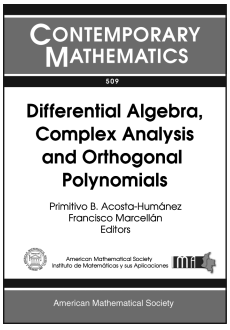
New Publications Offered by the AMS

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

Analysis



Differential Algebra, Complex Analysis and Orthogonal Polynomials

Primitivo B. Acosta-Humánez, *Universidad Sergio Arboleda, Bogotá, Colombia*, and **Francisco Marcellán**, *Universidad Carlos III de Madrid, Leganés, Spain*, Editors

This volume represents the 2007–2008 Jairo Charris Seminar in Algebra and Analysis on Differential Algebra, Complex Analysis and Orthogonal Polynomials, which was held at the Universidad Sergio Arboleda in Bogotá, Colombia.

It provides the state of the art in the theory of Integrable Dynamical Systems based on such approaches as Differential Galois Theory and Lie Groups as well as some recent developments in the theory of multivariable and q-orthogonal polynomials, weak Hilbert's 16th Problem, Singularity Theory, Tournaments in flag manifolds, and spaces of bounded analytic functions on the unit circle.

The reader will also find survey presentations, an account of recent developments, and the exposition of new trends in the areas of Differential Galois Theory, Integrable Dynamical Systems, Orthogonal Polynomials and Special Functions, and Bloch–Bergman classes of analytic functions from a theoretical and an applied perspective.

The contributions present new results and methods, as well as applications and open problems, to foster interest in research in these areas.

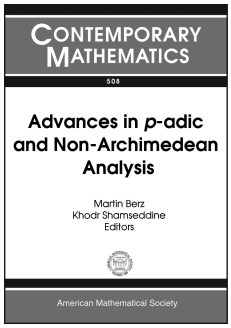
This item will also be of interest to those working in algebra and algebraic geometry.

A co-publication of the AMS and Instituto de Matemáticas y sus Aplicaciones (IMA).

Contents: D. Blázquez-Sanz and **J. J. Morales-Ruiz**, Differential Galois theory of algebraic Lie-Vessiot systems; **L. Fernández**, **F. Marcellán**, **T. E. Pérez**, and **M. A. Piñar**, Recent trends on two variable orthogonal polynomials; **C. A. Gomez S.**, On the integrability of the Riccati equation; **M. E. H. Ismail**, Two discrete systems of q-orthogonal polynomials; **J. Ławrynowicz**, **L. F. Reséndis O.**, and **L. M. Tovar S.**, Like-hyperbolic Bloch-Bergman classes; **J. T. Lázaro**, Some words about the application of Tchebycheff systems to weak Hilbert's 16th problem; **D. Mond**, From the index of a differential operator to the Milnor number of a singularity; **J. J. Morales-Ruiz** and **J.-P. Ramis**, Integrability of dynamical systems through differential Galois theory: a practical guide; **M. Paredes** and **S. Pinzón**, Tournaments and parabolic almost complex structures on flag manifolds.

Contemporary Mathematics, Volume 509

April 2010, approximately 235 pages, Softcover, ISBN: 978-0-8218-4886-9, 2000 *Mathematics Subject Classification:* 05C20, 12H05, 14E20, 14L99, 14M15, 20C20, 30C45, 33C50, 33D45, 34A26, 34C07, 34C08, 34M15, 35C05, 41A60, 42C05, 46E25, 53C15, 54C40, **AMS members US$63**, List US$79, Order code CONM/509



Advances in p-adic and Non-Archimedean Analysis

Martin Berz, *Michigan State University, East Lansing, MI*, and **Khodr Shamseddine**, *University of Manitoba, Winnipeg, Manitoba, Canada*, Editors

This volume contains the proceedings of the Tenth International Conference on p-adic and Non-Archimedean Analysis, held at Michigan State University in East Lansing, Michigan, on June 30–July 3, 2008.

