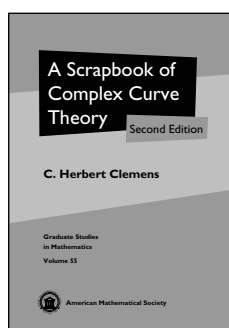


New Publications Offered by the AMS

Algebra and Algebraic Geometry



A Scrapbook of Complex Curve Theory Second Edition

C. Herbert Clemens, *Ohio State University, Columbus*

This fine book by Herb Clemens quickly became a favorite of many complex algebraic geometers when it

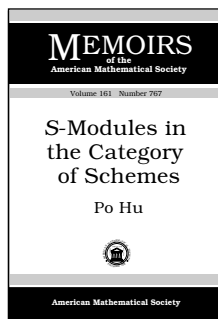
was first published in 1980. It has been popular with novices and experts ever since. It is written as a book of "impressions" of a journey through the theory of complex algebraic curves. Many topics of compelling beauty occur along the way. A cursory glance at the subjects visited reveals an apparently eclectic selection, from conics and cubics to theta functions, Jacobians, and questions of moduli. By the end of the book, the theme of theta functions becomes clear, culminating in the Schottky problem.

The author's intent was to motivate further study and to stimulate mathematical activity. The attentive reader will learn much about complex algebraic curves and the tools used to study them. The book can be especially useful to anyone preparing a course on the topic of complex curves or anyone interested in supplementing his/her reading.

Contents: Conics; Cubics; Theta functions; The Jacobian variety; Quartics and quintics; The Schottky relation; References; Additional references; Index.

Graduate Studies in Mathematics, Volume 55

January 2003, 188 pages, Hardcover, ISBN 0-8218-3307-3, LC 2002033352, 2000 *Mathematics Subject Classification*: 14-01, 14H05, 14H42, 14K25, 30Fxx, 32G15, **All AMS members***, List \$39, Order code GSM/55N



S-Modules in the Category of Schemes

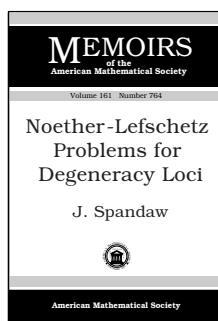
Po Hu, *University of Chicago, IL*

Contents: Introduction; Preliminaries; Coordinate-free spectra; Coordinatized prespectra; Comparison with coordinatized spectra; The stable simplicial model structure; The \mathbb{A}^1 -local model structure; Characterization of \mathbb{A}^1 -weak equivalences; Change of universe; The space of linear injections preserving

finite subspaces; Twisted half-smash products and twisted function spectra; The category of \mathbb{L} -spectra; Unital properties of \mathbb{L} -spectra; The category of S -modules; S -algebras and their modules; Proofs of the model structure theorems; Technical results on the extended injections operad; Appendix: Small objects in the category of simplicial sheaves; Bibliography.

Memoirs of the American Mathematical Society, Volume 161, Number 767

January 2003, 125 pages, Softcover, ISBN 0-8218-2956-4, LC 2002033244, 2000 *Mathematics Subject Classification*: 55P42, 55P48; 14F42, **Individual member***, List \$53, **Institutional member***, Order code MEMO/161/767N



Noether-Lefschetz Problems for Degeneracy Loci

J. Spandaw, *Institut für Mathematik, Universität Hannover, Germany*

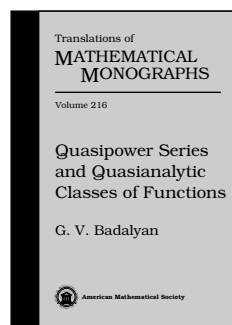
Contents: Introduction; The Monodromy theorem; Degeneracy loci of corank one; Degeneracy loci of arbitrary corank; Degeneracy loci in

projective space; Examples; A: On the cohomology of $\mathbb{G}(s, F)$; Frequently used notations; Bibliography.

Memoirs of the American Mathematical Society, Volume 161, Number 764

January 2003, 136 pages, Softcover, ISBN 0-8218-3183-6, LC 2002033241, 2000 *Mathematics Subject Classification*: 14F05, 14C30; 14F17, **Individual member***, List \$55, **Institutional member***, Order code MEMO/161/764N

Analysis



Quasipower Series and Quasianalytic Classes of Functions

G. V. Badalyan, *Armenian Academy of Sciences, Yerevan*

In this book, G. V. Badalyan addresses the fundamental problems of the theory of infinitely-differentiable functions using the theory of functions of quasianalytic classes.

