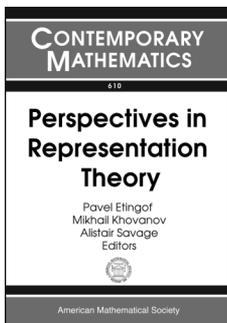


New Publications Offered by the AMS

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Algebra and Algebraic Geometry



Perspectives in Representation Theory

Pavel Etingof, *Massachusetts Institute of Technology, Cambridge, MA*, Mikhail Khovanov, *Columbia University, New York, NY*, and Alistair Savage, *University of Ottawa, ON, Canada*, Editors

This volume contains the proceedings of the conference Perspectives in Representation Theory, held from May 12–17, 2012, at Yale University, in honor of Igor Frenkel's 60th birthday.

The aim of the conference was to present current progress on the following (interrelated) topics: vertex operator algebras and chiral algebras, conformal field theory, the (geometric) Langlands program, affine Lie algebras, Kac-Moody algebras, quantum groups, crystal bases and canonical bases, quantum cohomology and K-theory, geometric representation theory, categorification, higher-dimensional Kac-Moody theory, integrable systems, quiver varieties, representations of real and p -adic groups, and quantum gauge theories.

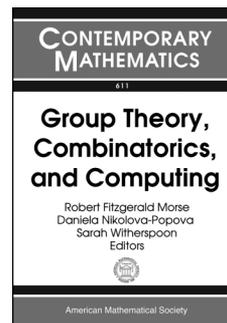
The papers in this volume present representation theory connections of numerous other subjects, as well as some of the most recent advances in representation theory, including those which occurred thanks to the application of techniques in other areas of mathematics, and of ideas of quantum field theory and string theory.

Contents: J. Duncan, P. Etingof, I. Ip, M. Khovanov, M. Libine, A. Licata, A. Savage, and M. Schlosser, On the work of Igor Frenkel; A. Braverman, M. Finkelberg, and J. Shiraishi, MacDonal polynomials, Laumon spaces and perverse coherent sheaves; A. Braverman, H. Garland, D. Kazhdan, and M. Patnaik, An affine Gindikin-Karpelevich formula; M. C. N. Cheng and J. F. R. Duncan, On the discrete groups of Mathieu moonshine; G. Felder, D. Kazhdan, and T. M. Schlank, The classical master equation with an appendix by Tomer M. Schlank; D. Gaitsgory and N. Rozenblyum, DG indschemes; T. Kobayashi, Special functions in minimal representations; G. Lusztig, Asymptotic Hecke algebras and involutions; F. Malikov and V. Schechtman, Chiral differential operators on abelian varieties; H. Nakajima, Refined Chern-Simons theory and Hilbert schemes

of points on the plane; C. Stroppel and J. Sussan, Categorified Jones-Wenzl projectors: A comparison; Y. Zhu, Weil representations and theta functionals on surfaces.

Contemporary Mathematics, Volume 610

March 2014, approximately 369 pages, Softcover, ISBN: 978-0-8218-9170-4, 2010 *Mathematics Subject Classification*: 17Bxx, 22E57, AMS members US\$100.80, List US\$126, Order code CONM/610



Group Theory, Combinatorics, and Computing

Robert Fitzgerald Morse, *University of Evansville, IN*, Daniela Nikolova-Popova, *Florida Atlantic University, Boca Raton, FL*, and Sarah Witherspoon, *Texas A & M University, College Station, TX*, Editors

This volume contains the proceedings of the International Conference on Group Theory, Combinatorics and Computing held from October 3–8, 2012, in Boca Raton, Florida.

The papers cover a number of areas in group theory and combinatorics. Topics include finite simple groups, groups acting on structured sets, varieties of algebras, classification of groups generated by 3-state automata over a 2-letter alphabet, new methods for construction of codes and designs, groups with constraints on the derived subgroups of its subgroups, graphs related to conjugacy classes in groups, and lexicographical configurations. Application of computer algebra programs is incorporated in several of the papers.

This volume includes expository articles on finite coverings of loops, semigroups and groups, and on the application of algebraic structures in the theory of communications.

