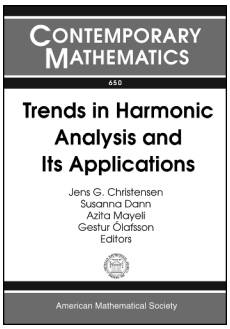
New Publications Offered by the AMS

To subscribe to email notification of new AMS publications, please go to www.ams.org/bookstore-email.

Analysis



Trends in Harmonic Analysis and Its Applications

Jens G. Christensen, *Colgate University, Hamilton, NY*, **Susanna Dann**, *Vienna University of Technology, Wien, Austria*, **Azita Mayeli**, *Queensborough Community College, CUNY, Bayside, NY*, and **Gestur Ólafsson**, *Louisiana State University, Baton Rouge, LA*, Editors

This volume contains the proceedings of the AMS Special Session on Harmonic Analysis and Its Applications, held March 29–30, 2014, at the University of Maryland, Baltimore County, Baltimore, MD.

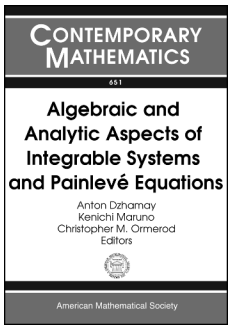
It provides an in depth look at the many directions taken by experts in Harmonic Analysis and related areas. The papers cover topics such as frame theory, Gabor analysis, interpolation and Besov spaces on compact manifolds, Cuntz-Krieger algebras, reproducing kernel spaces, solenoids, hypergeometric shift operators and analysis on infinite dimensional groups.

Expositions are by leading researchers in the field, both young and established. The papers consist of new results or new approaches to solutions, and at the same time provide an introduction into the respective subjects.

Contents: *Frame theory:* **S. Bahmanpour**, **J. Cahill**, **P. G. Casazza**, **J. Jasper**, and **L. M. Woodland**, Phase retrieval and norm retrieval; **R. Balan** and **D. Zou**, On Lipschitz inversion of nonlinear redundant representations; **J. Cahill**, **P. G. Casazza**, **M. Ehler**, and **S. Li**, Tight and random nonorthogonal fusion frames; **V. Oussa**, Decompositions of rational Gabor representations; *Functional analysis and C^*-algebras:* **S. Bezuglyi** and **P. E. T. Jorgensen**, Representations of Cuntz-Krieger relations, dynamics on Bratteli diagrams, and path-space measures; **M. Dawson** and **G. Ólafsson**, A survey of amenability theory for direct-limit groups; **F. Latrémolière** and **J. A. Packer**, Explicit construction of equivalence bimodules between noncommutative solenoids; *Harmonic analysis on manifolds:* **V. M. Ho** and **G. Ólafsson**, An application of hypergeometric shift operators to the χ-spherical Fourier transform; **P. E. T. Jorgensen**, **S. Pedersen**, and **F. Tian**, Harmonic analysis of a class of reproducing kernel Hilbert spaces arising from groups; **I. Z. Pesenson**, Approximations in L_p-norms and Besov spaces on compact manifolds.

Contemporary Mathematics, Volume 650

November 2015, 209 pages, Softcover, ISBN: 978-1-4704-1879-3, LC 2015011079, 2010 *Mathematics Subject Classification:* 22E27, 32M15, 42C15, 46E22, 41A05, 43A07, 46L40, 43A32, **AMS members US$84**, List US$105, Order code CONM/650



Algebraic and Analytic Aspects of Integrable Systems and Painlevé Equations

Anton Dzhamay, *University of Northern Colorado, Greeley, CO*, **Kenichi Maruno**, *University of Texas-Pan American, Edinburg, TX*, and **Christopher M. Ormerod**, *California Institute of Technology, Pasadena, CA*, Editors

This volume contains the proceedings of the AMS Special Session on Algebraic and Analytic Aspects of Integrable Systems and Painlevé Equations, held on January 18, 2014, at the Joint Mathematics Meetings in Baltimore, MD.

The theory of integrable systems has been at the forefront of some of the most important developments in mathematical physics in the last 50 years. The techniques to study such systems have solid foundations in algebraic geometry, differential geometry, and group representation theory.

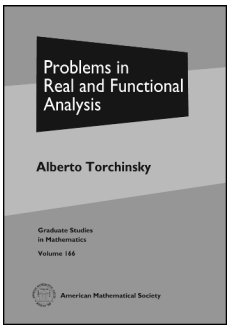
Many important special solutions of continuous and discrete integrable systems can be written in terms of special functions such as hypergeometric and basic hypergeometric functions. The analytic tools developed to study integrable systems have numerous applications in random matrix theory, statistical mechanics and quantum gravity. One of the most exciting recent developments has been the emergence of good and interesting discrete and quantum analogues of classical integrable differential equations, such as the Painlevé equations and soliton equations. Many algebraic and analytic ideas developed in the continuous case generalize in a beautifully natural manner to discrete integrable systems. The editors have

sought to bring together a collection of expository and research articles that represent a good cross section of ideas and methods in these active areas of research within integrable systems and their applications.