A certain class of functions C on an interval is called quasianalytic if any function in C is uniquely determined by the values of its derivatives at any point. The obvious question, then, is how to reconstruct such a function from the sequence of values of its derivatives at a certain point. In order to answer that question, Badalyan combines a study of expanding functions in generalized factorial series with a study of quasipower series.

The theory of quasipower series and its application to the reconstruction problem are explained in detail in this research monograph. Along the way other, related problems are solved, such as Borel's hypothesis that no quasianalytic function can have all positive derivatives at a point.

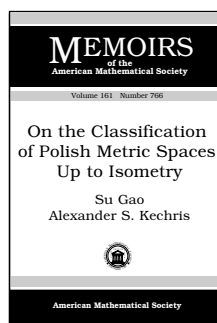
Originally published in Russian, this English translation contains additional material that treats the problems of classification of infinitely-differentiable functions, conditions for absolute convergence of quasipower series in terms of the functions that generate them, and the possibility of representing analytic functions by quasipower series in non-circular domains.

While the treatment is technical, the theory is developed chapter by chapter in detail, and the first chapter is of an introductory nature. The quasipower series technique explained here provides the means to extend the previously known results and elucidates their nature in the most relevant manner. This method also allows for thorough investigation of numerous problems of the theory of functions of quasianalytic classes by graduate students and research mathematicians.

Contents: Quasianalytic classes of functions; Generalizations of the Taylor formula. Quasipower series; Functions of Carleman's classes: Expansion in quasipower series; Criteria for the possibility of expanding functions in quasipower and factorial series; Generalized completely monotone functions and the condition for absolute convergence of a quasipower series (in the basic interval); On the use of quasipower series for representation of analytic functions in non-circular domains; Some applications of quasipower series to the theory of functions of quasianalytic classes; Bibliography.

Translations of Mathematical Monographs, Volume 216

December 2002, 183 pages, Hardcover, ISBN 0-8218-2943-2, LC 2002034246, 2000 *Mathematics Subject Classification*: 30Bxx, 30D60, **Individual member***, List \$79, Institutional member* Order code MMONO/216N



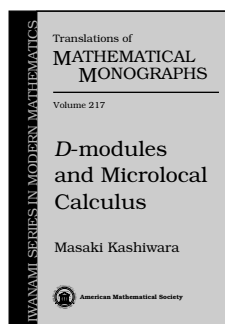
On the Classification of Polish Metric Spaces Up to Isometry

Su Gao, *University of North Texas, Denton*, and Alexander S. Kechris, *California Institute of Technology, Pasadena*

Contents: Introduction; Preliminaries; Isometric classification of Polish metric spaces; Characterizing the isometry groups of Polish metric spaces; Some special cases; Isometries of locally compact spaces, *I*: The pseudo-connected case; Isometries of locally compact spaces, *II*: The general case; Isometric classification of locally compact spaces; Locally compact ultrametric spaces; Some analogies with the model theory of countable structures; Open problems.

Memoirs of the American Mathematical Society, Volume 161, Number 766

January 2003, 78 pages, Softcover, ISBN 0-8218-3190-9, LC 2002033243, 2000 *Mathematics Subject Classification*: 03E15, 54E35; 54H05, 03E75, **Individual member***, List \$49, Institutional member*, Order code MEMO/161/766N



D-modules and Microlocal Calculus

Masaki Kashiwara, *Research Institute for Mathematical Sciences, Kyoto University, Japan*

Masaki Kashiwara is undoubtedly one of the masters of the theory of D -modules, and he has created a good, accessible entry point to the subject.

The theory of D -modules is a very powerful point of view, bringing ideas from algebra and algebraic geometry to the analysis of systems of differential equations. It is often used in conjunction with microlocal analysis, as some of the important theorems are best stated or proved using these techniques. The theory has been used very successfully in applications to representation theory.

Here, there is an emphasis on b -functions. These show up in various contexts: number theory, analysis, representation theory, and the geometry and invariants of prehomogeneous vector spaces. Some of the most important results on b -functions were obtained by Kashiwara.