This volume is a valuable resource for researchers and graduate students working in group theory and combinatorics. The articles provide excellent examples of the interplay between the two areas.

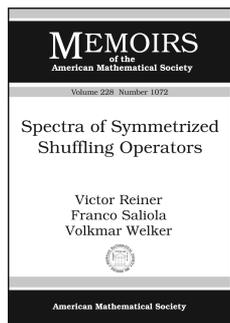
This item will also be of interest to those working in discrete mathematics and combinatorics and applications.

Contents: M. Bianchi, M. Herzog, and E. Pacifici, On the regularity of a graph related to conjugacy classes of groups: Small valencies; R. Grigorchuk and D. Savchuk, Self-similar groups acting essentially

freely on the boundary of the binary rooted tree; **C. Hering**, **A. Krebs**, and **T. Edgar**, Non-symmetric lexicographic configurations; **T. Hurley**, Algebraic structures for communications; **L.-C. Kappe**, Finite coverings: A journey through groups, loops, rings and semigroups; **R. Laue**, Decompositions of Kramer-Mesner matrices; **P. Longobardi**, **M. Maj**, and **D. J. S. Robinson**, Recent results on groups with few isomorphism classes of derived subgroups; **J. Moori**, Designs and codes from $PSL_2(q)$; **B. Plotkin**, Algebraic logic and logical geometry in arbitrary varieties of algebras; **P. Spiga** and **A. Zalesski**, A uniform upper bound for the character degree sums and Gelfand-Graev-like characters for finite simple groups.

Contemporary Mathematics, Volume 611

April 2014, approximately 194 pages, Softcover, ISBN: 978-0-8218-9435-4, 2010 *Mathematics Subject Classification*: 05E18, 08A99, 20B15, 20D05, 20E45, 20F14, 20F65, 20N05, 51E15, 94A99, **AMS members US\$62.40**, List US\$78, Order code CONM/611



Spectra of Symmetrized Shuffling Operators

Victor Reiner, *University of Minnesota, Minneapolis, Minnesota*, **Franco Saliola**, *Université du Québec à Montréal, Canada*, and **Volkmar Welker**, *Philipps-Universität Marburg, Germany*

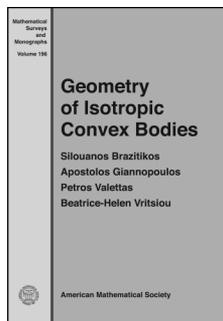
This item will also be of interest to those working in probability and statistics.

Contents: Introduction; Defining the operators; The case where \mathcal{O} contains only hyperplanes; Equivariant theory of BHR random walks; The family $v_{(2k, 1n-2k)}$; The original family $v_{(k, 1n-k)}$; Acknowledgements; Appendix A. \mathfrak{S}_n -module decomposition of $v_{(k, 1n-k)}$; Bibliography; List of Symbols; Index.

Memoirs of the American Mathematical Society, Volume 228, Number 1072

March 2014, 109 pages, Softcover, ISBN: 978-0-8218-9095-0, LC 2013042563, 2010 *Mathematics Subject Classification*: 05E15, 20F55, 60J10, **AMS members US\$60.80**, List US\$76, Order code MEMO/228/1072

Analysis



Geometry of Isotropic Convex Bodies

Silouanos Brazitikos and **Apostolos Giannopoulos**, *University of Athens, Greece*, **Petros Valettas**, *Texas A & M University, College Station, TX*, and **Beatrice-Helen Vritsiou**, *University of Athens, Greece*

The study of high-dimensional convex bodies from a geometric and analytic point of view, with an emphasis on the dependence of various parameters on the dimension stands at the intersection of classical convex geometry and the local theory of Banach spaces. It is also closely linked to many other fields, such as probability theory, partial differential equations, Riemannian geometry, harmonic analysis and combinatorics. It is now understood that the convexity assumption forces most of the volume of a high-dimensional convex body to be concentrated in some canonical way and the main question is whether, under some natural normalization, the answer to many fundamental questions should be independent of the dimension.

