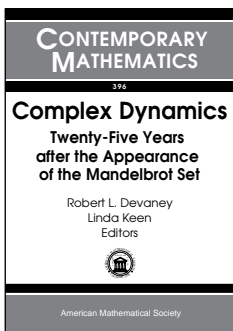


New Publications Offered by the AMS

Analysis



Complex Dynamics Twenty-Five Years after the Appearance of the Mandelbrot Set

Robert L. Devaney and
Linda Keen, Editors

Chaotic behavior of (even the simplest) iterations of polynomial maps of the complex plane was known for almost one hundred years

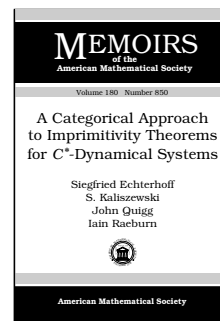
due to the pioneering work of Farou, Julia, and their contemporaries. However, it was only twenty-five years ago that the first computer generated images illustrating properties of iterations of quadratic maps appeared. These images of the so-called Mandelbrot and Julia sets immediately resulted in a strong resurgence of interest in complex dynamics. The present volume, based on the talks at the conference commemorating the twenty-fifth anniversary of the appearance of Mandelbrot sets, provides a panorama of current research in this truly fascinating area of mathematics.

Contents: D. K. Childers, J. C. Mayer, H. M. Tuncali, and E. D. Tymchatyn, Indecomposable continua and the Julia sets of rational maps; E. Bedford and J. Smillie, The Hénon family: The complex horseshoe locus and real parameter space; R. L. Devaney, Baby Mandelbrot sets adorned with halos in families of rational maps; R. L. Devaney, M. Holzer, and D. Uminsky, Blowup points and baby Mandelbrot sets for singularly perturbed rational maps; R. Dujardin, Some remarks on the connectivity of Julia sets for 2-dimensional diffeomorphisms; S. L. Hruska, Rigorous numerical studies of the dynamics of polynomial skew products of \mathbb{C}^2 ; L. Keen, Open problems; L. Keen and N. Lakic, Accumulation points of iterated function systems; L. Keen and S. Yuan, Parabolic perturbations of the family $\lambda \tan z$; K. M. Pilgrim, Polynomial

vector fields, dessins d'enfants, and circle packings; J. T. Rogers, Jr., Siegel disks whose boundaries have only two complementary domains; K. A. Roth, Non-uniform porosity for a subset of some Julia sets; B. Skorulski, The existence of conformal measures for some transcendental meromorphic functions.

Contemporary Mathematics, Volume 396

March 2006, approximately 208 pages, Softcover, ISBN 0-8218-3625-0, 2000 *Mathematics Subject Classification*: 37F45, 37F50; 37F10, 30D05, 37D35, 54F15, All AMS members US\$47, List US\$59, Order code CONM/396



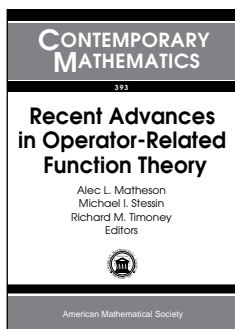
A Categorical Approach to Imprimitivity Theorems for C^* -Dynamical Systems

Siegfried Echterhoff,
S. Kaliszewski, John Quigg,
and Iain Raeburn

Contents: Introduction; Right-Hilbert bimodules; The categories; The functors; The natural equivalences; Applications; Appendix A. Crossed products by actions and coactions; Appendix B. The imprimitivity theorems of Green and Mansfield; Appendix C. Function spaces; Appendix. Bibliography.

