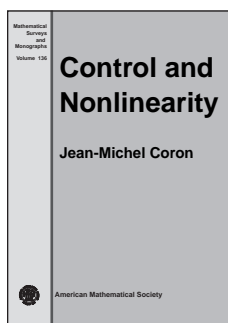


New Publications Offered by the AMS

Applications



Control and Nonlinearity

Jean-Michel Coron, *Université de Paris-Sud, Orsay, France*

This book presents methods to study the controllability and the stabilization of nonlinear control systems in finite and infinite dimensions. The emphasis is put on specific phenomena due to nonlinearities. In particular, many

examples are given where nonlinearities turn out to be essential to get controllability or stabilization. Various methods are presented to study the controllability or to construct stabilizing feedback laws. The power of these methods is illustrated by numerous examples coming from such areas as celestial mechanics, fluid mechanics, and quantum mechanics.

The book is addressed to graduate students in mathematics or control theory and to mathematicians or engineers with an interest in nonlinear control systems governed by ordinary or partial differential equations.

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

Contents: *Controllability of linear control systems:* Finite-dimensional linear control systems; Linear partial differential equations; *Controllability of nonlinear control systems:* Controllability of nonlinear systems in finite dimension; Linearized control systems and fixed-point methods; Iterated Lie brackets; Return method; Quasi-static deformations; Power series expansion; Previous methods applied to a Schrödinger equation; *Stabilization:* Linear control systems in finite dimension and applications to nonlinear control systems; Stabilization of nonlinear control systems in finite dimension; Feedback design tools; Applications to some partial differential equations; Elementary results on

semigroups of linear operators; Degree theory; Bibliography; List of symbols; Index.

Mathematical Surveys and Monographs, Volume 136

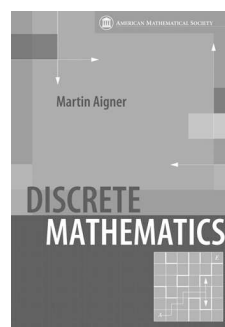
April 2007, approximately 427 pages, Hardcover, ISBN-10: 0-8218-3668-4, ISBN-13: 978-0-8218-3668-2, 2000 *Mathematics Subject Classification:* 93B05, 93B52, 93C10, 93C20, 93D15; 35K50, 35L50, 35L60, 35Q30, 35Q53, 35Q55, 93D09, 93D20, **All AMS members US\$79**, List US\$99, Order code SURV/136

Discrete Mathematics and Combinatorics



Discrete Mathematics

Martin Aigner, *Freie Universität Berlin, Germany*



The advent of fast computers and the search for efficient algorithms revolutionized combinatorics and brought about the field of discrete mathematics. This book is an introduction to the main ideas and results of discrete mathematics, and with its emphasis on algorithms it should be interesting to mathematicians

and computer scientists alike. The book is organized into three parts: enumeration, graphs and algorithms, and algebraic systems. There are 600 exercises with hints and solutions to about half of them. The only prerequisites for understanding everything in the book are linear algebra and calculus at the undergraduate level.

Praise for the German edition...

This book is a well-written introduction to discrete mathematics and is highly recommended to every student of mathematics and computer science as well as to teachers of these topics.

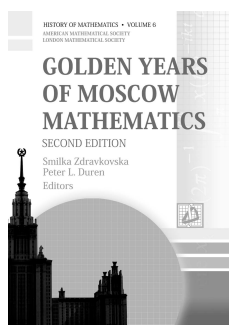
—Konrad Engel for MathSciNet

Martin Aigner is a professor of mathematics at the Free University of Berlin. He received his PhD at the University of Vienna and has held a number of positions in the USA and Germany before moving to Berlin. He is the author of several books on discrete mathematics, graph theory, and the theory of search. The Monthly article *Turan's graph theorem* earned him a 1995 Lester R. Ford Prize of the MAA for expository writing, and his book *Proofs from the BOOK* with Günter M. Ziegler has been an international success with translations into 12 languages.

Contents: *Counting:* Fundamentals; Summation; Generating functions; Counting patterns; Asymptotic analysis; Bibliography for Part 1; *Graphs and algorithms:* Graphs; Trees; Matchings and networks; Searching and sorting; General optimization methods; Bibliography for Part 2; *Algebraic systems:* Boolean algebras; Modular arithmetic; Coding; Cryptography; Linear optimization; Bibliography for Part 3; Solutions to selected exercises; Index.

