fuzzy representations, hybrid approaches involving both constraint programming and integer programming, and applications to scheduling problems in domains such as sports scheduling and satellite scheduling.

Contents: R. J. Wallace and **E. C. Freuder**, Introduction to DIMACS workshop on Constraint Programming and Large Scale Discrete Optimization; *General methods:* **A. Nareyek**, Using global constraints for local search; **C. Voudouris** and **E. Tsang**, Guided local search joins the elite in discrete optimisation; **F. Zabatta**, Multithreaded constraint programming: A hybrid approach; *CP approaches to scheduling:* **H. Meyer auf'm Hofe**, Nurse rostering as constraint satisfaction with fuzzy constraints and inferred control strategies; **J. C. Pemberton** and **F. Galiber, III**, A constraint-based approach to satellite scheduling; **J.-C. Régin**, Minimization of the number of breaks in sports scheduling problems using constraint programming; **B. M. Smith**, **C. J. Layfield**, and **A. Wren**, A constraint programming pre-processor for a bus driver scheduling system; *LSCO and software methodology:* **C. Gervet**, Large scale combinatorial optimization: A methodological viewpoint.

DIMACS: Series in Discrete Mathematics and Theoretical Computer Science, Volume 57

March 2001, 175 pages, Hardcover, ISBN 0-8218-2710-3, LC 00-066354, 2000 *Mathematics Subject Classification*: 65K10, 68T20; 90B35, 90B36, 90B50, 90C27, **Individual member $33**, List $55, Institutional member $44, Order code DIMACS/57N

Differential Equations



Layer Potentials, the Hodge Laplacian, and Global Boundary Problems in Nonsmooth Riemannian Manifolds

Dorina Mitrea and **Marius Mitrea**, *University of Missouri, Columbia*, and **Michael Taylor**, *University of North Carolina, Chapel Hill*

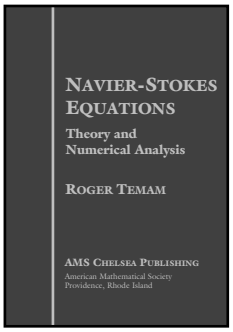
This item will also be of interest to those working in geometry and topology.

Contents: Introduction; Singular integrals on Lipschitz submanifolds of codimension one; Estimates on fundamental solutions; General second-order strongly elliptic systems; The Dirichlet problem for the Hodge Laplacian and related operators; Natural boundary problems for the Hodge Laplacian in Lipschitz domains; Layer potential operators on Lipschitz domains; Rellich type estimates for differential forms; Fredholm properties of boundary integral operators on regular spaces; Weak extensions of boundary derivative operators; Localization arguments and the end of the proof of Theorem 6.2; Harmonic fields on Lipschitz domains; The proofs of the Theorems 5.1–5.5; The proofs of the auxiliary lemmas; Applications to Maxwell's equations on Lipschitz domains; Analysis on Lipschitz manifolds; The connection between d_{∂} and $d_{\partial\Omega}$; Bibliography.

Memoirs of the American Mathematical Society, Volume 150, Number 713

March 2001, 120 pages, Softcover, ISBN 0-8218-2659-X, LC 00-053585, 2000 *Mathematics Subject Classification*: 35J55, 42B20, 58J05, 58J32, 58A14; 31B10, 31C12, 45E05, 78A30, **Individual member $28**, List $47, Institutional member $38, Order code MEMO/150/713N

A Classic!



Navier–Stokes Equations

Theory and Numerical Analysis

Roger Temam, *Indiana University, Bloomington*

From a review for the First Edition:

This book, in many ways remarkable, gives a detailed account of a number of results concerned with the theory and numerical analysis of the Navier-Stokes equations of viscous incompressible fluids.

—Zentralblatt für Mathematik

This book was originally published in 1977 and has since been reprinted four times (the last reprint was in 1985). The current volume is reprinted and fully retypeset by the AMS. It is very close in content to the 1985 edition. The book presents a systematic treatment of results on the theory and numerical analysis of the Navier-Stokes equations for viscous incompressible fluids. Considered are the linearized stationary case, the nonlinear stationary case, and the full nonlinear time-dependent case. The relevant mathematical tools are introduced at each stage.

The new material in this book is Appendix III, reproducing a survey article written in 1998. This appendix contains a few aspects not addressed in the earlier editions, in particular a short derivation of the Navier-Stokes equations from the basic conservation principles in continuum mechanics, further historical perspectives, and indications on new developments in the area. The appendix also surveys some aspects of the related Euler equations and the compressible Navier-Stokes equations. Readers are advised to peruse this appendix before reading the core of the book.

This book presents basic results on the theory of Navier-Stokes equations and, as such, continues to serve as a comprehensive reference source on the topic.

This item will also be of interest to those working in applications.

Contents: The steady-state Stokes equations; Steady-state Navier–Stokes equations; The evolution Navier–Stokes equation; Appendix I: Properties of the curl operator and application to the steady-state Navier–Stokes equations; Appendix II (by F. Thomasset): Implementation of non-conforming linear finite elements (Approximation APX5—Two-dimensional case); Appendix III: Some developments on Navier–Stokes equations in the second half of the 20th century; Bibliography to Appendix III; Comments; Additional comments to the revised edition; Bibliography; Index.