A hot topic from the mid '70s to mid '80s, it has now moved a bit more into the mainstream. Graduate students and research mathematicians will find that working on the subject in the two-decade interval has given Kashiwara a very good perspective for presenting the topic to the general mathematical public.

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

Contents: Basic properties of D -modules; Characteristic varieties; Construction of D -modules; Functorial properties of

D-modules; Regular holonomic systems; *b*-functions; Ring of formal microdifferential operators; Microlocal analysis of holonomic systems; Microlocal calculus of *b*-functions; Appendix; Bibliography; Index; Index of notations.

Translations of Mathematical Monographs (*Iwanami Series in Modern Mathematics*), Volume 217

January 2003, 254 pages, Softcover, ISBN 0-8218-2766-9, LC 2002027793, 2000 *Mathematics Subject Classification*: 32A37, 32C38, 58J15, **All AMS members***, List \$49, Order code MMONO/217N

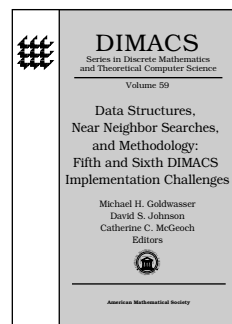
D. S. Johnson, A theoretician's guide to the experimental analysis of algorithms; **C. C. McGeoch**, A bibliography of algorithm experimentation.

DIMACS: Series in Discrete Mathematics and Theoretical Computer Science, Volume 59

January 2003, 256 pages, Hardcover, ISBN 0-8218-2892-4, LC 2002038557, 2000 *Mathematics Subject Classification*: 68-06, 68P05, 68P10, 68U05, 68W01, **All AMS members***, List \$79, Order code DIMACS/59N

Recommended Text

Applications

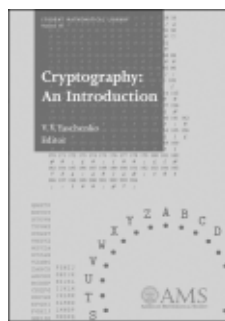


Data Structures, Near Neighbor Searches, and Methodology: Fifth and Sixth DIMACS Implementation Challenges

Michael H. Goldwasser, *Loyola University of Chicago, IL*, **David S. Johnson**, *AT&T Bell Laboratories, Florham Park, NJ*, and **Catherine C. McGeoch**, *Amherst College, MA*, Editors

This book presents reviewed and revised papers from the fifth and sixth DIMACS Implementation Challenge workshops. These workshops, held approximately annually, aim at encouraging high-quality work in experimental analysis of data structures and algorithms. The papers published in this volume are the results of year-long coordinated research projects and contain new findings and insights. Three papers address the performance evaluation of implementations for two fundamental data structures, dictionaries and priority queues, as used in the context of real applications. Another four papers consider the still evolving topic of methodologies for experimental algorithmics. Five papers are concerned with implementations of algorithms for nearest neighbor search in high dimensional spaces, an area with applications in information retrieval and data mining on collections of Web documents, DNA sequences, images and various other data types.

Contents: **R. Battiti**, Partially persistent dynamic sets for history-sensitive heuristics; **C. Silverstein**, A practical perfect hashing algorithm; **A. V. Goldberg** and **C. Silverstein**, Computational evaluation of hot queues; **K. Zatloukal**, **M. H. Johnson**, and **R. E. Ladner**, Nearest neighbor search for data compression; **N. Katayama** and **S. Satoh**, Experimental evaluation of disk-based data structures for nearest neighbor searching; **S. Maneewongvatana** and **D. M. Mount**, Analysis of approximate nearest neighbor searching with clustered point sets; **J.-C. Perez-Cortes** and **E. Vidal**, Approximate nearest neighbor search using the extended general space-filling curves heuristic; **P. N. Yianilos**, Locally lifting the curse of dimensionality for nearest neighbor search; **R. J. Anderson**, The role of experiment in the theory of algorithms; **B. M. E. Moret**, Towards a discipline of experimental algorithmics;



Cryptography: An Introduction

V. V. Yaschenko, *Moscow Center for Continuous Mathematics Education, Russia*, Editor

Learning about cryptography requires examining fundamental issues about information security. Questions abound, ranging from "Whom are we protecting ourselves from?" and "How

can we measure levels of security?" to "What are our opponent's capabilities?" and "What are their goals?" Answering these questions requires an understanding of basic cryptography. This book, written by Russian cryptographers, explains those basics.

