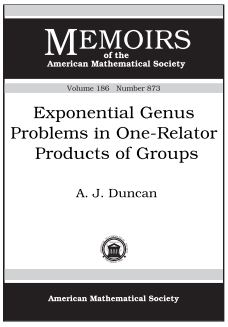
New Publications Offered by the AMS

Algebra and Algebraic Geometry



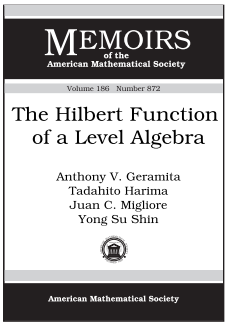
Exponential Genus Problems in One-Relator Products of Groups

A. J. Duncan, *University of Newcastle, Newcastle upon Tyne, England*

Contents: Introduction; Quadratic words; Quadratic exponential equations and $\mathcal{L}$-genus; Resolutions of quadratic equations; Decision problems; Pictures; Corridors; Angle assignment; Curvature; Configurations C; Configurations D; Final angle adjustment; Isoperimetry; Proof of Theorem 5.9; Bibliography.

Memoirs of the American Mathematical Society, Volume 186, Number 873

February 2007, 156 pages, Softcover, ISBN-10: 0-8218-3945-4, ISBN-13: 978-0-8218-3945-4, LC 2006047919, 2000 *Mathematics Subject Classification:* 20F65, 20F05, 20F10; 20F06, 57M07, **Individual member US$40**, List US$66, Institutional member US$53, Order code MEMO/186/873



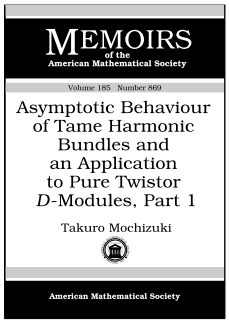
The Hilbert Function of a Level Algebra

Anthony V. Geramita, *Queen's University, Kingston, ON, Canada*, **Tadahito Harima**, *Hokkaido University of Education, Kushiro, Hokkaido, Japan*, **Juan C. Migliore**, *University of Notre Dame, IN*, and **Yong Su Shin**, *Sungshin Women's University, Seoul, Korea*

Contents: *Part 1. Nonexistence and Existence:* Introduction; Numerical conditions; Homological methods; Some refinements; Constructing Artinian level algebras; Constructing level sets of points; Expected behavior; *Part 2. Appendix: A Classification of Codimension Three Level Algebras of Low Socle Degree:* Appendix A. Introduction and notation; Appendix B. Socle degree 6 and Type 2; Appendix C. Socle degree 5; Appendix D. Socle degree 4; Appendix E. Socle degree 3; Appendix F. Summary; Appendix. Bibliography.

Memoirs of the American Mathematical Society, Volume 186, Number 872

February 2007, 139 pages, Softcover, ISBN-10: 0-8218-3940-3, ISBN-13: 978-0-8218-3940-9, LC 2006047920, 2000 *Mathematics Subject Classification:* 13D40, 13D02; 13C13, 13C40, 14C20, **Individual member US$38**, List US$64, Institutional member US$51, Order code MEMO/186/872



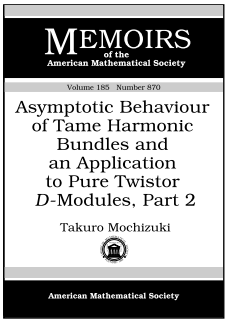
Asymptotic Behaviour of Tame Harmonic Bundles and an Application to Pure Twistor D-Modules, Part 1

Takuro Mochizuki, *Kyoto University, Japan*

Contents: Introduction; *Part 1. Preliminary:* Preliminary; Preliminary for mixed twistor structure; Preliminary for filtrations; Some lemmas for generically splitted case; Model bundles; *Part 2. Prolongation of Deformed Holomorphic Bundles:* Harmonic bundles on a punctured disc; Harmonic bundles on a product of punctured discs; The KMS-structure of the space of the multi-valued flat sections; The induced regular λ-connection on $\Delta^n \times C^*$; *Part 3. Limiting Mixed Twistor theorem and Some Consequence:* The induced vector bundle over $\mathbb{P}^1$; Limiting mixed twistor theorem; Norm estimate; Bibliography; Index.