April 2007, 388 pages, Hardcover, ISBN-10: 0-8218-4151-3, ISBN-13: 978-0-8218-4151-8, LC 2006052285, 2000 *Mathematics Subject Classification:* 05A10, 05A15, 05B05, 05B15, 05C70, 05C85, 06E30, 11A07, 90C05, 94B05, **All AMS members US\$47**, List US\$59, Order code DISCMAT

General and Interdisciplinary



Golden Years of Moscow Mathematics Second Edition

Smilka Zdravkovska,
Mathematical Reviews, Ann Arbor, MI, and **Peter L. Duren,**
University of Michigan, Ann Arbor, MI, Editors

This volume contains articles on the history of Soviet mathematics, many of which are personal accounts by mathematicians who witnessed and contributed to the turbulent and glorious years of Moscow mathematics. The articles in the book focus on mathematical developments in that era, the personal lives of Russian mathematicians, and political events that shaped the course of scientific work in the Soviet Union. Important contributions include an article about Luzin and his school, based in part on documents that were released only after perestroika, and two articles on Kolmogorov. The volume concludes with annotated bibliographies in English and Russian for further reading.

The revised edition is appended by an article of Tikhomirov, which provides an update and general overview of 20th-century

Moscow mathematics, and it also includes an Index of Names.

This book should appeal to mathematicians, historians, and anyone else interested in Soviet mathematical history.

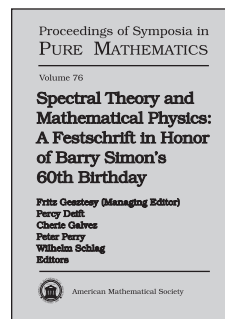
Co-published with the London Mathematical Society beginning with Volume 4. Members of the LMS may order directly from the AMS at the AMS member price. The LMS is registered with the Charity Commissioners.

Contents: **A. P. Yushkevich**, Encounters with mathematicians; **S. S. Demidov**, The Moscow school of the theory of functions in the 1930s; **E. M. Landis**, About mathematics at Moscow State University in the late 1940s and early 1950s; **B. A. Rosenfeld**, Reminiscences of Soviet mathematicians; **V. M. Tikhomirov**, A. N. Kolmogorov; **V. I. Arnol'd**, On A. N. Kolmogorov; **M. M. Postnikov**, Pages of a mathematical autobiography (1942–1953); **B. A. Kushner**, Markov and Bishop: An essay in memory of A. A. Markov (1903–1979) and E. Bishop (1928–1983); **I. Piatetski-Shapiro**, Étude on life and automorphic forms in the Soviet Union; **D. B. Fuchs**, On Soviet mathematics of the 1950s and 1960s; **A. B. Sossinsky**, In the other direction; **S. S. Demidov**, A brief survey of the literature on the development of mathematics in the USSR; **S. S. Demidov**, Russian bibliography; **V. M. Tikhomirov**, Moscow mathematics—Then and now; Errata; Index of names.

History of Mathematics, Volume 6

May 2007, approximately 300 pages, Hardcover, ISBN-10: 0-8218-4261-7, ISBN-13: 978-0-8218-4261-4, LC 2006052223, 2000 *Mathematics Subject Classification:* 01-06, 01A60, 01A65, 01A70, **All AMS members US\$47**, List US\$59, Order code HMATH/6.R

Mathematical Physics



Spectral Theory and Mathematical Physics: A Festschrift in Honor of Barry Simon's 60th Birthday

Fritz Gesztesy, Managing Editor, *University of Missouri, Columbia, MO*, **Percy Deift**, *New York University, Courant*

Institute, NY, **Cherie Galvez**, *California Institute of Technology, Pasadena, CA*, **Peter Perry**, *University of Kentucky, Lexington, KY*, and **Wilhelm Schlag**, *University of Chicago, IL*, Editors

This Festschrift had its origins in a conference called SimonFest held at Caltech, March 27–31, 2006, to honor Barry Simon's 60th birthday. It is not a proceedings volume in the usual sense since the emphasis of the majority of the contributions is on reviews of the state of the art of certain fields, with particular focus on recent developments and open problems. The bulk of the articles in this Festschrift are of this survey form, and a few review