Memoirs of the American Mathematical Society, Volume 180, Number 850

March 2006, 169 pages, Softcover, ISBN 0-8218-3857-1, LC 2005057160, 2000 *Mathematics Subject Classification*: 46L55, Individual member US\$39, List US\$65, Institutional member US\$52, Order code MEMO/180/850



Recent Advances in Operator-Related Function Theory

Alec L. Matheson, *Lamar University, Beaumont, TX*,
 Michael I. Stessin, *State University of New York (SUNY), Albany, NY*, and
 Richard M. Timoney, *Trinity College, Dublin, Ireland*,
 Editors

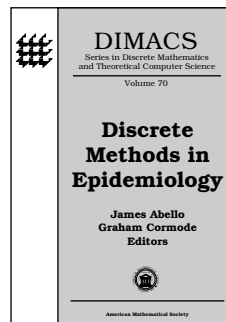
The articles in this book are based on talks at a conference devoted to interrelations between function theory and the theory of operators. The main theme of the book is the role of Alexandrov-Clark measures. Two of the articles provide the introduction to the theory of Alexandrov-Clark measures and to its applications in the spectral theory of linear operators. The remaining articles deal with recent results in specific directions related to the theme of the book.

Contents: A. Poltoratski and D. Sarason, Aleksandrov-Clark measures; A. Matheson and M. Stessin, Applications of spectral measures; J. Agler and J. E. McCarthy, Parametrizing distinguished varieties; J. T. Anderson and J. Wermer, Approximation by CR functions on the unit sphere in \mathbb{C}^2 ; S. M. Buckley and D. Vukotić, Superposition operators and the order and type of entire functions; K. Dyakonov and D. Khavinson, Smooth functions in star-invariant subspaces; S. R. Garcia, Conjugation and Clark operators; D. Girela, A class of conformal mappings with applications to function spaces; H. Koo and W. Smith, Composition operators between Bergman spaces of functions of several variables; M. J. Martín and D. Vukotić, Isometries of some classical function spaces among the composition operators; A. Montes-Rodríguez and S. A. Shkarin, New results on a classical operator; J. Pau, Size conditions to be in a finitely generated ideal of H^∞ ; W. T. Ross, The classical Dirichlet space; E. Saksman and C. Sundberg, Comparing topologies on the space of composition operators; W. Smith, Brennan's conjecture for weighted composition operators.

Contemporary Mathematics, Volume 393

February 2006, 214 pages, Softcover, ISBN 0-8218-3925-X, LC 2005053622, 2000 *Mathematics Subject Classification*: 46E15, 46E20, 47B33, 47B38, 47B32, 30E20, 30E25, **All AMS members US\$55**, List US\$69, Order code CONM/393

Applications



Discrete Methods in Epidemiology

James Abello and
 Graham Cormode, Editors

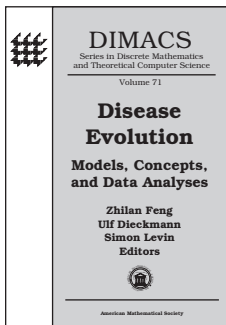
Studies of the spread and containment of disease rely at heart on a variety of mathematical and computational techniques. This collection aims to introduce the fundamentals of epidemiology and to showcase contemporary work using discrete

mathematical techniques. Introductory chapters explain the fundamental concepts of epidemiology, the basic tools provided by mathematics and computer science, and some of the outstanding open problems in the area. Contributed articles then highlight particular problems in monitoring disease outbreaks, vaccination strategies, and modelling disease survival factors, and successfully apply techniques such as formal concept analysis, support vector machines, random graph models, and systems of differential equations.

Contents: J. Abello, G. Cormode, D. Fradkin, D. Madigan, O. Melnik, and I. Muchnik, Selected data mining concepts; D. Schneider, Descriptive epidemiology: A brief introduction; W. D. Shannon, Biostatistical challenges in molecular data analysis; L. Hirschman and L. E. Damianos, Mining online media for global disease outbreak monitoring; D. Ozonoff, A. Pogel, and T. Hannan, Generalized contingency tables and concept lattices; J. Abello and A. Pogel, Graph partitions and concept lattices; K. Desai, M.-C. Boily, B. Mâsse, and R. M. Anderson, Using transmission dynamics models to validate vaccine efficacy measures prior to conducting HIV vaccine efficacy trials; A. Vázquez, Causal tree of disease transmission and the spreading of infectious diseases; S. Eubank, V. S. Anil Kumar, M. V. Marathe, A. Srinivasan, and N. Wang, Structure of social contact networks and their impact on epidemics; J. Abello and M. Capalbo, Random graphs (and the spread of infections in a social network); S. G. Hartke, Attempting to narrow the integrality gap for the firefighter problem on trees; J. Li, I. Muchnik, and D. Schneider, Influences on breast cancer survival via SVM classification in the SEER database; D. Fradkin, I. Muchnik, P. Hermans, and K. Morgan, Validation of epidemiological models: Chicken epidemiology in the UK; Index.