Contents: **M. Noumi**, Padé interpolation and hypergeometric series; **T. Suzuki**, A q-analogue of the Drinfeld-Sokolov hierarchy of type A and q-Painlevé system; **H. Nagoya**, Fractional calculus of quantum Painlevé systems of type $A_1^{(1)}$; **C. M. Ormerod**, Spectral curves and discrete Painlevé equations; **A. Dzhamay** and **T. Takenawa**, Geometric analysis of reductions from Schlesinger transformations to difference Painlevé equations; **I. Rumanov**, Beta ensembles, quantum Painlevé equations and isomonodromy systems; **B. Prinari** and **F. Vitale**, Inverse scattering transform for the focusing nonlinear Schrödinger equation with a one-sided non-zero boundary condition.

Contemporary Mathematics, Volume 651

December 2015, 194 pages, Softcover, ISBN: 978-1-4704-1654-6, LC 2015011076, 2010 *Mathematics Subject Classification:* 34M55, 34M56, 37K10, 39A10, 35Q55, 14E07, 17B80, 33C20, 41A05, 81R12, **AMS members US$84**, List US$105, Order code CONM/651



Problems in Real and Functional Analysis

Alberto Torchinsky, *Indiana University, Bloomington, IN*

It is generally believed that solving problems is the most important part of the learning process in mathematics because it forces students to truly understand the definitions, comb through the theorems and proofs, and think at length about the mathematics. The purpose of this book is to complement the existing literature in introductory real and functional analysis at the graduate level with a variety of conceptual problems (1,457 in total), ranging from easily accessible to thought provoking, mixing the practical and the theoretical aspects of the subject. Problems are grouped into ten chapters covering the main topics usually taught in courses on real and functional analysis. Each of these chapters opens with a brief reader's guide stating the needed definitions and basic results in the area and closes with a short description of the problems.

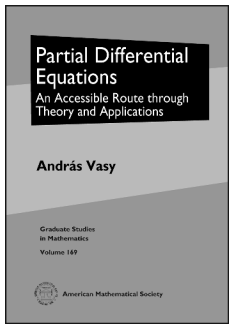
The Problem chapters are accompanied by Solution chapters, which include solutions to two-thirds of the problems. Students can expect the solutions to be written in a direct language that they can understand; usually the most "natural" rather than the most elegant solution is presented.

Contents: *Problems:* Set theory and metric spaces; Measures; Lebesgue measure; Measurable and integrable functions; L^p spaces; Sequences of functions; Product measures; Normed linear spaces. Functionals; Normed linear spaces. Linear operators; Hilbert spaces; *Solutions:* Set theory and metric spaces; Measures; Lebesgue measure; Measurable and integrable functions; L^p spaces; Sequences of functions; Product measures; Normed linear spaces. Functionals; Normed linear spaces. Linear operators; Hilbert spaces; Index.

Graduate Studies in Mathematics, Volume 166

December 2015, 467 pages, Hardcover, ISBN: 978-1-4704-2057-4, LC 2015022653, 2010 *Mathematics Subject Classification:* 26-01, 28-01, 46-01, 47-01, **AMS members US$63.20**, List US$79, Order code GSM/166

Differential Equations



Partial Differential Equations

An Accessible Route through Theory and Applications

András Vasy, *Stanford University, CA*

This text on partial differential equations is intended for readers who want to understand the theoretical underpinnings of modern PDEs in settings that are important for the applications without using extensive analytic tools required by most advanced texts. The assumed mathematical background is at the level of multivariable calculus and basic metric space material, but the latter is recalled as relevant as the text progresses.

The key goal of this book is to be mathematically complete without overwhelming the reader, and to develop PDE theory in a manner that reflects how researchers would think about the material. A concrete example is that distribution theory and the concept of weak solutions are introduced early because while these ideas take some time for the students to get used to, they are fundamentally easy and, on the other hand, play a central role in the field. Then, Hilbert spaces that are quite important in the later development are introduced via completions which give essentially all the features one wants without the overhead of measure theory.

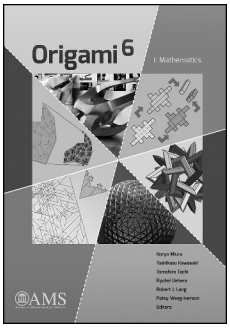
There is additional material provided for readers who would like to learn more than the core material, and there are numerous exercises to help solidify one's understanding. The text should be suitable for advanced undergraduates or for beginning graduate students including those in engineering or the sciences.