Chapters are independent and can be read in any order. The introduction gives a general description of all the main notions of modern cryptography: a cipher, a key, security, an electronic digital signature, a cryptographic protocol, etc. Other chapters delve more deeply into this material. The final chapter presents problems and selected solutions from "Cryptography Olympiads for (Russian) High School Students".

This is an English translation of a Russian textbook. It is suitable for advanced high school students and undergraduates studying information security. It is also appropriate for a general mathematical audience interested in cryptography.

Also on cryptography and available from the AMS is *Codebreakers: Arne Beurling and the Swedish Crypto Program during World War II*, SWCRY.

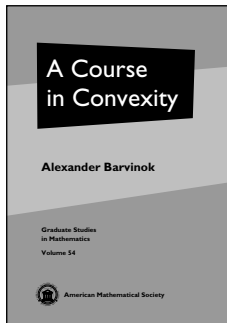
This item will also be of interest to those working in number theory.

Contents: Main notions; Cryptography and complexity theory; Cryptographic protocols; Algorithmic problems of number theory; Mathematics of secret sharing; Cryptography olympiads for high school students; Bibliography.

Student Mathematical Library, Volume 18

December 2002, 229 pages, Softcover, ISBN 0-8218-2986-6, LC 2002027740, 2000 *Mathematics Subject Classification*: 94-01, 94A60; 11T71, 68P25, **All AMS members***, List \$39, Order code STML/18N

Discrete Mathematics and Combinatorics



A Course in Convexity

Alexander Barvinok,
University of Michigan, Ann Arbor

Convexity is a simple idea that manifests itself in a surprising variety of places. This fertile field has an immensely rich structure and numerous applications. Barvinok demonstrates that simplicity, intuitive

appeal, and the universality of applications make teaching (and learning) convexity a gratifying experience. The book will benefit both teacher and student: It is easy to understand, entertaining to the reader, and includes many exercises that vary in degree of difficulty. Overall, the author demonstrates the power of a few simple unifying principles in a variety of pure and applied problems.

The notion of convexity comes from geometry. Barvinok describes here its geometric aspects, yet he focuses on applications of convexity rather than on convexity for its own sake. Mathematical applications range from analysis and probability to algebra to combinatorics to number theory. Several important areas are covered, including topological vector spaces, linear programming, ellipsoids, and lattices. Specific topics of note are optimal control, sphere packings, rational approximations, numerical integration, graph theory, and more. And of course, there is much to say about applying convexity theory to the study of faces of polytopes, lattices and polyhedra, and lattices and convex bodies.

The prerequisites are minimal amounts of linear algebra, analysis, and elementary topology, plus basic computational skills. Portions of the book could be used by advanced undergraduates. As a whole, it is designed for graduate students interested in mathematical methods, computer science, electrical engineering, and operations research. The book will also be of interest to research mathematicians, who will find some results that are recent, some that are new, and many known results that are discussed from a new perspective.

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

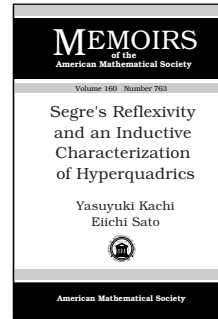
Contents: Convex sets at large; Faces and extreme points; Convex sets in topological vector spaces; Polarity, duality and linear programming; Convex bodies and ellipsoids; Faces of polytopes; Lattices and convex bodies; Lattice points and polyhedra; Bibliography; Index.

Graduate Studies in Mathematics, Volume 54

December 2002, 366 pages, Hardcover, ISBN 0-8218-2968-8, LC 2002028208, 2000 *Mathematics Subject Classification*: 52-01, 52-02, 52B45, 52C07, 46A20, 46N10, 90C05, 90C08, 90C22, 49N15, All AMS members*, List \$59, Order code GSM/54N

Recommended Text

Geometry and Topology



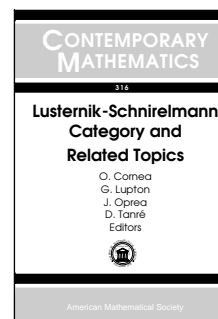
Connectivity Properties of Group Actions on Non-Positively Curved Spaces

Robert Bieri, *University of Frankfurt, Germany*, and
Ross Geoghegan, *Binghamton University, NY*