AMS Chelsea Publishing

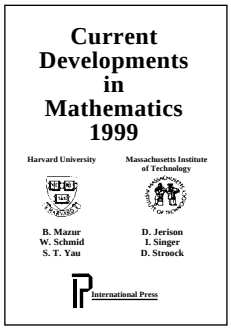
April 2001, approximately 424 pages, Hardcover, ISBN 0-8218-2737-5, 2000 *Mathematics Subject Classification*: 76–02; 65–02, 76D05, 35Q30, **All AMS members $53**, List $59, Order code CHEL-TEMAMN

General and Interdisciplinary

Current Developments in Mathematics—A Series of Books from International Press

Each year in November, the mathematics departments of Harvard and MIT host a small, yet remarkable, conference highlighting some of the most important mathematical developments of the previous year. Usually, the speakers have played leading roles in the work they discuss.

The lectures are addressed to a wide mathematical audience. And the speakers generally give an overview of the subject, placing the new results in context both mathematically and historically. They explain why the results are interesting and give a sense of the methods of proof. The proceedings of these conferences provide attractive introductions to the important mathematical research of today.



Current Developments in Mathematics, 1999

B. Mazur, **W. Schmid**, and **S.-T. Yau**, *Harvard University, Cambridge, MA*, **D. Jerison**, **I. Singer**, and **D. Stroock** *Massachusetts Institute of Technology, Cambridge*, Editors

A publication of the International Press.

These are the proceedings of the joint MIT-Harvard conference, Current Developments in Mathematics, held in 1999. Included are the following:

Hubert L. Bray and Richard M. Schoen: "Recent Proofs of the Riemannian Penrose Conjecture". The proofs are by Huisken and Ilmanen and by Bray. The conjecture is a statement about the mass of black holes in a three-dimensional space-like slice of a spacetime, first proposed by Penrose as a test of cosmic censorship. The proof by Huisken and Ilmanen is by way of a generalized inverse mean curvature flow. The proof by Bray is quite different, relying on the positive mass theorem and conformal deformations of metrics.

J. H. Conway, C. Goodman-Strauss, and N. J. A. Sloane: "Recent Progress in Sphere Packing". The packings are for spheres in dimensions less than 24, with certain better results in dimensions 9 and below. Many of the best packings come from laminated lattices, which are described here as sections of the Leech lattice.

Guy Henniart: "A Report on the Proof of the Langlands Conjectures for $GL(N)$ over p-adic Fields". The conjectures relate Galois representations and automorphic representations. The first objects are, roughly, representations of the Galois group of the algebraic closure of a p-adic field. The second are representations of the p-adic $GL(N)$ satisfying certain conditions. The original proof was by Michael Harris and Richard Taylor.

Later, Henniart provided another method which was somewhat more direct.

Gérard Laumon: "The Langlands Correspondence for Function Fields Following Laurent Lafforgue". Here, the correspondence between Galois representations and automorphic representations assumes that the ground field is the field of functions of a finite field. The methods here are quite different from those for the p-adic case. For instance, Drinfeld shtukas play a central role.

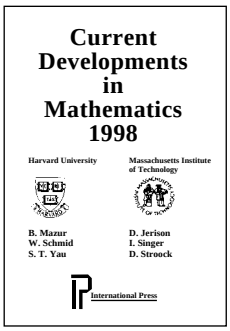
The proceedings of the Current Developments in Mathematics conferences from 1995, 1996, 1997, and 1998, published by International Press, are also available through the AMS. See the list of International Press books at www.ams.org/bookstore.

This item will also be of interest to those working in mathematical physics, discrete mathematics and combinatorics, and number theory.

Distributed worldwide, except in Japan, by the American Mathematical Society.

International Press

December 2000, 132 pages, Hardcover, ISBN 1-57146-043-8, 2000 *Mathematics Subject Classification*: 00B25, **All AMS members $34**, List $42, Order code INPR/43N



Current Developments in Mathematics, 1998

B. Mazur, **W. Schmid**, and **S.-T. Yau,** *Harvard University, Cambridge, MA*, **D. Jerison**, **I. Singer**, and **D. Stroock**, *Massachusetts Institute of Technology, Cambridge*, Editors

A publication of the International Press.

These are the proceedings of the joint MIT-Harvard conference Current Developments in Mathematics, held in 1998.

There were two talks on mirror symmetry. Brian Greene gives a review of the first ten years of mirror symmetry, including its origins in string theory and its current applications in complex algebraic geometry. The paper by Bong H. Lian, Kefeng Liu, and S.-T. Yau goes into some detail about the mirror principle and its proof, which are important pieces of the mirror symmetry setup.

Peter Kronheimer talks about the recent uses of symplectic techniques in topology. He explains the theory of J-holomorphic curves, which lies behind some of the important results of Gromov, and Donaldson's work on symplectic submanifolds.

Lou Van Den Dries describes the role of o-minimal structures in real analytic geometry. The theory of o-minimal structures was begun as a way of studying the real exponential field. It was clear in the 1980s that subanalytic geometry falls under the roof of o-minimality. In the 1990s o-minimal expansions of the real field allowed for new results in geometry. One application was the proof by Schmid and Vilonen of the Barbasch-Vogan conjecture in representation theory.

Horng-Tzer Yau discusses asymptotic solutions to dynamics of many-body systems and classical continuum equations. There is a review of some basic ideas from classical, stochastic, and quantum dynamics of large systems. The limiting classical equations are the Boltzmann, Euler, and incompressible Navier-Stokes equations. The analytic tools reviewed include perturbation theory, large deviations, the relative entropy method, the logarithmic Sobolev inequality, renumalization, and multiscale analysis.

Lai-Sang Young looks at the mathematics that lies at the confluence of the geometric theory of ordinary differential equations and ergodic theory. Rather than an exhaustive survey, Young concentrates on recent results in four areas: billiards and related physical systems; examples of strange attractors; entropy, Lyapunov exponents and dimension; and correlation decay and related statistical properties. Background material is provided for readers who are not specialists in dynamics.