Contents: Introduction; Where do PDE come from; First order scalar semilinear equations; First order scalar quasilinear equations; Distributions and weak derivatives; Second order constant coefficient PDE: Types and d'Alembert's solution of the wave equation; Properties of solutions of second order PDE: Propagation, energy estimates and the maximum principle; The Fourier transform: Basic properties, the inversion formula and the heat equation; The Fourier transform: Tempered distributions, the wave equation and Laplace's equation; PDE and boundaries; Duhamel's principle; Separation of variables; Inner product spaces, symmetric operators, orthogonality; Convergence of the Fourier series and the Poisson formula on disks; Bessel functions; The method of stationary phase; Solvability via duality; Variational problems; Bibliography; Index.

Graduate Studies in Mathematics, Volume 169

January 2016, approximately 280 pages, Hardcover, ISBN: 978-1-4704-1881-6, LC 2015026781, 2010 *Mathematics Subject Classification:* 35-01, **AMS members US$55.20**, List US$69, Order code GSM/169

General Interest



Origami^6

I. Mathematics

Koryo Miura, *University of Tokyo, Japan*, **Toshikazu Kawasaki**, *Anan National College of Technology, Tokushima, Japan*, **Tomohiro Tachi**, *University of Tokyo, Japan*, **Ryuhei Uehara**, *Japan Advanced Institute of Science and Technology, Tokushima, Japan*, **Robert J. Lang**, *Langorigami, Alamo, CA*, and **Patsy Wang-Iverson**, *Gabriella & Paul Rosenbaum Foundation, Bryn Mawr, PA*, Editors

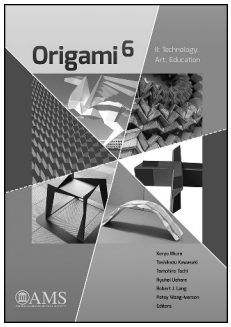
Origami^6 is a unique collection of papers illustrating the connections between origami and a wide range of fields. The papers compiled in this two-part set were presented at the 6th International Meeting on Origami in Science, Mathematics and Education (10–13 August 2014, Tokyo, Japan). They display the creative melding of origami (or, more broadly, folding) with fields ranging from cell biology to space exploration, from education to kinematics, from abstract mathematical laws to the artistic and aesthetics of sculptural design.

This two-part book contains papers accessible to a wide audience, including those interested in art, design, history, and education and researchers interested in the connections between origami and science, technology, engineering, and mathematics. This Part 1 contains papers on various aspects of mathematics of origami: coloring, constructability, rigid foldability, and design algorithms.

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

Contents: *Mathematics of origami: Coloring:* **T. C. Hull**, Coloring connections with counting mountain-valley assignments; **M. L. A. de las Penas**, **E. C. Taganap**, and **T. A. Rapanut**, Color symmetry approach to the construction of crystallographic flat origami; **s.-m. belcastro** and **T. C. Hull**, Symmetric colorings of polypolyhedra; *Mathematics of origami: constructibility:* **J. Guàrdia** and **E. Tramuns**, Geometric and arithmetic relations concerning origami; **J. I. Royo Prieto** and **E. Tramuns**, Abelian and non-abelian numbers via 3D origami; **F. Ghourabi**, **T. Ida**, and **K. Takahashi**, Interactive construction and automated proof in Eos system with application to knot fold of regular polygons; **S. Chen**, Equal division on any polygon side by folding; **R. Uehara**, A survey and recent results about commmon developments of two or more boxes; **H. A. Akitaya**, **Y. Kanamori**, **Y. Fukui**, and **J. Mitani**, Unfolding simple folds from crease patterns; *Mathematics of origami: Rigid foldability:* **T. Tachi**, Rigid folding of periodic origami tessellations; **Z. Abel**, **R. Connelly**, **E. Demaine**, **M. L. Demaine**, **T. C. Hull**, **A. Lubiw**, and **T. Tachi**, Rigid flattening of polyhedra with slits; **T. A. Evans**, **R. J. Lang**, **S. P. Magleby**, and **L. L. Howell**, Rigidly foldable origami twists; **Z. Abel**, **T. C. Hull**, and **T. Tachi**, Locked rigid origami with multiple degrees of freedom; **K. Zhang**, **C. Qiu**, and **J. S. Dai**, Screw-algebra-based kinematic and static modeling of origami-inspired mechanisms; **B. J. Edmondson**, **R. J. Lang**, **M. R. Morgan**, **S. P. Magleby**, and **L. L. Howell**, Thick rigidly foldable structures realized by an offset panel technique; **J. S. Dai**, Configuration transformation and manipulation of origami cartons; *Mathematics of origami: design algorithms:* **E. D. Demaine** and **J. S. Ku**, Filling a hole in a crease pattern: Isometric mapping from prescribed boundary folding; **R. J. Lang**, Spiderwebs, tilings, and flagstone tessellations; **E. D. Demaine**, **M. L. Demaine**, and **K. Qaiser**, Scaling any surface down to any fraction; **E. D. Demaine**, **M. L. Demaine**, **D. A. Huffmann**, **D. Koschitz**, and **T. Tachi**, Characterization of curved creases and rulings: Design and analysis of lens tessellations; **S. Chandra**, **S. Bhooshan**, and **M. El-Sayed**, Curve-folding polyhedra skeletons through smoothing; **T. Sushida**, **A. Huzume**, and **Y. Yamagishi**, Design methods of origami tessellations for triangular spiral multiple tilings; **T. R. Crain**, A new scheme to describe twist-fold tessellations; **E. Davis**, **E. D. Demaine**, **M. L. Demaine**, and **J. Ramseyer**, Weaving a uniformly thick sheet from rectangles; **H. Y. Cheng**, Extruding towers by serially grafting prismoids; **G. Konjevod**, On pleat rearrangements in pureland tessellations; **R. J. Lang** and **R. C. Alperin**, Graph paper for polygon-packed origami design; **T. Kawasaki**, A method to fold generalized bird bases from a given quadrilateral containing an inscribed circle; **R. J. Lang** and **B. Hayes**, Pentasia: An aperiodic origami surface; **U. Ikegami**, Base design of a snowflake curve model and its difficulties; **M. Kawamura**, Two calculations for geodesic modular works; Index.

