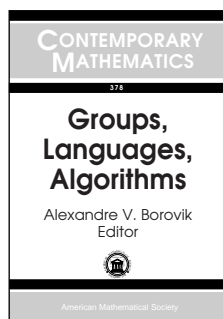

New Publications Offered by the AMS

Algebra and Algebraic Geometry



Groups, Languages, Algorithms

Alexandre V. Borovik,
University of Manchester, UK,
Editor

Since the pioneering works of Novikov and Maltsev, group theory has been a testing ground for mathematical logic in its many manifestations, from the theory of algorithms to model theory. The interaction between logic and

group theory led to many prominent results which enriched both disciplines.

This volume reflects the major themes of the American Mathematical Society/Association for Symbolic Logic Joint Special Session (Baltimore, MD), Interactions between Logic, Group Theory and Computer Science. Included are papers devoted to the development of techniques used for the interaction of group theory and logic. It is suitable for graduate students and researchers interested in algorithmic and combinatorial group theory.

A complement to this work is Volume 349 in the AMS series, Contemporary Mathematics, *Computational and Experimental Group Theory*, which arose from the same meeting and concentrates on the interaction of group theory and computer science.

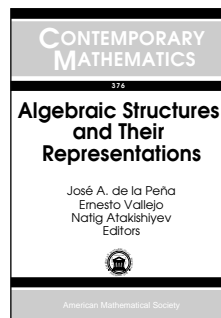
This item will also be of interest to those working in logic and foundations.

Contents: R. H. Gilman, Formal languages and their application to combinatorial group theory; A. G. Myasnikov, V. N. Remeslennikov, and D. E. Serbin, Regular free length functions on Lyndon's free $\mathbb{Z}[t]$ -group $F^{\mathbb{Z}[t]}$; I. Chiswell, A-free groups and tree-free groups; O. Kharlampovich and A. G. Myasnikov, Effective JSJ decompositions; O. Kharlampovich and A. Myasnikov, Algebraic geometry over free groups: Lifting solutions into generic points; E. S. Eshp, I. V. Kazatchkov, and V. N. Remeslennikov,

Divisibility theory and complexity of algorithms for free partially commutative groups.

Contemporary Mathematics, Volume 378

July 2005, 348 pages, Softcover, ISBN 0-8218-3618-8, LC 2005043610, 2000 *Mathematics Subject Classification*: 20B40, 20E05, 20F28, 81P68; 68Q05, 68Q17, 68Q42, 68Q45, 68T05, All AMS members US\$71, List US\$89, Order code CONM/378



Algebraic Structures and Their Representations

José A. de la Peña, Ernesto
Vallejo, and Natig Atakishiyev,
*Universidad Nacional
Autónoma de México,* Editors

The Latin-American conference on algebra, the XV Coloquio Latinoamericano de Álgebra (Cocoyoc, México), consisted of plenary sessions

of general interest and special sessions on algebraic combinatorics, associative rings, cohomology of rings and algebras, commutative algebra, group representations, Hopf algebras, number theory, quantum groups, and representation theory of algebras.

This proceedings volume contains original research papers related to talks at the colloquium. In addition, there are several surveys presenting important topics to a broad mathematical audience. There are also two invited papers by Raymundo Bautista and Roberto Martínez, founders of the Mexican school of representation theory of algebras.

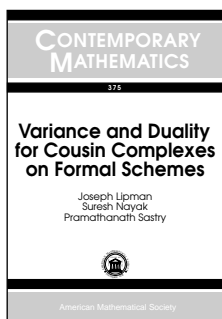
The book is suitable for graduate students and researchers interested in algebra.

Contents: R. Alfaro and A. Kelarev, Recent results on ring constructions for error-correcting codes; I. Assem, F. U. Coelho, M. Lanzilotta, D. Smith, and S. Trepode, Algebras determined by their left and right parts; E. L. Green, The work of Roberto Martínez-Villa; E. Guardo, A survey on fat points on a smooth quadric; C. M. Ringel, Bautista and the development of the representation theory of Artin algebras; M. Takeuchi, A survey on Nichols algebras; Y. Yoshino, Approximations by modules of G-dimension zero; M. Aguiar

and **N. Andruskiewitsch**, Representations of matched pairs of groupoids and applications to weak Hopf algebras; **V. A. Artamonov**, On symmetries of quasicrystals; **M. J. Asiaín**, Frattini-type and Fitting-type subgroups; **N. M. Atakishiyev** and **A. U. Klimyk**, Representations of the quantum algebra $su_q(1, 1)$ and duality of q -orthogonal polynomials; **G. Böhm**, Internal bialgebroids, entwining structures and corings; **R. Coquereaux**, The A_2 Ocneanu quantum groupoid; **W. Cortes**, Skew Armendariz rings and annihilator ideals of skew polynomial rings; **D. Flores de Chela**, Quantum symmetric algebras as braided Hopf algebras; **I. Gitler**, **E. Reyes**, and **R. H. Villarreal**, Blowup algebras of ideals of vertex covers of bipartite graphs; **D. Happel** and **L. Unger**, Minimal elements in the poset of tilting modules; **E. Karolinsky**, **A. Stolin**, and **V. Tarasov**, Dynamical twists and quantization; **V. K. Kharchenko** and **A. Andrade**, On the combinatorial rank of Hopf algebras; **I. Lizasoain**, A tensor product of projective G -groups; **L. Marino**, The minimum degree of a surface that passes through all the points of a 0-dimensional scheme but a point P ; **S. Montgomery**, Primitive ideals and Jacobson radicals in Hopf Galois extensions; **R. C. Orellana**, On the algebraic decomposition of a centralizer algebra of the hyperoctahedral group; **S. Rodríguez-Romo**, Quantum group global symmetries of quantum chains. States for linear chains with left end open and right end closed; **S. Rodríguez-Romo** and **E. J. Taft**, One-sided Hopf algebras; **F. L. Williams**, BTZ black hole and Jacobi inversion for fundamental domains of infinite volume; **T. Yanai**, Galois correspondence theorem for Hopf algebra actions; **A. G. Zavadskij**, On two-point differentiation and its generalization.

Contemporary Mathematics, Volume 376

July 2005, 436 pages, Softcover, ISBN 0-8218-3630-7, LC 2005042812, 2000 *Mathematics Subject Classification*: 13D05, 13H10, 16E10, 16G20, 16G70, 16S36, 16W30, 94B60, **All AMS members US\$87**, List US\$109, Order code CONM/376



Variance and Duality for Cousin Complexes on Formal Schemes

Joseph Lipman, **Suresh Nayak**, and **Pramathanath Sastry**, *Purdue University, West Lafayette, IN*

Robert Hartshorne's book, *Residues and Duality* (1966, Springer-Verlag),

introduced the notion of residual complexes and developed a duality theory (Grothendieck duality) on the category of maps of noetherian schemes.

The three articles in this volume constitute a reworking of the main parts of the corresponding chapters in Hartshorne's 1966 book in greater generality using a somewhat different approach.

In particular, throughout this volume, the authors work with arbitrary (quasi-coherent, torsion) Cousin complexes on formal schemes, not only with residual complexes on ordinary schemes. Additionally, their motivation is to help readers gain

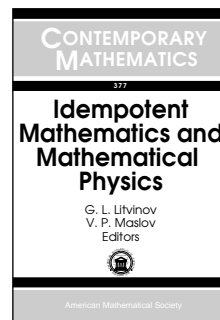
a better understanding of the relation between local properties of residues and global properties of the dualizing pseudofunctor.