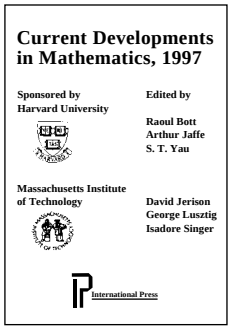
The proceedings of the Current Developments in Mathematics conferences from 1995, 1996, 1997, and 1999, published by International Press, are also available through the AMS. See the list of International Press books at www.ams.org/bookstore.

This item will also be of interest to those working in mathematical physics, geometry and topology, logic and foundations, and differential equations.

Distributed worldwide, except in Japan, by the American Mathematical Society.

International Press

December 2000, 278 pages, Hardcover, ISBN 1-57146-077-2, 2000 *Mathematics Subject Classification*: 00B25, **All AMS members $34**, List $42, Order code INPR/42N



Current Developments in Mathematics, 1997

Raoul Bott, **Arthur Jaffe**, and **S.-T. Yau,** *Harvard University, Cambridge, MA*, **David Jerison**, **George Lusztig**, and **Isadore Singer**, *Massachusetts Institute of Technology, Cambridge*, Editors

A publication of the International Press.

These are the proceedings of the joint MIT-Harvard conference, Current Developments in Mathematics, held in 1997. Included are the following:

- Alain Connes, "Trace Formula on the Adele Class Space and Weil Positivity". This is a survey of Connes's approach to the Riemann Hypothesis. The zeroes of the zeta function are related to the eigenvalues for the action of the idele class group on the adele class space, a noncommutative space. The positivity of the Weil distribution can be proved in this setting, provided a conjectured analogue of the Selberg trace formula holds.
- Lawrence C. Evans, "Partial Differential Equations and Monge-Kantorovich Mass Transfer". Recently, progress has been made on some problems in the calculus of variations by using techniques from differential equations. An important example of this is the Monge-Kantorovich mass transfer, a problem which dates back to the 18th century. Evans examines this problem, using tools from both analysis and geometry, in two situations: first, where the cost function is uniformly convex and then for a nonuniformly convex cost function.
- Peter Sarnak, "Quantum Chaos, Symmetry and Zeta Functions". In physics, quantum chaos is the study of the chaotic

behavior of eigenvalues of Hamiltonian systems as Planck's constant goes to zero. Arithmetic quantum chaos relates to similar ideas applied to Hamiltonian flows on an arithmetic hyperbolic manifold. The behavior of the eigenvalues is related to properties of the Riemann zeta function and L-functions.

- W. Soergel, "Character Formulas for Tilting Modules over Quantum Groups at Roots of One". Using his earlier results on character formulas for tilting modules for Kac-Moody algebras, Soergel proves a character formula for tilting modules for quantum groups at roots of unity.
- A. Suslin, "Voevodsky's Proof of the Milnor Conjecture". Milnor's conjecture asserts that a certain map from the Milnor K-theory of a field to the Galois cohomology of the Galois group of its separable closure with coefficients in $\mathbf{Z}/2$ is an isomorphism. The proof is remarkable, adapting tools from algebraic topology to the problem at hand, such as a homotopy theory for schemes and Steenrod operations for motivic cohomology.

The proceedings also contains four lists of open problems. The topics of the problems and their editors are: Mathematical and Applied Physics, A. Jaffe and D. Stroock; Number Theory, B. Mazur; Geometry and Topology, C. Taubes; Analysis, D. Jerison.

The proceedings of the Current Developments in Mathematics conferences from 1995, 1996, 1998, and 1999, published by International Press, are also available through the AMS. See the list of International Press books at www.ams.org/bookstore.

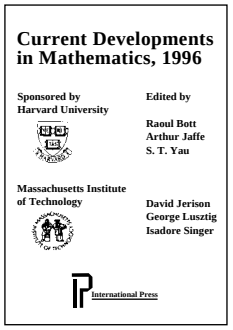
This item will also be of interest to those working in differential equations, algebra and algebraic geometry, and geometry and topology.

Distributed worldwide, except in Japan, by the American Mathematical Society.

Contents: *Part I: Lectures:* **A. Connes**, Trace formula on the adele class space and Weil positivity; **L. C. Evans**, Partial differential equations and Monge-Kantorovich mass transfer; **P. Sarnak**, Quantum chaos, symmetry and zeta functions, I: Quantum chaos; **P. Sarnak**, Quantum chaos, symmetry and zeta functions, II: Zeta functions; **W. Soergel**, Character formulas for tilting modules over quantum groups at roots of one; **A. Suslin**, Voevodsky's proof of the Milnor conjecture; *Part II: Open Problems:* Open problems in mathematical and applied physics, collected by A. Jaffe and D. Stroock; Open problems in number theory, collected by B. Mazur; Open problems in geometry and topology, collected by C. Taubes; Open problems in analysis, collected by D. Jerison.

International Press

December 2000, 266 pages, Hardcover, ISBN 1-57146-078-0, 2000 *Mathematics Subject Classification*: 00B25, **All AMS members $34**, List $42, Order code INPR/41N



Current Developments in Mathematics, 1996

Raoul Bott, **Arthur Jaffe**, and **S.-T. Yau,** *Harvard University, Cambridge, MA*, **David Jerison**, **George Lusztig**, and **Isadore Singer**, *Massachusetts Institute of Technology, Cambridge*, Editors

A publication of the International Press.

These are the proceedings of the joint MIT-Harvard conference, Current Developments in Mathematics, held in 1996.

