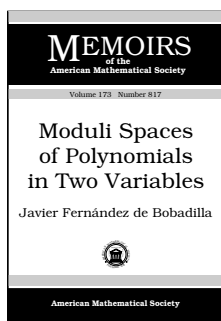


New Publications Offered by the AMS

Algebra and Algebraic Geometry



Moduli Spaces of Polynomials in Two Variables

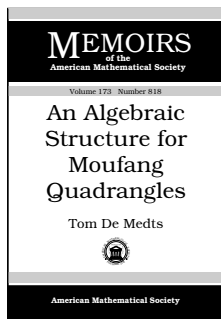
Javier Fernández de
Bobadilla, *Universiteit Utrecht,
Netherlands*

Contents: Introduction; Automorphisms of the affine plane; A partition on $\mathbb{C}[x, y]$; The geometry of the partition; The action of $\text{Aut}(\mathbb{C}^2)$ on

$\mathbb{C}[x, y]$; The moduli problem; The moduli spaces; Appendix A. Canonical orders; Bibliography.

Memoirs of the American Mathematical Society, Volume 173, Number 817

December 2004, 136 pages, Softcover, ISBN 0-8218-3593-9, LC 2004057486, 2000 *Mathematics Subject Classification*: 14R05, 14R10, 14H10; 14E07, 14H20, **Individual member \$36**, List \$60, Institutional member \$48, Order code MEMO/173/817



An Algebraic Structure for Moufang Quadrangles

Tom De Medts, *Ghent
University, Belgium*

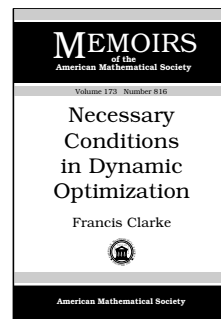
Contents: Introduction; Definition; Some identities; From quadrangular systems to Moufang quadrangles; From Moufang quadrangles to quad-

rangular systems; Some remarks; Examples; The classification; Appendix A. Abelian quadrangular systems; Bibliography.

Memoirs of the American Mathematical Society, Volume 173, Number 818

December 2004, 99 pages, Softcover, ISBN 0-8218-3608-0, LC 2004057482, 2000 *Mathematics Subject Classification*: 51E12, 16W10, 20E42, **Individual member \$34**, List \$56, Institutional member \$45, Order code MEMO/173/818

Analysis



Necessary Conditions in Dynamic Optimization

Francis Clarke, *University of
Lyon, Villeurbanne, France*

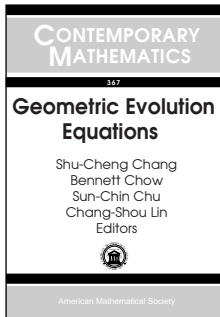
Contents: Introduction; Boundary trajectories; Differential inclusions; The calculus of variations; Optimal control of vector fields; The Hamil-

tonian inclusion; Bibliography; Index.

Memoirs of the American Mathematical Society, Volume 173, Number 816

December 2004, 113 pages, Softcover, ISBN 0-8218-3591-2, LC 2004057483, 2000 *Mathematics Subject Classification*: 49K15, 49K05, **Individual member \$34**, List \$57, Institutional member \$46, Order code MEMO/173/816

Differential Equations



Geometric Evolution Equations

Shu-Cheng Chang, *National Tsing Hua University, Hsinchu, Taiwan*, **Bennett Chow**, *University of California San Diego, La Jolla*, and **Sun-Chin Chu** and **Chang-Shou Lin**, *National Chung Cheng University, Chia-Yi, Taiwan*,

Editors

The Workshop on Geometric Evolution Equations was a gathering of experts that produced this comprehensive collection of articles. Many of the papers relate to the Ricci flow and Hamilton's program for understanding the geometry and topology of 3-manifolds.

The use of evolution equations in geometry can lead to remarkable results. Of particular interest is the potential solution of Thurston's Geometrization Conjecture and the Poincaré Conjecture. Yet applying the method poses serious technical problems. Contributors to this volume explain some of these issues and demonstrate a noteworthy deftness in the handling of technical areas.

Various topics in geometric evolution equations and related fields are presented. Among other topics covered are minimal surface equations, mean curvature flow, harmonic map flow, Calabi flow, Ricci flow (including a numerical study), Kähler-Ricci flow, function theory on Kähler manifolds, flows of plane curves, convexity estimates, and the Christoffel-Minkowski problem.

The material is suitable for graduate students and researchers interested in geometric analysis and connections to topology.

