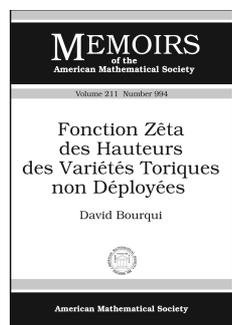


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Algebra and Algebraic Geometry



Fonction Zêta des Hauteurs des Variétés Toriques non Déployées

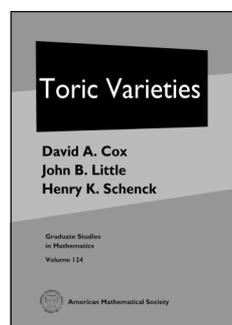
David Bourqui, *I.R.M.A.R.,
Rennes, France*

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

Contents: Introduction; Tores algébriques; Hauteurs sur une variété torique et fonction zêta associée; Calcul des transformées de Fourier et expression intégrale de la fonction zêta des hauteurs; Évaluation de l'intégrale dans le cas arithmétique; Évaluation de l'intégrale dans le cas fonctionnel; Bibliographie; Index des notations; Index des définitions.

Memoirs of the American Mathematical Society, Volume 211, Number 994

April 2011, 151 pages, Softcover, ISBN: 978-0-8218-4936-1, 2010 *Mathematics Subject Classification*: 11G35, 11G50, 14M25, 11M41, **Individual member US\$46.20**, List US\$77, Institutional member US\$61.60, Order code MEMO/211/994



Toric Varieties

David A. Cox, *Amherst College, MA*, John B. Little, *College of the Holy Cross, Worcester, MA*, and Henry K. Schenck, *University of Illinois at Urbana-Champaign, IL*

Toric varieties form a beautiful and accessible part of modern algebraic geometry. This book covers the standard topics in toric geometry; a novel feature is that each of the first nine chapters

contains an introductory section on the necessary background material in algebraic geometry. Other topics covered include quotient constructions, vanishing theorems, equivariant cohomology, GIT quotients, the secondary fan, and the minimal model program for toric varieties. The subject lends itself to rich examples reflected in the 134 illustrations included in the text. The book also explores connections with commutative algebra and polyhedral geometry, treating both polytopes and their unbounded cousins, polyhedra. There are appendices on the history of toric varieties and the computational tools available to investigate nontrivial examples in toric geometry.

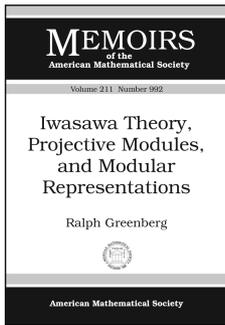
Readers of this book should be familiar with the material covered in basic graduate courses in algebra and topology, and to a somewhat lesser degree, complex analysis. In addition, the authors assume that the reader has had some previous experience with algebraic geometry at an advanced undergraduate level. The book will be a useful reference for graduate students and researchers who are interested in algebraic geometry, polyhedral geometry, and toric varieties.

Contents: *Basic theory of toric varieties:* Affine toric varieties; Projective toric varieties; Normal toric varieties; Divisors on toric varieties; Homogeneous coordinates on toric varieties; Line bundles on toric varieties; Projective toric morphisms; The canonical divisor of a toric variety; Sheaf cohomology of toric varieties; *Topics in toric geometry:* Toric surfaces; Toric resolutions and toric singularities; The topology of toric varieties; Toric Hirzebruch-Riemann-Roch; Toric GIT and the secondary fan; Geometry of the secondary fan; The history of toric varieties; Computational methods; Spectral sequences; Bibliography; Index.

Graduate Studies in Mathematics, Volume 124

June 2011, approximately 858 pages, Hardcover, ISBN: 978-0-8218-4819-7, LC 2010053054, 2010 *Mathematics Subject Classification*: 14M25, **AMS members US\$76**, List US\$95, Order code GSM/124

Applications



Iwasawa Theory, Projective Modules, and Modular Representations

Ralph Greenberg, *University of Washington, Seattle, WA*

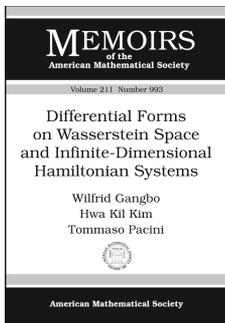
This item will also be of interest to those working in number theory.