Memoirs of the American Mathematical Society, Volume 185, Number 869

January 2007, 324 pages, Softcover, ISBN-10: 0-8218-3942-X, ISBN-13: 978-0-8218-3942-3, LC 2006047813, 2000 *Mathematics Subject Classification:* 14C30, 32S40, 53C07, 53C43, **Individual member US$51**, List US$85, Institutional member US$68, Order code MEMO/185/869



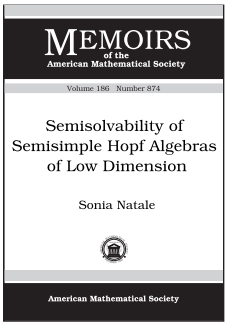
Asymptotic Behaviour of Tame Harmonic Bundles and an Application to Pure Twistor D-Modules, Part 2

Takuro Mochizuki, *Kyoto University, Japan*

Contents: *Part 4. An Application to the theory of Pure Twistor D-modules:* Pure twistor D-module; Prolongation of $\mathcal{R}$-module $\mathcal{E}$; The filtrations of $\mathfrak{E}[\partial_t]$; The weight filtration on $\psi_{t,u}\mathfrak{E}$ and the induced $\mathcal{R}$-triple; The sesqui-linear pairings; Polarized pure twistor D-module and tame harmonic bundles; The pure twistor D-modules on a smooth curve (Appendix); *Part 5. Characterization of Semisimplicity by Tame Pure Imaginary Pluri-harmonic Metric:* Preliminary; Tame pure imaginary harmonic bundle; The Dirichlet problem in the punctured disc case; Control of the energy of twisted maps on a Kahler surface; The existence of tame pure imaginary pluri-harmonic metric; Bibliography; Index.

Memoirs of the American Mathematical Society, Volume 185, Number 870

January 2007, 240 pages, Softcover, ISBN-10: 0-8218-3943-8, ISBN-13: 978-0-8218-3943-0, LC 2006047813, 2000 *Mathematics Subject Classification:* 14C30, 32S40, 53C07, 53C43, **Individual member US$47**, List US$78, Institutional member US$62, Order code MEMO/185/870



Semisolvability of Semisimple Hopf Algebras of Low Dimension

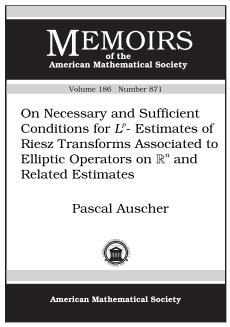
Sonia Natale, *Universidad Nacional de Córdoba, Argentina*

Contents: Introduction and main results; Conventions and notation; Semisimple Hopf algebras; The Nichols-Richmond theorem; Quotient coalgebras; Braided Hopf algebras; Cocycle deformations of some Hopf algebras; Dimension 24; Dimension 30; Dimension 36; Dimension 40; Dimension 42; Dimension 48; Dimension 54; Dimension 56; Appendix A. Drinfeld double of H_8; Appendix. Bibliography.

Memoirs of the American Mathematical Society, Volume 186, Number 874

February 2007, 123 pages, Softcover, ISBN-10: 0-8218-3948-9, ISBN-13: 978-0-8218-3948-5, LC 2006047928, 2000 *Mathematics Subject Classification:* 16W30; 17B37, **Individual member US$37**, List US$62, Institutional member US$50, Order code MEMO/186/874

Analysis



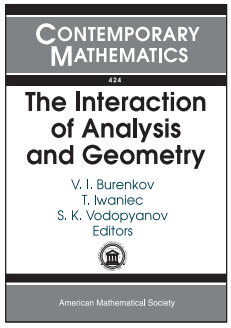
On Necessary and Sufficient Conditions for L^p-Estimates of Riesz Transforms Associated to Elliptic Operators on $\mathbb{R}^n$ and Related Estimates

Pascal Auscher, *Université Paris-Sud, Orsay, France*

Contents: Beyond Calderón-Zygmund operators; Basic L^2 theory for elliptic operators; L^p theory for the semigroup; L^p theory for square roots; Riesz transforms and functional calculi; Square function estimates; Miscellani; Appendix A. Calderón-Zygmund decomposition for Sobolev functions; Appendix. Bibliography.

Memoirs of the American Mathematical Society, Volume 186, Number 871

February 2007, 75 pages, Softcover, ISBN-10: 0-8218-3941-1, ISBN-13: 978-0-8218-3941-6, 2000 *Mathematics Subject Classification:* 42B20, 42B25, 47F05, 47B44, 35J15, 35J30, 35J45, **Individual member US$36**, List US$60, Institutional member US$48, Order code MEMO/186/871



The Interaction of Analysis and Geometry

V. I. Burenkov, *Cardiff University, United Kingdom*, **T. Iwaniec**, *Syracuse University, NY*, and **S. K. Vodopyanov**, *Sobolev Institute of Mathematics, Novosibirsk, Russia*, Editors

