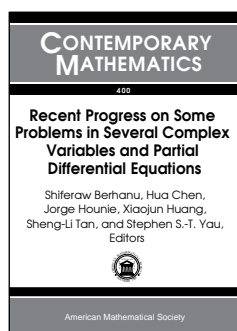


New Publications Offered by the AMS

Analysis



Recent Progress on Some Problems in Several Complex Variables and Partial Differential Equations

Shiferaw Berhanu, Hua Chen, Jorge Hounie, Xiaojun Huang, Sheng-Li Tan, and Stephen S.-T. Yau, Editors

The papers in this volume cover many important topics of current interest in partial differential equations and several complex variables. An international group of well-known mathematicians has contributed original research articles on diverse topics such as the geometry of complex manifolds, the mean curvature equation, formal solutions of singular partial differential equations, and complex vector fields.

The material in this volume is useful for graduate students and researchers interested in partial differential equations and several complex variables.

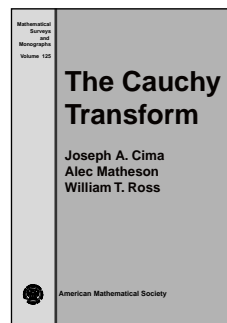
This item will also be of interest to those working in differential equations.

Contents: C. Anedda and G. Porru, Problems on the Monge-Ampère equation in the plane; A. P. Bergamasco and P. L. D. da Silva, Global solvability for a special class of vector fields on the torus; F. Catanese and P. Frediani, Deformation in the large of some complex manifolds, II; A. Chau and L.-F. Tam, Gradient Kähler-Ricci solitons and complex dynamical systems; H. Chen, Z. Luo, and C. Zhang, On the summability of formal solutions for a class of nonlinear singular PDEs with irregular singularity; Z. Chen and S.-L. Tan, Upper bounds on the slope of a genus 3 fibration; J.-H. Cheng, The mean curvature equation in pseudohermitian geometry; W. M. Eby, Moment results for the Heisenberg group interpreted using the Weyl calculus; N. Gan and X.-Y. Zhou, The cohomology of vector bundles on general non-primary Hopf manifolds; H. Hannah, A. A. Himonas, and G. Petronilho, Gevrey regularity in time for generalized KdV type equations; J. Hounie and E. Lanconelli, An Alexandrov type theorem for Reinhardt domains of \mathbb{C}^2 ; L. Lei, G. Wang, and L. Zhang, The

quantitative estimate of unique continuation and the cost of approximate controllability for coupled parabolic systems; H. S. Luk, S. S.-T. Yau, and W. Zang, Complete invariant of a family of strongly pseudoconvex domain in A_1 -singularity: Bergman function; G. A. Mendoza, Anisotropic blowup and compactification; A. Meziani, Planar complex vector fields and infinitesimal bendings of surfaces with nonnegative curvature; S.-K. Yeung, Bergman metric on Teichmüller spaces and moduli spaces of curves.

Contemporary Mathematics, Volume 400

May 2006, approximately 215 pages, Softcover, ISBN 0-8218-3921-7, 2000 *Mathematics Subject Classification*: 32-XX, 35-XX, All AMS members US\$47, List US\$59, Order code CONM/400



The Cauchy Transform

Joseph A. Cima, *University of North Carolina, Chapel Hill, NC*, Alec L. Matheson, *Lamar University, Beaumont, TX*, and William T. Ross, *University of Richmond, VA*

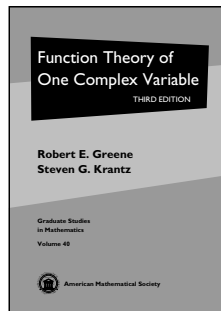
The Cauchy transform of a measure on the circle is a subject of both

classical and current interest with a sizable literature. This book is a thorough, well-documented, and readable survey of this literature and includes full proofs of the main results of the subject. This book also covers more recent perturbation theory as covered by Clark, Poltoratski, and Aleksandrov and contains an in-depth treatment of Clark measures.

Contents: Overview; Preliminaries; The Cauchy transform as a function; The Cauchy transform as an operator; Topologies on the space of Cauchy transforms; Which functions are Cauchy integrals?; Multipliers and divisors; The distribution function for Cauchy transforms; The backward shift on H^2 ; Clark measures; The normalized Cauchy transform; Other operators on the Cauchy transforms; List of symbols; Bibliography; Index.

Mathematical Surveys and Monographs, Volume 125

April 2006, 272 pages, Hardcover, ISBN 0-8218-3871-7, LC 2005055587, 2000 *Mathematics Subject Classification*: 30E20, 30E10, 30H05, 32A35, 32A40, 32A37, 32A60, 47B35, 47B37, 46E27, All AMS members US\$60, List US\$75, Order code SURV/125



Function Theory of One Complex Variable

Third Edition

Robert E. Greene, *University of California, Los Angeles, CA*, and Steven G. Krantz, *Washington University, St. Louis, MO*

Complex analysis is one of the most central subjects in mathematics. It is compelling and rich in its own right, but it is also remarkably useful in a wide variety of other mathematical subjects, both pure and applied. This book is different from others in that it treats complex variables as a direct development from multivariable real calculus. As each new idea is introduced, it is related to the corresponding idea from real analysis and calculus. The text is rich with examples and exercises that illustrate this point.