Contents: Introduction; *Part 1. Controlled Connectivity and Openness Results:* Outline, main results and examples; Technicalities concerning the CC^{n-1} property; Finitary maps and sheaves of maps; Sheaves and finitary maps over a control space; Construction of sheaves with positive shift; Controlled connectivity as an open condition; Completion of the proofs of Theorems A and A'; The invariance theorem; *Part 2. The Geometric Invariants:* Short summary of Part 2; Outline, main results and examples; Further technicalities on CAT(0) spaces; CC^{n-1} over endpoints; Finitary contractions towards endpoints; From CC^{n-1} over endpoints to contractions; Proofs of Theorems E-H; appendix A: Alternative formulations of CC^{n-1} ; Appendix B: Further formulations of CC^{n-1} ; Bibliography.

Memoirs of the American Mathematical Society, Volume 161, Number 765

January 2003, 83 pages, Softcover, ISBN 0-8218-3184-4, LC 2002033241, 2000 *Mathematics Subject Classification*: 20F65, 53C23, 20C99, 20F69, 57N16; 20E08, 20J05, 20G25, **Individual member***, List \$51, Institutional member*, Order code MEMO/161/765N



Lusternik-Schnirelmann Category and Related Topics

O. Cornea, *Universite de Lille, France*, G. Lupton and J. Oprea, *Cleveland State University, OH*, and D. Tanré, *Université de Lille, France*, Editors

This collection is the proceedings volume for the AMS-IMS-SIAM Joint Summer Research Conference, Lusternik-Schnirelmann Category, held in 2001 at Mount Holyoke College in Massachusetts. The conference attracted an international group of 37 participants that included many leading experts. The contributions included here represent some of the field's most able practitioners.

With a surge of recent activity, exciting advances have been made in this field, including the resolution of several long-standing conjectures. Lusternik-Schnirelmann category is a numerical homotopy invariant that also provides a lower bound for the number of critical points of a smooth function

on a manifold. The study of this invariant, together with related notions, forms a subject lying on the boundary between homotopy theory and critical point theory.

These articles cover a wide range of topics: from a focus on concrete computations and applications to more abstract extensions of the fundamental ideas. The volume includes a survey article by P. Hilton that discusses earlier results from homotopy theory that form the basis for more recent work in this area.

In this volume, professional mathematicians in topology and dynamical systems as well as graduate students will catch glimpses of the most recent views of the subject.

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

Contents: P. Hilton, Lusternik-Schnirelmann category in homotopy theory; M. Arkowitz, D. Stanley, and J. Strom, The \mathcal{A} -category and \mathcal{A} -cone length of a map; H. Colman, Equivariant LS-category for finite group actions; H. Colman and S. Hurder, Tangential LS category and cohomology for foliations; M. C. Costoya-Ramos, Spaces in the Mislin genus of a finite, simply connected co- H_0 -space; M. Cuvilliez and Y. Félix, Approximations to the \mathcal{F} -killing length of a space; G. Dula, Pseudo-comultiplications, their Hopf-type invariant and Lusternik-Schnirelmann category of conic spaces; M. Farber, Lusternik-Schnirelmann theory and dynamics; C. Gavrila, The Lusternik-Schnirelmann theorem for the ball category; P. Ghienne, The Lusternik-Schnirelmann category of spaces in the Mislin genus of $Sp(3)$; J. R. Hubbuck and N. Iwase, A p -complete version of the Ganea conjecture for co- H -spaces; G. Lupton, The rational Toomer invariant and certain elliptic spaces; H. J. Marcum, On the Hopf invariant of the Hopf construction; J. Oprea, Bochner-type theorems for the Gottlieb group and injective toral actions; J. Oprea and Y. Rudyak, Detecting elements and Lusternik-Schnirelmann category of 3-manifolds; J. Strom, Generalizations of category weight.

Contemporary Mathematics, Volume 316

January 2003, 203 pages, Softcover, ISBN 0-8218-2800-2, LC 2002038243, 2000 *Mathematics Subject Classification*: 55M30, 55P45, 55P60, 55P62, 55P91, 55Q25, 57M99, 57R30, 58E05, **Individual member***, List \$59, Institutional member*, Order code CONM/316N

constructions analogous to those used to study the homotopy theory of topological spaces.