The book is suitable for graduate students and researchers working in algebraic geometry.

Contents: **J. Lipman**, **S. Nayak**, and **P. Sastry**, Part 1. Pseudofunctorial behavior of Cousin complexes on formal schemes; **P. Sastry**, Part 2. Duality for Cousin complexes; **S. Nayak**, Part 3. Pasting pseudofunctors; Index.

Contemporary Mathematics, Volume 375

June 2005, 276 pages, Softcover, ISBN 0-8218-3705-2, LC 2005041986, 2000 *Mathematics Subject Classification*: 14F99; 14B15, 18A99, 18E99, 32C37, **All AMS members US\$63**, List US\$79, Order code CONM/375



Idempotent Mathematics and Mathematical Physics

G. L. Litvinov, *Independent University of Moscow, Russia*, and **V. P. Maslov**, *Moscow Institute of Electrical Engineering, Russia*, Editors

Idempotent mathematics is a rapidly developing new branch of the mathematical sciences that is closely related to mathematical physics. The existing literature on the subject is vast and includes numerous books and journal papers.

A workshop was organized at the Erwin Schrödinger Institute for Mathematical Physics (Vienna) to give a snapshot of modern idempotent mathematics. This volume contains articles stemming from that event. Also included is an introductory paper by G. Litvinov and additional invited contributions.

The resulting volume presents a comprehensive overview of the state of the art. It is suitable for graduate students and researchers interested in idempotent mathematics and tropical mathematics.

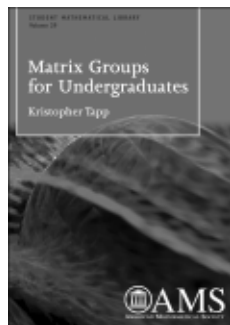
This item will also be of interest to those working in mathematical physics.

Contents: **G. L. Litvinov**, The Maslov's dequantization, idempotent and tropical mathematics: A very brief introduction; **M. Akian**, **S. Gaubert**, and **V. Kolokoltsov**, Set coverings and invertibility of functional Galois connections; **M. Akian**, **S. Gaubert**, and **C. Walsh**, Discrete max-plus spectral theory; **A. Baklouti**, Dequantization of coadjoint orbits: Moment sets and characteristic varieties; **P. Butkovič**, On the combinatorial aspects of max-algebra; **G. Cohen**, **S. Gaubert**, **J.-P. Quadrat**, and **I. Singer**, Max-plus convex sets and functions; **A. Di Nola** and **B. Gerla**, Algebras of Lukasiewicz's logic and their semiring reducts; **W. H. Fleming** and **W. M. McEneaney**, Max-plus approaches to continuous space control and dynamic programming; **K. Khanin**, **D. Khmelev**, and **A. Sobolevskii**, A blow-up phenomenon in the Hamilton-Jacobi equation in an unbounded domain; **G. L. Litvinov** and **G. B. Shpiz**, The dequantization transform

and generalized Newton polytopes; **P. Loreti** and **M. Pedicini**, An object-oriented approach to idempotent analysis: Integral equations as optimal control problems; **P. Lotito**, **J.-P. Quadrat**, and **E. Mancinelli**, Traffic assignment & Gibbs-Maslov semirings; **D. McCaffrey**, Viscosity solutions on Lagrangian manifolds and connections with tunnelling operators; **E. Pap**, Applications of the generated pseudo-analysis to nonlinear partial differential equations; **E. Pap**, A generalization of the utility theory using a hybrid idempotent-probabilistic measure; **M. Passare** and **A. Tsikh**, Amoebas: Their spines and their contours; **J. Richter-Gebert**, **B. Sturmfels**, and **T. Theobald**, First steps in tropical geometry; **I. V. Roublev**, On minimax and idempotent generalized weak solutions to the Hamilton-Jacobi equation; **E. Wagneur**, Dequantisation: Semi-direct sums of idempotent semimodules; **J. van der Woude** and **G. J. Oldsder**, On $(\min, \max, +)$ -inequalities; **K. Zimmermann**, Solution of some max-separable optimization problems with inequality constraints.

Contemporary Mathematics, Volume 377

July 2005, 370 pages, Softcover, ISBN 0-8218-3538-6, LC 2005043637, 2000 *Mathematics Subject Classification*: 00B10, 81Q20, 06F07, 35Q99, 49L99, 46S99, 81S99, 52B20, 52A41, 14P99, **All AMS members US\$79**, List US\$99, Order code CONM/377



Matrix Groups for Undergraduates



Kristopher Tapp, *Williams College, Williamstown, MA*

Matrix groups are a beautiful subject and are central to many fields in mathematics and physics. They touch upon an enormous spectrum within the mathematical arena. This textbook

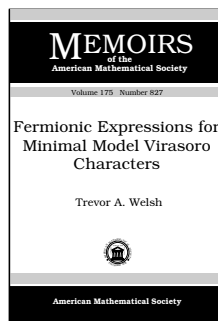
brings them into the undergraduate curriculum. It is excellent for a one-semester course for students familiar with linear and abstract algebra and prepares them for a graduate course on Lie groups.

Matrix Groups for Undergraduates is concrete and example-driven, with geometric motivation and rigorous proofs. The story begins and ends with the rotations of a globe. In between, the author combines rigor and intuition to describe basic objects of Lie theory: Lie algebras, matrix exponentiation, Lie brackets, and maximal tori. The volume is suitable for graduate students and researchers interested in group theory.

Contents: Why study matrix groups?; Matrices; All matrix groups are real matrix groups; The orthogonal groups; The topology of matrix groups; Lie algebras; Matrix exponentiation; Matrix groups are manifolds; The Lie bracket; Maximal tori; Bibliography; Index.

Student Mathematical Library, Volume 29

July 2005, 166 pages, Softcover, ISBN 0-8218-3785-0, LC 2005041182, 2000 *Mathematics Subject Classification*: 20-02, 20G20; 22C05, 22E15, **All AMS members US\$23**, List US\$29, Order code STML/29



Fermionic Expressions for Minimal Model Virasoro Characters

Trevor A. Welsh, *University of Melbourne, Parkville, Victoria, Australia*

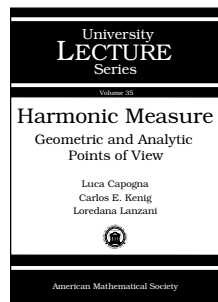
Contents: Prologue; Path combinatorics; The \mathcal{B} -transform; The \mathcal{D} -transform; Mazy runs; Extending

and truncating paths; Generating the fermionic expressions; Collating the runs; Fermionic character expressions; Discussion; Appendix A. Examples; Appendix B. Obtaining the bosonic generating function; Appendix C. Bands and the floor function; Appendix D. Bands on the move; Appendix E. Combinatorics of the Takahashi lengths; Bibliography.

Memoirs of the American Mathematical Society, Volume 175, Number 827

March 2005, 160 pages, Softcover, ISBN 0-8218-3656-0, LC 2005041982, 2000 *Mathematics Subject Classification*: 82B23; 05A15, 05A19, 17B68, 81T40, **Individual member US\$37**, List US\$61, Institutional member US\$49, Order code MEMO/175/827

Analysis



Harmonic Measure Geometric and Analytic Points of View

Luca Capogna, *University of Arkansas, Fayetteville*, **Carlos E. Kenig**, *University of Chicago, IL*, and **Loredana Lanzani**, *University of Arkansas, Fayetteville*

Recent developments in geometric measure theory and harmonic analysis have led to new and deep results concerning the regularity of the support of measures which behave “asymptotically” (for balls of small radius) as the Euclidean volume. A striking feature of these results is that they actually characterize flatness of the support in terms of the asymptotic behavior of the measure. Such characterizations have led to important new progress in the study of harmonic measure for non-smooth domains.