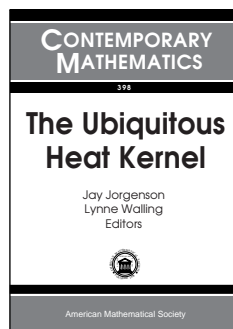
The authors have systematically separated the analysis from the topology, as can be seen in their proof of the Cauchy theorem. The book concludes with several chapters on special topics, including full treatments of special functions, the prime number theorem, and the Bergman kernel. The authors also treat H^p spaces and Painlevé's theorem on smoothness to the boundary for conformal maps.

This book is a text for a first-year graduate course in complex analysis. It is an engaging and modern introduction to the subject, reflecting the authors' expertise both as mathematicians and as expositors.

Contents: Fundamental concepts; Complex line integrals; Applications of the Cauchy integral; Meromorphic functions and residues; The zeros of a holomorphic function; Holomorphic functions as geometric mappings; Harmonic functions; Infinite series and products; Applications of infinite sums and products; Analytic continuation; Topology; Rational approximation theory; Special classes of holomorphic functions; Hilbert spaces of holomorphic functions, the Bergman kernel, and biholomorphic mappings; Special functions; The prime number theorem; Appendix A: Real analysis; Appendix B: The statement and proof of Goursat's theorem; References; Index.

Graduate Studies in Mathematics, Volume 40

April 2006, 504 pages, Hardcover, ISBN 0-8218-3962-4, LC 2005057188, 2000 *Mathematics Subject Classification*: 30-01; 30-02, 30-03, **All AMS members US\$63**, List US\$79, Order code GSM/40.R



The Ubiquitous Heat Kernel

Jay Jorgenson, *The City College of New York, NY*, and Lynne Walling, *University of Colorado at Boulder, CO*, Editors

The aim of this volume is to bring together research ideas from various fields of mathematics which utilize

the heat kernel or heat kernel techniques in their research. The intention of this collection of papers is to broaden productive communication across mathematical sub-disciplines and to provide a vehicle which would allow experts in one field to initiate research with individuals in another field, as well as to give non-experts a resource which can facilitate expanding their research and connecting with others.

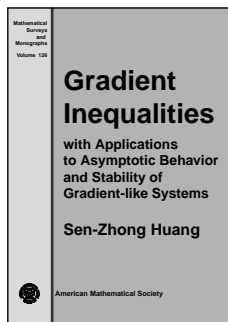
This item will also be of interest to those working in differential equations and mathematical physics.

Contents: L. Barchini, M. Sepanski, and R. Zierau, Positivity of zeta distributions and small unitary representations; R. Berndt, The heat equation and representations of the Jacobi group; J. Dodziuk and V. Mathai, Kato's inequality and asymptotic spectral properties for discrete magnetic Laplacians; D. S. Fine, The heat kernel in low-dimensional quantum theories; A. Grigor'yan, Heat kernels on weighted manifolds and applications; J. F. Grotowski, Heat kernels in geometric evolution equations; B. C. Hall, The range of the heat operator; B. Harris, Heat kernels and cycles; G. Hein, Green currents on Kähler manifolds; S. Hofmann, Heat kernels and Riesz transforms; M. D. Horton, D. B. Newland, and A. A. Terras, The contest between the kernels in the Selberg trace formula for the $(q + 1)$ -regular tree; J. Jorgenson and J. Kramer, Expressing Arakelov invariants using hyperbolic heat kernels; M. H. Lee and E. Previato, Grassmannians of higher local fields and multivariable tau functions; V. Mathai and I. Chatterji, Heat kernels and the range of the trace on completions of twisted group algebras; E. Previato, Theta functions, old and new; P. Sawyer, The heat kernel on the symmetric space $SL(n, \mathbb{F})/SU(n, \mathbb{F})$; B. Wang, Incidence structure.

Contemporary Mathematics, Volume 398

April 2006, 402 pages, Softcover, ISBN 0-8218-3698-6, LC 2005057186, 2000 *Mathematics Subject Classification*: 35K05, 22E45, 11F50, 14C99, 47N50, 58J35, 53C44, 32W30, 11F72, 53C15, **All AMS members US\$79**, List US\$99, Order code CONM/398

Differential Equations



Gradient Inequalities with Applications to Asymptotic Behavior and Stability of Gradient-like Systems

Sen-Zhong Huang, *Universität Rostock, Germany*

This book presents a survey of the relatively new research field of gradient inequalities and their applications. The exposition emphasizes the powerful applications of gradient inequalities in studying asymptotic behavior and stability of gradient-like dynamical systems. It explains in-depth how gradient inequalities are established and how they can be used to prove convergence and stability of solutions to gradient-like systems. This book will serve as an introduction for further studies of gradient inequalities and their applications in other fields, such as geometry and computer sciences.