A model category has a class of maps called weak equivalences plus two other classes of maps, called cofibrations and fibrations. Quillen's axioms ensure that the homotopy category exists and that the cofibrations and fibrations have extension and lifting properties similar to those of cofibration and fibration maps of topological spaces. During the past several decades the language of model categories has become standard in many areas of algebraic topology, and it is increasingly being used in other fields where homotopy theoretic ideas are becoming important, including modern algebraic K -theory and algebraic geometry.

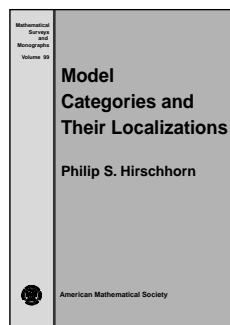
All these subjects and more are discussed in the book, beginning with the basic definitions and giving complete arguments in order to make the motivations and proofs accessible to the novice. The book is intended for graduate students and research mathematicians working in homotopy theory and related areas.

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

Contents: *Localization of model category structures:* Summary of part 1; Local spaces and localization; The localization model category for spaces; Localization of model categories; Existence of left Bousfield localizations; Existence of right Bousfield localizations; Fiberwise localization; *Homotopy theory in model categories:* Summary of part 2; Model categories; Fibrant and cofibrant approximations; Simplicial model categories; Ordinals, cardinals, and transfinite composition; Cofibrantly generated model categories; Cellular model categories; Proper model categories; The classifying space of a small category; The Reedy model category structure; Cosimplicial and simplicial resolutions; Homotopy function complexes; Homotopy limits in simplicial model categories; Homotopy limits in general model categories; Index; Bibliography.

Mathematical Surveys and Monographs, Volume 99

January 2003, 457 pages, Hardcover, ISBN 0-8218-3279-4, LC 2002027794, 2000 *Mathematics Subject Classification*: 18G55, 55P60, 55U35; 18G30, **Individual member***, List \$95, Institutional member*, Order code SURV/99N



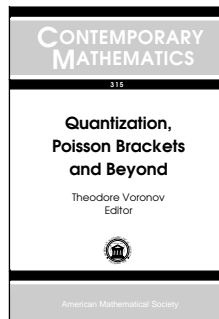
Model Categories and Their Localizations

Philip S. Hirschhorn, *Wellesley College, MA*

The aim of this book is to explain modern homotopy theory in a manner accessible to graduate students yet structured so that experts can skip over numerous linear developments to

quickly reach the topics of their interest. Homotopy theory arises from choosing a class of maps, called weak equivalences, and then passing to the homotopy category by localizing with respect to the weak equivalences, i.e., by creating a new category in which the weak equivalences are isomorphisms. Quillen defined a model category to be a category together with a class of weak equivalences and additional structure useful for describing the homotopy category in terms of the original category. This allows you to make

Mathematical Physics



Quantization, Poisson Brackets and Beyond

Theodore Voronov, *University of Manchester Institute of Science and Technology (UMIST), England*, Editor

The papers in this volume are based on talks given at the 2001 Manchester Meeting of the London Mathematical

Society, which was followed by an international workshop on "Quantization, Deformations, and New Homological and Categorical Methods in Mathematical Physics".

Focus is on the topics suggested by the title: Quantization in its various aspects, Poisson brackets and generalizations, and

structures “beyond”, including symplectic supermanifolds, operads, Lie groupoids and Lie (bi)algebroids and algebras with n -ary operations. This book offers accounts of new results as well as accessible expositions useful to a broad reading audience of researchers in differential geometry, algebraic topology and mathematical physics.

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

Contents: B. Fedosov, Deformation quantization: Pro and contra; N. P. Landsman, Quantization as a functor; H. Omori, Y. Maeda, N. Miyazaki, and A. Yoshioka, Star exponential functions for quadratic forms and polar elements; J. Rawnsley, On traces for differential star products on symplectic manifolds; J. Donin, Quantum G -manifolds; J. Donin and A. Mudrov, $U_q(sl(n))$ -covariant quantization of symmetric coadjoint orbits via reflection equation algebra; O. Radko, Toward a classification of Poisson structures on surfaces; J. D. S. Jones, Lectures on operads; T. Voronov, Graded manifolds and Drinfeld doubles for Lie bialgebroids; D. Roytenberg, On the structure of graded symplectic supermanifolds and Courant algebroids; K. C. H. Mackenzie, On certain canonical diffeomorphisms in symplectic and Poisson geometry; H. M. Khudaverdian, Laplacians in odd symplectic geometry; Y. Kosmann-Schwarzbach and K. C. H. Mackenzie, Differential operators and actions of Lie algebroids; L.-g. He, Z.-J. Liu, and D.-S. Zhong, Poisson actions and Lie bialgebroid morphisms; A. S. Dzhumadil'daev, Identities and derivations for Jacobian algebras.