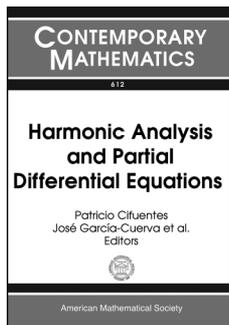
The aim of this book is to introduce a number of well-known questions regarding the distribution of volume in high-dimensional convex bodies, which are exactly of this nature: among them are the slicing problem, the thin-shell conjecture and the Kannan-Lovasz-Simonovits conjecture. This book provides a self-contained and up to date account of the progress that has been made in the last fifteen years.

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

Contents: Background from asymptotic convex geometry; Isotropic log-concave measures; Hyperplane conjecture and Bourgain's upper bound; Partial answers; L_q -centroid bodies and concentration of mass; Bodies with maximal isotropic constant; Logarithmic Laplace transform and the isomorphic slicing problem; Tail estimates for linear functionals; M and M^* -estimates; Approximating the covariance matrix; Random polytopes in isotropic convex bodies; Central limit problem and the thin shell conjecture; The thin shell estimate; Kannan-Lovász-Simonovits conjecture; Infimum convolution inequalities and concentration; Information theory and the hyperplane conjecture; Bibliography; Subject index; Author index.

Mathematical Surveys and Monographs, Volume 196

April 2014, approximately 603 pages, Hardcover, ISBN: 978-1-4704-1456-6, LC 2913041914, 2010 *Mathematics Subject Classification*: 52Axx, 46Bxx, 60Dxx, 28Axx, **AMS members US\$107.20**, List US\$134, Order code SURV/196



Harmonic Analysis and Partial Differential Equations

Patricio Cifuentes and José García-Cuerva, *Universidad Autónoma de Madrid, Spain*, Gustavo Garrigós, *Universidad de Murcia, Spain*, Eugenio Hernández, *Universidad Autónoma de Madrid, Spain*, José María Martell, Javier Parcet, and Keith M. Rogers, *Consejo Superior de Investigaciones Científicas, Madrid, Spain*, and Alberto Ruiz, Fernando Soria, and Ana Vargas, *Universidad Autónoma de Madrid, Spain*, Editors

This volume contains the Proceedings of the 9th International Conference on Harmonic Analysis and Partial Differential Equations, held June 11–15, 2012, in El Escorial, Madrid, Spain.

Included in this volume is the written version of the mini-course given by Jonathan Bennett on *Aspects of Multilinear Harmonic Analysis Related to Transversality*. Also included, among other papers, is a paper by Emmanouil Milakis, Jill Pipher, and Tatiana Toro, which reflects and extends the ideas presented in the mini-course on *Analysis on Non-smooth Domains* delivered at the conference by Tatiana Toro.

The topics of the contributed lectures cover a wide range of the field of Harmonic Analysis and Partial Differential Equations and illustrate the fruitful interplay between the two subfields.

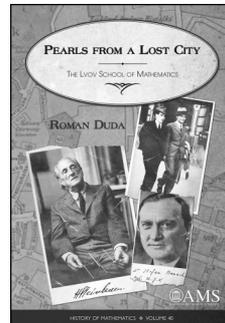
This item will also be of interest to those working in differential equations.

Contents: J. Bennett, Aspects of multilinear harmonic analysis related to transversality; F. Bernicot, Multi-frequency Calderón-Zygmund analysis and connexion to Bochner-Riesz multipliers; O. Beznosova, J. C. Moraes, and M. C. Pereyra, Sharp bounds for t -Haar multipliers on L^2 ; M. Bownik and J. Jasper, Spectra of frame operators with prescribed frame norms; J. Fan and T. Ozawa, Regularity criteria for Hall-magnetohydrodynamics and the space-time monopole equation in Lorenz gauge; T. P. Hytönen, The A_2 theorem: Remarks and complements; M. Junge, T. Mei, and J. Parcet, An invitation to harmonic analysis associated with semigroups of operators; J. M. Martell, D. Mitrea, I. Mitrea, and M. Mitrea, The higher order regularity Dirichlet problem for elliptic systems in the upper-half space; E. Milakis, J. Pipher, and T. Toro, Perturbations of elliptic operators in chord arc domains; A. Rosén, Cauchy non-integral formulas.