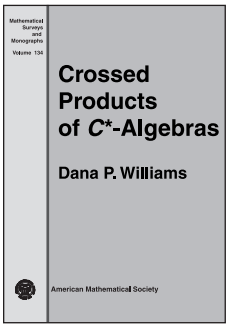
The papers in this volume are based on talks given at the International Conference on Analysis and Geometry in honor of the 75th birthday of Yuriĭ Reshetnyak (Novosibirsk, 2004). The topics include geometry of spaces with bounded curvature in the sense of Alexandrov, quasiconformal mappings and mappings with bounded distortion (quasiregular mappings), nonlinear potential theory, Sobolev spaces, spaces with fractional and generalized smoothness, variational problems, and other modern trends in these areas. Most articles are related to Reshetnyak's original works and demonstrate the vitality of his fundamental contribution in some important fields of mathematics such as the geometry in the "large", quasiconformal analysis, Sobolev spaces, potential theory and variational calculus.

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

Contents: I. D. Berg and **I. G. Nikolaev**, On an extremal property of quadrilaterals in an Aleksandrov space of curvature $\leq K$; **V. I. Burenkov**, **H. V. Guliyev**, and **V. S. Guliyev**, On boundedness of the fractional maximal operator from complementary Morrey-type spaces to Morrey-type spaces; **V. N. Dubinin** and **D. B. Karp**, Generalized condensers and distortion theorems for conformal mappings of planar domains; **M. L. Goldman**, Rearrangement invariant envelopes of generalized Besov, Sobolev, and Calderon spaces; **T. Iwaniec**, Null Lagrangians, the art of integration by parts; **M. Karmanova**, Geometric measure theory formulas on rectifiable metric spaces; **A. P. Kopylov**, Stability and regularity of solutions to elliptic systems of partial differential equations; **V. M. Miklyukov**, Removable singularities of differential forms and A-solutions; **H. Murakami**, Various generalizations of the volume conjecture; **P. Pedregal**, Gradient Young measures and applications to optimal design; **H. M. Riemann**, Wavelets for the cochlea; **Y. G. Reshetnyak**, Sobolev-type classes of mappings with values in metric spaces; **L. Székelyhidi, Jr.**, Counterexamples to elliptic regularity and convex integration; **S. K. Vodopyanov**, Geometry of Carnot-Carathéodory spaces and differentiability of mappings; **S. K. Vodopyanov**, Foundations of the theory of mappings with bounded distortion on Carnot groups.

Contemporary Mathematics, Volume 424

April 2007, approximately 342 pages, Softcover, ISBN-10: 0-8218-4060-6, ISBN-13: 978-0-8218-4060-3, LC 2006052735, 2000 *Mathematics Subject Classification:* 26-XX, 28-XX, 30Cxx, 35-XX, 46Exx, 49-XX, 53Cxx, 57Mxx, 58-XX, **All AMS members US$79**, List US$99, Order code CONM/424



Crossed Products of C^*-Algebras

Dana P. Williams, *Dartmouth College, Hanover, NH*

The theory of crossed products is extremely rich and intriguing. There are applications not only to operator algebras, but to subjects as varied as noncommutative geometry and mathematical physics. This book provides a detailed introduction to this vast subject suitable for graduate students and others whose research has contact with crossed product C^*-algebras. In addition to providing the basic definitions and results, the main focus of this book is the fine ideal structure of crossed products as revealed by the study of induced representations via the Green-Mackey-Rieffel machine. In particular, there is an in-depth analysis of the imprimitivity theorems on which Rieffel's theory of induced representations and Morita equivalence of C^*-algebras are based. There is also a detailed treatment of the generalized Effros-Hahn conjecture and its proof due to Gootman, Rosenberg, and Sauvageot.

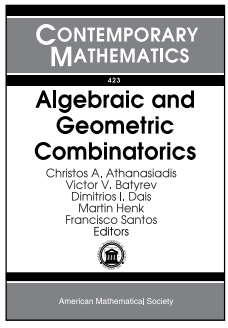
This book is meant to be self-contained and accessible to any graduate student coming out of a first course on operator algebras. There are appendices that deal with ancillary subjects, which while not central to the subject, are nevertheless crucial for a complete understanding of the material. Some of the appendices will be of independent interest.

Contents: Locally compact groups; Dynamical systems and crossed products; Special cases and basic constructions; Imprimitivity theorems; Induced representations and induced ideals; Orbits and quasi-orbits; Properties of crossed products; Ideal structure; The proof of the Gootman-Rosenberg-Sauvageot theorem; Amenable groups; The Banach *-algebra $L^1(G, A)$; Bundles of C^*-algebras; Groups; Representations of C^*-algebras; Direct integrals; Effros's ideal center decomposition; The Fell topology; Miscellany; Notation and Symbol Index; Index; Bibliography.