Simon's contributions to a particular area. Part 1 contains surveys in the areas of Quantum Field Theory, Statistical Mechanics, Nonrelativistic Two-Body and N -Body Quantum Systems, Resonances, Quantum Mechanics with Electric and Magnetic Fields, and the Semiclassical Limit. Part 2 contains surveys in the areas of Random and Ergodic Schrödinger Operators, Singular Continuous Spectrum, Orthogonal Polynomials, and Inverse Spectral Theory. In several cases, this collection of surveys portrays both the history of a subject and its current state of the art. Exhaustive lists of references enhance the presentation offered in these surveys.

A substantial part of the contributions to this Festschrift are survey articles on the state of the art of certain areas with special emphasis on open problems. This will benefit graduate students as well as researchers who want to get a quick yet comprehensive introduction into an area covered in this volume.

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

Contents: Part I: Quantum field theory, statistical mechanics: **M. Aizenman**, Perspectives in statistical mechanics; **T. Chen** and **J. Fröhlich**, Coherent infrared representations in non-relativistic QED; **B. Nachtergaele**, Quantum spin systems after DLS 1978; **L. Rosen**, Barry Simon's contributions to quantum field theory; *Nonrelativistic two-body and N -body quantum systems, resonances:* **M. S. Ashbaugh** and **R. D. Benguria**, Isoperimetric inequalities for eigenvalues of the Laplacian; **E. B. Davies**, Non-self-adjoint operators and pseudospectra; **R. Froese**, Barry Simon's contribution to non-relativistic quantum mechanics: Two-body and N -body Schrödinger operators and resonances; **C. Gérard**, N -body quantum scattering and quantum resonances: An overview; **G. A. Hagedorn** and **A. Joye**, Mathematical analysis of Born-Oppenheimer approximations; **E. M. Harrell II**, Perturbation theory and atomic resonances since Schrödinger's time; **A. Lenard**, On a theorem for quantum mechanical scattering theory; **V. Maz'ya**, Analytic criteria in the qualitative spectral analysis of the Schrödinger operator; **P. Perry**, The spectral geometry of geometrically finite hyperbolic manifolds; **Y. Pinchover**, Topics in the theory of positive solutions of second-order elliptic and parabolic partial differential equations; **W. P. Reinhardt**, Complex scaling in atomic physics: A staging ground for experimental mathematics and for extracting physics from otherwise impossible computations; **A. V. Sobolev**, Recent results on the Bethe-Sommerfeld conjecture; *Electric and magnetic fields, semiclassical limit:* **L. Erdős**, Recent developments in quantum mechanics with magnetic fields; **G. M. Graf**, Aspects of the integer quantum Hall effect; **I. W. Herbst**, Barry Simon's work on electric and magnetic fields and the semi-classical limit; **D. Hundertmark**, Some bound state problems in quantum mechanics; **Part II: Random and ergodic Schrödinger operators, singular continuous spectrum:** **J. Bourgain**, A new approach to spectral gap problems; **D. Damanik**, Strictly ergodic subshifts and associated operators; **D. Damanik**, Lyapunov exponents and spectral analysis of ergodic Schrödinger operators: A survey of Kotani theory and its applications; **S. A. Denisov** and **A. Kiselev**, Spectral properties of Schrödinger operators with decaying potentials; **M. Goldstein** and **W. Schlag**, On the formation of gaps in the spectrum of Schrödinger operators with quasi-periodic potentials; **S. Jitomirskaya**, Ergodic Schrödinger operators (on one foot); **W. Kirsch** and **B. Metzger**, The integrated density of states for random Schrödinger operators; **Y. Last**, Exotic spectra: A review of Barry Simon's central contributions; *Orthogonal polynomials, inverse spectral theory:* **P. Deift**, Riemann-Hilbert methods in the theory of orthogonal polynomials; **F. Gesztesy**,

Inverse spectral theory as influenced by Barry Simon; **L. Golinskii** and **V. Totik**, Orthogonal polynomials: From Jacobi to Simon; **S. Khrushchev**, Orthogonal polynomials: The first minutes; **R. Killip**, Spectral theory via sum rules; **F. Gesztesy**, **P. Deift**, **C. Galvez**, **P. Perry**, and **W. Schlag**, Barry Simon's list of publications.

