

CATALOG OF PUBLICATIONS

Student Mathematical Library Series

1	0	1
0	1	0
1	0	0



AMS

AMERICAN MATHEMATICAL SOCIETY

www.ams.org



AMS

AMERICAN MATHEMATICAL SOCIETY

201 Charles St., Providence, RI 02904-2294 USA
Phone: 401-455-4000
Fax: 401-331-3842
www.ams.org

Sergei I. Gelfand
Publisher

The step from mathematical coursework to research is one of the most important transitions in a mathematician's career. To succeed, the student must become interested in "doing" mathematics rather than merely learning it.

The AMS series Student Mathematical Library is intended to spark interests in modern mathematics and to increase appreciation for mathematical research. Books published in the series emphasize original approaches by presenting modern and classic areas of mathematics in an accessible way. They are suitable for honors courses, upper-division seminars, reading courses, or self-study.

To obtain more detailed information on the Student Mathematical Library series or to preview our publications online please visit our electronic bookstore at <http://www.ams.org/bookstore>.

Regards,

Sergei I. Gelfand
Publisher

CONTENTS

Algebra and Algebraic Geometry	3
Analysis	7
Applications	8
Differential Equations	9
Discrete Mathematics and Combinatorics	10
General and Interdisciplinary	10
Geometry and Topology	11
Logic and Foundations	14
Number Theory	15
Probability	17
Index	18
Ordering Information	19

Algebra and Algebraic Geometry

Galois Theory for Beginners

A Historical Perspective

Jörg Bewersdorff

Translated by David Kramer

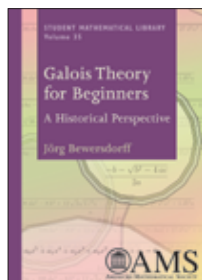
For those with minimal exposure to undergraduate mathematics, the book would make for some formidable reading. ... it provides excellent historical and mathematical context.

—*CHOICE Reviews*

This book offers an approachable introduction to Galois theory that is ideally suited to undergraduates and beginning graduate students. The text offers a historical progression from solutions of the general equations of degree 3 and 4 to solving equations of higher degree by radicals. A deeper understanding of the subject is explored through the main theorem on symmetric polynomials, the factorization of polynomials, and ideas around cyclotomic equations.

READERSHIP: Undergraduates and graduate students interested in Galois Theory.

2006; 180 pp.; softcover; ISBN: 978-0-8218-3817-4; List US\$35; AMS members US\$28; Order code: STML/35



Transformation Groups for Beginners

S. V. Duzhin, *Steklov Institute of Mathematics, St. Petersburg, Russia*, and
B. D. Chebotarevsky, *Minsk, Belarus*

This is a book that one can hand to a motivated student and expect them to get something out of it...

—*MAA Reviews*

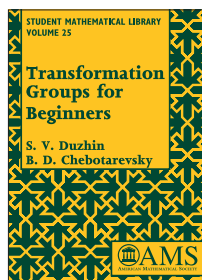
This book is intended for undergraduate students and all those interested in mathematics. Its goal is to give an easy introduction to the concept of a transformation group using examples from different areas of mathematics.

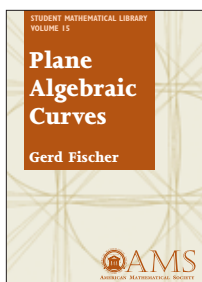
The warm-up of the first two chapters includes a discussion of algebraic operations on points in the plane, and of Euclidean plane movements. Then the notions of a transformation group and of an abstract group are introduced. Group actions, orbits, and invariants constitute the subject of the next chapter. The book concludes with an elementary exposition of the basic ideas of Sophus Lie about symmetries of differential equations.

The book contains plenty of figures, as well as many exercises with hints and solutions, which help the reader to master the material.

READERSHIP: Students interested in group theory, especially with applications to geometry.