Mathematical Surveys and Monographs, Volume 134

March 2007, 528 pages, Hardcover, ISBN-10: 0-8218-4242-0, ISBN-13: 978-0-8218-4242-3, LC 2006047931, 2000 *Mathematics Subject Classification:* 46L55, 46L05, 22D25, 22D30, 46L45, 54H15, **All AMS members US$87**, List US$109, Order code SURV/134

Discrete Mathematics and Combinatorics



Algebraic and Geometric Combinatorics

Christos A. Athanasiadis, *University of Athens, Hellas, Greece*, **Victor V. Batyrev**, *Universität Tübingen, Germany*, **Dimitrios I. Dais**, *University of Crete, Hellas, Greece*, **Martin Henk**, *Otto von Guericke University, Magdeburg, Germany*, and **Francisco Santos**, *University of Cantabria, Santander, Spain*, Editors

This volume contains original research and survey articles stemming from the Euroconference "Algebraic and Geometric Combinatorics". The papers discuss a wide range of problems that illustrate interactions of combinatorics with other branches of mathematics, such as commutative algebra, algebraic geometry, convex and discrete geometry, enumerative geometry, and topology of complexes and partially ordered sets. Among the topics covered are combinatorics of polytopes, lattice polytopes, triangulations and subdivisions, Cohen–Macaulay cell complexes, monomial ideals, geometry of toric surfaces, groupoids in combinatorics, Kazhdan–Lusztig combinatorics, and graph colorings. This book is aimed at researchers and graduate students interested in various aspects of modern combinatorial theories.

Contents: V. V. Batyrev, Lattice polytopes with a given $h*$-polynomial; **A. Conca**, **S. Hoten**, and **R. R. Thomas**, Nice initial complexes of some classical ideals; **V. C. Quiñonez**, Ratliff-Rush monomial ideals; **P. Csorba** and **F. H. Lutz**, Graph coloring manifolds; **D. I. Dais**, Geometric combinatorics in the study of compact toric surfaces; **D. I. Dais**, **M. Henk**, and **G. M. Ziegler**, On the existence of Crepant resolutions of Gorenstein abelian quotient singularities in dimensions ≥ 4; **P. Fiebig**, Kazhdan-Lusztig combinatorics via sheaves on Bruhat graphs; **G. Fløystad**, Cohen-Macaulay cell complexes; **D. N. Kozlov**, Homology tests for graph colorings; **P. McMullen**, Polyhedra and polytopes: Algebra and combinatorics; **B. Nill**, Classification of pseudo-symmetric simplicial reflexive polytopes; **A. Paffenholz** and **A. Werner**,

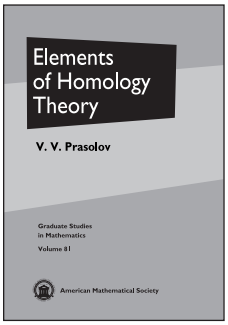
Constructions for 4-polytopes and the cone of flag vectors; **R. T. Živaljević**, Groupoids in combinatorics–Applications of a theory of local symmetries.

Contemporary Mathematics, Volume 423

February 2007, approximately 453 pages, Softcover, ISBN-10: 0-8218-4080-0, ISBN-13: 978-0-8218-4080-1, LC 2006043048, 2000 *Mathematics Subject Classification:* 05-06, 05Exx, 52-06; 05Axx, 05Cxx, 14Mxx, 20Cxx, 52Axx, 52Bxx, 52Cxx, **All AMS members US$71**, List US$89, Order code CONM/423

Geometry and Topology

COURSE ADOPTION



Elements of Homology Theory

V. V. Prasolov, *Independent University of Moscow, Russia*

The book is a continuation of the previous book by the author (*Elements of Combinatorial and Differential Topology*, Graduate Studies in Mathematics, Volume 74, American Mathematical Society, 2006). It starts with the definition of simplicial homology and cohomology, with many examples and applications. Then the Kolmogorov–Alexander multiplication in cohomology is introduced. A significant part of the book is devoted to applications of simplicial homology and cohomology to obstruction theory, in particular, to characteristic classes of vector bundles. The later chapters are concerned with singular homology and cohomology, and Čech and de Rham cohomology. The book ends with various applications of homology to the topology of manifolds, some of which might be of interest to experts in the area.

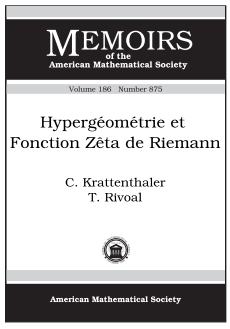
The book contains many problems; almost all of them are provided with hints or complete solutions.