Contemporary Mathematics, Volume 612

April 2014, 178 pages, Softcover, ISBN: 978-0-8218-9433-0, LC 2013036893, 2010 *Mathematics Subject Classification*: 31-XX, 35-XX, 42-XX, 46-XX, 47-XX, **AMS members US\$62.40**, List US\$78, Order code CONM/612

General Interest



Pearls from a Lost City

The Lvov School of Mathematics

Roman Duda, *University of Wrocław, Poland*

Translated by Daniel Davies

The fame of the Polish school at Lvov rests with the diverse and fundamental contributions of Polish mathematicians working there during the interwar years.

In particular, despite material hardship and without a notable mathematical tradition, the school made major contributions to what is now called functional analysis. The results and names of Banach, Kac, Kuratowski, Mazur, Nikodym, Orlicz, Schauder, Sierpiński, Steinhaus, and Ulam, among others, now appear in all the standard textbooks.

The vibrant joie de vivre and singular ambience of Lvov's once scintillating social scene are evocatively recaptured in personal recollections. The heyday of the famous Scottish Café—unquestionably the most mathematically productive cafeteria of all time—and its precious *Scottish Book* of highly influential problems are described in detail, revealing the special synergy of scholarship and camaraderie that permanently elevated Polish mathematics from utter obscurity to global prominence.

This chronicle of the Lvov school—its legacy and the tumultuous historical events which defined its lifespan—will appeal equally to mathematicians, historians, or general readers seeking a cultural and institutional overview of key aspects of twentieth-century Polish mathematics not described anywhere else in the extant English-language literature.

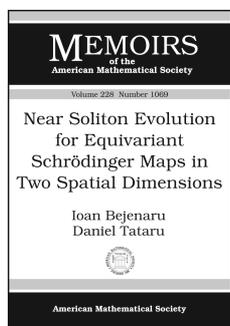
This item will also be of interest to those working in analysis.

Contents: *Background:* The University and the Polytechnic in Lvov; Polish mathematics at the turn of the twentieth century; Sierpiński's stay at the University of Lvov (1908–1914); The University in Warsaw and Janiszewski's program (1915–1920); World mathematics (active fields in Poland) around 1920; *The golden age: Individuals and community:* The mathematical community in Lvov after World War I; Mathematical studies and students; Journals, monographs, and congresses; The popularization of mathematics; Social life (the Scottish Café, the *Scottish Book*); The Polish Mathematical Society; Collaboration with other centers; In the eyes of others; *The golden age: Achievements:* Stefan Banach's doctoral thesis and priority claims; Probability theory; Measure theory; Game theory: A revelation without follow-up; Operator theory in the 1920s; Methodological audacity; Banach's monograph: Polishing the pearls; Operator theory in the 1930s: The dazzle of pearls; New perspectives for which time did not allow; On the periphery; *Oblivion:* Ukrainization the Soviet way (1939–1941); The German occupation (1941–1944); The expulsion of Poles (1945–1946); *Historical significance:* Chronological overview; Chronology of events as perceived elsewhere; Influence on mathematics of the Lvov school; A tentative summary; Mathematics in Lvov after 1945; *List of Lvov mathematicians:* Mathematicians associated with Lvov; Bibliographies; List of illustrations; Index of names.

History of Mathematics, Volume 40

May 2014, approximately 207 pages, Hardcover, ISBN: 978-1-4704-1076-6, LC 2013037212, 2010 *Mathematics Subject Classification*: 01A60, 01A70, 01A72, 01A80, **AMS members US\$31.20**, List US\$39, Order code HMATH/40

Mathematical Physics



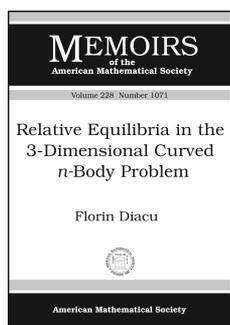
Near Soliton Evolution for Equivariant Schrödinger Maps in Two Spatial Dimensions

Ioan Bejenaru, *University of California, San Diego, La Jolla, CA*, and **Daniel Tataru**, *University of California, Berkeley, CA*

Contents: Introduction; An outline of the paper; The Coulomb gauge representation of the equation; Spectral analysis for the operators H, \tilde{H} ; the X, LX spaces; The linear \tilde{H} Schrödinger equation; The time dependent linear evolution; Analysis of the gauge elements in X, LX ; The nonlinear equation for ψ ; The bootstrap estimate for the λ parameter; The bootstrap argument; The \tilde{H}^1 instability result; Bibliography.