Richard Borcherds writes about his well-known work on automorphic forms and Lie algebras. The algebras involved include Kac-Moody algebras and vertex algebras. The main character is the "fake monster Lie algebra", with a strong supporting role played by the Leech lattice. There is a brief discussion of how results such as the no-ghost theorem and Frenkel's upper bound are used to prove the moonshine conjectures. Borcherds shows how the fake monster Lie algebra can be used to construct special types of (generalized) automorphic forms.

Gerrit Heckman and Eric Opdam write about harmonic analysis for affine Hecke algebras. Here, the goal is to establish Reeder's proposed version of Lusztig's classification of unipotent representations of a p-adic group by computing formal degrees via a residue calculation.

Ehud Hrushovski describes one of the recent striking results in pure mathematics which is proved using model theory. In particular, he shows how to to prove the Mordell-Lang conjecture for function fields. Once he has reviewed the requisite model theory, the proof is much less difficult than the earlier proof of the Mordell conjecture using the deep machinery of arithmetic algebraic geometry.

Yves Meyer focuses on the application of wavelet analysis to the Navier-Stokes equations. The general problem is the existence and uniqueness of solutions to the equations for initial conditions in a given function space. The analysis includes a careful look at wavelets in this setting, as well as a careful look at the subtleties of the Navier-Stokes equations.

The proceedings of the Current Developments in Mathematics conferences from 1995, 1997, 1998 and 1999, published by International Press, are also available through the AMS. See the list of International Press books at www.ams.org/bookstore.

This item will also be of interest to those working in number theory, logic and foundations, analysis, and differential equations.

Distributed worldwide, except in Japan, by the American Mathematical Society.

International Press

December 2000, 212 pages, Hardcover, ISBN 1-57146-035-7, 2000 *Mathematics Subject Classification*: 00B25, **All AMS members $34**, List $42, Order code INPR/40N

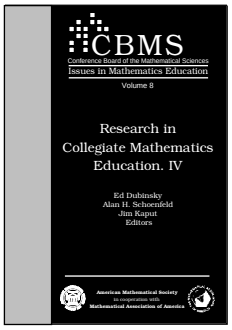
Forthcoming from the AMS!

Triangle of Thoughts

Alain Connes, **André Lichnerowicz**, and **Marcel Paul Schützenberger**

In these "conversations", Connes, Lichnerowitz and Schützenberger, all members of the French Academy, closely examine the relationships that connect mathematics, physics and philosophy. The book may make you think again about things that you thought were familiar.

June 2001, approximately 234 pages, Hardcover, ISBN 0-8218-2614-X, LC 00-065064, 2000 *Mathematics Subject Classification*: 00A30, **All AMS members $24**, List $30, Order code TOTN



Research in Collegiate Mathematics Education. IV

Ed Dubinsky, **Alan H. Schoenfeld**, *University of California, Berkeley*, **Jim Kaput**, *University of Massachusetts at Dartmouth, North Dartmouth*, Editors

This fourth volume of *Research in Collegiate Mathematics Education*(RCME IV) reflects the themes of student learning and calculus. Included are overviews of calculus reform in France and in the U.S. and large-scale and small-scale longitudinal comparisons of students enrolled in first-year reform courses and in traditional courses. The work continues with detailed studies relating students' understanding of calculus and associated topics. Direct focus is then placed on instruction and student comprehension of courses other than calculus, namely abstract algebra and number theory. The volume concludes with a study of a concept that overlaps the areas of focus, quantifiers. The book clearly reflects the trend towards a growing community of researchers who systematically gather and distill data regarding collegiate mathematics' teaching and learning.

This series is published in cooperation with the Mathematical Association of America.

Contents: M. Artigue, Teaching and learning calculus: What can be learned from education research and curricular changes in France?; **B. Darken**, **R. Wynegar**, and **S. Kuhn**, Evaluating calculus reform: A review and a longitudinal study; **S. L. Ganter** and **M. R. Jiroutek**, The need for evaluation in the calculus reform movement. A comparison of two calculus teaching methods; **K. E. Schwingendorf**, **G. P. McCabe**, and **J. Kuhn**, A longitudinal study of the C^4L calculus reform program: Comparisons of C^4L and traditional students; **M. A. McDonald**, **D. M. Mathews**, and **K. H. Strobel**, Understanding sequences: A tale of two objects; **M. J. Zandieh**, A theoretical framework for analyzing student understanding of the concept of derivative; **A. Selden**, **J. Selden**, **S. Hauk**, and **A. Mason**, Why can't calculus students access their knowledge to solve non-routine problems?; **W. O. Martin**, Lasting effects of the integrated use of graphing technologies in precalculus mathematics; **J. Hannah**, Visual confusion in permutation representations; **R. Zazkis**, Factors, divisors, and multiples: Exploring the web of students' connections; **E. Dubinsky** and **O. Yiparaki**, On student understanding of AE and EA quantification.

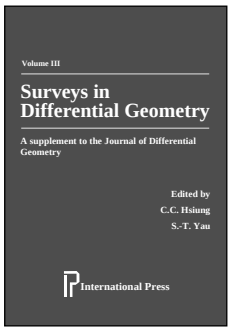
CBMS Issues in Mathematics Education, Volume 8

January 2001, 291 pages, Softcover, ISBN 0-8218-2028-1, 2000 *Mathematics Subject Classification*: 00–XX, 97–XX, **All Individuals $29**, List $49, Order code CBMATH/8N

Geometry and Topology

Surveys in Differential Geometry—A Series of Books from International Press

Surveys in Differential Geometry is a series of books published by International Press and sponsored in part by the *Journal of Differential Geometry* (Lehigh University, Bethleham, PA). Each volume in the series is devoted to one or several topics and comprises survey and research articles written by leading specialists in the area. For a full listing of the volumes in this International Press series that are available through the AMS, go to www.ams.org/bookstore.