January 2016, approximately 368 pages, Softcover, ISBN: 978-1-4704-1875-5, 2010 *Mathematics Subject Classification:* 00-XX, 01-XX, 51-XX, 52-XX, 53-XX, 68-XX, 70-XX, 74-XX, 92-XX, 97-XX, 00A99, **Individual member US$55.30**, **All Individuals US$55.30**, List US$79, Institutional member US$63.20, Order code MBK/95.1



Origami^6

II. Technology, Art, Education

Koryo Miura, *University of Tokyo, Japan*, **Toshikazu Kawasaki**, *Anan National College of Technology, Tokushima, Japan*, **Tomohiro Tachi**, *University of Tokyo, Japan*, **Ryuhei Uehara**, *Japan Advanced Institute of Science and Technology, Ishikawa, Japan*, **Robert J. Lang**, *Langorigami, Alamo, CA*, and **Patsy Wang-Iverson**, *Gabriella & Paul Rosenbaum Foundation, Bryn Mawr, PA*, Editors

Origami^6 is a unique collection of papers illustrating the connections between origami and a wide range of fields. The papers compiled in this two-part set were presented at the 6th International Meeting on Origami in Science, Mathematics and Education (10–13 August 2014, Tokyo, Japan). They display the creative melding of origami (or, more broadly, folding) with fields ranging from cell biology to space exploration, from education to kinematics, from abstract mathematical laws to the artistic and aesthetics of sculptural design.

This two-part book contains papers accessible to a wide audience, including those interested in art, design, history, and education and researchers interested in the connections between origami and science, technology, engineering, and mathematics. This Part 2 focuses on the connections between origami and more applied areas of science: engineering, physics, architecture, industrial design, and other artistic fields that go well beyond the usual folded paper.

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

Contents: *Mathematics of origami:* **Y. Klett**, **M. Grzeschik**, and **P. Middendorf**, Comparison of compressive properties of periodic non-flat tessellations; **K. Fuchi**, **P. R. Buskohl**, **J. J. Joo**, **G. W. Reich**, and **R. A. Vaia**, Numerical analysis of origami structures through modified frame elements; **Y. Yang**, **X. Zhao**, **S. Tokura**, and **I. Hagiwara**, A study on crash energy absorption ability of lightweight structures with truss core panel; **E. T. Filipov**, **T. Tachi**, and **G. H. Paulino**, Toward optimization of stiffness and flexibility of rigid, flat-foldable origami structures; **J. M. Gattas** and **Z. You**, Structural engineering applications of morphing sandwich structures; **S. Ishida**, **H. Morimura**, and **I. Hagiwara**, Sound-insulting performance of origami-based sandwich trusscore panels; **J. Ho** and **Z. You**, Thin-walled deployable grid structures; **R. Maleczek**, Deployable linear folded stripe structures; **G. H. Filz**, **G. Grasser**, **J. Ladinig**, and **R. Maleczek**, Gravity and friction-driven self-organized folding; **E. Iwase** and **I. Shimoyama**, Magnetic self-assembly of three-dimensional microstructures; **P. D'Acunto** and **J. J. C. Castellón González**, Folding augmented: A design method to integrate structural folding in archietecture; **S. Hoffmann**, **M. Barej**, **B. Günther**, **M. Trautz**, **B. Corves**, and **J. Feldhusen**, Demands on an adapted design process for foldable structures; **M. Ghosh**, **D. Tomkins**, **J. Denny**, **S. Rodriguez**, **M. Morales**, and **N. M. Amato**, Planning motions for shape-memory alloy sheets; **N. Tsuruta**, **J. Mitani**, **Y. Kanamori**, and **Y. Fukui**, Simple flat origami exploration system with random folds; **R. Chudoba**, **J. van der Woerd**, and **J. Hegger**, ORICREATE: Modeling framework for design and manufacturing of folded plate structures; **Y. Miyamoto**, Rotation erection system (res): Origami extended with cuts; **P. J. Mehner**, **T. Liu**, **A. B. Karimi**, **A. Brodeur**, **J. Paniagua**, **S. Giles**, **P. Richard**, **A. Nemtserova**, **S. Liu**, **R. C. Alperin**, **S. Bhatia**, **M. Culpepper**, **R. J. Lang**, and **C. Livermore**, Toward engineering biological tissues by directed assembly and origami folding; **M. C. Neyrinck**, Cosmological origami: Properties of cosmic-web components when a non-stretchy dark-matter sheet folds; **C. Cumino**, **E. Frigerio**, **S. Gallina**, **M. L. Spreafico**, and **U. Zich**, Modeling vaults in origami: A bridge between mathematics and architecture; *Origami in art, design, and history:* **Y. Klett**, Folding perspectives: Joys and uses of 3d anamorphic origami; **K. Box** and **R. J. Lang**, Master peace: An evolution of monumental origami; **T. de Ruysser**, Wearable metal origami; **J. Mosely**, Crowdsourcing origami sculptures; **M. Gardiner**, On the aesthetics of folding and technology: Scale, dimensionality, and materiality; **J. Maekawa**, Computational problems related to paper crane in the Edo period; **H. Koshiro**, Mitate and origami; *Origami in education:* **M. Golan** and **J. Oberman**, The kindergarten origametria programme; **E. Frigerio** and **M. L. Spreafico**, Area and optimization problems; **S.-P. Kwan**, Mathematics and art through the cubotahedron; **A. Tubis**, Origami-inspired deductive threads in pre-geometry; **H. Yanping** and **P.-Y. Lee**, Using paper folding to solve problems in school geometry; **A. Bahmani**, **K. Sharif**, and **A. Hudson**, Using origami to enrich mathematical understanding of self similarity and fractals; **L. Poladian**, Using the Fujimoto approximation technique to teach chaos theory to high school students; Index.