2004; 246 pp.; softcover; ISBN: 978-0-8218-3643-9; List US\$39; AMS members US\$31; Order code: STML/25





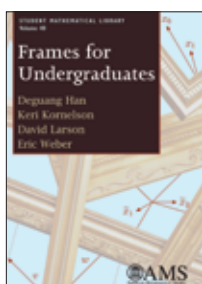
Plane Algebraic Curves

Gerd Fischer, *Heinrich-Heine-Universität, Düsseldorf, Germany*

This is an excellent introduction to algebraic geometry, which assumes only standard undergraduate mathematical topics: complex analysis, rings and fields, and topology. Reading this book will help establish the geometric intuition that lies behind the more advanced ideas and techniques used in the study of higher-dimensional varieties.

READERSHIP: Advanced undergraduates, graduate students, and research mathematicians interested in algebraic geometry.

2001; 231 pp.; softcover; ISBN: 978-0-8218-2122-0; List US\$37; AMS members US\$30; Order code: STML/15



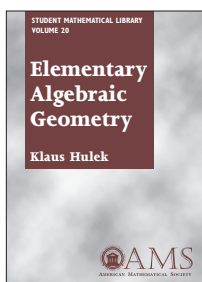
Frames for Undergraduates

Deguang Han, *University of Central Florida, Orlando, FL*, Keri Kornelson, *Grinnell College, IA*, David Larson, *Texas A&M University, College Station, TX*, and Eric Weber, *Iowa State University, Ames, IA*

This introduction to the theory of Hilbert space frames is designed to motivate undergraduate students by presenting mathematical theory while also showing how it can be used to develop publishable results. The book is based on the Research Experience for Undergraduates (REU) program conducted at several colleges. The final chapter assists students in composing their own presentations on the subject.

READERSHIP: Undergraduate and graduate students interested in linear algebra and applications, and the theory of frames.

2007; 295 pp.; softcover; ISBN: 978-0-8218-4212-6; List US\$49; AMS members US\$39; Order code: STML/40



Elementary Algebraic Geometry

Klaus Hulek, *Universität Hannover, Germany*

All in all, the book does an excellent job of explaining what algebraic geometry is about, what are the basic results, and it invites the reader to continue exploring the subject.

—MAA Online

This book is a true introduction to the basic concepts and techniques of algebraic geometry. The language is purposefully kept on an elementary level, avoiding sheaf theory and cohomology theory. The introduction of new algebraic concepts is always motivated by a discussion of the corresponding geometric ideas. The main point of the book is to illustrate the interplay between abstract theory and specific examples. The book contains numerous problems that illustrate the general theory.

READERSHIP: Advanced undergraduates, graduate students, and research mathematicians interested in algebra and algebraic geometry; those working in neighboring fields (algebraic topology, algebra, Lie groups, etc.) who need to know the basics of algebraic geometry.

2003; 213 pp.; softcover; ISBN: 978-0-8218-2952-3; List US\$35; AMS members US\$28; Order code: STML/20

Enumerative Geometry and String Theory

Sheldon Katz, *University of Illinois at Urbana-Champaign, IL*

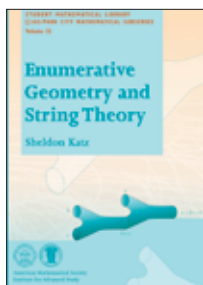
It is a nicely and intuitively written remarkable little booklet covering a huge amount of interesting material describing a beautiful area, where modern mathematics and theoretical physics meet. It can give inspiration to teachers for a lecture series on the topic as well as a chance for self-study by students.

—*European Mathematical Society Newsletter*

Perhaps the most famous example of how ideas from modern physics have revolutionized mathematics is the way string theory has led to an overhaul of enumerative geometry, an area of mathematics that started in the eighteen hundreds. Century-old problems of enumerating geometric configurations have now been solved using new and deep mathematical techniques inspired by physics!

READERSHIP: Undergraduate and graduate students interested in algebraic geometry or in mathematical physics.