Contents: Introduction; Projective and quasi-projective modules; Projectivity or quasi-projectivity of $X_E^{20}(K_\infty)$; Selmer atoms; The structure of $\mathcal{H}_V(K_\infty, E)$; The case where Δ is a p -group; Other specific groups; Some arithmetic illustrations; Self-dual representations; A duality theorem; p -modular functions; Parity; More arithmetic illustrations; Bibliography.

Memoirs of the American Mathematical Society, Volume 211, Number 992

April 2011, 185 pages, Softcover, ISBN: 978-0-8218-4931-6, 2010 *Mathematics Subject Classification*: 11G05, 11R23; 20C15, 20C20, **Individual member US\$49.80**, List US\$83, Institutional member US\$66.40, Order code MEMO/211/992

Analysis



Differential Forms on Wasserstein Space and Infinite-Dimensional Hamiltonian Systems

Wilfrid Gangbo and Hwa Kil Kim, *Georgia Institute of Technology, Atlanta, GA*, and Tommaso Pacini, *Scuola Normale Superiore, Pisa, Italy*

Contents: Introduction; The topology on \mathcal{M} and a differential calculus of curves; The calculus of curves, revisited; Tangent and cotangent bundles; Calculus of pseudo differential 1-forms; A symplectic foliation of \mathcal{M} ; The symplectic foliation as a Poisson structure; Review of relevant notions of differential geometry; Bibliography.

Memoirs of the American Mathematical Society, Volume 211, Number 993

April 2011, 77 pages, Softcover, ISBN: 978-0-8218-4939-2, 2010 *Mathematics Subject Classification*: 35Qxx, 49-XX; 53Dxx, 70-XX, **Individual member US\$39.60**, List US\$66, Institutional member US\$52.80, Order code MEMO/211/993



BioMath in the Schools

Margaret B. Cozzens and Fred S. Roberts, *Rutgers University, Piscataway, NJ*, Editors

Even though contemporary biology and mathematics are inextricably linked, high school biology and mathematics courses have traditionally been taught in isolation. But this is beginning to change. This volume presents papers related to the integration of biology and mathematics in high school classes.

The first part of the book provides the rationale for integrating mathematics and biology in high school courses as well as opportunities for doing so. The second part explores the development and integration of curricular materials and includes responses from teachers.

Papers in the third part of the book explore the interconnections between biology and mathematics in light of new technologies in biology. The last paper in the book discusses what works and what doesn't and presents positive responses from students to the integration of mathematics and biology in their classes.

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

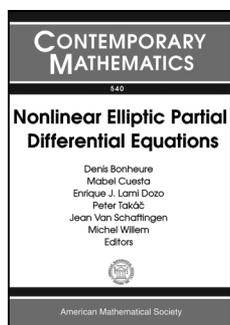
Co-published with the Center for Discrete Mathematics and Theoretical Computer Science beginning with Volume 8. Volumes 1-7 were co-published with the Association for Computer Machinery (ACM).