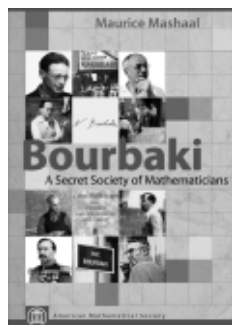
This book is written for advanced graduate students, researchers and applied mathematicians interested in dynamical systems and mathematical modeling.

Contents: Introduction and overview of the results; Gradient inequality; Abstract convergence results; Applications to semilinear gradient-like systems in Hilbert spaces; Applications to the stability problem; Bibliography; Index.

Mathematical Surveys and Monographs, Volume 126

June 2006, approximately 190 pages, Hardcover, ISBN 0-8218-4070-3, LC 2005058916, 2000 *Mathematics Subject Classification*: 35A15, 35Bxx, 35Kxx, 37L15, 47J35; 35Q80, 47Hxx, **All AMS members US\$47**, List US\$59, Order code SURV/126

General and Interdisciplinary



Bourbaki A Secret Society of Mathematicians

Maurice Mashaal, *Pour la Science, Paris, France*

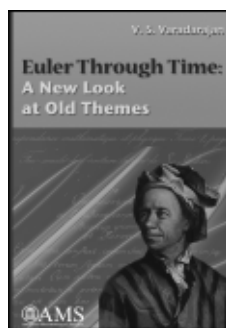
The name Bourbaki is known to every mathematician. Many also know something of the origins of Bourbaki, yet few know the full story. In 1935, a small group of young mathematicians

in France decided to write a fundamental treatise on analysis to replace the standard texts of the time. They ended up writing the most influential and sweeping mathematical treatise of the twentieth century, *Les éléments de mathématique*.

Maurice Mashaal lifts the veil from this secret society, showing us how heated debates, schoolboy humor, and the devotion and hard work of the members produced the ten books that took them over sixty years to write. The book has many first-hand accounts of the origins of Bourbaki, their meetings, their seminars, and the members themselves. He also discusses the lasting influence that Bourbaki has had on mathematics, through both the *Éléments* and the *Seminaires*. The book is illustrated with numerous remarkable photographs.

Contents: A group forms; The story of a name; Young Turks against stubborn priests; Bourbaki's *Éléments de Mathématique*; Towards axioms and structures; A snapshot of Bourbaki's work: Filters; The Bourbaki seminar; Subtle and austere schoolboys; "For the honor of the human spirit"; New math in the classroom; An immortal mathematician?; Acknowledgments; Bibliography

June 2006, approximately 260 pages, Softcover, ISBN 0-8218-3967-5, 2000 *Mathematics Subject Classification*: 01A70, 01A60, **All AMS members US\$23**, List US\$29, Order code BOURBAKI



Euler through Time: A New Look at Old Themes

V. S. Varadarajan, *University of California, Los Angeles, CA*

Euler is one of the greatest and most prolific mathematicians of all time. He wrote the first accessible books on calculus, created the theory of circular functions, and discovered new areas

of research such as elliptic integrals, the calculus of variations, graph theory, divergent series, and so on. It took hundreds of years for his successors to develop in full the theories he began, and some of his themes are still at the center of today's mathematics. It is of great interest therefore to examine his work and its relation to current mathematics. This book attempts to do that.

In number theory the discoveries he made empirically would require for their eventual understanding such sophisticated developments as the reciprocity laws and class field theory. His pioneering work on elliptic integrals is the precursor of the modern theory of abelian functions and abelian integrals. His evaluation of zeta and multizeta values is not only a fantastic and exciting story but very relevant to us, because they are at the confluence of much research in algebraic geometry and number theory today (Chapters 2 and 3 of the book).

Anticipating his successors by more than a century, Euler created a theory of summation of series that do not converge in the traditional manner. Chapter 5 of the book treats the progression of ideas regarding divergent series from Euler to many parts of modern analysis and quantum physics.

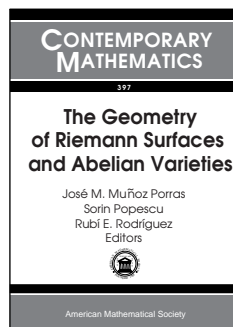
The last chapter contains a brief treatment of Euler products. Euler discovered the product formula over the primes for the zeta function as well as for a small number of what are now called Dirichlet L -functions. Here the book goes into the development of the theory of such Euler products and the role they play in number theory, thus offering the reader a glimpse of current developments (the Langlands program).