This volume provides an up-to-date overview and an introduction to the research literature in this area. The presentation follows a series of five lectures given by Carlos Kenig at the 2000 Arkansas Spring Lecture Series at the University of Arkansas. The original lectures have been expanded and updated to reflect the rapid progress in this

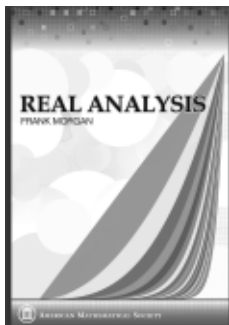
field. A chapter on the planar case has been added to provide a historical perspective.

Additional background has been included to make the material accessible to advanced graduate students and researchers in harmonic analysis and geometric measure theory.

Contents: Introduction; Motivation and statement of the main results; The relation between potential theory and geometry for planar domains; Preliminary results in potential theory; Reifenberg flat and chord arc domains; Further results on Reifenberg flat and chord arc domains; From the geometry of a domain to its potential theory; From potential theory to the geometry of a domain; Higher codimension and further regularity results; Bibliography.

University Lecture Series, Volume 35

June 2005, 155 pages, Softcover, ISBN 0-8218-2728-6, 2000 *Mathematics Subject Classification:* 35-02, 31-XX, 34A26, 35R35, 28A75, **All AMS members US\$28**, List US\$35, Order code ULECT/35



Real Analysis

Frank Morgan, Williams College, Williamstown, MA

This book is written by award-winning author, Frank Morgan. It offers a simple and sophisticated point of view, reflecting Morgan's insightful teaching, lecturing, and writing style.

Intended for undergraduates studying real analysis, this book builds the

theory behind calculus directly from the basic concepts of real numbers, limits, and open and closed sets in \mathbb{R}^n . It gives the three characterizations of continuity: via epsilon-delta, sequences, and open sets. It gives the three characterizations of compactness: as "closed and bounded," via sequences, and via open covers. Topics include Fourier series, the Gamma function, metric spaces, and Ascoli's Theorem.

This concise text not only provides efficient proofs, but also shows students how to derive them. The excellent exercises are accompanied at the back of the book by select solutions. Ideally suited as an undergraduate textbook, this complete book on real analysis will fit comfortably into one semester.

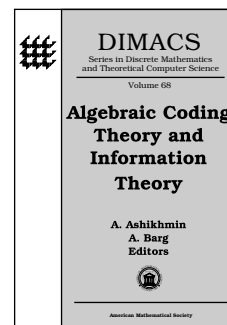
Frank Morgan received the first national Haimo teaching award from the Mathematical Association of America. He has also garnered top teaching awards from Rice University (Houston, TX) and MIT (Cambridge, MA).

Contents: *Part I: Real numbers and limits:* Numbers and logic; Infinity; Sequences; Functions and limits; *Part II: Topology:* Open and closed sets; Continuous functions; Composition of functions; Subsequences; Compactness; Existence of maximum; Uniform continuity; Connected sets and the intermediate value theorem; The Cantor set and fractals; *Part III: Calculus:* The derivative and the mean value theorem; The Riemann integral; The fundamental theorem of calculus;

Sequences of functions; The Lebesgue theory; Infinite series $\sum a_n$; Absolute convergence; Power series; Fourier series; Strings and springs; Convergence of Fourier series; The exponential function; Volumes of n -balls and the gamma function; *Part IV: Metric spaces:* Metric spaces; Analysis on metric spaces; Compactness in metric spaces; Ascoli's theorem; Partial solutions to exercises; Greek letters; Index.

July 2005, approximately 160 pages, Hardcover, ISBN 0-8218-3670-6, LC 2005041221, 2000 *Mathematics Subject Classification:* 26-XX, **All AMS members US\$31**, List US\$39, Order code REAL

Applications



Algebraic Coding Theory and Information Theory

A. Ashikhmin, Bell Labs, Lucent Technologies, Murray Hill, NJ, and A. Barg, University of Maryland, College Park, Editors

Collected here are papers that were presented at or inspired by the

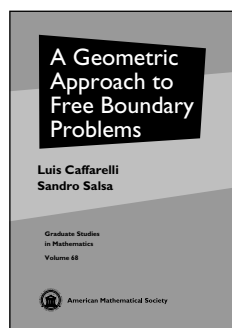
DIMACS workshop, Algebraic Coding Theory and Information Theory (Rutgers University, Piscataway, NJ). Among the topics discussed are universal data compression, graph theoretical ideas in the construction of codes and lattices, decoding algorithms, and computation of capacity in various communications schemes. The book is suitable for graduate students and researchers interested in coding and information theory.

Contents: G. Caire, S. Shamai, A. Shokrollahi, and S. Verdú, Fountain codes for lossless data compression; G. I. Shamir, Applications of coding theory to universal lossless source coding performance bounds; K. W. Shum and I. F. Blake, Expander graphs and codes; A. Barg and G. Zémor, Multilevel expander codes; M. R. Sadeghi and D. Panario, Low density parity check lattices based on construction D' and cycle-free Tanner graphs; J. S. Yedidia, Sparse factor graph representations of Reed-Solomon and related codes; M. El-Khomy and R. J. McEliece, Interpolation multiplicity assignment algorithms for algebraic soft-decision decoding of Reed-Solomon codes; S. Litsyn and A. Shpunt, On the capacity of two-dimensional weight-constrained memories; G. Kramer and S. A. Savari, On networks of two-way channels; R. G. Cavalcante, H. Lazari, J. d. D. Lima, and R. Palazzo, Jr., A new approach to the design of digital communication systems.

DIMACS: Series in Discrete Mathematics and Theoretical Computer Science, Volume 68

August 2005, 176 pages, Hardcover, ISBN 0-8218-3626-9, LC 2005047070, 2000 *Mathematics Subject Classification*: 94A24, 94A29, 94B15, 94B25, 94B35, 94B70, All AMS members US\$63, List US\$79, Order code DIMACS/68

Differential Equations



A Geometric Approach to Free Boundary Problems



Luis Caffarelli, *University of Texas, Austin*, and Sandro Salsa, *Politecnico di Milano, Italy*

Written by the well-known mathematician, Luis Caffarelli, and

Sandro Salsa, this book offers an excellent exposition on free boundary problems.

Free or moving boundary problems appear in many areas of analysis, geometry, and applied mathematics. A typical example is the evolving interphase between a solid and liquid phase: if we know the initial configuration well enough, we should be able to reconstruct its evolution, in particular, the evolution of the interphase.

In this book, the authors present a series of ideas, methods, and techniques for treating the most basic issues of such a problem. In particular, they describe the very fundamental tools of geometry and real analysis that make this possible: properties of harmonic and caloric measures in Lipschitz domains, a relation between parallel surfaces and elliptic equations, monotonicity formulas and rigidity, etc. The tools and ideas presented here will serve as a basis for the study of more complex phenomena and problems.

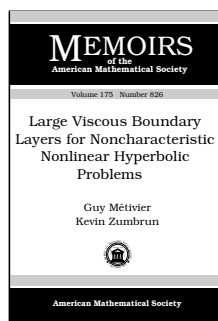
This book is useful for supplementary reading or will be a fine independent study text. It is suitable for graduate students and researchers interested in partial differential equations.