Surveys in Differential Geometry, Volume III

Chuan C. Hsiung, *Lehigh University, Bethlehem, PA*, and **Shing-Tung Yau**, *Harvard University, Cambridge, MA*, Editors

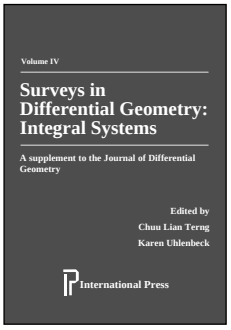
A publication of the International Press.

This volume features surveys based on lectures given at Harvard University in 1996. Topics include local index theory, eta invariants, and holomorphic torsion, Thurston's hyperbolization of Haken manifolds, quasi-minimal semi-Euclidean laminations in 3-manifolds, embedded surfaces and gauge theory in three and four dimensions, and the geometry of the Seiberg-Witten invariants.

Distributed worldwide, except in Japan, by the American Mathematical Society.

International Press

December 2000, 339 pages, Hardcover, ISBN 1-57146-067-5, 2000 *Mathematics Subject Classification*: 58–06; 57–06, **All AMS members $38**, List $48, Order code INPR/44N



Surveys in Differential Geometry, Volume IV: Integral Systems

Chuu-Lian Terng, *Northeastern University, Boston, MA*, and **Karen Uhlenbeck**, *University of Texas at Austin*, Editors

A publication of the International Press.

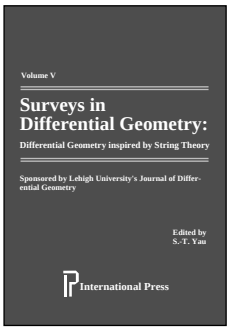
Topics in this volume include integrable systems in Riemannian geometry, Seiberg-Witten integrable systems, soliton equations, geometry of the space of orbits of a Coxeter group, differential geometry of moduli spaces, symplectic forms in the theory of solitons, Poisson actions and scattering theory for integrable systems, loop groups and equations of *KdV* type, and scattering and inverse scattering for first order systems.

This item will also be of interest to those working in differential equations.

Distributed worldwide, except in Japan, by the American Mathematical Society.

International Press

December 2000, 519 pages, Hardcover, ISBN 1-57146-066-7, 2000 *Mathematics Subject Classification*: 37J35, 35K10, 35K15, **All AMS members $38**, List $48, Order code INPR/45N



Surveys in Differential Geometry, Volume V: Differential Geometry Inspired by String Theory

Shing-Tung Yau, *Harvard University, Cambridge, MA*, Editor

A publication of the International Press.

The articles in this volume are devoted to geometrical aspects of the modern development of string theory. The geometric ideas initiated by consideration of string theory have been tremendously successful; this volume surveys the subject. Articles in this volume reflect rigorous and important interaction between string theory and geometry.

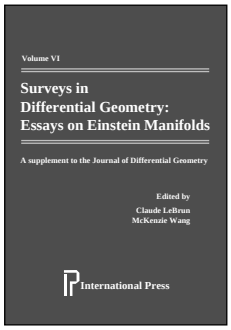
This item will also be of interest to those working in mathematical physics.

Distributed worldwide, except in Japan, by the American Mathematical Society.

Contents: P. S. Aspinwall, K3 surfaces and string duality; **J.-M. Bismut** and **F. Labourie**, Symplectic geometry and the Verlinde formulas; **J. Bryan** and **N. C. Leung**, Counting curves on irrational surfaces; **M. Gross**, Special Lagrangian fibrations II: Geometry. A survey of techniques in the study of special Lagrangian fibrations; **B. H. Lian**, **K. Liu**, and **S.-T. Yau**, Mirror principle I; **B. H. Lian**, **K. Liu**, and **S.-T. Yau**, Mirror principle II; **B. H. Lian** and **S.-T. Yau**, Differential equations from mirror symmetry; **K. Liu**, Heat kernels, symplectic geometry, moduli spaces and finite groups; **G. Tian** and **J. Li**, A brief tour of GW invariants.

International Press

December 2000, 569 pages, Hardcover, ISBN 1-57146-070-5, 2000 *Mathematics Subject Classification*: 00B15; 14–06, 53–06, **All AMS members $38**, List $48, Order code INPR/46N



Surveys in Differential Geometry, Volume VI: Essays on Einstein Manifolds

Claude LeBrun, *State University of New York at Stony Brook, NY*, and **McKenzie Wang**, *McMaster University, Hamilton, ON, Canada*, Editors

A publication of the International Press.

The main topic of the articles in this volume is the theory of Einstein manifolds. The articles are centered around three main themes:

- Einstein manifolds and special holonomy,
- The general theory of Einstein manifolds, and
- Einstein manifolds and general relativity.

The book offers a comprehensive overview of this vital area of differential geometry.

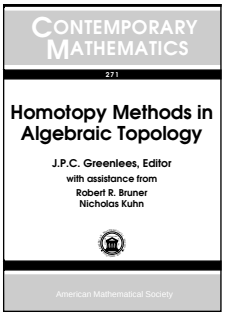
This item will also be of interest to those working in mathematical physics.

Distributed worldwide, except in Japan, by the American Mathematical Society.