DIMACS: Series in Discrete Mathematics and Theoretical Computer Science, Volume 70

April 2006, approximately 246 pages, Hardcover, ISBN 0-8218-3754-0, 2000 *Mathematics Subject Classification*: 92D30; 68R01, **All AMS members US\$71**, List US\$89, Order code DIMACS/70



Disease Evolution Models, Concepts, and Data Analyses

Zhilan Feng, Ulf Dieckmann,
and Simon Levin, Editors

Infectious diseases are continuing to threaten humankind. While some diseases have been controlled, new diseases are constantly appearing.

Others are now reappearing in forms

that are resistant to drug treatments. A capacity for continual re-adaptation furnishes pathogens with the power to escape our control efforts through evolution. This makes it imperative to understand the complex selection pressures that are shaping and reshaping diseases. Modern models of evolutionary epidemiology provide powerful tools for creating, expressing, and testing such understanding.

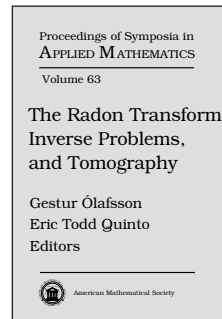
Bringing together international leaders in the field, this volume offers a panoramic tour of topical developments in understanding the mechanisms of disease evolution. The volume's first part elucidates the general concepts underlying models of disease evolution. Methodological challenges addressed include those posed by spatial structure, stochastic dynamics, disease phases and classes, single- and multi-drug resistance, the heterogeneity of host populations and tissues, and the intricate coupling of disease evolution with between-host and within-host dynamics. The book's second part shows how these methods are utilized for investigating the dynamics and evolution of specific diseases, including HIV/AIDS, tuberculosis, SARS, malaria, and human rhinovirus infections.

This volume is particularly suited for introducing young scientists and established researchers with backgrounds in mathematics, computer science, or biology to the current techniques and challenges of mathematical evolutionary epidemiology.

Contents: *Model infrastructure:* M. Boots, M. Kamo, and A. Sasaki, The implications of spatial structure within populations to the evolution of parasites; T. Day and S. Gandon, Insights from Price's equation into evolutionary epidemiology; R. D. Holt and M. Barfield, Within-host pathogen dynamics: Some ecological and evolutionary consequences of transients, dispersal mode, and within-host spatial heterogeneity; J. K. Kelly, Evolutionary and dynamic models of infection with internal host structure; W. M. Getz and J. O. Lloyd-Smith, Basic methods for modeling the invasion and spread of contagious diseases; *Applications to specific diseases:* W. M. Getz, J. O. Lloyd-Smith, P. C. Cross, S. Bar-David, P. L. Johnson, T. C. Porco, and M. S. Sánchez, Modeling the invasion and spread of contagious diseases in heterogeneous populations; M. A. Charleston and A. P. Galvani, A cophylogenetic perspective on host-pathogen evolution; Z. Feng and L. Rong, The influence of anti-viral drug therapy on the evolution of HIV-1 pathogens; W. J. Koppelman and F. R. Adler, Do rhinoviruses follow the neutral theory? The role of cross-immunity in maintaining the diversity of the common cold; A. L. Lloyd and D. Wodarz, Drug resistance in acute viral infections: Rhinovirus as a case study; D. L. Smith, M. F. Boni, and R. Laxminarayan, Dynamics and control of antibiotic resistance in structured metapopulations.