Contents: *The rationale for high school BioMath:* F. S. Roberts, Why BioMath? Why now?; E. Jakobsson, The interdisciplinary scientist of the 21st century; L. J. Heyer and A. M. Campbell, Teaching bioinformatics and genomics: An interdisciplinary approach; N. H. Fefferman and L. M. Fefferman, Mathematical macrobiology: An unexploited opportunity in high school education; A. Nkwanta, D. Hill, A. Swamy, and K. Peters, Counting RNA patterns in the classroom: A link between molecular biology and enumerative combinatorics; *Curriculum materials and teacher training/development:* M. B. Cozzens, New materials to integrate biology and mathematics in the high school curriculum; K. M. Gabric, The awakening of a high school biology teacher to the BioMath connection; L. J. Morris, C. Long, and J. Kissler, A beginning experience: Linking high school biology and mathematics; K. G. Herbert and J. H. Dyer, Integrating interdisciplinary science into high school science modules through a preproinsulin example; M. C. Rogers and D. S. Yuster, Insights from math-science collaboration at the high school level; *Topics, course changes, and technology:* H. Scheintaub, E. Klopfer, M. Scheintaub, and E. Rosenbaum, Complexity and biology—bringing quantitative science to the life sciences classroom; J. Malkevitch, Distance and trees in high school biology and mathematics classrooms; M. E. Martin, Mathematical biology: Tools for inquiry on the Internet; E. S. Marland and M. E. Searcy, The calculus cycle: Using biology to connect discrete and continuous modeling in calculus; C. Mullins and D. W. Cranston, Research at ASMSA based on the DIMACS BioMath program; *Evaluation of how integration of biology/mathematics works:* A. E. Weinberg and L. Albright, Integrating biology and mathematics in high school classrooms.

DIMACS: Series in Discrete Mathematics and Theoretical Computer Science, Volume 76

April 2011, approximately 254 pages, Hardcover, ISBN: 978-0-8218-4295-9, 2010 *Mathematics Subject Classification*: 00A06, 00A08, 92F05, 97-XX, 93A30, 00A69, 92-XX, 05Cxx, 68Uxx, **AMS members US\$41.60**, List US\$52, Order code DIMACS/76

Differential Equations



Nonlinear Elliptic Partial Differential Equations

Denis Bonheure, *Université Libre de Bruxelles, Belgium*, **Mabel Cuesta**, *Université du Littoral, Calais, France*, **Enrique J. Lami Dozo**, *Université Libre de Bruxelles, Belgium*, **Peter Takáč**, *Universität Rostock, Germany*, and **Jean Van Schaftingen** and **Michel Willem**, *Université Catholique de Louvain, Louvain-la-Neuve, Belgium*, Editors

This volume contains papers on semi-linear and quasi-linear elliptic equations from the workshop on Nonlinear Elliptic Partial Differential Equations, in honor of Jean-Pierre Gossez's 65th birthday, held September 2–4, 2009 at the Université Libre de Bruxelles, Belgium.

The workshop reflected Gossez's contributions in nonlinear elliptic PDEs and provided an opening to new directions in this very active research area. Presentations covered recent progress in Gossez's favorite topics, namely various problems related to the p -Laplacian operator, the antimaximum principle, the Fučík Spectrum, and other related subjects. This volume will be of principle interest to researchers in nonlinear analysis, especially in partial differential equations of elliptic type.

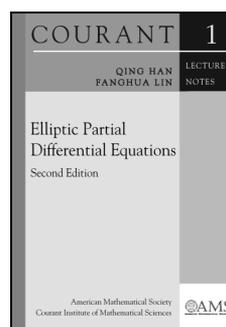
This item will also be of interest to those working in analysis.

Contents: **J. Mawhin**, Partial differential equations also have principles: Maximum and antimaximum; **B. Ruf**, On the Fučík spectrum for equations with symmetries; **B. Kawohl**, Variations on the p -Laplacian; **V. Bouchez** and **J. Van Schaftingen**, Extremal functions in Poincaré-Sobolev inequalities for functions of bounded variation; **P. Bousquet** and **P. Mironescu**, An elementary proof of an inequality of Maz'ya involving L^1 vector fields; **D. G. Costa** and **C. Li**, Homoclinic type solutions for a class of differential equations with periodic coefficients; **J. Giacomoni**, **J. Hernández**, and **A. Moussaoui**, Quasilinear and singular systems: The cooperative case; **P. Drábek**, **R. F. Manásevich**, and **P. Takáč**, Manifolds of critical points in a quasilinear model for phase transitions; **L. Leadi** and **H. R. Quoirin**, Weighted asymmetric problems for an indefinite elliptic operator; **F. Obersnel** and **P. Omari**, Multiple non-trivial solutions of the Dirichlet problem for the prescribed mean curvature equation; **M. Perez-Llanos** and **J. D. Rossi**, Limits as $p(x) \rightarrow \infty$ of $p(x)$ -harmonic functions with non-homogeneous

Neumann boundary conditions; **C. A. Stuart**, Bifurcation and decay of solutions for a class of elliptic equations on \mathbb{R}^N ; **S. de Valeriola** and **M. Willem**, Existence of nodal solutions for some nonlinear elliptic problems; **F. Robert**, Admissible Q -curvatures under isometries for the conformal GJMS operators.