This volume was co-published with the Institute for Advanced Study/Park City Mathematics Institute.
2006; 206 pp.; softcover; ISBN: 978-0-8218-3687-3; List US\$35; AMS members US\$28; Order code: STML/32



A (Terse) Introduction to Linear Algebra

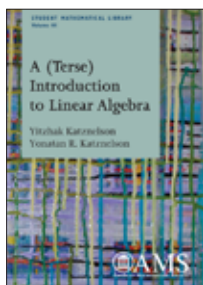


Yitzhak Katznelson, *Stanford University, CA*, and Yonatan R. Katznelson, *University of California, Santa Cruz, CA*

This concise presentation of the core material of linear algebra will appeal to students with some mathematical maturity and an interest in abstraction and formal reasoning. This self-contained treatment of the subject assumes minimal mathematical background on the reader's part. The final chapter presents directions for applications of the core material.

READERSHIP: Undergraduate and graduate students interested in linear algebra.

2008; 215 pp.; softcover; ISBN: 978-0-8218-4419-9; List US\$35; AMS members US\$28; Order code: STML/44



Finite Fields and Applications

Gary L. Mullen, *Pennsylvania State University, University Park, PA*, and Carl Mummert, *University of Michigan, Ann Arbor, MI*

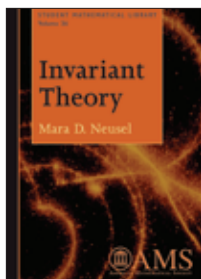
This book uses an opening discussion of the properties of finite fields to set the stage for a subsequent look at finite fields' diversity of applications. The subject is handled in a way to make the book useful both as an auxiliary text and for self-study. A set of exercises of varying levels of difficulty serve to motivate the reader further.

READERSHIP: Undergraduate and graduate students interested in the theory of finite fields and applications.

This book is co-published with Mathematics Advanced Study Semesters.

2007; 175 pp.; softcover; ISBN: 978-0-8218-4418-2; List US\$35; AMS members US\$28; Order code: STML/41





Invariant Theory

Mara D. Neusel, *Texas Tech University, Lubbock, TX*

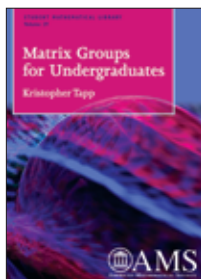
If you are an undergraduate, or first-year graduate student, and you love algebra, certainly you will enjoy this book, and you will learn a lot from it. It is pleasant reading, and it is self-contained. I strongly recommend this book for an advanced undergraduate or first-year graduate course, and also for independent study.

—MAA Online

This introduction to invariant theory of finite groups acting linearly on polynomial algebras illustrates the dynamic nature of this area of research. Each section of the book includes an application of invariant theory to other areas of mathematics or to fields such as engineering and physics. Numerous exercises, examples, and results obtained by students add to the text's value.

READERSHIP: Undergraduate and graduate students interested in invariant theory and its applications.

2007; 314 pp.; softcover; ISBN: 978-0-8218-4132-7; List US\$49; AMS members US\$39; Order code: STML/36



Matrix Groups for Undergraduates

Kristopher Tapp, *Williams College, Williamstown, MA*

Matrix groups touch an enormous spectrum of the mathematical arena. This textbook brings them into the undergraduate curriculum. It makes an excellent one-semester course for students familiar with linear and abstract algebra and prepares them for a graduate course on Lie groups.

Matrix Groups for Undergraduates is concrete and example-driven, with geometric motivation and rigorous proofs. The story begins and ends with the rotations of a globe. In between, the author combines rigor and intuition to describe basic objects of Lie theory: Lie algebras, matrix exponentiation,

Lie brackets, and maximal tori.

READERSHIP: Undergraduates and beginning graduate students interested in group theory.