DIMACS: Series in Discrete Mathematics and Theoretical Computer Science, Volume 71

May 2006, approximately 241 pages, Hardcover, ISBN 0-8218-3753-2, 2000 *Mathematics Subject Classification:* 34C60, 35Q80, 62P10, 92B05, 92C50, 92C60, 92D10, 92D15, 92D25, 92D30, All AMS members US\$71, List US\$89, Order code DIMACS/71



The Radon Transform, Inverse Problems, and Tomography

Gestur Ólafsson and
Eric Todd Quinto, Editors

Since their emergence in 1917, tomography and inverse problems remain active and important fields that combine pure and applied

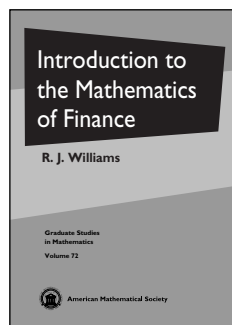
mathematics and provide strong interplay between diverse mathematical problems and applications. The applied side is best known for medical and scientific use, in particular, medical imaging, radiotherapy, and industrial non-destructive testing. Doctors use tomography to see the internal structure of the body or to find functional information, such as metabolic processes, noninvasively. Scientists discover defects in objects, the topography of the ocean floor, and geological information using X-rays, geophysical measurements, sonar, or other data.

This volume, based on the lectures in the Short Course *The Radon Transform and Applications to Inverse Problems* at the American Mathematical Society meeting in Atlanta, GA, January 3-4, 2005, brings together articles on mathematical aspects of tomography and related inverse problems. The articles cover introductory material, theoretical problems, and practical issues in 3-D tomography, impedance imaging, local tomography, wavelet methods, regularization and approximate inverse, sampling, and emission tomography. All contributions are written for a general audience, and the authors have included references for further reading.

Contents: E. T. Quinto, An introduction to X-ray tomography and radon transforms; A. K. Louis, Development of algorithms in computerized tomography; A. Faridani, Fan-beam tomography and sampling theory; P. Kuchment, Generalized transforms of radon type and their applications; P. Massopust, Inverse problems in pipeline inspection; L. Borcea, Robust interferometric imaging in random media; Index.

Proceedings of Symposia in Applied Mathematics, Volume 63

March 2006, 158 pages, Hardcover, ISBN 0-8218-3930-6, LC 2005057107, 2000 *Mathematics Subject Classification:* 92C55, 44A12, 65R32, 65R10, 94A20, 42C40, All AMS members US\$31, List US\$39, Order code PSAPM/63



Introduction to the Mathematics of Finance

R. J. Williams, *University of California, San Diego, La Jolla, California, USA*

The modern subject of mathematical finance has undergone considerable development, both in theory and practice, since the seminal work of

Black and Scholes appeared a third of a century ago. This book is intended as an introduction to some elements of the theory that will enable students and researchers to go on to read more advanced texts and research papers.

The book begins with the development of the basic ideas of hedging and pricing of European and American derivatives in the discrete (i.e., discrete time and discrete state) setting of binomial tree models. Then a general discrete finite market model is introduced, and the fundamental theorems of asset pricing are proved in this setting. Tools from probability such as conditional expectation, filtration, (super)martingale, equivalent martingale measure, and martingale representation are all used first in this simple discrete framework. This provides a bridge to the continuous (time and state) setting, which requires the additional concepts of Brownian motion and stochastic calculus. The simplest model in the continuous setting is the famous Black-Scholes model, for which pricing and hedging of European and American derivatives are developed. The book concludes with a description of the fundamental theorems for a continuous market model that generalizes the simple Black-Scholes model in several directions.

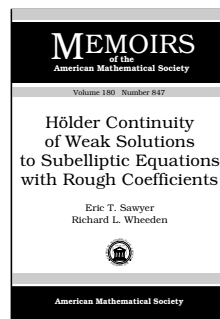
This item will also be of interest to those working in probability.