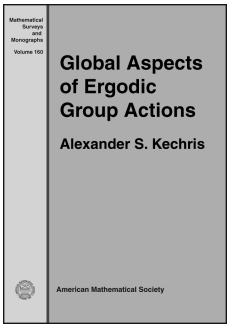
This volume contains a kaleidoscope of papers based on several of the more important talks presented at the meeting. It provides a cutting-edge connection to some of the most important recent developments in the field. Through a combination of survey papers, research articles, and extensive references to earlier work, this volume allows the reader to quickly gain an overview of current activity in the field and become acquainted with many of the recent sub-branches of its development.

Contents: J. Aguayo, **S. Navarro**, and **M. Nova**, Strict topologies on spaces of vector-valued continuous functions over non-Archimedean field; **B. Diarra**, Some subalgebras of the algebra of bounded linear operators of the one variable Tate algebra; **A. Escassut** and **N. Maïnetti**, The ultrametric corona problem;

A. K. Katsaras, Vector-valued p-adic measures; **H. A. Keller** and **H. Ochsenius**, On the Clifford algebra of orthomodular spaces over Krull valued fields; **K.-O. Lindahl**, Divergence and convergence of conjugacies in non-Archimedean dynamics; **H. M. Moreno**, A criterion for the invertibility of Lipschitz operators on type separating spaces; **M. Nilsson** and **R. Nyqvist**, On monomial dynamical systems on the p-adic n-torus; **H. Ochsenius** and **E. Olivos**, On the value group and norms of a form Hilbert space; **H. Ochsenius** and **W. H. Schikhof**, Compact perturbations of Fredholm operators on Norm Hilbert spaces over Krull valued fields; **J. Ojeda**, Applications of the p-adic Nevanlinna theory to problems of uniqueness; **C. Pérez-García** and **W. M. Schikhof**, Tensor products of p-adic locally convex spaces having the strongest locally convex topology; **C. G. Petalas** and **A. K. Katsaras**, Tensor products of p-adic measures; **A. Rodionov** and **S. Volkov**, p-adic arithmetic coding; **K. Shamseddine** and **M. Berz**, Analysis on the Levi-Civita field, a brief overview; **P.-A. Svensson**, Criteria for non-repelling fixed points; **F. Tangara**, A p-adic q-deformation of the Weyl algebra, for q a p^N-th root of unity.

Contemporary Mathematics, Volume 508

March 2010, 269 pages, Softcover, ISBN: 978-0-8218-4740-4, LC 2009042367, 2000 *Mathematics Subject Classification:* 46S10, 11S80, 12J25, 16W30, 46G10, 32P05, 11D88, 30G06, 47B37, **AMS members US$71**, List US$89, Order code CONM/508



Global Aspects of Ergodic Group Actions

Alexander S. Kechris, *California Institute of Technology, Pasadena, CA*

The subject of this book is the study of ergodic, measure preserving actions of countable discrete groups on standard probability spaces. It explores a direction that emphasizes a global point of view, concentrating on the structure of the space of measure preserving actions of a given group and its associated cocycle spaces. These are equipped with canonical topological actions that give rise to the usual concepts of conjugacy of actions and cohomology of cocycles. Structural properties of discrete groups such as amenability, Kazhdan's property (T) and the Haagerup Approximation Property play a significant role in this theory as they have important connections to the global structure of these spaces. One of the main topics discussed in this book is the analysis of the complexity of the classification problems of conjugacy and orbit equivalence of actions, as well as of cohomology of cocycles. This involves ideas from topological dynamics, descriptive set theory, harmonic analysis, and the theory of unitary group representations. Also included is a study of properties of the automorphism group of a standard probability space and some of its important subgroups, such as the full and automorphism groups of measure preserving equivalence relations and connections with the theory of costs.

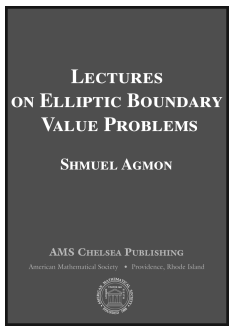
The book contains nine appendices that present necessary background material in functional analysis, measure theory, and group representations, thus making the book accessible to a wider audience.