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

Contents: Leonhard Euler (1707–1783); The universal mathematician; Zeta values; Euler-Maclaurin sum formula; Divergent series and integrals; Euler products; Gallery.

June 2006, 296 pages, Hardcover, ISBN 0-8218-3580-7, LC 2005057177, 2000 *Mathematics Subject Classification:* 01A70; 01A50, 11-03, 40-03, **All AMS members US\$47**, List US\$59, Order code EULER

May 2006, 209 pages, Softcover, ISBN 0-8218-3696-X, LC 2005057189, 2000 *Mathematics Subject Classification:* 11S70, 19D55, 20D20, 46L80, 55N91, 55P35, 55P60, 55R80, 55U35, 57T25, **All AMS members US\$55**, List US\$69, Order code CONM/399



The Geometry of Riemann Surfaces and Abelian Varieties

José M. Muñoz Porras, *Universidad de Salamanca, Spain*, **Sorin Popescu**, *State University of New York at Stony Brook, NY*, and **Rubí E. Rodríguez**, *Pontificia Universidad Católica de Chile, Santiago, Chile*, Editors

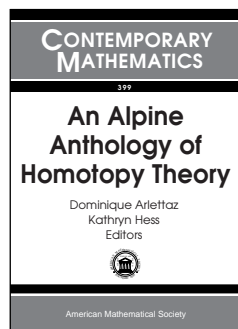
Most of the papers in this book deal with the theory of Riemann surfaces (moduli problems, automorphisms, etc.), abelian varieties, theta functions, and modular forms. Some of the papers contain surveys on the recent results in the topics of current interest to mathematicians, whereas others contain new research results.

Contents: **A. Basmajian** and **M. Zeinalian**, Möbius transformations of the circle form a maximal convergence group; **A. Campillo** and **J. Olivares**, On the polar linear system of a foliation by curves in a projective space; **F. J. Cirre**, Birational classification of hyperelliptic real algebraic curves; **C. J. Earle**, The genus two Jacobians that are isomorphic to a product of elliptic curves; **H. M. Farkas**, Vanishing thetanulls and Jacobians; **C. Florentino**, **J. Mourão**, and **J. P. Nunes**, Theta functions, geometric quantization and unitary Schottky bundles; **Y. Fuertes** and **G. González-Diez**, Smooth double coverings of hyperelliptic curves; **J. Gilman** and **L. Keen**, Planar families of discrete groups; **E. Gómez González** and **C. González-Martínez**, Generalized addition formulae for theta functions; **E. Gómez González** and **F. J. P. Martín**, Curves with a group action and Galois covers via infinite Grassmannians; **V. González-Aguilera**, **J. M. Muñoz-Porras**, and **A. G. Zamora**, Some recent results on the irreducible components of the singular locus of A_g ; **M. R. Gonzalez-Dorrego**, A note on the arithmetic genus of reducible plane curves; **F. Herrlich**, Teichmüller curves defined by characteristic origamis; **R. A. Hidalgo** and **B. Maskit**, Lowest uniformizations of compact real surfaces; **H. Lange**, Principal polarizations on products of elliptic curves; **F. P. Romo**, An approach to a 2-dimensional Contou-Carrère symbol; **S. Recillas** and **R. E. Rodríguez**, Prym varieties and fourfold covers II: The dihedral case; **G. Schmithüsen**, Examples for Veech groups of origamis; **R. Silhol**, Genus 2 translation surfaces with an order 4 automorphism; **R. Smith** and **R. Varley**, The Pfaffian structure defining a Prym theta divisor.

Contemporary Mathematics, Volume 397

April 2006, 236 pages, Softcover, ISBN 0-8218-3855-5, LC 2005057090, 2000 *Mathematics Subject Classification:* 30F10, 14H30, 14H40; 14H10, 14H15, 14H37, 14K25, 14K05, 30F40, **All AMS members US\$55**, List US\$69, Order code CONM/397

Geometry and Topology



An Alpine Anthology of Homotopy Theory

Dominique Arlettaz, *Université de Lausanne, Switzerland*, and **Kathryn Hess**, *Ecole Polytechnique Fédérale de Lausanne, Switzerland*, Editors

The second Arolla conference on algebraic topology brought together specialists covering a wide range of homotopy theory and K -theory. These proceedings reflect both the variety of talks given at the conference and the diversity of promising research directions in homotopy theory. The articles contained in this volume include significant contributions to classical unstable homotopy theory, model category theory, equivariant homotopy theory, and the homotopy theory of fusion systems, as well as to K -theory of both local fields and C^* -algebras.