Also available from the AMS by Luis Caffarelli is *Fully Nonlinear Elliptic Equations* as volume 43 in the AMS series Colloquium Publications.

Contents: *Elliptic problems:* An introductory problem; Viscosity solutions and their asymptotic developments; The regularity of the free boundary; Lipschitz free boundaries are $C^{1,\gamma}$; Flat free boundaries are Lipschitz; Existence theory; *Evolution problems:* Parabolic free boundary problems; Lipschitz free boundaries: Weak results; Lipschitz free boundaries: Strong results; Flat free boundaries are smooth; *Complementary chapters: Main tools:* Boundary behavior of harmonic functions; Monotonicity formulas and applications; Boundary behavior of caloric functions; Bibliography; Index.

Graduate Studies in Mathematics, Volume 68

July 2005, 270 pages, Hardcover, ISBN 0-8218-3784-2, LC 2005041181, 2000 *Mathematics Subject Classification*: 35-01, 35R35; 35J25, 35K20, All AMS members US\$39, List US\$49, Order code GSM/68



Large Viscous Boundary Layers for Noncharacteristic Nonlinear Hyperbolic Problems

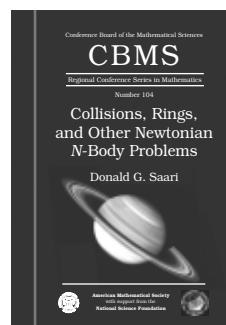


Guy Métivier, *University of Bordeaux, Talence, France*, and Kevin Zumbrun, *Bloomington, IN*

Contents: Introduction; Linear stability: the model case; Pieces of paradifferential calculus; L^2 and conormal estimates near the boundary; Linear stability; Nonlinear stability; Appendix A. Kreiss symmetrizers; Appendix B. Para-differential calculus; Appendix; Bibliography.

Memoirs of the American Mathematical Society, Volume 175, Number 826

March 2005, 107 pages, Softcover, ISBN 0-8218-3649-8, LC 2005041981, 2000 *Mathematics Subject Classification*: 35L60; 35B35, **Individual member US\$34**, List US\$57, Institutional member US\$46, Order code MEMO/175/826



Collisions, Rings, and Other Newtonian N-Body Problems



Donald G. Saari, *University of California, Irvine*

Written by leading expert Donald Saari, this book is directed toward readers who want to learn about the Newtonian N -body problem. It is also

intended for students and experts who are interested in new expositions of past results in this area, previously unpublished research conclusions, and new research problems.

Professor Saari has written the book for a broad audience, including readers with no previous knowledge about this fascinating area. He begins each chapter with introductory material motivated by unanswered research questions. He then includes some history, discussions intended to develop intuition, descriptions of open problems, and examples taken from real problems in astronomy.

The first chapter starts with simple explanations of the apparent "looping" orbit of Mars and the unexpected "Sunrise, Sunset" behavior as viewed from Mercury and then leads up to the unexplained and weird dynamics exhibited by Saturn's F-

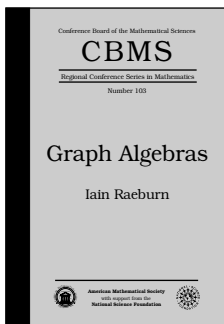
ring. The second chapter, which introduces a way to decompose the velocity of the system, is motivated by a seemingly easy but unanswered conjecture involving the dynamics of the system when the system's diameter is a constant. The third chapter, which describes questions about the structure of the rings of Saturn, introduces new and surprisingly simple ways to find configurations of the particles that are "central" to any discussion of the N -body problem. The fourth chapter analyzes collisions, and the last chapter discusses the likelihood of collisions and other events.

The book is suitable for graduate students and researchers interested in celestial mechanics.

Contents: Introduction; Central configurations; Finding central configurations; Collisions—Both real and imaginary; How likely is it?; Bibliography; Index.

CBMS Regional Conference Series in Mathematics, Number 104
June 2005, 235 pages, Softcover, ISBN 0-8218-3250-6, LC 2005041205, 2000 *Mathematics Subject Classification*: 70F10; 70F15, **All Individuals US\$36**, List US\$45, Order code CBMS/104

Discrete Mathematics and Combinatorics



Graph Algebras

Iain Raeburn, *University of Newcastle, Callaghan, NSW, Australia*

Graph algebras are a family of operator algebras which are associated to directed graphs. These algebras have an attractive structure theory in which algebraic properties of the algebra are related to the behavior of

paths in the underlying graph. In the past few years there has been a great deal of activity in this area, and graph algebras have cropped up in a surprising variety of situations, including non-abelian duality, non-commutative geometry, and the classification of simple C^* -algebras.

The first part of the book provides an introduction to the subject suitable for students who have seen a first course on the basics of C^* -algebras. In the second part, the author surveys the literature on the structure theory of graph algebras, highlights some applications of this theory, and discusses several recent generalizations which seem particularly promising.

The volume is suitable for graduate students and research mathematicians interested in graph theory and operator algebras.

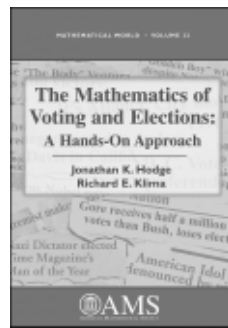
This item will also be of interest to those working in algebra and algebraic geometry.

Contents: Introduction; Directed graphs and Cuntz-Krieger families; Uniqueness theorems for graph algebras; Proofs of the uniqueness theorems; Simplicity and ideal structure;

Arbitrary graphs; Applications to non-abelian duality; K -theory of graph algebras; Cuntz-Pimsner algebras; Topological graphs; Higher-rank graphs; Background material; Bibliography; Index.

CBMS Regional Conference Series in Mathematics, Number 103
May 2005, 113 pages, Softcover, ISBN 0-8218-3660-9, LC 2005041206, 2000 *Mathematics Subject Classification*: 46L05; 46L08, 46L35, 46L55, 46L80, 22D35, **All Individuals US\$28**, List US\$35, Order code CBMS/103

General and Interdisciplinary



The Mathematics of Voting and Elections: A Hands-On Approach

Jonathan K. Hodge, *Grand Valley State University, Allendale, MI*, and **Richard E. Klima**, *Appalachian State University, Boone, NC*

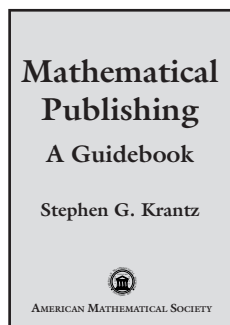
Have you ever wondered ... why elections often produce results that seem to be displeasing to many of the voters involved? Would you be surprised to learn that a perfectly fair election can produce an outcome that literally *nobody* likes? When voting, we often think about the candidates or proposals in the election, but we rarely consider the procedures that we use to express our preferences and arrive at a collective decision.

The Mathematics of Voting and Elections: A Hands-On Approach will help you discover answers to these and many other questions. Easily accessible to anyone interested in the subject, the book requires virtually no prior mathematical experience beyond basic arithmetic, and includes numerous examples and discussions regarding actual elections from politics and popular culture. It is recommended for researchers and advanced undergraduates interested in all areas of mathematics and is ideal for independent study.

Contents: What's so good about majority rule?; Perot, Nader, and other inconveniences; Back into the ring; Trouble in democracy; Explaining the impossible; One person, one vote?; Calculating corruption; The ultimate college experience; Trouble in direct democracy; Proportional (mis)representation; Bibliography; Index.