Contemporary Mathematics, Volume 540

May 2011, 259 pages, Softcover, ISBN: 978-0-8218-4907-1, LC 2010049092, 2010 *Mathematics Subject Classification*: 35B50, 35J15, 35J20, 35J25, 35J60, 35J70, 35P30, 46E35, 49Q20, 58J05, **AMS members US\$71.20**, List US\$89, Order code CONM/540



Elliptic Partial Differential Equations

Second Edition

Qing Han, *University of Notre Dame, IN*, and **Fanghua Lin**, *Courant Institute, New York University, NY*

Elliptic Partial Differential Equations by Qing Han and Fanghua Lin is one of the best textbooks I know. It is the perfect introduction to PDE. In 150 pages or so it covers an amazing amount of wonderful and extraordinary useful material. I have used it as a textbook at both graduate and undergraduate levels which is possible since it only requires very little background material yet it covers an enormous amount of material. In my opinion it is a must read for all interested in analysis and geometry, and for all of my own PhD students it is indeed just that. I cannot say enough good things about it—it is a wonderful book.

—**Tobias Colding**

This volume is based on PDE courses given by the authors at the Courant Institute and at the University of Notre Dame, Indiana. Presented are basic methods for obtaining various a priori estimates for second-order equations of elliptic type with particular emphasis on maximal principles, Harnack inequalities, and their applications. The equations considered in the book are linear; however, the presented methods also apply to nonlinear problems.

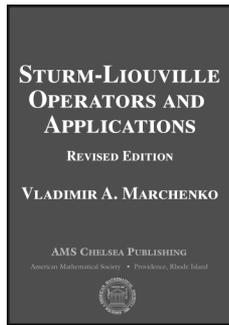
This second edition has been thoroughly revised and in a new chapter the authors discuss several methods for proving the existence of solutions of primarily the Dirichlet problem for various types of elliptic equations.

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

Contents: Harmonic functions; Maximum principles; Weak solutions: Part I; Weak solutions: Part II; Viscosity solutions; Existence of solutions; Bibliography.

Courant Lecture Notes, Volume 1

April 2011, 147 pages, Softcover, ISBN: 978-0-8218-5313-9, LC 2010051489, 2010 *Mathematics Subject Classification*: 35-01, 35Jxx, **AMS members US\$24.80**, List US\$31, Order code CLN/1.R



Sturm-Liouville Operators and Applications

Revised Edition

Vladimir A. Marchenko, *Verkin Institute for Low Temperature Physics and Engineering, Kharkov, Ukraine*

The spectral theory of Sturm-Liouville operators is a classical domain of analysis, comprising a wide variety of problems. Besides the basic results on the structure of the spectrum and the eigenfunction expansion of regular and singular Sturm-Liouville problems, it is in this domain that one-dimensional quantum scattering theory, inverse spectral problems, and the surprising connections of the theory with nonlinear evolution equations first become related. The main goal of this book is to show what can be achieved with the aid of transformation operators in spectral theory as well as in their applications. The main methods and results in this area (many of which are credited to the author) are for the first time examined from a unified point of view.

The direct and inverse problems of spectral analysis and the inverse scattering problem are solved with the help of the transformation operators in both self-adjoint and nonself-adjoint cases. The asymptotic formulae for spectral functions, trace formulae, and the exact relation (in both directions) between the smoothness of potential and the asymptotics of eigenvalues (or the lengths of gaps in the spectrum) are obtained. Also, the applications of transformation operators and their generalizations to soliton theory (i.e., solving nonlinear equations of Korteweg-de Vries type) are considered.