Contents: Measure preserving automorphisms; The space of actions; Cocycles and cohomology; Realifications and complexifications; Tensor products of Hilbert spaces; Gaussian probability spaces; Wiener chaos decomposition; Extending representations to actions; Unitary representations of abelian groups; Induced representations and actions; The space of unitary representations; Semidirect products of groups; Bibliography; Index.

Mathematical Surveys and Monographs, Volume 160

February 2010, 237 pages, Hardcover, ISBN: 978-0-8218-4894-4, LC 2009042253, 2000 *Mathematics Subject Classification:* 37A15, 37A20, 03E15, **AMS members US$62**, List US$77, Order code SURV/160

Differential Equations



Lectures on Elliptic Boundary Value Problems

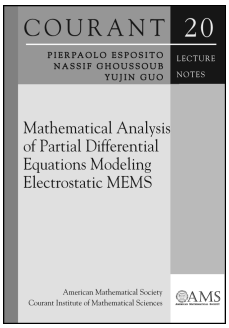
Shmuel Agmon, *Hebrew University of Jerusalem, Israel*

This book, which is a new edition of a book originally published in 1965, presents an introduction to the theory of higher-order elliptic boundary value problems. The book contains a detailed study of basic problems of the theory, such as the problem of existence and regularity of solutions of higher-order elliptic boundary value problems. It also contains a study of spectral properties of operators associated with elliptic boundary value problems. Weyl's law on the asymptotic distribution of eigenvalues is studied in great generality.

Contents: Notations and conventions; Calculus of L^2 derivatives—Local properties; Calculus of L^2 derivatives—Global properties; Some inequalities; Elliptic operators; Local existence theory; Local regularity of solutions of elliptic systems; Gårding's inequality; Global existence; Global regularity of solutions of strongly elliptic equations; Coerciveness; Coerciveness results of Aronszajn and Smith; Some results on linear transformations on a Hilbert space; Spectral theory of abstract operators; Eigenvalue problems for elliptic equations; The self-adjoint case; Non-self-adjoint eigenvalue problems; Completeness of the eigenfunctions; Bibliography; Notation index; Index.

AMS Chelsea Publishing, Volume 369

March 2010, 210 pages, Hardcover, ISBN: 978-0-8218-4910-1, LC 2009047651, 2000 *Mathematics Subject Classification:* 35J40; 35P10, **AMS members US$36**, List US$40, Order code CHEL/369.H



Mathematical Analysis of Partial Differential Equations Modeling Electrostatic MEMS

Pierpaolo Esposito, *Università degli Studi Roma Tre, Rome, Italy*, **Nassif Ghoussoub**, *University of British Columbia, Vancouver, BC, Canada*, and **Yujin Guo**, *University of Minnesota, Minneapolis, MN*

Micro- and nanoelectromechanical systems (MEMS and NEMS), which combine electronics with miniature-size mechanical devices, are essential components of modern technology. It is the mathematical model describing "electrostatically actuated" MEMS that is addressed in this monograph. Even the simplified models that the authors deal with still lead to very interesting second- and fourth-order nonlinear elliptic equations (in the stationary case) and to nonlinear parabolic equations (in the dynamic case). While nonlinear eigenvalue problems—where the stationary MEMS models fit—are a well-developed field of PDEs, the type of inverse square nonlinearity that appears here helps shed a new light on the class of singular supercritical problems and their specific challenges.

Besides the practical considerations, the model is a rich source of interesting mathematical phenomena. Numerics, formal asymptotic analysis, and ODE methods give lots of information and point to many conjectures. However, even in the simplest idealized versions of electrostatic MEMS, one essentially needs the full available arsenal of modern PDE techniques to do the required rigorous mathematical analysis, which is the main objective of this volume. This monograph could therefore be used as an advanced graduate text for a motivational introduction to many recent methods of nonlinear analysis and PDEs through the analysis of a set of equations that have enormous practical significance.