2005; 166 pp.; softcover; ISBN: 978-0-8218-3785-6; List US\$29; AMS members US\$23; Order code: STML/29

ALSO AVAILABLE IN ALGEBRA AND ALGEBRAIC GEOMETRY

Codes and Curves

Judy L. Walker, *University of Nebraska, Lincoln, NE*

2000; 66 pp.; softcover; ISBN: 978-0-8218-2628-7; List US\$16; AMS members US\$13; Order code: STML/7

Analysis

Problems in Mathematical Analysis I

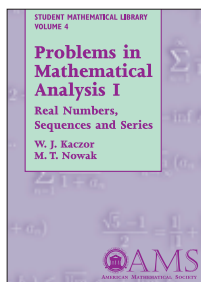
Real Numbers, Sequences and Series

W. J. Kaczor and M. T. Nowak, *Marie Curie–Sklodowska University, Lublin, Poland*

We learn by doing. We learn mathematics by doing problems. This book is the first volume of a series of books of problems in mathematical analysis. It is mainly intended for students studying the basic principles of analysis. However, given its organization, level, and selection of problems, it would also be an ideal choice for tutorial or problem-solving seminars, particularly those geared toward the Putnam exam. The volume is also suitable for self-study.

Each section of the book begins with relatively simple exercises, yet may also contain quite challenging problems. Very often a few consecutive exercises are concerned with different aspects of one mathematical problem or theorem. This presentation of material is designed to help student comprehension and to encourage them to ask their own questions and to start research. The collection of problems in the book is also intended to help teachers who wish to incorporate the problems into lectures. Solutions for all the problems are provided.

READERSHIP: Undergraduates, graduate students, and instructors interested in analysis.
2000; 380 pp.; softcover; ISBN: 978-0-8218-2050-6; List US\$51; AMS members US\$41; Order code: STML/4



Problems in Mathematical Analysis II

Continuity and Differentiation

W. J. Kaczor and M. T. Nowak, *Marie Curie–Sklodowska University, Lublin, Poland*

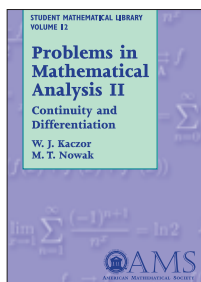
As with the first volume, the book is of great help for problem seminars and also for self-study ... The book can be recommended for libraries and for students.

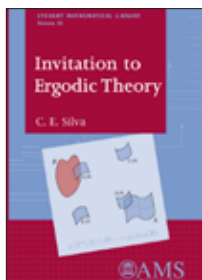
—*European Mathematical Society Newsletter*

We learn by doing. We learn mathematics by doing problems. And we learn more mathematics by doing more problems. If you want to hone your understanding of continuous and differentiable functions, this book contains hundreds of problems to help you do so. The emphasis here is on real functions of a single variable.

The book is mainly geared toward students studying the basic principles of analysis. However, given its selection of problems, organization, and level, it would be an ideal choice for tutorial or problem-solving seminars, particularly those geared toward the Putnam exam. It is also suitable for self-study. The presentation of the material is designed to help student comprehension, to encourage them to ask their own questions, and to start research. The collection of problems will also help teachers who wish to incorporate problems into their lectures. The problems are grouped into sections according to the methods of solution. Solutions for the problems are provided.

READERSHIP: Undergraduates, graduate students, and instructors interested in analysis.
2001; 398 pp.; softcover; ISBN: 978-0-8218-2051-3; List US\$51; AMS members US\$41; Order code: STML/12





Invitation to Ergodic Theory

C. E. Silva, *Williams College, Williamstown, MA*

This introduction into the basic topics of ergodic theory develops all necessary measure theory from scratch. Topics include recurrence, ergodicity, the ergodic theorem and mixing, as well as a detailed construction of Lebesgue measure on the real line. The book also includes exercises of varying difficulty and open questions to suggest avenues of research.

READERSHIP: Undergraduate and graduate students interested in ergodic theory and measure theory.