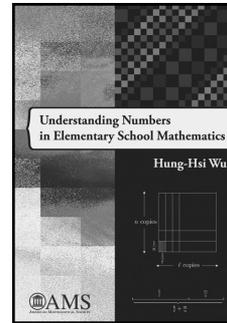
The new Chapter 5 is devoted to the stability of the inverse problem solutions. The estimation of the accuracy with which the potential of the Sturm-Liouville operator can be restored from the scattering data or the spectral function, if they are only known on a finite interval of a spectral parameter (i.e., on a finite interval of energy), is obtained.

Contents: The Sturm-Liouville equation and transformation operators; The Sturm-Liouville boundary value problem on the half line; The boundary value problem of scattering theory; Nonlinear equations; Stability of inverse problems; References.

AMS Chelsea Publishing, Volume 373

April 2011, approximately 404 pages, Hardcover, ISBN: 978-0-8218-5316-0, 2010 *Mathematics Subject Classification:* 34A55, 34B24, 35Q51, 47E05, 47J35, **AMS members US\$54.90**, List US\$61, Order code CHEL/373.H

General Interest



Understanding Numbers in Elementary School Mathematics

Hung-Hsi Wu, *University of California, Berkeley, CA*

This is a textbook for pre-service elementary school teachers and for current teachers who are taking

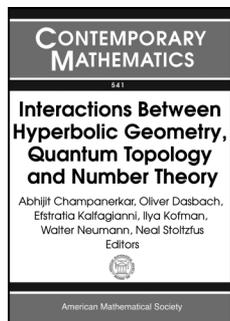
professional development courses. By emphasizing the precision of mathematics, the exposition achieves a logical and coherent account of school mathematics at the appropriate level for the readership. Wu provides a comprehensive treatment of all the standard topics about numbers in the school mathematics curriculum: whole numbers, fractions, and rational numbers. Assuming no previous knowledge of mathematics, the presentation develops the basic facts about numbers from the beginning and thoroughly covers the subject matter for grades K through 7.

Every single assertion is established in the context of elementary school mathematics in a manner that is completely consistent with the basic requirements of mathematics. While it is a textbook for pre-service elementary teachers, it is also a reference book that school teachers can refer to for explanations of well-known but hitherto unexplained facts. For example, the sometimes-puzzling concepts of percent, ratio, and rate are each given a treatment that is down to earth and devoid of mysticism. The fact that a negative times a negative is a positive is explained in a leisurely and comprehensible fashion.

Contents: *Whole numbers:* Place value; The basic laws of operations; The standard algorithms; The addition algorithm; The subtraction algorithm; The multiplication algorithm; The long division algorithm; The number line and the four operations revisited; What is a number?; Some comments on estimation; Numbers in base b ; *Fractions:* Definitions of fraction and decimal; Equivalent fractions and FFFP; Addition of fractions and decimals; Equivalent fractions: further applications; Subtraction of fractions and decimals; Multiplication of fractions and decimals; Division of fractions; Complex fractions; Percent; Fundamental Assumption of School Mathematics (FASM); Ratio and rate; Some interesting word problems; On the teaching of fractions in elementary school; *Rational numbers:* The (two-sided) number line; A different view of rational numbers; Adding and subtracting rational numbers; Adding and subtracting rational numbers redux; Multiplying rational numbers; Dividing rational numbers; Ordering rational numbers; *Number theory:* Divisibility rules; Primes and divisors; The Fundamental Theorem of Arithmetic (FTA); The Euclidean algorithm; Applications; Pythagorean triples; *More on decimals:* Why finite decimals are important; Review of finite decimals; Scientific notation; Decimals; Decimal expansions of fractions; Bibliography; Index.