Contents: Simplicial homology; Cohomology rings; Applications of simplicial homology; Singular homology; Čech cohomology and de Rham cohomology; Miscellaneous; Hints and solutions; Bibliography; Index.

Graduate Studies in Mathematics, Volume 81

March 2007, approximately 424 pages, Hardcover, ISBN-10: 0-8218-3812-1, ISBN-13: 978-0-8218-3812-9, LC 2006047074, 2000 *Mathematics Subject Classification:* 55-01, **All AMS members US$55**, List US$69, Order code GSM/81

Number Theory



Hypergéométrie et Fonction Zêta de Riemann

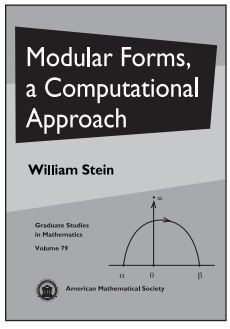
C. Krattenthaler, *Université Claude Bernard, Villeurbanne, France*, and **T. Rivoal**, *Université de Grenoble I, Saint-Martin d'Héres, France*

Contents: Introduction et plan de l'article; Arrière plan; Les résultats principaux; Conséquences diophantiennes du Théorème 1; Le principe des démonstrations des Théorèmes 1 à 6; Deux identités entre une somme simple et une somme multiple; Quelques explications; Des identités hypergéométrico-harmoniques; Corollaires au Théorème 8; Corollaires au Théorème 9; Lemmes arithmétiques; Démonstration du Théorème 1, partie i); Démonstration du Théorème 1, partie ii); Démonstration du Théorème 3, partie i) et des Théorèmes 4 et 5; Démonstration du Théorème 3, partie ii) et du Théorème 6; Encore un peu d'hypergéométrie; Perspectives; Bibliographie.

Memoirs of the American Mathematical Society, Volume 186, Number 875

February 2007, 87 pages, Softcover, ISBN-10: 0-8218-3961-6, ISBN-13: 978-0-8218-3961-4, LC 2006047930, 2000 *Mathematics Subject Classification:* 11J72; 11J82, 33C20, **Individual member US$36**, List US$60, Institutional member US$48, Order code MEMO/186/875

COURSE ADOPTION



Modular Forms, a Computational Approach

William Stein, *University of Washington, Seattle, WA*
with an appendix by Paul E. Gunnells

This marvellous and highly original book fills a significant gap in the extensive literature on classical modular forms. This is not just yet another introductory text to this theory, though it could certainly be used as such in conjunction with more traditional treatments. Its novelty lies in its computational emphasis throughout: Stein not only defines what modular forms are, but shows in illuminating detail how one can compute everything about them in practice. This is illustrated throughout the book with examples from his own (entirely free) software package SAGE, which really bring the subject to life while not detracting in any way from its theoretical beauty. The author is the leading expert in computations with modular forms, and what he says on this subject is all tried and tested and based on his extensive experience. As well as being an invaluable companion to those learning the theory in a more traditional way, this book will be a great help to those who wish to use modular forms in applications, such as in the explicit solution

of Diophantine equations. There is also a useful Appendix by Gunnells on extensions to more general modular forms, which has enough in it to inspire many PhD theses for years to come. While the book's main readership will be graduate students in number theory, it will also be accessible to advanced undergraduates and useful to both specialists and non-specialists in number theory.

—***John E. Cremona, University of Nottingham***

William Stein is an associate professor of mathematics at the University of Washington at Seattle. He earned a PhD in mathematics from UC Berkeley and has held positions at Harvard University and UC San Diego. His current research interests lie in modular forms, elliptic curves, and computational mathematics.

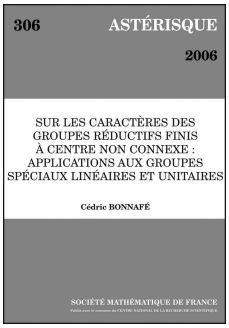
Contents: Modular forms; Modular forms of level 1; Modular forms of weight 2; Dirichlet characters; Eisenstein series and Bernoulli numbers; Dimension formulas; Linear algebra; General modular symbols; Computing with newforms; Computing periods; Solutions to selected exercises; Appendix A: Computing in higher rank; Bibliography; Index.

Graduate Studies in Mathematics, Volume 79

March 2007, 268 pages, Hardcover, ISBN-10: 0-8218-3960-8, ISBN-13: 978-0-8218-3960-7, LC 2006047950, 2000 *Mathematics Subject Classification:* 11F11, 11Y16, 11F67, 11F55, 11F75, **All AMS members US$44**, List US$55, Order code GSM/79

New AMS-Distributed Publications

Algebra and Algebraic Geometry



Sur les caractères des groupes réductifs finis à centre non connexe: applications aux groupes spéciaux linéaires et unitaires

Cédric Bonnafé, *Université de Franche-Comté, Besancon, France*

A first aim of this paper is to present an overview of results obtained by several authors on the characters of finite reductive groups with non-connected centre. The author is particularly interested in problems directly linked to the non-connectedness of the centre. He emphasises Gelfand-Graev and semisimple characters.