Related titles of interest include *The Ricci Flow: An Introduction*. *This item will also be of interest to those working in geometry and topology.*

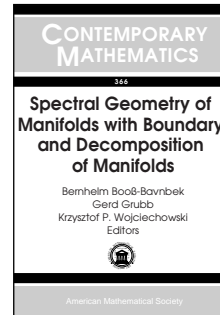
Contents: **S. Angenent** and **J. Hulshof**, Singularities at $t = \infty$ in equivariant harmonic map flow; **S.-C. Chang**, Recent developments on the Calabi flow; **A. Chau**, Stability of the Kähler-Ricci flow at complete non-compact Kähler Einstein metrics;

B. Chow, A survey of Hamilton's program for the Ricci flow on 3-manifolds; **S.-C. Chu**, Basic properties of gradient Ricci solitons; **D. Garfinkle** and **J. Isenberg**, Numerical studies of the behavior of Ricci flow; **P. Guan** and **X.-N. Ma**, Convex solutions of fully nonlinear elliptic equations in classical differential geometry; **R. Gulliver**, Density estimates for minimal surfaces and surfaces flowing by mean curvature; **D. Knopf**, An introduction to the Ricci flow neckpinch; **L. Ni**, Monotonicity and Kähler-Ricci flow; **M. Simon**, Deforming Lipschitz metrics into smooth metrics while keeping their curvature operator non-negative; **L.-F. Tam**, Liouville properties on Kähler manifolds; **D.-H. Tsai**, Expanding embedded plane curves; **M.-T. Wang**, Remarks on a class of solutions to the minimal surface system.

Contemporary Mathematics, Volume 367

February 2005, 235 pages, Softcover, ISBN 0-8218-3361-8, LC 2004046440, 2000 *Mathematics Subject Classification*: 53C44, 53C21, 35K55, 57M50, 35K57, 53C42, 53C43, 58J05, 53C35, 58J35, **All AMS members \$55**, List \$69, Order code CONM/367

Geometry and Topology



Spectral Geometry of Manifolds with Boundary and Decomposition of Manifolds

Bernhelm Booß-Bavnbek, *Roskilde University, Denmark*, **Gerd Grubb**, *University of Copenhagen, Denmark*, and **Krzysztof P. Wojciechowski**, *Indiana University-Purdue University, Indianapolis*, Editors

In recent years, increasingly complex methods have been brought into play in the treatment of geometric and topological problems for partial differential operators on manifolds. This collection of papers, resulting from a Workshop on Spectral Geometry of Manifolds with Boundary and Decomposition of Manifolds, provides a broad picture of these methods with new results.

Subjects in the book cover a wide variety of topics, from recent advances in index theory and the more general theory of spectral invariants on closed manifolds and manifolds with boundary, to applications of those invariants in geometry, topology, and physics.

Papers are grouped into four parts: Part I gives an overview of the subject from various points of view. Part II deals with spectral invariants, such as traces, indices, and determinants. Part III is concerned with general geometric and topological questions. Part IV deals specifically with problems on manifolds with singularities. The book is suitable for graduate students and researchers interested in spectral problems in geometry.

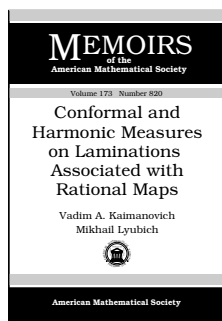
This item will also be of interest to those working in analysis.

Contents: *Part I. Basic material-Reviews:* **D. V. Vassilevich**, Spectral problems from quantum field theory; **G. Esposito**, Euclidean quantum gravity in light of spectral geometry; **G. Grubb**, Analysis of invariants associated with spectral boundary problems for elliptic operators; *Part II. Spectral invariants and asymptotic expansions:* **G. Grubb**, A resolvent approach to traces and zeta Laurent expansions; **Y. Lee**, Asymptotic expansion of the zeta-determinant of an invertible Laplacian on a stretched manifold; **J. Park** and **K. P. Wojciechowski**, Agranovich-Dynin formula for the zeta-determinants of the Neumann and Dirichlet problems; *Part III. Geometric and topological problems:* **H. U. Boden**, **C. M. Herald**, and **P. Kirk**, The Calderón projector for the odd signature operator and spectral flow calculations in 3-dimensional topology; **E. Leichtnam** and **P. Piazza**, Cut-and-paste on foliated bundles; **M. Lesch**, The uniqueness of the spectral flow on spaces of unbounded self-adjoint Fredholm operators;

M. Marcolli and **B.-L. Wang**, Variants of equivariant Seiberg-Witten Floer homology; *Part IV. Manifolds with singularities*; **P. Loya**, Dirac operators, boundary value problems, and the b -calculus; **V. E. Nazaikinskii**, **G. Rozenblum**, **A. Yu. Savin**, and **B. Yu. Sternin**, Guillemin transform and Toeplitz representations for operators on singular manifolds; **V. Nistor**, Pseudodifferential operators on non-compact manifolds and analysis on polyhedral domains.