Contents: *Part I: Einstein Manifolds and Special Holonomy:* **S.-T. Yau**, Einstein manifolds with zero Ricci curvature; **A. Dancer**, Hyper-Kähler manifolds; **D. Joyce**, Compact Riemannian manifolds with exceptional holonomy; **G. Tian**, Kähler-Einstein manifolds of positive scalar curvature; **S. Salamon**, Quaternion-Kähler geometry; **C. Boyer** and **K. Galicki**, 3-Sasakian manifolds; *Part II: Towards a General Theory of Einstein Manifolds:* **B. Chow**, Ricci flow and Einstein metrics in low dimensions; **P. Petersen**, Rigidity and compactness of Einstein metrics; **O. Biquard**, Einstein deformations of hyperbolic metrics; **C. LeBrun**, Four-dimensional Einstein manifolds, and beyond; **M. Wang**, Einstein metrics from symmetry and bundle constructions; *Part III: Relativity Revisited:* **K. Tod**, General relativity; **D. Christodoulou**, The stability of Minkowski space-time; **D. Calderbank** and **H. Pedersen**, Einstein-Weyl geometry.

International Press

December 2000, 423 pages, Hardcover, ISBN 1-57146-068-3, 2000 *Mathematics Subject Classification*: 53C25; 83Cxx, **All AMS members $38**, List $48, Order code INPR/47N



Homotopy Methods in Algebraic Topology

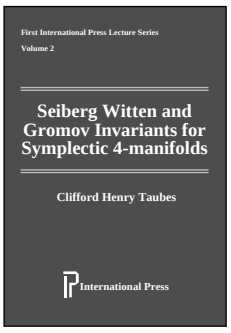
J. P. C. Greenlees, *University of Sheffield, UK*, **Editor,** with assistance from **Robert K. Bruner,** *Wayne State University, Detroit, MI,* and **Nicholas Kuhn,** *University of Virginia, Charlottesville*

This volume presents the proceedings from the AMS-IMS-SIAM Summer Research Conference on Homotopy Methods in Algebraic Topology held at the University of Colorado.The conference coincided with the sixtieth birthday of J. Peter May. An article is included reflecting his wide-ranging and influential contributions to the subject area. Other articles in the book discuss the Adams E_2 term for elliptic cohomology, mapping class groups and function spaces, rational SO(3) equivariant cohomology theories, toral groups and classifying spaces of p-compact groups, dual calculus for functors to spectra, flatness for the E_∞ tensor product, and further related areas. The book offers a true comprehensive source on modern aspects of homotopy theoretic methods exported to algebraic settings.

Contents: A. Baker, On the Adams E_2-term for elliptic cohomology; **C.-F. Bödigheimer**, **F. R. Cohen**, and **M. D. Peim**, Mapping class groups and function spaces; **R. R. Bruner**, Extended powers of manifolds and the Adams spectral sequence; **W. G. Dwyer** and **C. W. Wilkerson**, Centers and Coxeter elements; **B. Gray**, On the homotopy type of the loops on a 2-cell complex; **J. P. C. Greenlees**, Rational $SO(3)$-equivariant cohomology theories; **L. Hesselholt** and **I. Madsen**, On the K-theory of nilpotent endomorphisms; **P. Hu**, The Ext^0-term of the real-oriented Adams-Novikov spectral sequence; **K. Ishiguro**, Toral groups and classifying spaces of p-compact groups; **N. J. Kuhn**, Stable splittings and the diagonal; **R. McCarthy**, Dual calculus for functors to spectra; **M. Mahowald**, **D. Ravenel**, and **P. Shick**, The triple loop space approach to the telescope conjecture; **M. A. Mandell**, Flatness for the E_∞ tensor product; **I. Moerdijk**, On the Connes-Kreimer construction of Hopf algebras.

Contemporary Mathematics, Volume 271

March 2001, approximately 344 pages, Softcover, ISBN 0-8218-2621-2, LC 00-052604, 2000 *Mathematics Subject Classification*: 55–06, **Individual member $47**, List $79, Institutional member $63, Order code CONM/271N



Seiberg Witten and Gromov Invariants for Symplectic 4-Manifolds

Clifford Henry Taubes, *Harvard University, Cambridge, MA*

A publication of the International Press.

This book provides the complete proof of the remarkable relationship between Seiberg-Witten and Gromov invariants on symplectic 4-manifolds. It is a companion to *Topics on Symplectic 4-manifolds*, published by the International Press (Cambridge, MA) in 1998 (available from the AMS, see International Press Books, Number 29), and brings together articles published in the *Journal of the American Mathematical Society* and the *Journal of Differential Geometry*.

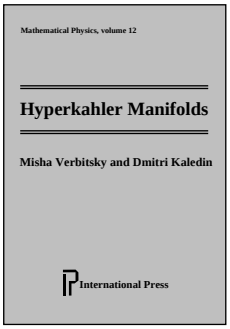
The book forms the second volume from the International Press Lecture Series held at the University of California at Irvine. It is written at a graduate mathematics level and will be essential reading for mathematicians everywhere.

Distributed worldwide, except in Japan, by the American Mathematical Society.

Contents: SW $\Rightarrow$ Gr; Counting pseudo-holomorphic submanifolds in dimension 4; Gr $\Rightarrow SW$; $Gr = SW$.

International Press

December 2000, 401 pages, Hardcover, ISBN 1-57146-061-6, 2000 *Mathematics Subject Classification*: 53D45, 57R57, **All AMS members $34**, List $42, Order code INPR/36N



Hyperkahler Manifolds

Misha Verbitsky, *Harvard University, Cambridge, MA*, and **Dmitri Kaledin**

A publication of the International Press.

Hyperkahler manifolds first appeared within the framework of differential geometry as Riemannian manifolds with holonomy of a special type. Recently, they have exhibited diverse and unexpected links with various branches of mathematics and also have played a very important role in modern versions of string theory—the potential basis of future unified field theory and quantum gravity.