2008; 262 pp.; softcover; ISBN: 978-0-8218-4420-5; List US\$45; AMS members US\$36; Order code: STML/42

ALSO AVAILABLE IN ANALYSIS

Six Themes on Variation

Robert Hardt, *Rice University, Houston, TX*, Editor

2004; 153 pp.; softcover; ISBN: 978-0-8218-3720-7; List US\$29; AMS members US\$23; Order code: STML/26

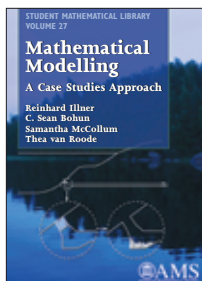
Problems in Mathematical Analysis III

Integration

W. J. Kaczor and M. T. Nowak, *Marie Curie-Skłodowska University, Lublin, Poland*

2003; 356 pp.; softcover; ISBN: 978-0-8218-3298-1; List US\$49; AMS members US\$39; Order code: STML/21

Applications



Mathematical Modelling

A Case Studies Approach

Reinhard Illner, C. Sean Bohun, Samantha McCollum, and Thea van Roode, *University of Victoria, BC, Canada*

The book is written in a nice manner, the exposition is very friendly and intriguing... (a) delightful introductory text.

—*Zentralblatt MATH*

This book explains the process of modelling real situations to obtain mathematical problems that can be analyzed, thus solving the original problem.

The presentation is in the form of case studies, which are developed much as they would be in true applications. In many cases, an initial model is created, then modified along the way. Some cases are familiar, such as the evaluation of an annuity. Others are unique, such as the fascinating situation in which an engineer, armed only with a slide rule, had 24 hours to compute whether a valve would hold when a temporary rock plug was removed from a water tunnel.

Each chapter ends with a set of exercises and some suggestions for class projects. Some projects are extensive, as with the explorations of the predator-prey model; others are more modest.

READERSHIP: Advanced undergraduates, graduate students, and research mathematicians interested in mathematical modelling and applied mathematics.

2005; 196 pp.; softcover; ISBN: 978-0-8218-3650-7; List US\$35; AMS members US\$28; Order code: STML/27

ALSO AVAILABLE IN APPLICATIONS

An Introduction to Game-Theoretic Modelling**Second Edition**Mike Mesterton-Gibbons, *Florida State University, Tallahassee, FL*

2001; 368 pp.; softcover; ISBN: 978-0-8218-1929-6; List US\$41; AMS members US\$33; Order code: STML/I 1

Cryptography: An IntroductionV. V. Yaschenko, *Moscow Center for Continuous Mathematics Education, Russia*, Editor

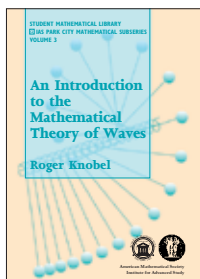
2002; 229 pp.; softcover; ISBN: 978-0-8218-2986-8; List US\$41; AMS members US\$33; Order code: STML/I 8

Differential Equations

An Introduction to the Mathematical Theory of WavesRoger Knobel, *University of Texas-Pan American, Edinburg, TX*

All in all, this book provides a sturdy bridge from a course on ordinary differential equations, and so I would recommend it, without batting an eyelash, to any of my differential equations students who wish to continue their study independently. Further, I feel that it could be very useable as a text for a first course in partial differential equations. Kudos to Roger Knobel on having produced such a well-written and much-needed book!

—MAA Online



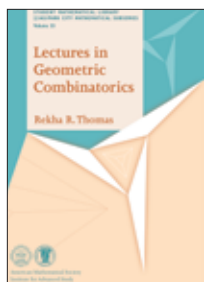
Linear and nonlinear waves are a central part of the theory of PDEs. This book begins with a description of one-dimensional waves and their visualization through computer-aided techniques. Next, traveling waves are covered, such as solitary waves for the Klein-Gordon and KdV equations. Finally, the author gives a lucid discussion of waves arising from conservation laws, including shock and rarefaction waves. As an application, interesting models of traffic flow are used to illustrate conservation laws and wave phenomena.

This book is based on a course given by the author at the IAS/Park City Mathematics Institute. It is suitable for independent study by undergraduate students in mathematics, engineering, and science programs.

READERSHIP: Advanced undergraduates, graduate students, and research mathematicians interested in nonlinear PDEs.

2000; 196 pp.; softcover; ISBN: 978-0-8218-2039-1; List US\$24; AMS members US\$19; Order code: STML/I 3

Discrete Mathematics and Combinatorics



Lectures in Geometric Combinatorics

Rekha R. Thomas, *University of Washington, Seattle, WA*

Undergraduates will find this a very friendly and stimulating introduction to creative mathematics in higher dimensions.