January 2016, approximately 368 pages, Softcover, ISBN: 978-1-4704-1876-2, 2010 *Mathematics Subject Classification:* 00-XX, 01-XX, 51-XX, 52-XX, 53-XX, 68-XX, 70-XX, 74-XX, 92-XX, 97-XX, 00A99, **Individual member US$55.30**, **All Individuals US$55.30**, List US$79, Institutional member US$63.20, Order code MBK/95.2

Origami^6 (The Set)

Koryo Miura, *University of Tokyo, Japan*, **Toshikazu Kawasaki**, *Anan National College of Technology, Tokushima, Japan*, **Tomohiro Tachi**, *University of Tokyo, Japan*, **Ryuhei Uehara**, *Japan Advanced Institute of Science and Technology, Ishikawa, Japan*, **Robert J. Lang**, *Langorigami, Alamo, CA*, and **Patsy Wang-Iverson**, *Gabriella & Paul Rosenbaum Foundation, Bryn Mawr, PA*, Editors

Origami^6 is a unique collection of papers illustrating the connections between origami and a wide range of fields. The papers compiled in this two-part set were presented at the 6th International Meeting on Origami in Science, Mathematics and Education (10–13 August 2014, Tokyo, Japan). They display the creative melding of origami (or, more broadly, folding) with fields ranging from cell biology to space exploration, from education to kinematics, from abstract mathematical laws to the artistic and aesthetics of sculptural design.

This two-part book contains papers accessible to a wide audience, including those interested in art, design, history, and education and researchers interested in the connections between origami and science, technology, engineering, and mathematics. Part 1 contains papers on various aspects of mathematics of origami: coloring, constructability, rigid foldability, and design algorithms. Part 2 focuses on the connections between origami and more applied areas of science: engineering, physics, architecture, industrial design, and other artistic fields that go well beyond the usual folded paper.

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

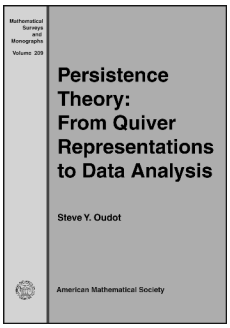
Part I (MBK/95.1) and Part 2 (MBK/95.2) are sold separately. For a description of each part, see the New Publication entries that precede this one.