Mathematical World, Volume 22

June 2005, approximately 240 pages, Softcover, ISBN 0-8218-3798-2, LC 2005041034, 2000 *Mathematics Subject Classification*: 91-01; 91B12, **All AMS members US\$28**, List US\$35, Order code MAWRDL/22



Mathematical Publishing A Guidebook

Steven G. Krantz, *Washington University, St. Louis, MO*

Mathematicians are expected to publish their work: in journals, conference proceedings, and books. It is vital to advancing their careers.

Later, some are asked to become

editors. However, most mathematicians are trained to *do* mathematics, not to publish it.

But here, finally, for graduate students and researchers interested in publishing their work, Steven G. Krantz, the respected author of several “how-to” guides in mathematics, shares his experience as an author, editor, editorial board member, and independent publisher. This new volume is an informative, comprehensive guidebook to publishing mathematics. Krantz describes both the general setting of mathematical publishing and the specifics about all the various publishing situations mathematicians may encounter.

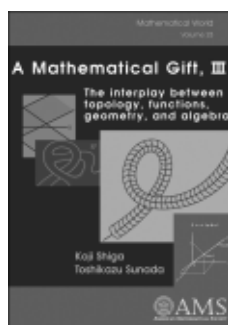
As with his other books, Krantz’s style is engaging and frank. He gives advice on how to get your book published, how to get organized as an editor, what to do when things go wrong, and much more. He describes the people, the language (including a glossary), and the process of publishing both books and journals.

Steven G. Krantz is an accomplished mathematician and an award-winning author. He has published more than 130 research articles and 45 books. He has worked as an editor of several book series, research journals, and for the *Notices of the AMS*. He is also the founder of the *Journal of Geometric Analysis*.

Other titles available from the AMS by Steven G. Krantz are *How to Teach Mathematics*, *A Primer of Mathematical Writing*, *A Mathematician’s Survival Guide*, and *Techniques of Problem Solving*.

Contents: *Introductory thoughts:* Why publish?; What do I publish?; Different types of publishing; *Publishing an article or paper:* Journal publishing; How to write an article or paper; *Publication of a book:* Your magnum opus; How to write a book; *Publishing personnel:* The people in publishing; The role of book editors; The nitty gritty of editing; *Parts of the publishing process:* The manuscript; What happens to your book at the publishing house; *Legal matters:* Copyright and author rights; Details of the book contract; *Closing thoughts:* Putting the scholarly life into perspective; Copy editor’s/proofreader’s marks; Use of copy editor’s marks; Specialized mathematics symbols; Alternative mathematical notations; \TeX , Postscript®, Acrobat®, and related internet sites (plus tips on how to ftp); The AMS consent to publish agreement; The AMS guidelines for journal editors; Glossary; References; Index.

August 2005, approximately 320 pages, Softcover, ISBN 0-8218-3699-4, 2000 *Mathematics Subject Classification:* 00A99, **All AMS members US\$23**, List US\$29, Order code MATPUB



A Mathematical Gift, III

The interplay between topology, functions, geometry, and algebra

Koji Shiga, *Yokohama, Japan*, and Toshikazu Sunada, *Tohoku University, Sendai, Japan*



This book brings the beauty and fun of mathematics to the classroom. It offers serious mathematics in a lively, reader-friendly style. Included are exercises and many figures illustrating the main concepts.

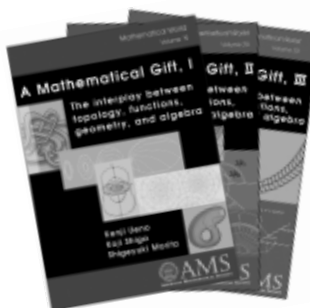
The first chapter talks about the theory of manifolds. It includes discussion of smoothness, differentiability, and analyticity, the idea of local coordinates and coordinate transformation, and a detailed explanation of the Whitney imbedding theorem (both in weak and in strong form). The second chapter discusses the notion of the area of a figure on the plane and the volume of a solid body in space. It includes the proof of the Bolyai–Gerwien theorem about scissors-congruent polynomials and Dehn’s solution of the Third Hilbert Problem.

This is the third volume originating from a series of lectures given at Kyoto University (Japan). It is suitable for classroom use for high school mathematics teachers and for undergraduate mathematics courses in the sciences and liberal arts. The first and second volumes are available as Volume 19 and Volume 20 in the AMS series, *Mathematical World*.

Contents: *The story of the birth of manifolds:* The prelude to the birth of manifolds; The birth of manifolds; *The story of area and volume from everyday notions to mathematical concepts:* Transition from the notion of “size” to the concept of “area”; Scissors-congruent polygons; Scissors-congruent polyhedra.

Mathematical World, Volume 23

July 2005, approximately 128 pages, Softcover, ISBN 0-8218-3284-0, LC 2003062778, 2000 *Mathematics Subject Classification:* 00A05; 53-01, **All AMS members US\$23**, List US\$29, Order code MAWRDL/23



A Mathematical Gift, I, II, III

This three-volume set addresses the interplay between topology, functions, geometry, and algebra. Bringing the beauty and fun of mathematics to the classroom, the authors offer serious mathematics in a lively, reader-friendly style. Included are exercises and many figures

illustrating the main concepts. It is suitable for advanced high-school students, graduate students, and researchers.

The three-volume set includes *A Mathematical Gift I, II, and III*.

Contents: Part I: Invitation to topology (Viewing figures globally): Introduction; The Euler characteristic; Vortices created by winds and the Euler characteristic; Curvature of a surface and the Euler characteristic; *The story of dimension:* Introduction; Learning to appreciate dimension; What is dimension?; Three-dimensional figures; Physics and dimension; **Part II: The legacy of trigonometric functions:** Introduction; Trigonometric functions and infinite series; Elliptic functions; *Intersection of geometry and algebra:* Introduction; The Poncelet closure theorem; The Poncelet theorem for circles; The Poncelet theorem in the world of complex numbers; Proof of the Poncelet theorem using plane geometry; Conclusion; **Part III: The story of the birth of manifolds:** The prelude to the birth of manifolds; The birth of manifolds; *The story of area and volume from everyday notions to mathematical concepts:* Transition from the notion of "size" to the concept of "area"; Scissors-congruent polygons; Scissors-congruent polyhedra.

Mathematical World

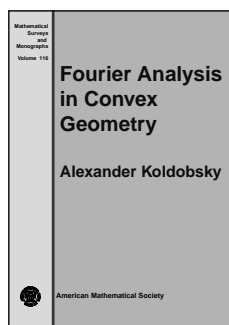
A Mathematical Gift, I: 2003, 136 pages, Softcover, ISBN 0-8218-3282-4, **All AMS members US\$23**, List US\$29, Order code MAWRDL/19

A Mathematical Gift, II: 2004, 128 pages, Softcover, ISBN 0-8218-3283-2, **All AMS members US\$23**, List US\$29, Order code MAWRDL/20

A Mathematical Gift, III: July 2005, approximately 128 pages, Softcover, ISBN 0-8218-3284-0, **All AMS members US\$23**, List US\$29, Order code MAWRDL/23

Set: July 2005, Softcover, ISBN 0-8218-3859-8, **All AMS members US\$60**, List US\$75, Order code MAWRDL-GSET

Geometry and Topology



Fourier Analysis in Convex Geometry

Alexander Koldobsky,
University of Missouri, Columbia

The study of the geometry of convex bodies based on information about sections and projections of these bodies has important applications in

many areas of mathematics and science. In this book, a new Fourier analysis approach is discussed. The idea is to express certain geometric properties of bodies in terms of Fourier analysis and to use harmonic analysis methods to solve geometric problems.