Contents: **G. Arone**, A note on the homology of Σ_n , the Schwartz genus, and solving polynomial equations; **C. Broto**, **R. Levi**, and **B. Oliver**, A geometric construction of saturated fusion systems; **C. Casacuberta** and **B. Chorny**, The orthogonal subcategory problem in homotopy theory; **W. Chachólski**, **W. Pitsch**, and **J. Scherer**, Homotopy pull-back squares up to localization; **I. Chatterji** and **G. Mislin**, Traces and reduced group C^* -algebras; **A. Clément**, Integral cohomology of 2-local Hopf spaces with at most two non-trivial finite homotopy groups; **B. Gray** and **S. Theriault**, On the double suspension and the mod- p Moore space; **J. P. C. Greenlees** and **J. Ph. Hoffmann**, Rational extended Mackey functors for the circle group; **L. Hesselholt**, On the topological cyclic homology of the algebraic closure of a local field; **M. Joachim** and **M. W. Johnson**, Realizing Kasparov's KK -theory groups as the homotopy classes of maps of a Quillen model category; **J. Lin**, Homology commutators and P^1 actions.

Contemporary Mathematics, Volume 399

New AMS-Distributed Publications

Algebra and Algebraic Geometry

Linear Algebra and Group Theory for Physicists Second Edition

K. N. Srinivasa Rao, *University of Mysore, India*

Professor Srinivasa Rao's text on Linear Algebra and Group Theory is directed to undergraduate and graduate students who wish to acquire a solid theoretical foundation in these mathematical topics which find extensive use in physics. Based on courses delivered during Professor Srinivasa Rao's long career at the University of Mysore, this text is remarkable for its clear exposition of the subject.

Advanced students will find a range of topics such as the Representation theory of Linear Associative Algebras, a complete analysis of Dirac and Kemmer algebras, Representations of the Symmetric group via Young Tableaux, a systematic derivation of the Crystallographic point groups, a comprehensive and unified discussion of the Rotation and Lorentz groups and their representations, and an introduction to Dynkin diagrams in the classification of Lie groups. In addition, the first few chapters on Elementary Group Theory and Vector Spaces also provide useful instructional material even at an introductory level.

An authority on diverse aspects of mathematical physics, Professor Srinivasa Rao taught at the University of Mysore until 1982 and was subsequently at the Indian Institute of Science, Bangalore. He has authored a number of texts, among them *The Rotation and Lorentz Groups and Their Representations for Physicists* (Wiley, 1988) and *Classical Mechanics* (Universities Press, 2003). The first edition of *Linear Algebra and Group Theory for Physicists* was co-published in 1996 by New Age International and Wiley, New York.

A publication of Hindustan Book Agency. Distributed on an exclusive basis by the AMS in North America. Online bookstore rights worldwide.

Contents: Elements of group theory; Some related algebraic structures; Linear vector space; Elements of representation theory; Representations of finite groups; Representations of linear associative algebras; Representations of the symmetric group; The rotation group and its representations; The crystallographic point groups; The Lorentz group and its representations; Introduction to the classification of Lie groups—Dynkin diagram; Index.

Hindustan Book Agency

January 2006, 608 pages, Hardcover, ISBN 81-85931-64-X, 2000 *Mathematics Subject Classification*: 15-XX, 15-01, 20-XX, 20-01, 20-02, **All AMS members US\$42**, List US\$52, Order code HIN/30

Analysis

Current Trends in Potential Theory

Dominique Bakry, *University of Toulouse, France*, **Lucian Beznea**, *Romanian Academy, Bucharest, Romania*, **Gheorghe Bucur**, *University of Bucharest, Romania*, and **Michael Röckner**, *Bielefeld University, Germany*, Editors

This is the proceedings volume of two mathematical meetings on Potential Theory organized in Bucharest, Romania, in September 2002 and September 2003. It includes six survey articles and seven selected research papers, covering the main topics of the conferences: geometric aspects in potential theory, Dirichlet structures, stochastic analysis, potential theory, and Markov processes.

A publication of the Theta Foundation. Distributed worldwide, except in Romania, by the AMS.

Contents: *Survey articles:* **N. Arcozzi**, **E. C. Tarabusi**, **F. Di Biase**, and **M. Picardello**, A potential theoretic approach to twisting; **D. Feyel**, A survey of the Monge transport problem; **B. Fuglede**, Harmonic maps from Riemann polyhedra to spaces of nonpositive curvature; **F. Hirsch**, Measurable metrics, intrinsic metrics and Lipschitz functions; **A. Lejay** and **T. Lyons**, On the importance of the Levy area for studying the limits of functions of stochastic processes. Application to homogenization; **V. Metz**, Superadditive Perron-Frobenius theory; *Research papers:* **I. Bachar**, Estimates for the Green function and existence of positive solutions of nonlinear equations with Navier boundary conditions; **D. Bakry** and **Z. Qian**, Volume comparison theorems without Jacobi fields; **N. B. Rhouma** and **M. Bezzarga**, On a singular value problem and the boundary Harnack principle for fractional Laplacian; **M. Biroli** and **P. G. Vernole**, Brelot property for the sheaf of harmonics relative to a Dirichlet form; **K. Janssen**, Factorization of excessive kernels; **E. Popescu**, Pseudo differential operators in the context of Feller semigroups and Dirichlet forms; **C. Udrea**, Resolvent and nonlinear potential theory.