Contents: Financial markets and derivatives; Binomial model; Finite market model; Black-Scholes model; Multi-dimensional Black-Scholes model; Conditional expectation and L^p -spaces; Discrete time stochastic processes; Continuous time stochastic processes; Brownian motion and stochastic integration; Bibliography; Index.

Graduate Studies in Mathematics, Volume 72

April 2006, 152 pages, Hardcover, ISBN 0-8218-3903-9, LC 2005055575, 2000 *Mathematics Subject Classification*: 60G42, 60G44, 60J65, 62P05, 91B28; 58J65, 60J60, **All AMS members US\$31**, List US\$39, Order code GSM/72

Differential Equations



Hölder Continuity of Weak Solutions to Subelliptic Equations with Rough Coefficients

Eric T. Sawyer and Richard L. Wheeden

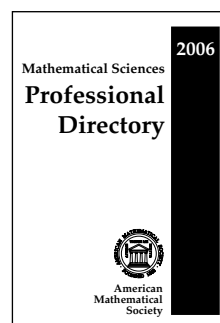
Contents: Introduction; Comparisons of conditions; Proof of the general

subellipticity theorem; Reduction of the proofs of the rough diagonal extensions of Hörmander's theorem; Homogeneous spaces and subrepresentation inequalities; Appendix; Bibliography.

Memoirs of the American Mathematical Society, Volume 180, Number 847

March 2006, 157 pages, Softcover, ISBN 0-8218-3826-1, LC 2005057158, 2000 *Mathematics Subject Classification*: 35B65, 35D10, 35H20, **Individual member US\$38**, List US\$63, Institutional member US\$50, Order code MEMO/180/847

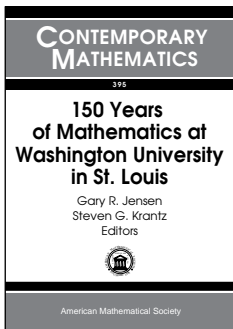
General and Interdisciplinary



Mathematical Sciences Professional Directory, 2006

This annual directory provides a handy reference to various organizations in the mathematical sciences community. Listed in the directory are the following: officers of over thirty professional mathematical organizations; addresses of selected government agencies; academic departments in the mathematical sciences; and alphabetic listings of colleges and universities.

March 2006, approximately 160 pages, Softcover, ISBN 0-8218-3899-7, List US\$55, Institutional member US\$44, Order code PROD/2006



150 Years of Mathematics at Washington University in St. Louis

Gary R. Jensen and Steven G. Krantz, Editors

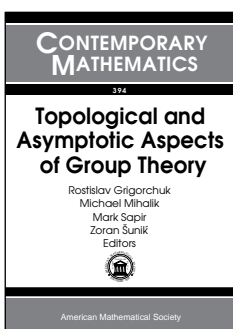
Articles in this book cover a wide range of important topics in mathematics and are based on talks given at the conference commemorating the 150th anniversary of Washington University in St. Louis. The volume is prefaced by a brief history of the Washington University Department of Mathematics, a roster of those who received the PhD degree from the department, and a list of the Washington University Department of Mathematics faculty since the founding of the university.

Contents: S. G. Krantz, An anecdotal history of the Washington University Mathematics Department; G. R. Jensen and S. G. Krantz, Dissertation list; G. R. Jensen and S. G. Krantz, History of the Mathematics faculty; R. L. Bryant, Geometry of manifolds with special holonomy: "100 years of holonomy"; R. R. Coifman, Geometric harmonic analysis in high dimensions: Challenges and opportunities; J. P. D'Angelo, An analogue of Hilbert's seventeenth problem in one complex dimension; J. J. Kohn, Hypoelliptic second order equations that lose derivatives; H. B. Lawson, Jr., Stokes' theorem and minimal surfaces; J. D. McNeal, L^2 estimates on twisted Cauchy-Riemann complexes; Y. Meyer, From wavelets to atoms; R. Schoen, The mathematics of general relativity: Problems and progress; R. R. Coifman, A. Bonami, R. Bryant, and J. P. D'Angelo, Panel discussion.