Memoirs of the American Mathematical Society, Volume 228, Number 1069

March 2014, 108 pages, Softcover, ISBN: 978-0-8218-9215-2, LC 2013042543, 2010 *Mathematics Subject Classification*: 58J35; 35B65, **AMS members US\$60.80**, List US\$76, Order code MEMO/228/1069



Relative Equilibria in the 3-Dimensional Curved n -Body Problem

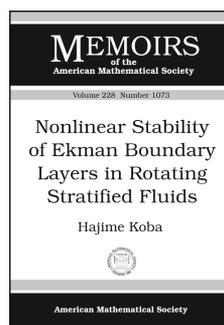
Florin Diacu, *University of Victoria, B.C., Canada*

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

Contents: Introduction; Background and equations of motion; Isometries and relative equilibria; Criteria and qualitative behaviour; Examples; Conclusions; Bibliography.

Memoirs of the American Mathematical Society, Volume 228, Number 1071

March 2014, 80 pages, Softcover, ISBN: 978-0-8218-9136-0, LC 2013042561, 2010 *Mathematics Subject Classification*: 70F10; 34C25, 37J45, **AMS members US\$56.80**, List US\$71, Order code MEMO/228/1071



Nonlinear Stability of Ekman Boundary Layers in Rotating Stratified Fluids

Hajime Koba, *Waseda University, Tokyo, Japan*

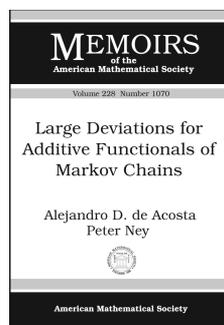
This item will also be of interest to those working in differential equations.

Contents: Introduction; Formulation and main results; Linearized problem; Existence of global weak solutions; Uniqueness of weak solutions; Nonlinear stability; Smoothness of weak solutions; Some extensions of the theory; Appendix A. Toolbox; Bibliography.

Memoirs of the American Mathematical Society, Volume 228, Number 1073

March 2014, 127 pages, Softcover, ISBN: 978-0-8218-9133-9, LC 2013042634, 2010 *Mathematics Subject Classification*: 35Q86, 76E20; 35B35, 35B40, 35B65, 76D03, 76D05, **AMS members US\$63.20**, List US\$79, Order code MEMO/228/1073

Probability and Statistics



Large Deviations for Additive Functionals of Markov Chains

Alejandro D. de Acosta and Peter Ney

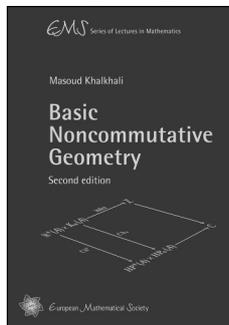
Contents: Introduction; The transform kernels K_g and their convergence parameters; Comparison of $\Lambda(g)$ and $\phi_\mu(g)$; Proof of Theorem 1; A characteristic equation and the analyticity of Λ_f ; The case when P has an atom $C \in S^+$ satisfying $\lambda^*(C) > 0$; Characteristic equations and the analyticity of Λ_f ; The general case when P is geometrically ergodic; Differentiation formulas for u_g and Λ_f in the general case and their consequences; Proof of Theorem 2; Proof of Theorem 3; Examples; Applications to an autoregressive process and to reflected random walk; Appendix; Background comments; References.