One of the results discussed in the book is Ball's theorem, establishing the exact upper bound for the $(n-1)$ -dimensional volume of hyperplane sections of the n -dimensional unit cube (it is $\sqrt{2}$ for each $n \geq 2$). Another is the Busemann-Petty problem: if K and L are two convex origin-symmetric n -dimensional bodies and the $(n-1)$ -dimensional volume of each

central hyperplane section of K is less than the $(n-1)$ -dimensional volume of the corresponding section of L , is it true that the n -dimensional volume of K is less than the volume of L ? (The answer is positive for $n \leq 4$ and negative for $n > 4$.)

The book is suitable for graduate students and researchers interested in geometry, harmonic and functional analysis, and probability. Prerequisites for reading this book include basic real, complex, and functional analysis.

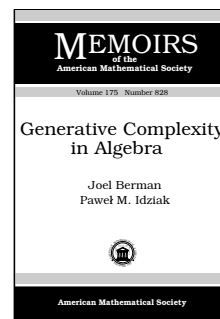
This item will also be of interest to those working in analysis.

Contents: Introduction; Basic concepts; Volume and the Fourier transform; Intersection bodies; The Busemann-Petty problem; Intersection bodies and L_p -spaces; Extremal sections of ℓ_q -balls; Projections and the Fourier transform; Bibliography; Index.

Mathematical Surveys and Monographs, Volume 116

April 2005, 170 pages, Hardcover, ISBN 0-8218-3787-7, LC 2005041147, 2000 *Mathematics Subject Classification:* 52A20, 52A38, 46B04, 46B07; 42A38, 42A82, 46F12, 60E07, 60E10, **All AMS members US\$47**, List US\$59, Order code SURV/116

Logic and Foundations



Generative Complexity in Algebra

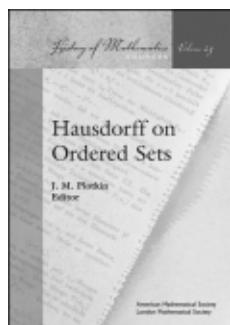
Joel Berman, *University of Illinois, Chicago*, and Paweł M. Idziak, *Jagiellonian University, Krakow, Poland*

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

geometry.

Contents: Introduction; Background material; *Part 1. Introducing Generative Complexity:* Definitions and examples; Semilattices and lattices; Varieties with a large number of models; Upper bounds; Categorical invariants; *Part 2. Varieties with Few Models:* Types 4 or 5 need not apply; Semisimple may apply; Permutable may also apply; Forcing modular behavior; Restricting solvable behavior; Varieties with very few models; Restricting nilpotent behavior; Decomposing finite algebras; Restricting affine behavior; A characterization theorem; *Part 3. Conclusions:* Application to groups and rings; Open problems; Tables; Bibliography.

Memoirs of the American Mathematical Society, Volume 175, Number 828 March 2005, 159 pages, Softcover, ISBN 0-8218-3707-9, LC 2005041979, 2000 *Mathematics Subject Classification:* 08A05; 03C13, 03C45, 05A16, 08B20, **Individual member US\$37**, List US\$61, Institutional member US\$49, Order code MEMO/175/828



Hausdorff on Ordered Sets

J. M. Plotkin, *Michigan State University, East Lansing*, Editor

Georg Cantor, the founder of set theory, published his last paper on sets in 1897. In 1900, David Hilbert made Cantor's Continuum Problem and the challenge of well-ordering the real numbers the first problem of his famous lecture at the international

Congress in Paris. Thus, as the nineteenth century came to a close and the twentieth century began, Cantor's work was finally receiving its due and Hilbert had made one of Cantor's most important conjectures his number one problem. It was time for the second generation of Cantorians to emerge.

Foremost among this group were Ernst Zermelo and Felix Hausdorff. Zermelo isolated the Choice Principle, proved that every set could be well-ordered, and axiomatized the concept of set. He became the father of abstract set theory. Hausdorff eschewed foundations and developed set theory as a branch of mathematics worthy of study in its own right, capable of supporting both general topology and measure theory. He is recognized as the era's leading Cantorian.

Hausdorff published seven articles in set theory during the period 1901-1909, mostly about ordered sets. This volume contains translations of these papers with accompanying introductory essays. They are highly accessible, historically significant works, important not only for set theory, but also for model theory, analysis and algebra.

This book is suitable for graduate students and researchers interested in set theory and the history of mathematics.

Also available from the AMS by Felix Hausdorff are the classic work, *Grundzüge der Mengenlehre*, and its English translation, *Set Theory*, as Volume 69 and Volume 119 in the AMS Chelsea Publishing series.

This item will also be of interest to those working in general and interdisciplinary areas.

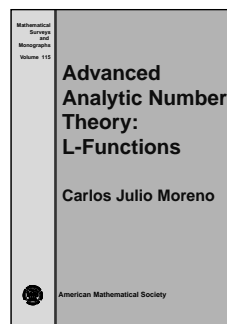
Copublished with the London Mathematical Society. Members of the LMS may order directly from the AMS at the AMS member price. The LMS is registered with the Charity Commissioners.

Contents: J. M. Plotkin, Selected Hausdorff bibliography; J. Plotkin, Introduction to "About a certain kind of ordered sets"; F. Hausdorff, About a certain kind of ordered sets [H 1901b]; J. M. Plotkin, Introduction to "The concept of power in set theory"; F. Hausdorff, The concept of power in set theory [H 1904a]; J. Plotkin, Introduction to "Investigations into order types, I, II, III"; F. Hausdorff, Investigations into order types [H 1906b]; J. Plotkin, Introduction to "Investigations into order types IV, V"; F. Hausdorff, Investigations into order types [H 1907a]; J. Plotkin, Introduction to "About dense order types"; F. Hausdorff, About dense order types [H 1907b]; J. Plotkin, Introduction to "The fundamentals of a theory of ordered sets"; F. Hausdorff, The fundamentals of a theory of ordered sets [H 1908]; J. Plotkin, Introduction to "Graduation by final behavior"; F. Hausdorff, Graduation by final behavior [H 1909a]; F. Hausdorff, Appendix. Sums of \aleph_1 sets [H 1936b]; Bibliography.

History of Mathematics, Volume 25

July 2005, 322 pages, Softcover, ISBN 0-8218-3788-5, LC 2005045328, 2000 *Mathematics Subject Classification*: 01A75, 01A60, 03-03, 06-03, 26-03, **All AMS members US\$55**, List US\$69, Order code HMATH/25

Number Theory



Advanced Analytic Number Theory: L-Functions

Carlos Julio Moreno, *The City University of New York (CUNY)*



Since the pioneering work of Euler, Dirichlet, and Riemann, the analytic

properties of L-functions have been used to study the distribution of prime numbers. With the advent of the Langlands Program, L-functions have assumed a greater role in the study of the interplay between Diophantine questions about primes and representation theoretic properties of Galois representations.

This book provides a complete introduction to the most significant class of L-functions: the Artin-Hecke L-functions associated to finite-dimensional representations of Weil groups and to automorphic L-functions of principal type on the general linear group. In addition to establishing functional equations, growth estimates, and non-vanishing theorems, a thorough presentation of the explicit formulas of Riemann type in the context of Artin-Hecke and automorphic L-functions is also given.