A second aim is to study the influence of the non-connectedness of the centre on the theory of character sheaves. The author studies more precisely the family of character sheaves whose support meets the regular unipotent class: these are analogues of the semisimple characters.

The last aim is the application of these results to finite reductive groups of type A, split or not (as for instance the special linear or special unitary groups). Whenever the cardinality of the finite field is large enough, the author obtains a parametrization of the irreducible characters, a parametrization of the character sheaves, and he shows that the characteristic functions of character sheaves are Fourier transforms of the irreducible characters (Lusztig's conjecture). This gives a theoretical algorithm for computing the character table of these groups.

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; Préliminaires, notations, définitions; Le groupe $\mathcal{Z}(\mathbf{G})$; Induction et restriction de Lusztig, séries de Lusztig; Théorie de Harish-Chandra; Autour des caractères de Gelfand-Graev; Faisceaux-caractères; Groupes de type A; Le groupe spécial linéaire; A. Produits en couronne; B. Sommes de Gauss; Bibliographie; Index.

Astérisque, Number 306

November 2006, 165 pages, Softcover, ISBN-10: 2-85629-190-2, ISBN-13: 978-2-85629-190-0, 2000 *Mathematics Subject Classification:* 20G05, 20G40, **Individual member US$47**, List US$52, Order code AST/306

Analysis

Surprises and Counterexamples in Real Function Theory

A. R. Rajwade *and* **A. K. Bhandari**, *Panjab University, Chandigarh, India*

This book presents a variety of intriguing, surprising and appealing topics and nonroutine proofs of several theorems in real function theory. It is a reference book to which one can turn for finding answers to curiosities that arise while studying or teaching analysis.

Chapter 1 is an introduction to algebraic, irrational and transcendental numbers and contains the construction of the Cantor ternary set. Chapter 2 contains functions with extraordinary properties. Chapter 3 discusses functions that are continuous at each point but differentiable at no point. Chapters 4 and 5 include the intermediate value property, periodic functions, Rolle's theorem, Taylor's theorem, points of inflexion and tangents. Chapter 6 discusses sequences and series. It includes the restricted harmonic series, rearrangements of alternating harmonic series and some number theoretic aspects. In Chapter 7, the infinite exponential x with its peculiar range of convergence is studied. Appendix I deals with some specialized topics. Exercises are included at the end of chapters and their solutions are provided in Appendix II.

This book will be useful for students and teachers alike.

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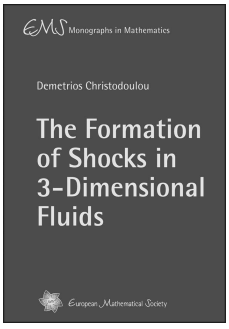
Contents: Introduction to the real line R and some of its subsets; Functions: Pathological, peculiar and extraordinary; Famous everywhere continuous, nowhere differentiable functions: van der Waerden's and others; Functions: Continuous, periodic, locally recurrent and others; The derivative and higher derivatives; Sequences, harmonic series, alternating series and related result; The infinite exponential $x^{x^{x^{\cdot^{\cdot^{\cdot}}}}}$ and related results; A.1. Stirling's formula and the trapezoidal rule; A.2. Schwarz differentiability; A.3. Cauchy's functional equation $f(x+y) = f(x) + f(y)$; Appendix II: Hints and solutions to exercises.

Hindustan Book Agency

January 2007, 298 pages, Hardcover, ISBN-10: 81-85931-71-2, ISBN-13: 978-81-85931-71-5, 2000 *Mathematics Subject Classification:* 26A06, **All AMS members US$34**, List US$42, Order code HIN/32

Applications



The Formation of Shocks in 3-Dimensional Fluids

Demetrios Christodoulou, *Eidgen Technische Hochschule, Zurich, Switzerland*

The equations describing the motion of a perfect fluid were first formulated by Euler in 1752. These equations were among the first partial differential equations to be written down, but, after a lapse of two and a half centuries, we are still far from adequately understanding the observed phenomena which are supposed to lie within their domain of validity.

These phenomena include the formation and evolution of shocks in compressible fluids, the subject of the present monograph. The first work on shock formation was done by Riemann in 1858. However, his analysis was limited to the simplified case of one space dimension. Since then, several deep physical insights have been attained and new methods of mathematical analysis invented. Nevertheless, the theory of the formation and evolution of shocks in real three-dimensional fluids has remained up to this day fundamentally incomplete.