June 2011, approximately 542 pages, Hardcover, ISBN: 978-0-8218-5260-6, LC 2010053021, 2010 *Mathematics Subject Classification:* 97-01, 00-01, 97F30, 97F40, 97F80, **AMS members US\$63.20**, List US\$79, Order code MBK/79

Geometry and Topology



Interactions Between Hyperbolic Geometry, Quantum Topology and Number Theory

Abhijit Champanerkar, *College of Staten Island, CUNY, Staten Island, NY*, **Oliver Dasbach**, *Louisiana State University, Baton Rouge, LA*, **Efstratia Kalfagianni**, *Michigan State University, East Lansing, MI*, **Ilya Kotman**, *College of Staten Island, CUNY, Staten Island, NY*, **Walter Neumann**, *Barnard College, Columbia University, New York, NY*, and **Neal Stoltzfus**, *Louisiana State University, Baton Rouge, LA*, Editors

This book is based on a 10-day workshop given by leading experts in hyperbolic geometry, quantum topology and number theory, in June 2009 at Columbia University. Each speaker gave a minicourse consisting of three or four lectures aimed at graduate students and recent PhDs. The proceedings of this enormously successful workshop can serve as an introduction to this active research area in a way that is expository and broadly accessible to graduate students.

Although many ideas overlap, the twelve expository/research papers in this volume can be grouped into four rough categories:

- (1) different approaches to the Volume Conjecture and relations between the main quantum and geometric invariants;
- (2) the geometry associated to triangulations of hyperbolic 3-manifolds;
- (3) arithmetic invariants of hyperbolic 3-manifolds;
- (4) quantum invariants associated to knots and hyperbolic 3-manifolds.

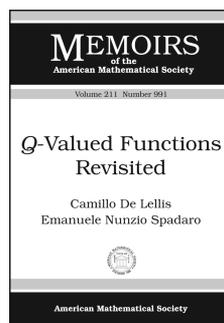
The workshop, the conference that followed, and these proceedings continue a long tradition in quantum and geometric topology of bringing together ideas from diverse areas of mathematics and physics, and highlights the importance of collaborative research in tackling big problems that require expertise in disparate disciplines.

Contents: **H. Murakami**, An introduction to the volume conjecture; **T. Dimofte** and **S. Gukov**, Quantum field theory and the volume conjecture; **R. M. Kashaev**, R -matrix knot invariants and triangulations; **S. Garoufalidis**, Knots and tropical curves; **S. Baseilhac**, Quantum coadjoint action and the $6j$ -symbols of $U_q sl_2$; **S. Garoufalidis**, What is a sequence of Nilsson type?; **D. Futer** and **F. Guéritaud**, From angled triangulations to hyperbolic structures; **F. Luo**, Triangulated 3-manifolds: From Haken's normal surfaces to Thurston's algebraic equation; **J. S. Purcell**, An introduction to fully augmented links; **G. S. Walsh**, Orbifolds and commensurability; **W. D. Neumann**, Realizing arithmetic invariants

of hyperbolic 3-manifolds; **D. D. Long** and **A. W. Reid**, Fields of definition of canonical curves.

Contemporary Mathematics, Volume 541

May 2011, approximately 262 pages, Softcover, ISBN: 978-0-8218-4960-6, 2010 *Mathematics Subject Classification*: 57Mxx, 32Qxx, 60Gxx, 16Txx, 17Bxx, 81Rxx, 81Txx, 11Sxx, 14Txx, **AMS members US\$71.20**, List US\$89, Order code CONM/541



Q-Valued Functions Revisited

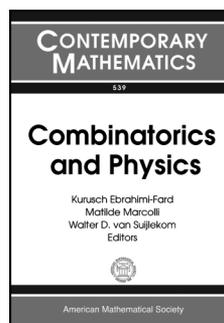
Camillo De Lellis, *University of Zurich, Switzerland*, and **Emanuele Nunzio Spadaro**, *University of Bonn, Germany*

Contents: Introduction; The elementary theory of Q -valued functions; Almgren's extrinsic theory; Regularity theory; Intrinsic theory; The improved estimate of the singular set in 2 dimensions; Bibliography.