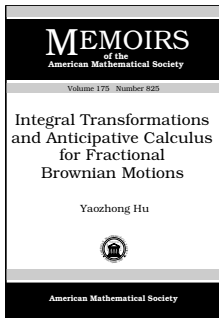
The survey is aimed at mathematicians and graduate students who want to learn about the modern analytic theory of L-functions and their applications in number theory and in the theory of automorphic representations. The requirements for a profitable study of this monograph are a knowledge of basic number theory and the rudiments of abstract harmonic analysis on locally compact abelian groups.

Contents: Hecke L-functions; Artin-Hecke L-functions; Analytic properties of L-functions; The explicit formulas; Bounds on discriminants and conductors; Non-vanishing theorems; The local theory of root numbers: A survey; Bibliography; Index.

Mathematical Surveys and Monographs, Volume 115

June 2005, 291 pages, Hardcover, ISBN 0-8218-3641-2, LC 2005041057, 2000 *Mathematics Subject Classification*: 11Mxx, 11Rxx, 22Exx, 11Sxx, **All AMS members US\$61**, List US\$76, Order code SURV/115

Probability



Integral Transformations and Anticipative Calculus for Fractional Brownian Motions

Yaozhong Hu, *University of Kansas, Lawrence*

Contents: Introduction; Representations; Induced

transformation I; Approximation; Induced transformation II; Stochastic calculus of variation; Stochastic integration; Nonlinear translation (Absolute continuity); Conditional expectation; Integration by parts; Composition (Itô formula); Clark type representation; Continuation; Stochastic control; Appendix; Bibliography.

Memoirs of the American Mathematical Society, Volume 175, Number 825

March 2005, 127 pages, Softcover, ISBN 0-8218-3704-4, LC 2005041980, 2000 *Mathematics Subject Classification*: 60H05, 60H07, 60G30, 60G15, 26A33, 44A05, **Individual member US\$35**, List US\$58, Institutional member US\$46, Order code MEMO/175/825

These two volumes contain papers of the participants in the International Press Conference on Motives, polylogarithms and non-abelian Hodge theory which took place at UC Irvine in June 1998. The conference commemorated the twentieth anniversary of the remarkable Irvine lectures of Spencer Bloch on "Higher regulators, algebraic K -theory and zeta functions of elliptic curves". The conference presented some of the best recent research in algebraic K -theory, Hodge theory, motivic cohomology and polylogarithms.

Fourteen papers explore the frontiers of motivic cohomology and motivic homotopy theory, the periods of modular forms and the variational aspects of Hodge theory. Contributions include a program paper of V. Voevodsky outlining the outstanding open questions in the stable homotopy theory of motives, as well as papers on motivic cohomology, Galois cohomology and algebraic differential characters by A. Beilinson, S. Bloch, F. Bogomolov, H. Esnault, and Y. Tschinkel; a paper of D. Zagier describing in detail the traces of the values of modular functions at quadratic irrationalities, works on theory of classical and elliptic polylogarithms by A. Goncharov and A. Levin, as well as works of J. Wildeshaus and Z. Wojtkowiak describing the recent progress towards a proof of various versions of Zagier's conjecture; a foundational paper of C. Simpson on geometric n -stacks and their applications to non-abelian Hodge structures, and papers on the geometric applications of non-abelian Hodge theory by D. Arapura, L. Katzarkov, T. Pantev, A. Reznikov, and C. Teleman.

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

A publication of International Press. Distributed worldwide by the American Mathematical Society.

Contents: **Part I:** V. Voevodsky, Open problems in the motivic stable homotopy theory, I; A. Beilinson, Remarks on n -motives and correspondences at the generic point; S. Bloch and H. Esnault, Relative algebraic differential characters; F. Bogomolov and Y. Tschinkel, Commuting elements in Galois groups of function fields; Z. Wojtkowiak, Mixed Hodge structures and iterated integrals, I; **Part II:** D. Zagier, Traces of singular moduli; A. B. Goncharov, Explicit regulator maps on polylogarithmic motivic complexes; A. Levin, An explicit formula for the motivic elliptic polylogarithm; J. Wildeshaus, On the Eisenstein symbol; C. Simpson, Algebraic aspects of higher nonabelian Hodge theory; D. Arapura, Higgs bundles, integrability, and holomorphic forms; L. Katzarkov and T. Pantev, Nonabelian (p, p) classes; A. Reznikov, The structure of Kähler groups, I: second cohomology; C. Teleman, Some Hodge theory from Lie algebras.

International Press

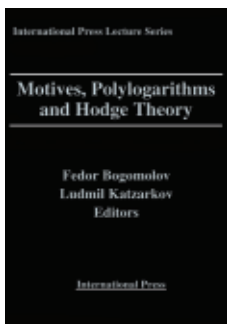
Part I: December 2002, 420 pages, Hardcover, ISBN 1-57146-090-X, **All AMS members US\$52**, List US\$65, Order code INPR/52.1

Part II: December 2002, 334 pages, Hardcover, ISBN 1-57146-091-8, **All AMS members US\$52**, List US\$65, Order code INPR/52.2

Set: December 2002, 754 pages, Hardcover, ISBN 1-57146-092-6, **All AMS members US\$80**, List US\$100, Order code INPR/52

New AMS-Distributed Publications

Algebra and Algebraic Geometry

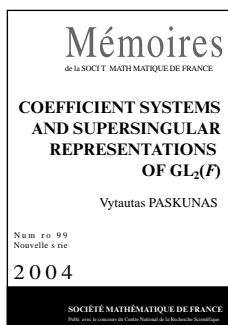


Motives, Polylogarithms and Hodge Theory

Part I: Motives and Polylogarithms
Part II: Hodge Theory

Fedor Bogomolov, *New York University, Courant Institute*, and Ludmil Katzarkov,

University of California, Irvine, Editors



Coefficient Systems and Supersingular Representations of $GL_2(F)$

Vytautas Paskunas,
Universität Bielefeld

Let F be a non-Archimedean local field with the residual characteristic p . The author constructs a “good” number of smooth irreducible \overline{F}_p -representations

of $GL_2(F)$, which are supersingular in the sense of Barthel and Livné. If $F = \mathbf{Q}_p$, then results of Breuil imply that our construction gives all the supersingular representations up to the twist by an unramified quasi-character. The author conjectures that this is true for an arbitrary F .

The book is suitable for graduate students and research mathematicians interested in algebra and algebraic geometry.

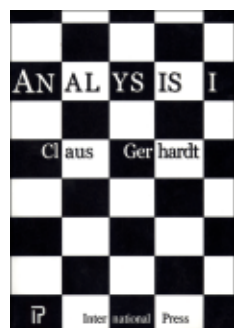
A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

Contents: Introduction; Hecke algebra; Irreducible representations of $GL_2(\mathbf{F}_q)$; Principal indecomposable representations; Coefficient systems; Supersingular representations; Bibliography.

Mémoires de la Société Mathématique de France, Number 99

February 2005, 84 pages, Softcover, ISBN 2-85629-165-1, 2000 *Mathematics Subject Classification*: 22E50, **Individual member US\$33**, List US\$37, Order code SMFMEM/99

Analysis



Analysis I

Claus Gerhardt, *University of Heidelberg, Germany*

Analysis I is based on the courses given by the author at Heidelberg. It comprises material for a one and a half semester course and can be used as a textbook. The contents range from elementary calculus to fairly advanced topics in functional analysis, measure theory and differential geometry.

The volume covers the convergence of sequences, topological concepts including continuity, compactness and connectedness, differentiation in one variable, theorems of Arzela-Ascoli and Stone-Weierstraß and analytic functions in several variables, as well as Riemann integral. It demands minimum prerequisites and is intended for first year graduate students or undergraduates who want to pursue the mathematics or physics fields.