—*CHOICE Magazine*

This book presents a course in the geometry of convex polytopes in arbitrary dimension. It takes readers from the basics of polytope theory to recent developments around secondary and state polytopes arising from point configurations. The most needed concepts are developed from scratch. Text illustrates the interaction among discrete geometry, computational algebra and combinatorics.

READERSHIP: Undergraduate and graduate students interested in computational geometry and polytopes.

This volume was co-published with the Institute for Advanced Study/Park City Mathematics Institute. 2006; 143 pp.; softcover; ISBN: 978-0-8218-4140-2; List US\$29; AMS members US\$23; Order code: STML/33

ALSO AVAILABLE IN DISCRETE MATHEMATICS AND COMBINATORICS

Ramsey Theory on the Integers

Bruce M. Landman, *State University of West Georgia, Carrollton, GA*, and **Aaron Robertson**, *Colgate University, Hamilton, NY*

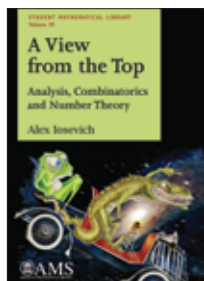
2003; 317 pp.; softcover; ISBN: 978-0-8218-3199-1; List US\$49; AMS members US\$39; Order code: STML/24

Lectures on Generating Functions

S. K. Lando, *Independent University of Moscow, Russia*

2003; 148 pp.; softcover; ISBN: 978-0-8218-3481-7; List US\$29; AMS members US\$23; Order code: STML/23

General and Interdisciplinary



A View from the Top

Analysis, Combinatorics and Number Theory

Alex Iosevich, *University of Missouri, Columbia, MO*

This book brings to life the connections among different areas of mathematics and illustrates how various subject areas flow from one another. It is designed to help readers appreciate that mathematics should not be compartmentalized into distinct subjects. The work inspires interest in research mathematics by highlighting the process in which ideas evolve.

READERSHIP: Undergraduate students interested in analysis, combinatorics, number theory, and geometry.

2007; 136 pp.; softcover; ISBN: 978-0-8218-4397-0; List US\$29; AMS members US\$23; Order code: STML/39



ALSO AVAILABLE IN GENERAL AND INTERDISCIPLINARY

The Game's Afoot! Game Theory in Myth and ParadoxAlexander Mehlmann, *Vienna University of Technology, Austria*

2000; 159 pp.; softcover; ISBN: 978-0-8218-2121-3; List US\$27; AMS members US\$22; Order code: STML/5

Geometry and Topology

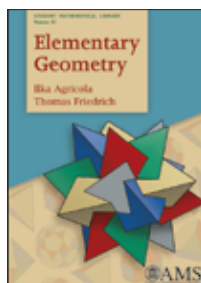
Elementary GeometryIlka Agricola and Thomas Friedrich, *Humboldt-Universität zu Berlin, Germany*

Translated by Philip G. Spain

This book uses an elegant style to illustrate elementary geometry's richness as one of the most classical topics in mathematics. The topic is revisited from the higher viewpoint of university mathematics, presenting a deeper understanding of familiar topics and an introduction to new topics that complete the picture of two-dimensional geometries. More than 200 carefully drawn figures support the understanding of geometric concepts.

READERSHIP: Undergraduate students interested in plane geometry.

2008; 243 pp.; softcover; ISBN: 978-0-8218-4347-5; List US\$39; AMS members US\$31; Order code: STML/43

**Differential Geometry****Curves – Surfaces – Manifolds, Second Edition**Wolfgang Kühnel, *University of Stuttgart, Germany*

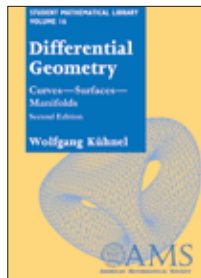
This carefully written book is an introduction to the beautiful ideas and results of differential geometry. The first half covers the geometry of curves and surfaces, which provide much of the motivation and intuition for the general theory. Special topics that are explored include Frenet frames, ruled surfaces, minimal surfaces, and the Gauss-Bonnet theorem.