Part 1: January 2016, approximately 368 pages, Softcover, ISBN: 978-1-4704-1875-5, 2010 *Mathematics Subject Classification:* 00-XX, 01-XX, 51-XX, 52-XX, 53-XX, 68-XX, 70-XX, 74-XX, 92-XX, 97-XX, 00A99, Order code MBK/95.1

Part 2: January 2016, approximately 368 pages, Softcover, ISBN: 978-1-4704-1876-2, 2010 *Mathematics Subject Classification:* 00-XX, 01-XX, 51-XX, 52-XX, 53-XX, 68-XX, 70-XX, 74-XX, 92-XX, 97-XX, 00A99, Order code MBK/95.2

Set: January 2016, approximately 736 pages, Softcover, ISBN: 978-1-4704-1874-8, 2010 *Mathematics Subject Classification:* 00-XX, 01-XX, 51-XX, 52-XX, 53-XX, 68-XX, 70-XX, 74-XX, 92-XX, 97-XX, 00A99, **Individual member US$91**, **All Individuals US$91**, List US$130, Institutional member US$104, Order code MBK/95

Geometry and Topology



Persistence Theory: From Quiver Representations to Data Analysis

Steve Y. Oudot, *Inria Saclay, Palaiseau, France*

Persistence theory emerged in the early 2000s as a new theory in the area of applied and computational topology. This book provides a broad and modern view of the subject, including its algebraic, topological, and algorithmic aspects. It also elaborates on applications in data analysis. The level of detail of the exposition has been set so as to keep a survey style, while providing sufficient insights into the proofs so the reader can understand the mechanisms at work.

The book is organized into three parts. The first part is dedicated to the foundations of persistence and emphasizes its connection to quiver representation theory. The second part focuses on its connection to applications through a few selected topics. The third part provides perspectives for both the theory and its applications. The book can be used as a text for a course on applied topology or data analysis.

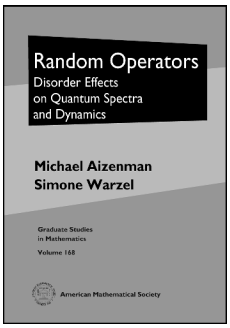
This item will also be of interest to those working in applications.

Contents: *Theoretical foundations:* Algebraic persistence; Topological persistence; Stability; *Applications:* Topological inference; Topological inference 2.0; Clustering; Signatures for metric spaces; *Perspectives:* New trends in topological data analysis; Further prospects on the theory; Introduction to quiver theory with a view toward persistence; Bibliography; List of figures; Index.

Mathematical Surveys and Monographs, Volume 209

January 2016, 218 pages, Hardcover, ISBN: 978-1-4704-2545-6, LC 2015027235, 2010 *Mathematics Subject Classification:* 62-07, 55U10, 16G20, 68U05, **AMS members US$88**, List US$110, Order code SURV/209

Mathematical Physics



Random Operators

Disorder Effects on Quantum Spectra and Dynamics

Michael Aizenman, *Princeton University, NJ*, and **Simone Warzel**, *Technische Universität München, Germany*

This book provides an introduction to the mathematical theory of disorder effects on quantum spectra and dynamics. Topics covered range from the basic theory of spectra and dynamics of self-adjoint operators through Anderson localization—presented here via the fractional moment method, up to recent results on resonant delocalization.

The subject's multifaceted presentation is organized into seventeen chapters, each focused on either a specific mathematical topic or on a demonstration of the theory's relevance to physics, e.g., its implications for the quantum Hall effect. The mathematical chapters include general relations of quantum spectra and dynamics, ergodicity and its implications, methods for establishing spectral and dynamical localization regimes, applications and properties of the Green function, its relation to the eigenfunction correlator, fractional moments of Herglotz-Pick functions, the phase diagram for tree graph operators, resonant delocalization, the spectral statistics conjecture, and related results.

The text incorporates notes from courses that were presented at the authors' respective institutions and attended by graduate students and postdoctoral researchers.

It has been almost 25 years since the last major book on this subject. The authors masterfully update the subject but more importantly present their own probabilistic insights in clear fashion. This wonderful book is ideal for both researchers and advanced students.

—***Barry Simon, California Institute of Technology***

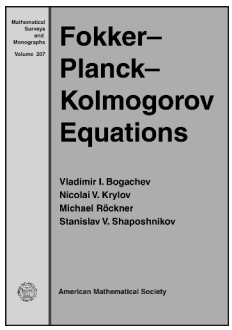
This item will also be of interest to those working in probability and statistics and analysis.

Contents: Introduction; General relations between spectra and dynamics; Ergodic operators and their self-averaging properties; Density of states bounds: Wegner estimate and Lifshitz tails; The relation of Green functions to eigenfunctions; Anderson localization through path expansions; Dynamical localization and fractional moment criteria; Fractional moments from an analytical perspective; Strategies for mapping exponential decay; Localization at high disorder and at extreme energies; Constructive criteria for Anderson localization; Complete localization in one dimension; Diffusion hypothesis and the Green-Kubo-Streda formula; Integer quantum Hall effect; Resonant delocalization; Phase diagrams for regular tree graphs; The eigenvalue point process and a conjectured dichotomy; Elements of spectral theory; Herglotz-Pick functions and their spectra; Bibliography; Index.