Contemporary Mathematics, Volume 395

March 2006, 145 pages, Softcover, ISBN 0-8218-3603-X, LC 2005057233, 2000 *Mathematics Subject Classification*: 00-02; 32T27, 32T05, 35N15, 53C29, 83C05, 49Q05, 81Q70, 83C10, 42B20, 42B99, All AMS members US\$39, List US\$49, Order code CONM/395

Geometry and Topology



Topological and Asymptotic Aspects of Group Theory

Rostislav Grigorchuk, Michael Mihalik, Mark Sapir, and Zoran Šunić, Editors

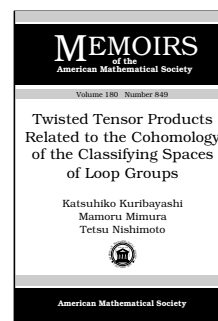
The articles in this volume are based on the talks given at two special sessions at the AMS Sectional meetings held in 2004. The articles cover various topological and asymptotic aspects of group theory such as hyperbolic and relatively hyperbolic

groups, asymptotic cones, Thompson's group, Nielsen fixed point theory, homology, groups acting on trees, groups generated by finite automata, iterated monodromy groups, random walks on finitely generated groups, heat kernels, and currents on free groups.

Contents: G. N. Arzhantseva, A dichotomy for finitely generated subgroups of word hyperbolic groups; L. Bartholdi and Z. Šunić, Some solvable automaton groups; A. V. Borovik and A. G. Myasnikov, Quotient tests and random walks in computational group theory; K. S. Brown, The homology of Richard Thompson's group F ; K.-U. Bux and R. Pérez, On the growth of iterated monodromy groups; A. N. Dranishnikov, On Bestvina-Mess formula; K. Dykema, Symmetric random walks on certain amalgamated free product groups; D. Farley, Homology of tree braid groups; R. Geoghegan and F. Guzmán, Associativity and Thompson's group; V. S. Guba, Traveller salesman property and Richard Thompson's group F ; S. V. Ivanov, On groups with periodic products of commutators; I. Kapovich, Currents on free groups; A. Karlsson and M. Neuhäuser, Heat kernels, theta identities, and zeta functions on cyclic groups; M. R. Kelly, The Nielsen fixed point structure for homotopy idempotents on surfaces; T. Napier and M. Ramachandran, Thompson's group F is not Kähler; A. Yu. Ol'shanskii and M. V. Sapir, Groups with non-simply connected asymptotic cones; D. V. Osin, Relative Dehn functions of amalgamated products and HNN-extensions; A. M. Brunner and S. N. Sidki, Endomorphisms of the finitary group of isometries of the binary tree.

Contemporary Mathematics, Volume 394

March 2006, 234 pages, Softcover, ISBN 0-8218-3756-7, LC 2005057078, 2000 *Mathematics Subject Classification*: 20-06; 55-06, 57-06, All AMS members US\$55, List US\$69, Order code CONM/394



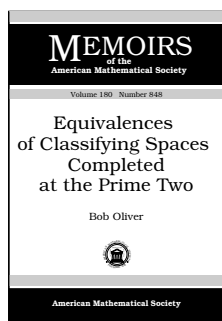
Twisted Tensor Products Related to the Cohomology of the Classifying Spaces of Loop Groups

Katsuhiko Kuribayashi, Mamoru Mimura, and Tetsu Nishimoto

Contents: Introduction; The mod 2 cohomology of $BLSO(n)$; The mod 2 cohomology of BLG for $G = Spin(n)$ ($7 \leq n \leq 9$); The mod 2 cohomology of BLG for $G = G_2, F_4$; A multiplication on a twisted tensor product; The twisted tensor product associated with $H^*(Spin(N); \mathbb{Z}/2)$; A manner for calculating the homology of a DGA; The Hochschild spectral sequence; Proof of Theorem 1.6; Computation of a cotorsion product of $H^*(Spin(10); \mathbb{Z}/2)$ and the Hochschild homology of $H^*(BSpin(10); \mathbb{Z}/2)$; Proof of Theorem 1.7; Proofs of Proposition 1.9 and Theorem 1.10; Appendix; Bibliography.