In this book, the authors introduce hyperkahler manifolds to those who have not previously studied them. They present new classes of examples of hyperkahler manifolds, extending the research knowledge in the field.

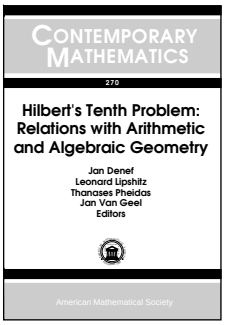
Distributed worldwide, except in Japan, by the American Mathematical Society.

Contents: M. Verbitsky, Hyperholomorphic sheaves and new examples of hyperkähler manifolds; **D. Kaledin**, Hyperkähler structures on total spaces of holomorphic cotangent bundles.

International Press

December 2000, 257 pages, Hardcover, ISBN 1-57146-071-3, 2000 *Mathematics Subject Classification*: 53C26, **All AMS members $34**, List $42, Order code INPR/37N

Logic and Foundations



Hilbert's Tenth Problem: Relations with Arithmetic and Algebraic Geometry

Jan Denef, *Katholieke Universiteit, Leuven, Belgium*, **Leonard Lipshitz**, *Purdue University, West Lafayette, IN*, **Thanases Pheidas**, *University of Crete, Greece*, and **Jan Van Geel**, *University of Ghent, Belgium*, Editors

This book is the result of a meeting that took place at the University of Ghent (Belgium) on the relations between Hilbert's tenth problem, arithmetic, and algebraic geometry. Included are written articles detailing the lectures that were given as well as contributed papers on current topics of interest.

The following areas are addressed: an historical overview of Hilbert's tenth problem, Hilbert's tenth problem for various rings and fields, model theory and local-global principles, including relations between model theory and algebraic groups and analytic geometry, conjectures in arithmetic geometry and the structure of diophantine sets, for example with Mazur's conjecture, Lang's conjecture, and Bücchi's problem, and results on the complexity of diophantine geometry, highlighting the relation to the theory of computation.

The volume allows the reader to learn and compare different approaches (arithmetical, geometrical, topological, model-theoretical, and computational) to the general structural analysis of the set of solutions of polynomial equations. It would make a nice contribution to graduate and advanced graduate courses on logic, algebraic geometry, and number theory.

This item will also be of interest to those working in number theory and algebra and algebraic geometry.

Contents: Y. Matiyasevich, Hilbert's tenth problem: What was done and what is to be done; **T. Pheidas** and **K. Zahidi**, Undecidability of existential theories of rings and fields: A survey; **A. Shlapentokh**, Hilbert's tenth problem over number fields, a survey; **M. Prunescu**, Defining constant polynomials; **L. Darnière**, Decidability and local-global principles; **L. Moret-Bailly**, Applications of local-global principles to arithmetic and geometry; **J. Schmid**, Regularly T-closed fields; **M. Jarden**, **A. Razon**, and **W.-D. Geyer**, Skolem density problems over large Galois extensions of global fields; **T. Pheidas**, An effort to prove that the existential theory of **Q** is undecidable; **G. Cornelissen** and **K. Zahidi**, Topology of Diophantine sets: Remarks on Mazur's conjectures; **P. Vojta**, Diagonal quadratic forms and Hilbert's tenth problem; **J. M. Rojas**, Algebraic geometry over four rings and the frontier to tractability; **A. Pillay**, Some model theory of compact complex spaces; **K. H. Kim** and **F. W. Roush**, Double coset decompositions for algebraic groups over $K[t]$; **C. D. Bennett**, **L. K. Elderbrock**, and **A. M. W. Glass**, Zero estimates for polynomials in 3 and 4 variables using orbits and stabilisers.

Contemporary Mathematics, Volume 270

January 2001, 367 pages, Softcover, ISBN 0-8218-2622-0, LC 00-052575, 2000 *Mathematics Subject Classification*: 00B25, 03B25, 03D20, 03D35, 11U05, 14Gxx, 65Y20, 68Q15, **Individual member $53**, List $89, Institutional member $71, Order code CONM/270N

Previously Announced Publications

Supplementary Reading

Number Theoretic Density and Logical Limit Laws

Stanley N. Burris, *University of Waterloo, ON, Canada*

This book shows how a study of generating series (power series in the additive case and Dirichlet series in the multiplicative case), combined with structure theorems for the finite models of a sentence, lead to general and powerful results on limit laws, including 0 – 1 laws. The book is unique in its approach to giving a combined treatment of topics from additive as well as from multiplicative number theory, in the setting of abstract number systems, emphasizing the remarkable parallels in the two subjects. Much evidence is collected to support the thesis that local results in additive systems lift to global results in multiplicative systems.

All necessary material is given to understand thoroughly the method of Compton for proving logical limit laws, including a full treatment of Ehrenfeucht-Fraissé games, the Feferman-Vaught Theorem, and Skolem's quantifier elimination for finite Boolean algebras. An intriguing aspect of the book is to see so many interesting tools from elementary mathematics pull together to answer the question: What is the probability that a randomly chosen structure has a given property? Prerequisites are undergraduate analysis and some exposure to abstract systems.

This item will also be of interest to those working in number theory.

Mathematical Surveys and Monographs, Volume 86

January 2001, 289 pages, Hardcover, ISBN 0-8218-2666-2, LC 00-048512, 2000 *Mathematics Subject Classification*: 03C13, 05A15, 05A16, 05C30, 11M41, 11M45, 11N45, 11N80, 11P82, 11U09, **Individual member $41**, List $69, Institutional member $55, Order code SURV/86RT102

Supplementary Reading

Large Deviations

Jean-Dominique Deuschel, *Technical University of Berlin, Germany*, and **Daniel W. Stroock**, *Massachusetts Institute of Technology, Cambridge*

From a review for the First Edition ...