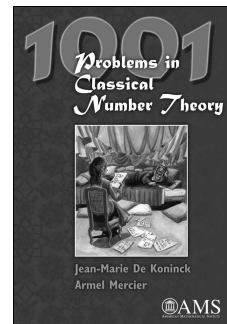
Proceedings of Symposia in Pure Mathematics, Volume 76

Part 1: March 2007, 496 pages, Hardcover, ISBN-10: 0-8218-4248-X, ISBN-13: 978-0-8218-4248-5, 2000 *Mathematics Subject Classification:* 00B30, 34-XX, 35-XX, 47-XX, 81-XX, 82-XX, **All AMS members US\$89**, List US\$111, Order code PSPUM/76.1

Part 2: March 2007, 464 pages, Hardcover, ISBN-10: 0-8218-4249-8, ISBN-13: 978-0-8218-4249-2, 2000 *Mathematics Subject Classification:* 00B30, 34-XX, 35-XX, 47-XX, 81-XX, 82-XX, **All AMS members US\$78**, List US\$97, Order code PSPUM/76.2

Set: March 2007, 960 pages, Hardcover, ISBN-10: 0-8218-3783-4, ISBN-13: 978-0-8218-3783-2, 2000 *Mathematics Subject Classification:* 00B30, 34-XX, 35-XX, 47-XX, 81-XX, 82-XX, **All AMS members US\$135**, List US\$169, Order code PSPUM/76

Number Theory



1001 Problems in Classical Number Theory

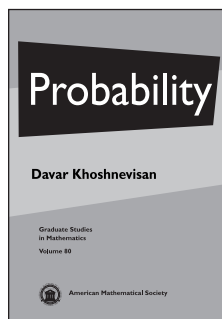
Jean-Marie De Koninck, Université Laval, Quebec, QC, Canada, and **Armel Mercier**, Université du Québec à Chicoutimi, QC, Canada

In the spirit of *The Book of the One Thousand and One Nights*, the authors offer 1001 problems in number theory in a way that entices the reader to immediately attack the next problem. Whether a novice or an experienced mathematician, anyone fascinated by numbers will find a great variety of problems—some simple, others more complex—that will provide them with a wonderful mathematical experience.

Contents: Key elements from the theory; Statements of the problems; Solutions; Bibliography; Terminology index; Index of authors.

May 2007, 336 pages, Hardcover, ISBN-10: 0-8218-4224-2, ISBN-13: 978-0-8218-4224-9, 2000 *Mathematics Subject Classification:* 11A05, 11A07, 11A15, 11A25, 11A41, 11A51, 11A55, 11D04, 11N05, 11N25, **All AMS members US\$39**, List US\$49, Order code PINT

Probability



Probability

Davar Khoshnevisan,
*University of Utah, Salt Lake
City, UT*

This is a textbook for a one-semester graduate course in measure-theoretic probability theory, but with ample material to cover an ordinary year-long course at a more leisurely pace. Khoshnevisan's approach is to develop the ideas that are absolutely central

to modern probability theory, and to showcase them by presenting their various applications. As a result, a few of the familiar topics are replaced by interesting non-standard ones.

The topics range from undergraduate probability and classical limit theorems to Brownian motion and elements of stochastic calculus. Throughout, the reader will find many exciting applications of probability theory and probabilistic reasoning. There are numerous exercises, ranging from the routine to the very difficult. Each chapter concludes with historical notes.

Contents: Classical probability; Bernoulli trials; Measure theory; Integration; Product spaces; Independence; The central limit theorem; Martingales; Brownian motion; Terminus; Stochastic integration; Background material; Bibliography; Index.

Graduate Studies in Mathematics, Volume 80

April 2007, 224 pages, Hardcover, ISBN-10: 0-8218-4215-3, ISBN-13: 978-0-8218-4215-7, LC 2006052603, 2000 *Mathematics Subject Classification*: 60-01; 60-03, 28-01, 28-03, **All AMS members US\$36**, List US\$45, Order code GSM/80