Memoirs of the American Mathematical Society, Volume 180, Number 849

March 2006, 85 pages, Softcover, ISBN 0-8218-3856-3, LC 2005057159, 2000 *Mathematics Subject Classification*: 55T20, 57T30, 55S05, Individual member US\$33, List US\$55, Institutional member US\$44, Order code MEMO/180/849



Equivalences of Classifying Spaces Completed at the Prime Two

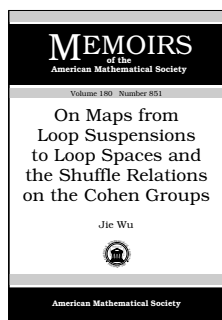
Bob Oliver

Contents: Introduction; Higher limits over orbit categories; Reduction to simple groups; A relative version of Λ -functors; Subgroups which contribute to higher limits; Alternating groups;

Groups of Lie type in characteristic two; Classical groups of Lie type in odd characteristic; Exceptional groups of Lie type in odd characteristic; Sporadic groups; Computations of $\lim^1(Z_G)$; Bibliography.

Memoirs of the American Mathematical Society, Volume 180, Number 848

March 2006, 102 pages, Softcover, ISBN 0-8218-3828-8, LC 2005058189, 2000 *Mathematics Subject Classification*: 55R37; 55P60, 20D05, **Individual member US\$35**, List US\$59, Institutional member US\$47, Order code MEMO/180/848



On Maps from Loop Suspensions to Loop Spaces and the Shuffle Relations on the Cohen Groups

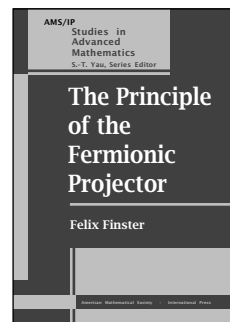
Jie Wu

Contents: Introduction; Maps from loop suspensions to loop spaces; Shuffle relations; Bibliography.

Memoirs of the American Mathematical Society, Volume 180, Number 851

March 2006, 64 pages, Softcover, ISBN 0-8218-3875-X, LC 2005058190, 2000 *Mathematics Subject Classification*: 55Pxx; 18G20, 20C05, 55Qxx, 55Uxx, **Individual member US\$30**, List US\$50, Institutional member US\$40, Order code MEMO/180/851

Mathematical Physics



The Principle of the Fermionic Projector

Felix Finster, *Universität Regensburg, Germany*

The “principle of the fermionic projector” provides a new mathematical framework for the formulation of physical theories and is a promising approach for physics beyond the standard model. This book begins with a brief review of relativity,

relativistic quantum mechanics, and classical gauge theories, emphasizing the basic physical concepts and mathematical foundations. The external field problem and Klein’s paradox are discussed and then resolved by introducing the fermionic projector, a global object in space-time that generalizes the notion of the Dirac sea. At the mathematical core of the book is a precise definition of the fermionic projector and the use of methods of hyperbolic differential equations for detailed analysis. The fermionic projector makes it possible to formulate a new type of variational principle in space-time. The mathematical tools are developed for the analysis of the corresponding Euler-Lagrange equations. A particular variational principle is proposed that gives rise to an effective interaction which shows many similarities to the interactions of the standard model.

The main chapters of the book are easily accessible for beginning graduate students in mathematics or physics. Several appendices provide supplementary material, which will be useful to the experienced researcher.

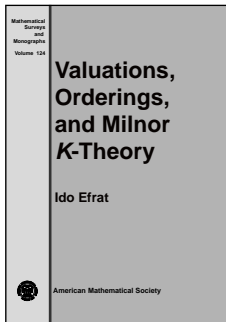
Titles in this series are copublished with International Press, Cambridge, MA.