International Book Series of Mathematical Texts

January 2006, 174 pages, Hardcover, ISBN 973-85432-6-6, 2000 *Mathematics Subject Classification*: 31-06, 60-06, **All AMS members US\$22**, List US\$28, Order code THETA/7

Advances in Operator Algebras and Mathematical Physics

Florin-Petre Boca, *University of Illinois, Urbana, IL*, **Ola Bratteli**, *University of Oslo, Norway*, **Roberto Longo**, *University of Rome Tor Vergata, Italy*, and **Heinz Siedentop**, *University of Regensburg, Germany*, Editors

A series of international conferences in operator algebras and mathematical physics was initiated by the Institute of Mathematics of Bucharest in 2001. The second meeting was held in Sinaia from June 26 to July 4, 2003. The volume

contains the proceedings of this conference. It consists of eighteen refereed papers, pointing out the interrelation of these two important domains of research. Among the subjects covered are structure and classification of C^* -algebras, invariants for subfactors and connections with quantum field theory, quantum systems, Weyl pseudo-differential calculus and twisted crossed products, Schrödinger operators, trace class approach for scattering, coherent states, quantum gauge theories, fractals and spectral triples, invariant subspaces and reflexivity in operator algebras, and amenability for groupoids.

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

A publication of the Theta Foundation. Distributed worldwide, except in Romania, by the AMS.

Contents: S. Berceanu, Realization of coherent state Lie algebras by differential operators; M. R. Buneci, Amenable equivariant maps defined on a groupoid; S. Carpi and M. Weiner, Uniqueness of the $\text{Diff}^+(S^1)$ symmetry for local nets of von Neumann algebras; V. Deaconu, C^* -algebras of commuting endomorphisms; P. Duclos, E. Soccorsi, P. Stovicek, and M. Vittot, Dynamical localization in periodically driven quantum systems; D. E. Evans and P. R. Pinto, Modular invariants and the double of the Haagerup subfactor; D. Guido and T. Isola, Dimensions and spectral triples for fractals in R^N ; C. Ivanescu, On the classification of continuous trace C^* -algebras with spectrum homeomorphic to the closed interval $[0, 1]$; M. Mantoiu, R. Purice, and S. Richard, Twisted crossed products and magnetic pseudodifferential operators; G. Nenciu, On the smoothness of gap boundaries for generalized Harper operators; G. K. Pedersen, A note on fixed points of completely positive maps; B. Prunaru, Dual algebras and approximate reflexivity; M. Rordam, The real rank of certain simple C^* -algebras; G. Scharf, Supersymmetric quantum gauge theories; H. Siedentop, The relativistic electron-positron field; A. L. Svendsen, Outer automorphisms of a series of non-amenable subfactors; M. Vittot, A Lie algebra point of view on global perturbation theory; D. R. Yafaev, Trace-class approach in scattering problems for perturbations of media.

International Book Series of Mathematical Texts

January 2006, 286 pages, Hardcover, ISBN 973-85432-7-4, 2000 *Mathematics Subject Classification*: 46-06, 47-06, 81-06, 35-06, **All AMS members US\$34**, List US\$42, Order code THETA/8

Analysis I

Terence Tao, University of California, Los Angeles, CA

This is part one in a two-volume introduction to real analysis and is intended for honours undergraduates, who have already been exposed to calculus. The emphasis is on rigour and on foundations. The material starts at the very beginning—the construction of the number systems and set theory, then to the basics of analysis (limits, series, continuity, differentiation, Riemann integration), through to power series, several variable calculus and Fourier analysis, and finally to the Lebesgue integral; these are almost entirely set in the concrete setting of the real line and Euclidean spaces, although there is some material on abstract metric and topological spaces. There are also appendices on mathematical logic and the decimal system. The entire text (omitting some

less central topics) can be taught in two quarters of twenty-five to thirty lectures each.

The course material is deeply intertwined with the exercises, as it is intended for the student to actively learn the material (and to practice thinking and writing rigorously) by proving several of the key results in the theory.

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Contents: *Volume 1:* Introduction; The natural numbers; Set theory; Integers and rationals; The real numbers; Limits of sequences; Series; Infinite sets; Continuous functions on \mathbf{R} ; Differentiation of functions; The Riemann integral; A Appendix: the basics of mathematical logic; B Appendix: the decimal system; Index.