The book provides a sound base for Large Deviations Theory and answers questions and clears up technical problems found in articles previously written on the subject ... Here you will find the interesting material, the reward for having read so far. One could liken the experience to that of climbing a mountain. After struggling with difficult technical demands, you then get to enjoy a grandiose view over a crystal landscape, where you can perceive traces of life way off in the distance.

—Zentralblatt für Mathematik

This is the second printing of the book first published in 1988. The first four chapters of the volume are based on lectures given by Stroock at MIT in 1987. They form an introduction to the basic ideas of the theory of large deviations and make a suitable package on which to base a semester-length course for advanced graduate students with a strong background in analysis and some probability theory. A large selection of exercises presents important material and many applications. The last two chapters present various non-uniform results (Chapter 5) and outline the analytic approach that allows one to test and compare techniques used in previous chapters (Chapter 6).

AMS Chelsea Publishing

February 2001, 283 pages, Hardcover, ISBN 0-8218-2757-X, LC 00-049583, 2000 *Mathematics Subject Classification*: 60F10, 60F17, 28D20, 28D05, **All AMS members $35**, List $39, Order code CHEL/342.HRT102

Stochastic Processes, Physics and Geometry: New Interplays. I, and II

Volumes in Honor of Sergio Albeverio

Fritz Gesztesy, *University of Missouri, Columbia*, **Helge Holden**, *Norwegian University of Science and Technology, Trondheim*, **Jürgen Jost**, *Max Planck Institut für Mathematik, Leipzig, Germany*, **Sylvie Paycha**, *Université Blaise Pascal, Aubiere, France*, **Michael Röckner**, *Universität Bielefeld, Germany*, and **Sergio Scarlatti**, *Universitá G. D'Annunzio, Pescara, Italy*, Editors

These volumes present state-of-the-art research currently unfolding at the interface between mathematics and physics. Included are select articles from the international conference held in Leipzig (Germany) in honor of Sergio Albeverio's sixtieth birthday. The theme of the conference, "Infinite Dimensional (Stochastic) Analysis and Quantum Physics", was chosen to reflect Albeverio's wide-ranging scientific interests. The articles in these books reflect that broad range of interests and provide a detailed overview highlighting the deep interplay among stochastic processes, mathematical physics, and geometry.

The contributions are written by internationally recognized experts in the fields of stochastic analysis, linear and nonlinear (deterministic and stochastic) PDEs, infinite dimensional analysis, functional analysis, commutative and noncommutative probability theory, integrable systems, quantum and statistical mechanics, geometric quantization, and neural networks. Also included are applications in biology and other areas.

Most of the contributions are high-level research papers. However, there are also some overviews on topics of general interest. The articles selected for publication in these volumes were specifically chosen to introduce readers to advanced topics, to emphasize interdisciplinary connections, and to stress future research directions. Volume I contains contributions from invited speakers; Volume II contains additional contributed papers.

These items will also be of interest to those working in mathematical physics.

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Volume I (CMSAMS/28) contributors include: F. Gesztesy, H. Holden, J. Jost, S. Paycha, M. Röckner, S. Scarlatti, P. Blanchard, G. B. Arous, A. F. Ramirez, Z. Brzez´niak, S. Peszat, A. M. Chebotarev, V. P. Maslov, G. Da Prato, A. Debussche, G. F. Dell'Antonio, R. Figari, A. Teta, C. Drumond, M. de Faria, L. Streit, D. Dürr, S. Teufel, E. B. Dynkin, K. D. Elworthy, X.-M. Li, V. Z. Enolskii, M. Fukushima, D. Hundertmark, W. Kirsch, G. Jona-Lasinio, Yu. G. Kondratiev, R. A. Minlos, G. V. Shchepan'uk, Z.-M. Ma, H. Ouerdiane, A. Rezgui, M. Piccioni, M. Sanz-Solé, M. Sarrà, B. Simon, and B. Zegarliński.

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Spectral Problems Associated with Corner Singularities of Solutions to Elliptic Equations

V. A. Kozlov and **V. G. Maz'ya**, *University of Linköping, Sweden*, and **J. Rossmann**, *University of Rostock, Germany*

This book focuses on the analysis of eigenvalues and eigenfunctions that describe singularities of solutions to elliptic boundary value problems in domains with corners and edges. The authors treat both classical problems of mathematical physics and general elliptic boundary value problems.

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Chapter 8 studies the Dirichlet problem for general elliptic differential equations of order $2m$ in an angle. In Chapter 9, an asymptotic formula for the distribution of eigenvalues of operator pencils corresponding to general elliptic boundary value problems in an angle is obtained. Chapters 10 and 11 discuss the Dirichlet problem for elliptic systems of differential equations of order 2 in an n-dimensional cone. Chapter 12 studies the Neumann problem for general elliptic systems, in particular with eigenvalues of the corresponding operator pencil in the strip $| \Re\lambda - m + /2n | \leq 1/2$. It is shown that only integer numbers contained in this strip are eigenvalues.

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Mathematical Surveys and Monographs, Volume 85

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Asymptotic Statistical Methods for Stochastic Processes

Yu. N. Lin´kov, *Institute of Applied Mathematics and Mechanics, Donetsk, Ukraine*

The asymptotic properties of the likelihood ratio play an important part in solving problems in statistics for various schemes of observations. In this book, the author describes the asymptotic methods for parameter estimation and hypothesis testing based on asymptotic properties of the likelihood ratios in the case where an observed stochastic process is a semimartingale.

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This English edition includes an extensive list of references and revised bibliographical notes.

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