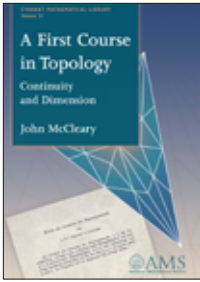
The second part is an introduction to the geometry of general manifolds, with particular emphasis on connections and curvature. The final two chapters are insightful examinations of the special cases of spaces of constant curvature and Einstein manifolds.

The text is illustrated with many figures and examples. For the second edition, a number of errors were corrected and some text and a number of figures have been added. The prerequisites are undergraduate analysis and linear algebra.

READERSHIP: Graduate students and research mathematicians interested in differential geometry.

2006; 380 pp.; softcover; ISBN: 978-0-8218-3988-1; List US\$49; AMS members US\$39; Order code: STML/I6.R





A First Course in Topology Continuity and Dimension

John McCleary, *Vassar College, Poughkeepsie, NY*

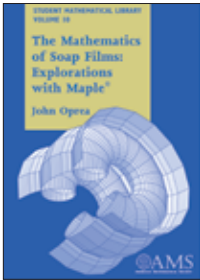
McCleary offers a tight, purpose-built book, establishing the invariance of dimension, the rigorous structural distinction that differentiates lines from planes from higher-dimensional spaces.

—CHOICE Magazine

This work departs from other texts on topology by taking a direct, focused approach grounded in solving the problem of invariance of dimension. Based on his Vassar College course, John McCleary addresses the basic point-set notions of topology and the fundamental group of a space, then proceeds to a proof of the Jordan Curve theorem. McCleary's approach emphasizes the tools and intuitions central to topology.

READERSHIP: Undergraduate and Graduate Students interested in Topology.

2006; 210 pp.; softcover; ISBN: 978-0-8218-3884-6; List US\$35; AMS members US\$28; Order code: STML/31



The Mathematics of Soap Films: Explorations with Maple®

John Oprea, *Cleveland State University, OH*

I am very enthusiastic about this book! It would make an excellent text for an undergraduate course in minimal surface theory. ... Enough detail is included so that this book would also be suitable for an independent study. The next time I teach undergraduate differential geometry, my plan is to first teach a lead-in course using Oprea's book. This provides students with easy access to soap film mathematics ...

—MAA Online

Nature tries to minimize the surface area of a soap film through the action of surface tension. The process can be understood mathematically by using differential geometry, complex analysis, and the calculus of variations. This book employs ingredients from each of these subjects to tell the mathematical story of soap films.

Through the Maple® applications, the reader is given tools for creating the shapes that are being studied. Thus, you can “see” a fluid rising up an inclined plane, create minimal surfaces from complex variables data, and investigate the “true” shape of a balloon. Oprea also includes descriptions of experiments and photographs that let you see real soap films on wire frames.

The theory of minimal surfaces is a beautiful subject, which naturally introduces the reader to fascinating, yet accessible, topics in mathematics. Oprea's presentation is rich with examples, explanations, and applications.

READERSHIP: Advanced undergraduates, graduate students, and mathematicians interested in the mathematics of soap films.

© Waterloo Maple, Inc., Ontario, Canada.

2000; 266 pp.; softcover; ISBN: 978-0-8218-2118-3; List US\$30; AMS members US\$24; Order code: STML/10

Geometry and Billiards

Serge Tabachnikov, *Penn State, University Park, PA*

Mathematical billiards describe the motion of a mass point in a domain with elastic reflections off the boundary or, equivalently, the behavior of rays of light in a domain with ideally reflecting boundary. From the point of view of differential geometry, the billiard flow is the geodesic flow on a manifold with boundary. This book is devoted to billiards in their relation with differential geometry, classical mechanics, and geometrical optics.