This monograph considers the relativistic Euler equations in three space dimensions for a perfect fluid with an arbitrary equation of state. The author considers initial data for these equations which outside a sphere coincide with the data corresponding to a constant state. Under suitable restriction on the size of the initial departure from the constant state, he establishes theorems that give a complete description of the maximal classical development. In particular, it is shown that the boundary of the domain of the maximal classical development has a singular part where the inverse density of the wave fronts vanishes, signalling shock formation. The theorems give a detailed description of the geometry of this singular boundary and a detailed analysis of the behavior of the solution there. A complete picture of shock formation in three-dimensional fluids is thereby obtained. The approach is geometric, the central concept being that of the acoustical spacetime manifold.

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

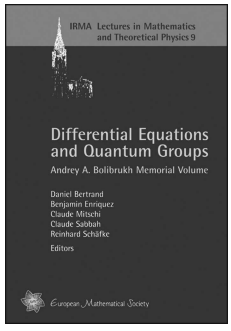
A publication of the European Mathematical Society (EMS). Distributed within the Americas by the American Mathematical Society.

Contents: Prologue and summary; Relativistic fluids and nonlinear wave equations. The equations of variations; The basic geometric construction; The acoustical structure equations; The acoustical curvature; The fundamental energy estimate; Construction of the commutation vectorfields; Outline of the derived estimates of each order; Regularization of the propagation equation for $\not{d}\mathrm{tr}\chi$. Estimates for the top order spatial derivatives of χ; Regularization of the propagation equation for $\not{\Delta}\mu$. Estimates for the top order spatial derivatives of μ; Control of the angular derivatives of the first derivatives of the x^i. Assumptions and estimates in regard to χ; Control of the spatial derivatives of the first derivatives of the x^i. Assumptions and estimates in regard to μ; Recovery of the acoustical assumptions. Estimates for up to the next to the top order angular derivatives of χ and spatial derivatives of μ; The error estimates involving the top order spatial derivatives of the acoustical entities. The energy estimates. Recovery of the bootstrap assumptions. Statement and proof of the main Theorem: Existence up to shock formation; Sufficient conditions on the initial data for the formation of a shock in the evolution; The nature of the singular hypersurface. The invariant curves. The trichotomy theorem. The structure of the boundary of the domain of the maximal solution; Epilogue; Bibliography; Index.

EMS Monographs in Mathematics

January 2007, 1000 pages, Hardcover, ISBN-10: 3-03719-031-0, ISBN-13: 978-3-03719-031-9, 2000 *Mathematics Subject Classification:* 35L67, 35L65, 35L70, 58J45, 76L05, 76N15, 76Y05, **All AMS members US$158**, List US$198, Order code EMSMONO/2

Differential Equations



Differential Equations and Quantum Groups

Andrey A. Bolibrukh Memorial Volume

Daniel Bertrand, *Université Pierre et Marie Curie, Paris, France*, **Benjamin Enriquez** and **Claude Mitschi**, *Université Louis Pasteur et CNRS, Strasbourg, France*, **Claude Sabbah**, *Ecole Polytechnique, Palaiseau, France*, and **Reinhard Schäfke**, *Université*

Louis Pasteur et CNRS, Strasbourg, France, Editors

This special volume is dedicated to the memory of Andrey A. Bolibrukh. It contains two expository articles devoted to some aspects of Bolibrukh's work, followed by ten refereed research articles.

Topics cover complex linear and nonlinear differential equations and quantum groups: monodromy, Fuchsian linear systems, Riemann–Hilbert problem, differential Galois theory, differential algebraic groups, multisummability, isomonodromy, Painlevé equations, Schlesinger equations, integrable systems, KZ equations, complex reflection groups, and root systems.

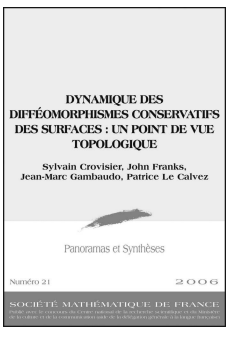
This item will also be of interest to those working in mathematical physics.

A publication of the European Mathematical Society. Distributed within the Americas by the American Mathematical Society.