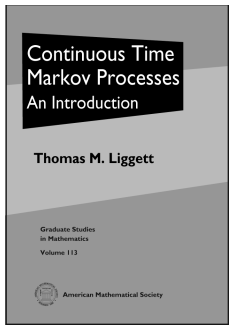
Titles in this series are co-published with the Courant Institute of Mathematical Sciences at New York University.

Contents: Introduction; *Part 1. Second-order equations modeling stationary MEMS:* Estimates for the pull-in voltage; The branch of stable solutions; Estimates for the pull-in distance; The first branch of unstable solutions; Description of the global set of solutions; Power-law profiles on symmetric domains; *Part 2. Parabolic equations modeling MEMS dynamic deflections:* Different modes of dynamic deflection; Estimates on quenching times; Refined profile of solutions at quenching time; *Part 3. Fourth-order equations modeling nonelastic MEMS:* A fourth-order model with a clamped boundary on a ball; A fourth-order model with a pinned boundary on convex domains; Appendix A. Hardy–Rellich inequalities; Bibliography; Index.

Courant Lecture Notes, Volume 20

March 2010, 318 pages, Softcover, ISBN: 978-0-8218-4957-6, LC 2009045518, 2000 *Mathematics Subject Classification:* 35J60, 35B45, 35B35, 35B40, 35P30, 74K15, 74F15, 35J20, 58E07, 74M05, **AMS members US$40**, List US$50, Order code CLN/20

Probability



Continuous Time Markov Processes

An Introduction

Thomas M. Liggett, *University of California, Los Angeles, CA*

Markov processes are among the most important stochastic processes for both theory and applications. This book develops the general theory of these processes, and applies this theory to various special examples. The initial chapter is devoted to the most important classical example—one-dimensional Brownian motion. This, together with a chapter on continuous time Markov chains, provides the motivation for the general setup based on semigroups and generators. Chapters on stochastic calculus and probabilistic potential theory give an introduction to some of the key areas of application of Brownian motion and its relatives. A chapter on interacting particle systems treats a more recently developed class of Markov processes that have as their origin problems in physics and biology.

This is a textbook for a graduate course that can follow one that covers basic probabilistic limit theorems and discrete time processes.

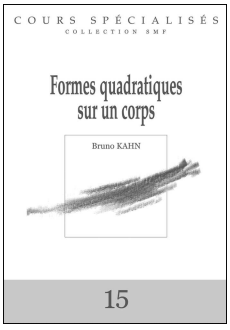
Contents: One-dimensional Brownian motion; Continuous time Markov chains; Feller processes; Interacting particle systems; Stochastic integration; Multidimensional Brownian motion and the Dirichlet problem; Appendix; Bibliography; Index.

Graduate Studies in Mathematics, Volume 113

April 2010, approximately 278 pages, Hardcover, ISBN: 978-0-8218-4949-1, 2000 *Mathematics Subject Classification:* 60J25, 60J27, 60J65; 35J05, 60J35, 60K35, **AMS members US$44**, List US$55, Order code GSM/113

New AMS-Distributed Publications

Number Theory



Formes Quadratiques sur Un Corps

Bruno Kahn, *Institut de Mathématiques de Jussieu, Paris, France*

This book presents the theory of quadratic forms over a field, focusing on the Pfister-Arason-Knebusch technique of extensions to function fields of quadrics.

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: La théorie de Witt; La théorie de Pfister; Corps de fonctions de quadriques; La théorie de Knebusch; Formes devenant isotropes sur le corps des fonctions d'une quadrique; Invariants élémentaires; Le théorème de réduction d'indice et ses applications; Formes de basse dimension; Invariants supérieurs; Descente; Rappels sur le groupe de Brauer; Rappels de cohomolgie galoisienne; Courbes algébriques; Un aperçu sur les formes quadratiques en caractéristique 2; Formes quadratiques et cycles algébriques; Solutions de certains exercises; Bibliographie; Glossaire; Index.

Cours Spécialisés—Collection SMF, Number 15

November 2009, 303 pages, Hardcover, ISBN: 978-2-85629-261-7, 2000 *Mathematics Subject Classification:* 11E04, 11E81, **Individual member US$74**, List US$82, Order code COSP/15