Hindustan Book Agency

January 2006, 420 pages, Softcover, ISBN 81-85931-62-3, 2000 *Mathematics Subject Classification*: 26A03, 26A42, 26B05, 26B10, **All AMS members US\$29**, List US\$36, Order code HIN/28

Analysis II

Terence Tao, University of California, Los Angeles, CA

This is part two of a two-volume introduction to real analysis and is intended for honours undergraduates, who have already been exposed to calculus. The emphasis is on rigour and on foundations. The material starts at the very beginning—the construction of the number systems and set theory, then to the basics of analysis (limits, series, continuity, differentiation, Riemann integration), through to power series, several variable calculus and Fourier analysis, and finally to the Lebesgue integral; these are almost entirely set in the concrete setting of the real line and Euclidean spaces, although there is some material on abstract metric and topological spaces. There are also appendices on mathematical logic and the decimal system. The entire text (omitting some less central topics) can be taught in two quarters of twenty-five to thirty lectures each.

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Contents: *Volume 2:* Metric spaces; Continuous functions on metric spaces; Uniform convergence; Power series; Fourier series; Several variable differential calculus; Lebesgue measure; Lebesgue integration; Index.

Hindustan Book Agency

January 2006, 272 pages, Softcover, ISBN 81-85931-63-1, 2000 *Mathematics Subject Classification*: 26A03, 26A42, 26B05, 26B10, **All AMS members US\$24**, List US\$30, Order code HIN/29

Differential Equations

Systemes différentiels involutifs

Bernard Malgrange, *University of Grenoble I, St. Martin d'Herès, France*

The first part of this volume is an exposition of the theory of "systemes en involution" of É. Cartan, from the homological point of view of Spencer, Sternburg *et al.* The point of view of Cartan himself is also recalled, and compared to the preceding one, in Appendix B. The second part proves the generic involutiveness of analytic differential systems, which is a precise version of an assertion of Cartan saying roughly that, "by prolongation, a differential system becomes eventually involutive".

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: Introduction; Modules gradués, involutivité; Systemes différentiels: théorie formelle; Le théorème de Cartan-Kähler; *D*-variétés; Involutivité générique (suite); Variétés affines; Involutivité à la Cartan; Bibliographie.

Panoramas et Synthèses, Number 19

December 2005, 106 pages, Softcover, ISBN 2-85629-178-3, 2000 *Mathematics Subject Classification*: 35N10, 12H05, 58A15, **Individual member US\$34**, List US\$38, Order code PASY/19

Strichartz Estimates for Schrödinger Equations with Variable Coefficients

Luc Robbiano, *Université de Versailles, France*, and **Claude Zuily**, *Université Paris Sud, Orsay, France*

The authors prove the (local in time) Strichartz estimates (for the full range of parameters given by the scaling unless the end point) for asymptotically flat and non trapping perturbations of the flat Laplacian in \mathbb{R}^n , $n \geq 2$. The main point of the proof, namely the dispersion estimate, is obtained in constructing a parametrix. The main tool for this construction is the use of the Fourier-Bros-Iagolnitzer (FBI) transform.

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Contents: Introduction and statement of the result; Preliminaries and reduction to the case of a small perturbation of the Laplacian; Study of the flow; The phase equation; The transport equations; Microlocal localizations and the use of the FBI transform; The dispersion estimate and the end of the proof of Theorem 1.0.1; Appendix; Bibliography.

Mémoires de la Société Mathématique de France, Number 101-102

December 2005, 208 pages, Softcover, ISBN 2-85629-180-5, 2000 *Mathematics Subject Classification*: 35A17, 35A22, 35Q40, 35Q55, **Individual member US\$53**, List US\$59, Order code SMFMEM/101/102

Mathematical Physics

New Trends in Continuum Mechanics

Mihaela Mihăilescu-Suliciu, *University of Bucharest, Romania*, Editor

The volume contains the proceedings of the international conference New Trends in Continuum Mechanics, held at Constanta, Romania between September 8 and 12, 2003. The conference was devoted to all domains of continuum mechanics; it also included a minisymposium on homogenization and its applications and a section devoted to numerical methods. The volume contains thirty-seven refereed papers; among the subjects covered are theoretical and laboratory modelling, mathematical modelling in biology, oil recovery, contact problems with friction, studies on different materials, non-Newtonian fluids, electrorheological and magnetorheological fluids, thermo-mechanical and electro-mechanical problems in solids.

A publication of the Theta Foundation. Distributed worldwide, except in Romania, by the AMS.