Memoirs of the American Mathematical Society, Volume 211, Number 991

April 2011, 79 pages, Softcover, ISBN: 978-0-8218-4914-9, 2010 *Mathematics Subject Classification*: 49Q20, 35J55, 54E40, 53A10, **Individual member US\$39.60**, List US\$66, Institutional member US\$52.80, Order code MEMO/211/991

Mathematical Physics



Combinatorics and Physics

Kurusch Ebrahimi-Fard, *Universidad de Zaragoza, Spain*, **Matilde Marcolli**, *California Institute of Technology, Pasadena, CA*, and **Walter D. van Suijlekom**, *Radboud University Nijmegen, The Netherlands*, Editors

This book is based on the mini-workshop Renormalization, held in December 2006, and the conference Combinatorics and Physics, held in March 2007. Both meetings took place at the Max-Planck-Institut für Mathematik in Bonn, Germany.

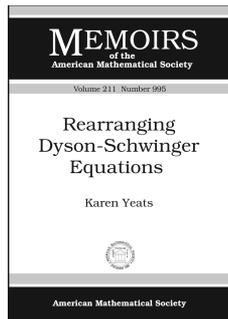
Research papers in the volume provide an overview of applications of combinatorics to various problems, such as applications to Hopf algebras, techniques to renormalization problems in quantum field theory, as well as combinatorial problems appearing in the context of the numerical integration of dynamical systems, in noncommutative geometry and in quantum gravity.

In addition, it contains several introductory notes on renormalization Hopf algebras, Wilsonian renormalization and motives.

Contents: C. Brouder and F. Patras, One-particle irreducibility with initial correlations; F. Brown, Multiple zeta values and periods: From moduli spaces to Feynman integrals; F. Chapoton and A. Frabetti, From quantum electrodynamics to posets of planar binary trees; G. H. E. Duchamp and C. Tollu, Sweedler's duals and Schützenberger's calculus; L. Foissy, Primitive elements of the Hopf algebra of free quasi-symmetric functions; R. Friedrich, A Renormalisation Group approach to Stochastic Lœwner Evolutions; J. M. Gracia-Bondía, On the causal gauge principle; M. Gubinelli, Abstract integration, combinatorics of trees and differential equations; R. Holtkamp, Rooted trees appearing in products and co-products; A. Iserles, Magnus expansions and beyond; T. Krajewski and P. Martinetti, Wilsonian renormalization, differential equations and Hopf algebras; E. Kraus, Algebraic analysis of non-renormalization theorems in supersymmetric field theories; D. Kreimer, Not so non-renormalizable gravity; D. Manchon, Renormalised multiple zeta values which respect quasi-shuffle relations; F. Menous, Formulas for the Connes-Moscovici Hopf algebra; A. Mestre and R. Oeckl, Hopf algebras and the combinatorics of connected graphs in quantum field theory; A. Lundervold and H. Munthe-Kaas, Hopf algebras of formal diffeomorphisms and numerical integration on manifolds; D. Oriti, A combinatorial and field theoretic path to quantum gravity: The new challenges of group field theory; S. Paycha, Noncommutative formal Taylor expansions and second quantised regularised traces; A. Rej, Motives: An introductory survey for physicists; W. van Suijlekom, Combinatorics and Feynman graphs for gauge theories; F. Vignes-Tourneret, Multi-scale analysis and non-commutative field theory.

Contemporary Mathematics, Volume 539

May 2011, 465 pages, Softcover, ISBN: 978-0-8218-5329-0, LC 2010048012, 2010 *Mathematics Subject Classification*: 81T15, 65D30, **AMS members US\$104**, List US\$130, Order code CONM/539



Rearranging Dyson-Schwinger Equations

Karen Yeats, *Simon Fraser University, Burnaby, BC, Canada*

Contents: Introduction; Background; Dyson-Schwinger equations; The first recursion; Reduction to one insertion place; Reduction to geometric series; The second recursion; The radius of

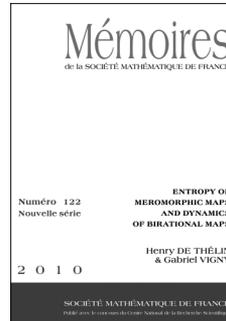
convergence; The second recursion as a differential equation; Bibliography; Index.