Contemporary Mathematics, Volume 366

February 2005, 328 pages, Softcover, ISBN 0-8218-3536-X, LC 2004053991, 2000 *Mathematics Subject Classification*: 19K56, 35S15, 46L80, 47A53, 58J30, 58J32, 58J35, 58J42, 81T20, 83C45, **All AMS members \$71**, List \$89, Order code CONM/366



Conformal and Harmonic Measures on Laminations Associated with Rational Maps

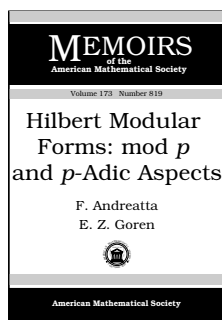
Vadim A. Kaimanovich, *Université Rennes, France*, and **Mikhail Lyubich**, *SUNY at Stony Brook, NY*

Contents: Introduction; Affine and hyperbolic laminations; Measures and currents on laminations; Laminations associated with rational maps; Measures on laminations associated with Kleinian groups; List of notations; Bibliography.

Memoirs of the American Mathematical Society, Volume 173, Number 820

December 2004, 119 pages, Softcover, ISBN 0-8218-3615-3, LC 2004057484, 2000 *Mathematics Subject Classification*: 37F10, 37F35, 57R30; 37D40, 37F30, 53C12, 57M50, 58J65, **Individual member \$35**, List \$58, Institutional member \$46, Order code MEMO/173/820

Number Theory



Hilbert Modular Forms: mod p and p -Adic Aspects

F. Andreatta, *University Degli Studi, Padova, Italy*, and **E. Z. Goren**, *McGill University, Montreal, PQ, Canada*

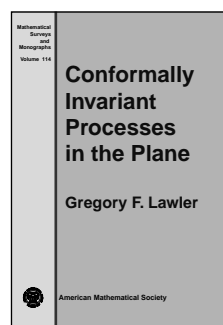
Contents: Introduction; Notations; Moduli spaces of abelian varieties with real multiplication; Properties of G ; Hilbert modular forms; The q -expansion map; The partial Hasse invariants; Reduceness of the partial Hasse invariants; A compactification of $\mathfrak{M}(k, \mu_{pN})^{\text{Kum}}$; Congruences mod p^n and Serre's p -adic modular forms;

Katz's p -adic Hilbert modular forms; The operators $\Theta_{\mathfrak{q},i}$; The operator V ; The operator U ; Applications to filtrations of modular forms; Theta cycles and parallel filtration (inert case); Functorialities; Integrality and congruences for values of zeta functions; Numerical examples; Comments regarding values of zeta functions; References.

Memoirs of the American Mathematical Society, Volume 173, Number 819

December 2004, 100 pages, Softcover, ISBN 0-8218-3609-9, LC 2004057485, 2000 *Mathematics Subject Classification*: 11G18, 14G35, 11F33, 11F41, **Individual member \$34**, List \$56, Institutional member \$45, Order code MEMO/173/819

Probability



Conformally Invariant Processes in the Plane

Gregory F. Lawler, *Cornell University, Ithaca, NY*

Theoretical physicists have predicted that the scaling limits of many two-dimensional lattice models in statistical physics are in some sense conformally invariant. This belief has allowed physicists to predict many

quantities for these critical systems. The nature of these scaling limits has recently been described precisely by using one well-known tool, Brownian motion, and a new construction, the Schramm-Loewner evolution (SLE).

This book is an introduction to the conformally invariant processes that appear as scaling limits. The following topics are covered: stochastic integration; complex Brownian motion and measures derived from Brownian motion; conformal mappings and univalent functions; the Loewner differential equation and Loewner chains; the Schramm-Loewner evolution (SLE), which is a Loewner chain with a Brownian motion input; and applications to intersection exponents for Brownian motion. The prerequisites are first-year graduate courses in real analysis, complex analysis, and probability. The book is suitable for graduate students and research mathematicians interested in random processes and their applications in theoretical physics.

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

Contents: Some discrete processes; Stochastic calculus; Complex Brownian motion; Conformal mappings; Loewner differential equation; Brownian measures on paths; Schramm-Loewner evolution; More results about SLE; Brownian intersection exponent; Restriction measures; Hausdorff dimension; Hypergeometric functions; Reflecting Brownian motion; Bibliography; Index; Index of symbols.

Mathematical Surveys and Monographs, Volume 114

March 2005, approximately 242 pages, Hardcover, ISBN 0-8218-3677-3, 2000 *Mathematics Subject Classification*: 30C35, 31A15, 60H30, 60J65, 81T40, 82B27, **All AMS members \$47**, List \$59, Order code SURV/114