Graduate Studies in Mathematics, Volume 168

January 2016, approximately 320 pages, Hardcover, ISBN: 978-1-4704-1913-4, LC 2015025474, 2010 *Mathematics Subject Classification:* 82B44, 60H25, 47B80, 81Q10, 81Q35, 82D30, 46N50, **AMS members US$63.20**, List US$79, Order code GSM/168

Probability and Statistics



Fokker–Planck–Kolmogorov Equations

Vladimir I. Bogachev, *Moscow State University, Russia*, **Nicolai V. Krylov**, *University of Minnesota, Minneapolis, MN*, **Michael Röckner**, *Bielefeld University, Germany*, and **Stanislav V. Shaposhnikov**, *Moscow State University, Russia*

This book gives an exposition of the principal concepts and results related to second order elliptic and parabolic equations for measures, the main examples of which are Fokker–Planck–Kolmogorov equations for stationary and transition probabilities of diffusion processes. Existence and uniqueness of solutions are studied along with existence and Sobolev regularity of their densities and upper and lower bounds for the latter.

The target readership includes mathematicians and physicists whose research is related to diffusion processes as well as elliptic and parabolic equations.

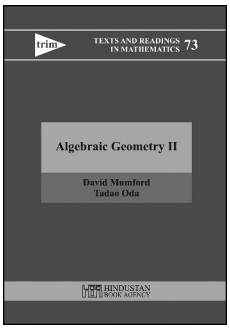
Contents: Stationary Fokker–Planck–Kolmogorov equations; Existence of solutions; Global properties of densities; Uniqueness problems; Associated semigroups; Parabolic Fokker–Planck–Kolmogorov equations; Global parabolic regularity and upper bounds; Parabolic Harnack inequalities and lower bounds; Uniquess of solutions to Fokker–Planck–Kolmogorov equations; The infinite-dimensional case; Bibliography; Subject index.

Mathematical Surveys and Monographs, Volume 207

January 2016, approximately 489 pages, Hardcover, ISBN: 978-1-4704-2558-6, LC 2015024922, 2010 *Mathematics Subject Classification:* 35-02, 35J15, 35K10, 60J35, 60J60, **AMS members US$88**, List US$110, Order code SURV/207

New AMS-Distributed Publications

Algebra and Algebraic Geometry



Algebraic Geometry II

David Mumford, *Brown University, Providence, RI*, and **Tadao Oda**, *Tohoku University, Japan*

Several generations of students of algebraic geometry have learned the subject from David Mumford's fabled "Red Book", which contains notes of his lectures at Harvard University. Their genesis and evolution are described by Mumford in the preface:

Initially, notes to the course were mimeographed and bound and sold by the Harvard mathematics department with a red cover. These old notes were picked up by Springer and are now sold as The Red Book of Varieties and Schemes. *However, every time I taught the course, the content changed and grew. I had aimed to eventually publish more polished notes in three volumes…*

This book contains what Mumford had then intended to be Volume II. It covers the material in the "Red Book" in more depth, with several topics added. Mumford has revised the notes in collaboration with Tadao Oda.

The book is a sequel to *Algebraic Geometry I*, published by Springer-Verlag in 1976.

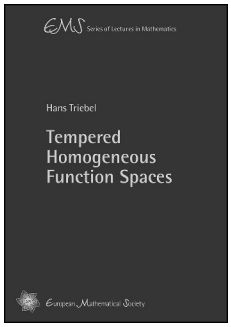
A publication of Hindustan Book Agency; distributed within the Americas by the American Mathematical Society. Maximum discount of 20% for all commercial channels.

Contents: Schemes and sheaves: definitions; Exploring the world of schemes; Elementary global study of Proj R; Ground fields and base rings; Singular vs. non-singular; Group schemes and applications; The cohomology of coherent sheaves; Applications of cohomology; Two deeper results; References; Index.

Hindustan Book Agency

September 2015, 516 pages, Hardcover, ISBN: 978-93-80250-80-9, 2010 *Mathematics Subject Classification:* 14-XX, **AMS members US$60.80**, List US$76, Order code HIN/70

Analysis



Tempered Homogeneous Function Spaces

Hans Triebel, *Friedrich Schiller University Jena, Germany*

This book deals with homogeneous function spaces of Besov–Sobolev type within the framework of tempered distributions in Euclidean n-space based on Gauss–Weierstrass semi-groups. Related Fourier-analytical descriptions and characterizations in terms of derivatives and differences are incorporated after as so-called domestic norms. This approach avoids the usual ambiguities modulo polynomials when homogeneous function spaces are considered in the context of homogeneous tempered distributions.

These notes are addressed to graduate students and mathematicians having a working knowledge of basic elements of the theory of function spaces, especially of Besov–Sobolev type. In particular, the book might be of interest for researchers dealing with (nonlinear) heat and Navier–Stokes equations in homogeneous function spaces.

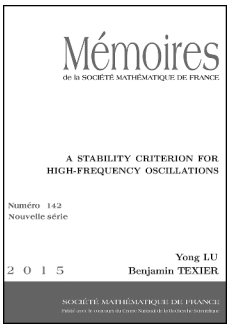
A publication of the European Mathematical Society (EMS). Distributed within the Americas by the American Mathematical Society.