Memoirs of the American Mathematical Society, Volume 211, Number 995

April 2011, 82 pages, Softcover, ISBN: 978-0-8218-5306-1, 2010 *Mathematics Subject Classification*: 81T18, **Individual member US\$39.60**, List US\$66, Institutional member US\$52.80, Order code MEMO/211/995

New AMS-Distributed Publications

Analysis



Entropy of Meromorphic Maps and Dynamics of Birational Maps

Henry De Thélin, *Université Paris 13, Villetaneuse, France*, and **Gabriel Vigny**, *Laboratoire Amiénois de Mathématique Fondamentale et Appliquée, Amiens, France*

The authors study the dynamics of meromorphic maps for a compact Kahler manifold X . More precisely, they give a simple criterion that allows them to produce a measure of maximal entropy. They can apply this result to bound the Lyapunov exponents.

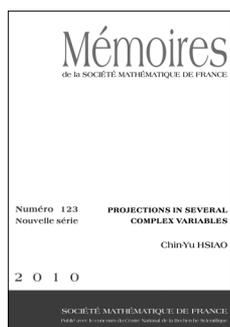
The authors then study the particular case of a family of generic birational maps of \mathbb{P}^k for which they construct the Green currents and the equilibrium measure. They use for that the theory of super-potentials. They show that the measure is mixing and gives no mass to pluripolar sets. Using the criterion they get that the measure is of maximal entropy. This implies finally that the measure is hyperbolic.

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; Entropy of meromorphic maps; Dynamics of birational maps of \mathbb{P}^k ; Super-potentials; Bibliography.

Mémoires de la Société Mathématique de France, Number 122

January 2011, 98 pages, Softcover, ISBN: 978-2-85629-302-7, 2010 *Mathematics Subject Classification*: 37Fxx, 32H04, 32Uxx, 37A35, 37Dxx, **Individual member US\$37.80**, List US\$42, Order code SMFMEM/122



Projections in Several Complex Variables

Chin-Yu Hsiao, *University of Cologne, Germany*

This work consists two parts. In the first part, the author studies completely the heat equation method of Menikoff-Sjöstrand and applies it to the Kohn Laplacian defined on a compact orientable connected CR manifold. He

then gets the full asymptotic expansion of the Szegő projection for $(0, q)$ forms when the Levi form is non-degenerate. This generalizes a result of Boutet de Monvel and Sjöstrand for $(0, 0)$ forms. The author's main tools are Fourier integral operators with complex valued phase Melin and Sjöstrand functions.

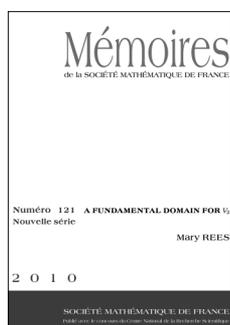
In the second part, the author obtains the full asymptotic expansion of the Bergman projection for $(0, q)$ forms when the Levi form is non-degenerate. This also generalizes a result of Boutet de Monvel and Sjöstrand for $(0, 0)$ forms. He introduces a new operator analogous to the Kohn Laplacian defined on the boundary of a domain and applies the heat equation method of Menikoff and Sjöstrand to this operator. He obtains a description of a new Szegő projection up to smoothing operators and gets his main result by using the Poisson operator.

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Contents: Introduction; Part I. On the singularities of the Szegő projection for $(0, q)$ forms; Part II. On the singularities of the Bergman projection for $(0, q)$ forms; Bibliography.

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A Fundamental Domain for V_3

Mary Rees, *University of Liverpool, England*

The author describes a fundamental domain for the punctured Riemann surface $V_{3,m}$ which parametrises (up to Möbius conjugacy) the set of quadratic rational maps with numbered critical points, such that the first critical point

has period three and the second critical point is not mapped in m iterates or less to the periodic orbit of the first. This gives, in turn, a description, up to topological conjugacy, of all dynamics in all type III hyperbolic components in V_3 , and gives indications of a topological model for V_3 , together with the hyperbolic components contained in it.

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Contents: Introduction; The space V_3 ; Captures and counting; The resident's view; Fundamental domains; Easy cases of the main theorem; The hard case: Final statement and examples; Proof of the hard and interesting case; Open questions; Bibliography.

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