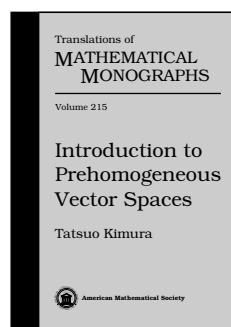
Contemporary Mathematics, Volume 315

January 2003, approximately 288 pages, Softcover, ISBN 0-8218-3201-8, LC 2002040772, 2000 *Mathematics Subject Classification*: 53D55, 46L65, 17B37, 53D17, 18D50, 58A50, 53D05, 58H05, 53D20, 17B66, **Individual member***, List \$69, Institutional member* Order code CONM/315N

Number Theory

Recommended Text

Independent Study



Introduction to Prehomogeneous Vector Spaces

Tatsuo Kimura, *Institute of Mathematics, University of Tsukuba, Japan*

This is the first introductory book on the theory of prehomogeneous vector spaces, introduced in the 1970s by Mikio Sato. The author was an early

and important developer of the theory and continues to be active in the field.

The subject combines elements of several areas of mathematics, such as algebraic geometry, Lie groups, analysis, number theory, and invariant theory. An important objective is to create applications to number theory. For example, one of the key topics is that of zeta functions attached to prehomogeneous vector spaces; these are generalizations of the Riemann zeta function, a cornerstone of analytic number

theory. Prehomogeneous vector spaces are also of use in representation theory, algebraic geometry and invariant theory.

This book explains the basic concepts of prehomogeneous vector spaces, the fundamental theorem, the zeta functions associated with prehomogeneous vector spaces, and a classification theory of irreducible prehomogeneous vector spaces. It strives, and to a large extent succeeds, in making this content, which is by its nature fairly technical, self-contained and accessible. The first section of the book, “Overview of the theory and contents of this book,” is particularly noteworthy as an excellent introduction to the subject.

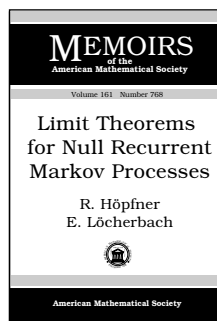
This item will also be of interest to those working in algebra and algebraic geometry.

Contents: Algebraic preliminaries; Relative invariants of prehomogeneous vector spaces; Analytic preliminaries; The fundamental theorem of prehomogeneous vector spaces; The zeta functions of prehomogeneous vector spaces; Convergence of zeta functions of prehomogeneous vector spaces; Classification of prehomogeneous vector spaces; Appendix: Table of irreducible reduced prehomogeneous vector spaces; Bibliography; Index of symbols; Index.

Translations of Mathematical Monographs, Volume 215

January 2003, 288 pages, Hardcover, ISBN 0-8218-2767-7, LC 2002032634, 2000 *Mathematics Subject Classification*: 11S90; 11-01, 11M41, 20G05, **Individual member***, List \$99, Institutional member*, Order code MMONO/215N

Probability



Limit Theorems for Null Recurrent Markov Processes

R. Höpfner, *University of Mainz, Germany*, and E. Löcherbach, *UFR des Sciences et Technologie, Creteil, France*

Contents: Introduction; Harris recurrence; Stable increasing processes and

Mittag Leffler processes; The main theorem; Proofs for subsection 3.1 - sufficient condition; Proofs for subsection 3.1 - necessary condition; Nummelin splitting in discrete time; Nummelin-like splitting for general continuous time Harris processes and proofs for subsection 3.3; Overview: assumptions (H1) - (H6); References.

Memoirs of the American Mathematical Society, Volume 161, Number 768

January 2003, 92 pages, Softcover, ISBN 0-8218-3231-X, LC 2002033245, 2000 *Mathematics Subject Classification*: 60J25, 60G44, 60F17, **Individual member***, List \$51, Institutional member*, Order code MEMO/161/768N

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