Contents: The principle of the Fermionic projector—A new mathematical model of space-time; Preliminaries; The Fermionic projector in the continuum; The principle of the Fermionic projector; The continuum limit; The Euler-Lagrange equations in the vacuum; The dynamical gauge group; Spontaneous block formation; The effective gauge group; Connection to the Fock space formalism; Some formulas of the light-cone expansion; Normalization of chiral fermions; The regularized causal perturbation theory; Linear independence of the basic fractions; The commutator $[P, Q]$; Perturbation calculation for the spectral decomposition of $P(x, y)P(y, x)$; Bibliography; Index; Notation index.

AMS/IP Studies in Advanced Mathematics, Volume 35

February 2006, 302 pages, Hardcover, ISBN 0-8218-3974-8, LC 2005053035, 2000 *Mathematics Subject Classification*: 83-02, 81-02; 83C47, 81T20, 81T25, 81T27, 81T13, 83E99, 83C60, **All AMS members US\$52**, List US\$65, Order code AMSIP/35

Number Theory



Valuations, Orderings, and Milnor K -Theory

Ido Efrat

This monograph is a comprehensive exposition of the modern theory of valued and ordered fields. It presents the classical aspects of such fields: their arithmetic, topology, and Galois theory. Deeper cohomological aspects are studied in its last part in an

elementary manner. This is done by means of the newly developed theory of generalized Milnor K -rings. The book emphasizes the close connections and interplay between valuations and orderings, and to a large extent, studies them in a unified manner.

The presentation is almost entirely self-contained. In particular, the text develops the needed machinery of ordered abelian groups. This is then used throughout the text to replace the more classical techniques of commutative algebra. Likewise, the book provides an introduction to the Milnor K -theory.

The reader is introduced to the valuation-theoretic techniques as used in modern Galois theory, especially in applications to birational anabelian geometry, where one needs to detect valuations from their "cohomological footprints". These powerful techniques are presented here for the first time in a unified and elementary way.

Contents: *Part I. Abelian Groups:* Preliminaries on abelian groups; Ordered abelian groups; *Part II. Valuations and orderings:* Valuations; Examples of valuations; Coarsenings of valuations; Orderings; The tree of localities; Topologies; Complete fields; Approximation theorems; Canonical valuations; Valuations of mixed characteristics; *Part III. Galois theory:* Infinite Galois theory; Valuations in field extensions; Decomposition groups; Ramification theory; The fundamental equality; Hensel's lemma; Real closures; Coarsening in algebraic extensions; Intersections of decomposition groups; Sections; *Part IV. K -rings:* κ -structures; Milnor K -rings of fields; Milnor K -rings and orderings; K -rings and valuations; K -rings of wild valued fields; Decomposition of K -rings; Realization of κ -structures; Bibliography; Glossary of notation; Index.

Mathematical Surveys and Monographs, Volume 124

March 2006, 288 pages, Hardcover, ISBN 0-8218-4041-X, LC 2005057091, 2000 *Mathematics Subject Classification:* 12J10, 12J15; 12E30, 12J20, 19F99, **All AMS members US\$60**, List US\$75, Order code SURV/124

New AMS-Distributed Publications

Algebra and Algebraic Geometry

Cohomologie locale des faisceaux cohérents et théorèmes de Lefschetz locaux et globaux (SGA 2)

Séminaire de géométrie algébrique du Bois Marie 1962

Alexander Grothendieck

This volume is a new updated edition of the book, *Cohomologie locale des faisceaux cohérents et théorèmes de Lefschetz locaux et globaux* (SGA 2), Advanced Studies in Pure Mathematics 2, North-Holland Publishing Company, Amsterdam, 1968, by A. Grothendieck, et al.

In this monograph are given necessary and sufficient conditions for the finiteness of the local cohomology sheaves of coherent sheaves. These results provide algebraization theorems leading in particular, with the help of purity results also proved in the text, to Lefschetz's theorem for both the fundamental group and the Picard group.

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