Contents: **L. Badea**, One and two-level multiplicative Schwarz methods for the constrained minimization of non-quadratic convex functionals; **N. Bontcheva** and **B. Petzov**, Phase transformation during metal forming processes; **A. Capatina** and **F. Lebon**, Remarks on the equilibrium finite element method for frictional contact problems; **A. Carabineanu**, The study of the self-propulsion of an oscillatory wing by the integral equations method; **Q. Chang** and **W. Sun**, On convergence of the multigrid method for nonnegative definite systems; **Y. D. Chashechkin**, Mathematical and laboratory modelling of stratified flows; **D. Cioranescu**, **A. Damilamian**, and **G. Griso**, The Stokes problem in perforated domains by the periodic unfolding method; **S. Cleja-Tigoiu**, Material symmetry in finite elasto-plasticity with continuum distributed dislocations; **M. Cocou** and **G. Scarella**, A dynamic unilateral contact problem for a cracked viscoelastic body; **C. Conca**, **J. I. Diaz**, **A. Linan**, and **C. Timofte**, Homogenization results for chemical reactive flows through porous media; **E. M. Craciun**, Stress in prestressed fiber reinforced composite containing two colinear cracks supposed to be under anti-plane shear loadings; **N. D. Cristescu**, Theory of falling cylinder viscometers; **A. Dumitrache**, An interactive computing method for stall flutter analysis; **C. Faciu** and **M. Mihăilescu-Suliciu**, Shape memory effect: A Maxwellian rate type constitutive approach; **C. Grandmont**, **Y. Maday**, and **B. Maury**, A multiscale/multimodel approach of the respiration tree; **D. Jiroveanu** and **J. Soler**, Numerical modeling of a bubble breakup behavior in homogeneous and isotropic turbulence; **V. Marina**, Reading the possibilities to

decode the microstructure characteristics from macroexperience; **G. Marinoschi**, On a nonlinear boundary value problem of infiltration in unsaturated media; **B. Matei**, Nonlinear multiscales representations for homogenization problems: A case study; **M. Negreanu**, Discrete inequalities; **G. Pasa**, Secondary oil recovery and variable permeability; **E. Perez**, Correcting terms from local problems for vibrating systems with concentrated masses; **K. Piechor**, On the hydrodynamic limit of the Enskog equation with weak square-well potential; **D. Polisevski** and **R. Schiltz-Bunoiu**, Heat conduction through a first-order jump interface; **M. Popescu**, On the optimal control of bilinear systems; **R. Raducanu**, On the mortar finite element method in linear elasticity; **S. Sburian** and **C. Sburian**, A coincidence degree for bifurcation problems with applications in mechanics of continua; **N. Simion**, Models of heat propagation in solid bodies; **O. Simionescu-Panait**, Propagation of attenuated waves in isotropic solids subject to initial electro-mechanical fields; **D. Socolescu**, On the Leray problems for the stationary and non-stationary-Navier-Stokes equations; **R. Stavre**, Boundary control of a non-stationary magnetohydrodynamic flow; **P. P. Teodorescu**, **T. Badea**, **L. Munteanu**, and **J. Onisoru**, On the wave propagation in materials with negative stiffness components; **P. P. Teodorescu**, **L. Munteanu**, and **V. Chiroiu**, On the wave propagation in a chiral medium; **V. Tigoiu** and **C. Cipu**, Flow of some viscoelastic fluids in a falling cylinder viscometer and the evaluation of shear viscosity; **A. Ursescu**, Influence of the electrode ends on the channel flow of electrorheological fluids; **A. Ursescu** and **C. Dascalu**, Thermally conductive elliptic hole in an anisotropic solid; **C. Vallee**, **C. Lerintiu**, **D. Fortune**, **M. Ban**, and **G. de Saxce**, Hill's bi-potential.

International Book Series of Mathematical Texts

November 2005, 352 pages, Hardcover, ISBN 973-85432-5-8, 2000 *Mathematics Subject Classification*: 74-06, 76-06, **All AMS members US\$38**, List US\$48, Order code THETA/6

divided into four independent chapters; although the most recent developments are studied, it remains mostly accessible to non-specialists.

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Contents: **F. Martin** and **E. Royer**, Formes modulaires et périodes; **V. Bosser**, Indépendance algébrique de valeurs de séries d'Eisenstein (théorème de Nesterenko); **Ph. Graftieaux**, Théorème stéphanois et méthode des pentes; **F. Pellarin**, Introduction aux formes modulaires de Hilbert et à leurs propriétés différentielles; Annexe. Liste des participants.

Séminaires et Congrès, Number 12

December 2005, 271 pages, Softcover, ISBN 2-85629-176-7, 2000 *Mathematics Subject Classification*: 11F03, 11F06, 11F11, 11F25, 11F30, 11F37, 11F41, 11F60, 11F67, 11Gxx, 11G35, 11G50, 11J85, 11J91, 14G40, **Individual member US\$53**, List US\$59, Order code SECO/12

Number Theory

Formes modulaires et transcendance

Colloque JEUNES

Stéphane Fischler, *Université Paris-Sud, Orsay, France*, **Éric Gaudron**, *Institut Fourier, Saint-Martin-d'Herès, France*, and **Samy Khémira**, *Institut de Mathématiques de Jussieu, Paris, France*, Editors

The present volume arises from a conference on the links between modular forms and transcendance held at the C.I.R.M (Marseille) from May 26 to 30, 2003.

It includes an overview of the few existing proofs of transcendance or algebraic independence of numbers coming from modular forms theory as well as more general techniques offering new perspectives (periods, Rankin-Cohen brackets, slope method, Hilbert modular forms). The book is