Contents: Y. Ilyashenko, Realization of irreducible monodromy by Fuchsian systems and reduction to the Birkhoff standard form (by Andrey Bolibrukh); **C. Sabbah**, The work of Andrey Bolibrukh on isomonodromic deformations; **M. Audin**, Two notions of integrability; **W. Balser**, Formal power series solutions of the heat equation in one spatial variable; **P. Belkale**, **E. Mukhin**, and **A. Varchenko**, Multiplicity of critical points of master functions and Schubert calculus; **P. Boalch**, Some explicit solutions to the Riemann–Hilbert problem; **P. J. Cassidy** and **M. F. Singer**, Galois theory of parameterized differential equations and linear differential algebraic groups; **B. Dubrovin** and **M. Mazzocco**, On the reductions and classical solutions of the Schlesinger equations; **V. A. Golubeva**, On the Riemann–Hilbert correspondence for generalized Knizhnik–Zamolodchikov equations for different root systems; **V. P. Kostov**, Monodromy groups of regular systems on the Riemann sphere; **V. P. Leksin**, Monodromy of Cherednik–Kohno–Veselov connections; **H. Umemura**, Invitation to Galois theory; List of Participants.

IRMA Lectures in Mathematics and Theoretical Physics, Volume 9

December 2006, 302 pages, Softcover, ISBN-10: 3-03719-020-5, ISBN-13: 978-3-03719-020-3, 2000 *Mathematics Subject Classification:* 14N15, 20F55, 32G34, 32S22, 33E17, 34Mxx, 35C10, 35Q15, 70H05, **All AMS members US$43**, List US$54, Order code EMSILMTP/9



Dynamique des différéomorphismes conservatifs des surfaces: un point de vue topologique

Sylvain Crovisier, *Université Paris XIII, Villetaneuse, France*, **John Franks**, *Northwestern University, Evanston, IL*, **Jean-Marc Gambaudo**, *Universidad de Chile, Santiago, Chile*, and **Patrice Le Calvez**, *Université Paris XIII, Villetaneuse, France*

This volume deals with the dynamics of area-preserving surface diffeomorphisms. In dimension 2, some specific mathematical tools are available. In addition, the authors present several approaches and some applications. In particular, they try to show how the geometrical theory of dynamical systems, the group theory, the hydrodynamics and the plane topology interact.

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

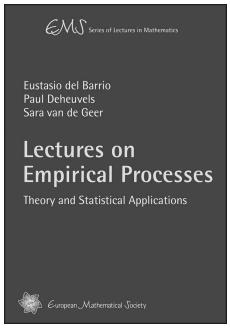
A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

Contents: S. Crovisier, Perturbation of C^1-diffeomorphisms and generic conservative dynamics on surfaces; **J. Franks**, Distortion in groups of circle and surface diffeomorphisms; **J.-M. Gambaudo**, Knots, flows, and fluids; **P. Le Calvez**, Identity isotopies on surfaces.

Panoramas et Synthèses, Number 21

November 2006, 142 pages, Softcover, ISBN-10: 2-85629-220-8, ISBN-13: 978-2-85629-220-4, 2000 *Mathematics Subject Classification:* 37-01, 37A05, 37C25, 37E30, 37E45, **Individual member US$47**, List US$52, Order code PASY/21

Probability



Lectures on Empirical Processes

Theory and Statistical Applications

Eustasio del Barrio, *Universidad de Valladolid, Valladolid, Spain*, **Paul Deheuvels**, *Université de Paris VI, Bourg-la-Reine, France*, and **Sara van de Geer**, *ETH Zentrum, Zurich, Switzerland*

The theory of empirical processes constitutes the mathematical toolbox of asymptotic statistics. Its growth was accelerated by the 1950s work on the Functional Central Limit Theorem and the Invariance Principle. The theory has developed in parallel with statistical methodologies, and has been successfully applied to a large diversity of problems related to the asymptotic behaviour of statistical procedures.

The three sets of lecture notes in the book offer a wide panorama of contemporary empirical processes theory. Techniques are developed in the framework of probability in Banach spaces, Hungarian-style strong approximations, using tools from general stochastic process theory. Other tools appear in this text in connection with historical as well as modern applications, such as goodness-of-fit tests, density estimation or general M-estimators.

This book gives an excellent overview of the broad scope of the theory of empirical processes. It will be an invaluable aid for students and researchers interested in

an advanced and well-documented approach to the selected topics.

A publication of the European Mathematical Society (EMS). Distributed within the Americas by the American Mathematical Society.

Contents: E. del Barrio, Empirical and quantile processes in the asymptotic theory of goodness-of-fit tests; **P. Deheuvels**, Topics on empirical process; **S. van de Geer**, Oracle inequalities and regularization; Index.

EMS Series of Lectures in Mathematics

January 2007, 264 pages, Softcover, ISBN-10: 3-03719-027-2, ISBN-13: 978-3-03719-027-2, 2000 *Mathematics Subject Classification:* 60F05, 60K35, 62C12, 62F05, 62F12, 62G30, 62Jxx, **All AMS members US$38**, List US$48, Order code EMSSERLEC/6