Memoirs of the American Mathematical Society, Volume 228, Number 1070

March 2014, 108 pages, Softcover, ISBN: 978-0-8218-9089-9, LC 2013042546, 2010 *Mathematics Subject Classification*: 60J05, 60F10, **AMS members US\$60.80**, List US\$76, Order code MEMO/228/1070

New AMS-Distributed Publications

Analysis



Basic Noncommutative Geometry

Second Edition

Masoud Khalkhali, *University of Western Ontario, London, Ontario, Canada*

This text provides an introduction to noncommutative geometry and some of its applications. It can be used either as a

textbook for a graduate course or for self-study. It will be useful for graduate students and researchers in mathematics and theoretical physics and all those who are interested in gaining an understanding of the subject.

One feature of this book is the wealth of examples and exercises that help the reader to navigate through the subject. While background material is provided in the text and in several appendices, some familiarity with basic notions of functional analysis, algebraic topology, differential geometry and homological algebra at a first year graduate level is helpful.

Developed by Alain Connes since the late 1970s, noncommutative geometry has found many applications to long-standing conjectures in topology and geometry and has recently made headways in theoretical physics and number theory. The book starts with a detailed description of some of the most pertinent algebra geometry correspondences by casting geometric notions in algebraic terms, then proceeds in the second chapter to the idea of a noncommutative space and how it is constructed. The last two chapters deal with homological tools: cyclic cohomology and Connes–Chern characters in K -theory and K -homology, culminating in one commutative diagram expressing the equality of topological and analytic index in a noncommutative setting. Applications to integrality of noncommutative topological invariants are given as well.

Two new sections have been added to the second edition: the first new section concerns the Gauss–Bonnet theorem and the definition and computation of the scalar curvature of the curved noncommutative two torus, and the second new section is a brief introduction to Hopf cyclic cohomology. The bibliography has been extended and some new examples are presented.

A publication of the European Mathematical Society (EMS). Distributed within the Americas by the American Mathematical Society.

Contents: Examples of algebra-geometry correspondences; Noncommutative quotients; Cyclic cohomology; Connes–Chern character; Appendices; Bibliography; Index.

EMS Series of Lectures in Mathematics, Volume 10

December 2013, 257 pages, Softcover, ISBN: 978-3-03719-128-6, 2010 *Mathematics Subject Classification:* 58-02, 58B34, **AMS members US\$38.40**, List US\$48, Order code EMSSERLEC/10.R

General Interest



Jacques Tits, Œuvres–Collected Works

Volumes I–IV

Francis Buekenhout, *Université Libre de Bruxelles, Brussels, Belgium*, Bernhard Mühlherr, *Universität Gissen, Germany*, Jean-Pierre Tignol, *Université Catholique de Louvain, Belgium*, and Hendrik Van Maldeghem, *Ghent University, Belgium*, Editors

Jacques Tits was awarded the Wolf Prize in 1993 and the Abel Prize (jointly with John Thompson) in 2008. The impact of his contributions in algebra, group theory and geometry made over a span of more than five decades is incalculable. Many fundamental developments in several fields of mathematics have their origin in ideas of Tits. A number of Tits' papers mark the starting point of completely new directions of research. Outstanding examples are papers on quadratic forms, on Kac-Moody groups and on what subsequently became known as the Tits alternative.

These volumes contain an almost complete collection of Tits' mathematical writings. They include, in particular, a number of published and unpublished manuscripts which have not been easily accessible until now. This collection of Tits' contributions in one place makes the evolution of his mathematical thinking visible. The development of his theory of buildings and BN-pairs and its bearing on the theory of algebraic groups, for example, reveal a fascinating story. Along with Tits' mathematical writings, these volumes contain biographical data, survey articles on aspects of Tits' work, and comments by the editors on the content of some of his papers.

With the publication of these volumes, a major piece of 20th-century mathematics is being made available to a wider audience.

This item will also be of interest to those working in discrete mathematics and combinatorics.

A publication of the European Mathematical Society (EMS). Distributed within the Americas by the American Mathematical Society.

Contents: For the table of contents, go to www.ams.org/bookstore.

Heritage of European Mathematics, Volume 8

November 2013, 3963 pages, Hardcover, ISBN: 978-3-03719-126-2, 2010 *Mathematics Subject Classification:* 00B60, 05-06, 17-06, 20-06, 22-06, 51-06, **AMS members US\$638.40**, List US\$798, Order code EMSHEM/8