Contents: Motivation and preliminaries; Spaces on $\dot{S}'(\mathbb{R}^n)$; New approach; Bibliography; Symbols; Index.

EMS Series of Lectures in Mathematics, Volume 21

October 2015, 143 pages, Softcover, ISBN: 978-3-03719-155-2, 2010 *Mathematics Subject Classification:* 46-02, 46E35, 42C40, 42B35, **AMS members US$30.40**, List US$38, Order code EMSSERLEC/21

Differential Equations



A Stability Criterion for High-Frequency Oscillations

Yong Lu, *Charles University, Prague, Czech Republic*, and **Benjamin Texier**, *Université Paris-Diderot, Jussieu, Paris, France*

The authors show that a simple Levi compatibility condition determines stability of WKB solutions to semilinear hyperbolic initial-value problems issued from highly oscillating data. If this condition is satisfied, the solutions are defined over time intervals independent of the wavelength, and the associated WKB solutions are stable under a large class of initial perturbations. If it is not satisfied, arbitrarily small initial perturbations can destabilize the WKB solutions in small time. The authors' examples include coupled Klein-Gordon systems and systems describing Raman and Brillouin instabilities.

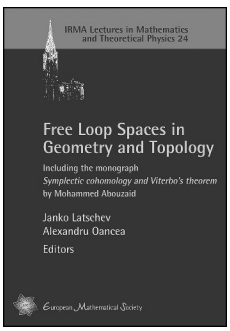
A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

Contents: Introduction; Assumptions and results; Main proof; Other proofs; Examples; Appendix; Bibliography.

Mémoires de la Société Mathématique de France, Number 142

September 2015, 138 pages, Softcover, ISBN: 978-2-85629-812-1, 2010 *Mathematics Subject Classification:* 35L03, 35B35, 35Q60, **AMS members US$36**, List US$45, Order code SMFMEM/142

Geometry and Topology



Free Loop Spaces in Geometry and Topology

Including the Monograph "Symplectic Cohomology and Viterbo's Theorem"

Janko Latschev, *University of Hamburg, Germany*, and **Alexandru Oancea**, *Sorbonne Universités, Paris, France*, Editors

In the late 1990s, two initially unrelated developments brought free loop spaces into renewed focus. In 1999, Chas and Sullivan introduced a wealth of new algebraic operations on the homology of these spaces under the name of *string topology*, the full scope of which is still not completely understood. A few years earlier, Viterbo had discovered a first deep link between the *symplectic topology* of cotangent bundles and the topology of their free loop space. In the past 15 years, many exciting connections between these two viewpoints have been found. Still, researchers working on one side of the story often know quite little about the other.

One of the main purposes of this book is to facilitate communication between topologists and symplectic geometers thinking about free loop spaces. It was written by active researchers who approach the topic from both perspectives and provides a concise overview of many of the classical results. The book also begins to explore the new directions of research that have emerged recently. One highlight is the research monograph by M. Abouzaid, which proves a strengthened version of Viterbo's isomorphism between the homology of the free loop space of a manifold and the symplectic cohomology of its cotangent bundle, following a new strategy.

The book grew out of a learning seminar on free loop spaces held at Strasbourg University in 2008–2009 and should be accessible to graduate students with a general interest in the topic. It focuses on introducing and explaining the most important aspects, rather than offering encyclopedic coverage, while providing the interested reader with a broad basis for further studies and research.

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

Contents: *I. A panorama of topology, geometry and algebra:* **D. Chataur** and **A. Oancea**, Basics on free loop spaces; **A. Oancea**, Morse theory, closed geodesics, and the homology of free loop spaces; **L. Menichi**, Rational homotopy–Sullivan models; **J.-L. Loday**, Free loop space and homology; **J. Latschev**, Appendix to the chapter by J.-L. Loday; **H. Abbaspou**, On algebraic structures of the Hochschild complex; **Y. Félix**, Basic rational string topology; **J. Latschev**, Fukaya's work on Lagrangian embeddings; *II. Symplectic cohomology and Viterbo's theorem by Mohammed Abouzaid:* Symplectic cohomology of cotangent bundles; Symplectic cohomology of cotangent bundles; Operations in symplectic cohomology; String topology using piecewise geodesics; From symplectic cohomology to loop homology; Viterbo's theorem: Surjectivity; Viterbo's theorem: Isomorphism; Bibliography to Part II; List of contributors; Index.

IRMA Lectures in Mathematics and Theoretical Physics, Volume 24

September 2015, 500 pages, Hardcover, ISBN: 978-3-03719-153-8, 2010 *Mathematics Subject Classification:* 53D40, 53D12, 53D25, 53D35, 53D37, 55P35, 55P50, 55P62, 55P92, 13D03, 13D07, 13D09, 13D10, 16E40, 16E45; 57R15, 57R19, 57R56, 57R70, 57R91, **AMS members US$69.60**, List US$87, Order code EMSILMTP/24