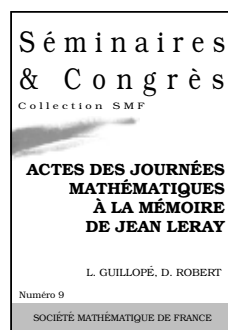
A publication of International Press. Distributed worldwide by the American Mathematical Society.

Contents: Foundations; Convergence; Continuity; Differentiation in one variable; Spaces of continuous functions; Integration in one variable; Bibliography; List of symbols; Index.

International Press

February 2004, 281 pages, Softcover, ISBN 1-57146-153-1, **All AMS members US\$40**, List US\$50, Order code INPR/59

Differential Equations



Actes des journées mathématiques à la mémoire de Jean Leray

Laurent Guillopé and Didier Robert, *Université de Nantes, France*, Editors

On the 17th and 18th of June 2002, the Laboratory of Mathematics of Nantes University (supported by

CNRS) organized a meeting to celebrate the memory of Jean Leray. At this time, the laboratory was named **Laboratoire Jean Leray**. This volume begins with the lecture by Yves Meyer, which relates the scientific life of Jean Leray. The lectures that follow illustrate most aspects of the scientific works of J. Leray and show the wide spectrum of his work.

The book is suitable for graduate students and research mathematicians interested in differential equations, geometry, and topology.

A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

Contents: Y. Meyer, Jean Leray et la recherche de la vérité; S. Agmon, On the asymptotics of Green's functions of elliptic operators with constant coefficients; D. Barlet, Singularités réelles isolées et développements asymptotiques d'intégrales oscillantes; P. Bolley and P. T. Lai, Réduction au bord d'un problème modèle de Kelvin; R. Camalès, Problème de Cauchy ramifié pour une classe d'opérateurs dont les racines caractéristiques sont en involution; J.-Y. Chemin, Le système de Navier-Stokes incompressible soixante dix ans après Jean Leray; Y. Choquet-Bruhat, Asymptotic solutions of nonlinear wave equations and polarized null conditions; M. Fontes and E. Saksman, Optimal results for the two dimensional Navier-Stokes equations with lower regularity on the data; J.-L. Loday, Scindement d'associativité et algèbres de Hopf; P. Schapira, Sheaves: from Leray to Grothendieck and Sato; J.-C. Sikorav, Dual elliptic planes.

Séminaires et Congrès, Number 9

February 2005, 208 pages, Softcover, ISBN 2-85629-160-0, 2000 *Mathematics Subject Classification*: 16A24, 16W30, 18D50, 32C30, 32C38, 32Q65, 32S40, 34A12, 35A10, 35A20, 35A27, 35C15, 35C20, 35E05, 35J25, 35Q30, 35S99, 53C15, 53C42, 53D35, 57R17, 58J60, 76B20, 76B99, 76D05, **Individual member US\$53**, List US\$59, Order code SECO/9

Geometry and Topology



Collected Papers on Ricci Flow

H. D. Cao, *Texas A & M University, College Station*,
B. Chow, *University of California, San Diego, La Jolla*,
S.-C. Chu, *National Chung Cheng University, Chia-Yi, Taiwan*, and
S.-T. Yau, *Harvard University, Cambridge, MA*, Editors

The Ricci flow is currently a hot topic at the forefront of mathematics research. The recent developments of Grisha Perelman on Richard Hamilton's program for Ricci flow are exciting. This collection is intended to make readily available to a wide audience one book containing the work of Hamilton and others on Ricci flow.

In the past two decades, the Ricci flow, and in particular Richard Hamilton's work in it, has received attention as both having a profound influence on geometric evolution equations and as a possible approach to studying Thurston's Geometrization Conjecture.

This selection of papers on the Riemannian Ricci flow is intended for a variety of purposes. The graduate student or researcher unfamiliar with the Ricci flow may use it as an introduction to the Ricci flow quickly leading to current research topics and open problems. Geometers already familiar with the Ricci flow may use it as a handy reference which contains almost all of Richard Hamilton's papers on the subject to date.

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

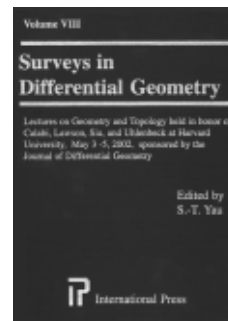
A publication of International Press. Distributed worldwide by the American Mathematical Society.

Contents: **R. S. Hamilton**, The formation of singularities in the Ricci flow; **R. S. Hamilton**, Three-manifolds with positive Ricci curvature; **D. DeTurck**, Deforming metrics in the direction of their Ricci tensors; **G. Huysken**, Ricci deformation of the metric on a Riemannian manifold; **R. S. Hamilton**, Four-manifolds with positive curvature operator; **R. S. Hamilton**, The Ricci flow on surfaces; **B. Chow**, The Ricci flow on the 2-sphere; **B. Chow**, On the entropy estimate for the Ricci flow on

compact 2-orbifolds; **R. S. Hamilton**, An isoperimetric estimate for the Ricci flow on surfaces; **R. S. Hamilton**, The Harnack estimate for the Ricci flow; **R. S. Hamilton**, Eternal solutions to the Ricci flow; **B. Chow** and **S.-C. Chu**, A geometric interpretation of Hamilton's Harnack inequality for the Ricci flow; **R. S. Hamilton**, A compactness property for the solutions of the Ricci flow; **R. S. Hamilton**, Non-singular solutions of the Ricci flow on three-manifolds; **R. S. Hamilton**, Four-manifolds with positive isotropic curvature; **R. S. Hamilton** and **S. T. Yau**, The Harnack estimate for the Ricci flow on a surface-Revisited; **P. Li** and **S. T. Yau**, On the parabolic kernel of the Schrödinger operator; **R. Schoen** and **S. T. Yau**, Existence of incompressible minimal surfaces and the topology of three dimensional manifolds with non-negative scalar curvature; **W. Meeks III**, **L. Simon**, and **S.-T. Yau**, Embedded minimal surfaces, exotic spheres, and manifolds with positive Ricci curvature; **B. L. Chen** and **X. P. Zhu**, Complete Riemannian manifolds with pointwise pinched curvature; **R. S. Hamilton**, Three-orbifolds with positive Ricci curvature; **X.-P. Zhu**, The Ricci flow on complete noncompact Kähler manifolds; Appendix: Kähler-Ricci flow references.

International Press

December 2003, 539 pages, Hardcover, ISBN 1-57146-110-8, **All AMS members US\$51**, List US\$64, Order code INPR/51



Surveys in Differential Geometry, Vol. VIII

S.-T. Yau, *Harvard University, Cambridge, MA*, Editor

The annual *Surveys in Differential Geometry* volume is received with anticipation each year as it summarizes many of the recent discoveries in the field. This year's volume is dedicated to Professors

Calabi, Lawson, Siu, and Uhlenbeck. It contains important contributions by their students and colleagues and reflects the important work in the field by these great mathematicians.

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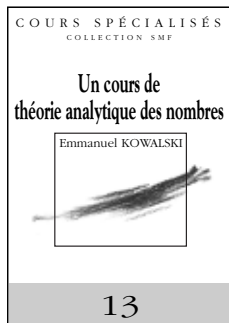
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Number Theory



Un cours de théorie analytique des nombres

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This book is an introduction to the multiplicative theory of prime numbers. It is divided roughly into two parts. The first part introduces

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