The topics covered include variational principles of billiard motion, symplectic geometry of rays of light and integral geometry, existence and nonexistence of caustics, optical properties of conics and quadrics and completely integrable billiards, periodic billiard trajectories, polygonal billiards, mechanisms of chaos in billiard dynamics, and the lesser-known subject of dual (or outer) billiards.

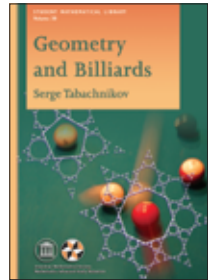
The book is based on an advanced undergraduate topics course (but contains more material than can be realistically taught in one semester). Although the minimum prerequisites include only the standard material usually covered in the first two years of college (the entire calculus sequence, linear algebra), readers should show some mathematical maturity and strongly rely on their mathematical common sense. As a reward, they will be taken to the forefront of current research.

A special feature of the book is a substantial number of digressions covering diverse topics related to billiards: evolutes and involutes of plane curves, the 4-vertex theorem, a mathematical theory of rainbows, distribution of first digits in various sequences, Morse theory, the Poincaré recurrence theorem, Hilbert's fourth problem, Poncelet porism, and many others.

READERSHIP: Advanced undergraduates, graduate students, and research mathematicians interested in ergodic theory and geometry.

This volume is copublished with the Mathematics Advanced Studies Seminars.

2005; 176 pp.; softcover; ISBN: 978-0-8218-3919-5; List US\$35; AMS members US\$28; Order code: STML/30



Introduction to Topology

V. A. Vassiliev, *Independent University of Moscow, Russia*

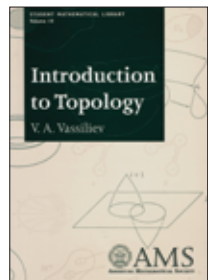
A concise treatment of differential and algebraic topology.

—*American Mathematical Monthly*

This English translation of a Russian book presents the basic notions of differential and algebraic topology, which are indispensable for specialists and useful for research mathematicians and theoretical physicists. In particular, ideas and results are introduced related to manifolds, cell spaces, coverings and fibrations, homotopy groups, intersection index, etc. The author notes, "The lecture note origins of the book left a significant imprint on its style. It contains very few detailed proofs: I tried to give as many illustrations as possible and to show what really occurs in topology, not always explaining why it occurs." He concludes, "As a rule, only those proofs (or sketches of proofs) that are interesting *per se* and have important generalizations are presented."

READERSHIP: Graduate students, research mathematicians, and theoretical physicists.

2001; 149 pp.; softcover; ISBN: 978-0-8218-2162-6; List US\$26; AMS members US\$21; Order code: STML/14



ALSO AVAILABLE IN GEOMETRY AND TOPOLOGY

Plateau's Problem**An Invitation to Varifold Geometry, Revised Edition**

Frederick J. Almgren, Jr.

2001; 78 pp.; softcover; ISBN: 978-0-8218-2747-5; List US\$20; AMS members US\$16; Order code: STML/13

An Introduction to Lie Groups and the Geometry of Homogeneous SpacesAndreas Arvanitoyeorgos, *The American College of Greece, Deree Campus, Athens, Greece*

2003; 148 pp.; softcover; ISBN: 978-0-8218-2778-9; List US\$29; AMS members US\$23; Order code: STML/22

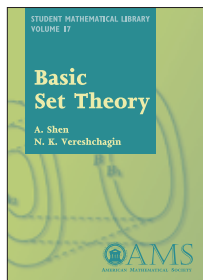
Inversion Theory and Conformal MappingDavid E. Blair, *Michigan State University, East Lansing, MI*

2000; 118 pp.; softcover; ISBN: 978-0-8218-2636-2; List US\$20; AMS members US\$16; Order code: STML/9

Miles of TilesCharles Radin, *University of Texas, Austin, TX*

1999; 120 pp.; softcover; ISBN: 978-0-8218-1933-3; List US\$17; AMS members US\$14; Order code: STML/1

Logic and Foundations

**Basic Set Theory**A. Shen, *Independent University of Moscow, Russia*, and N. K. Vereshchagin, *Moscow State Lomonosov University, Russia*

...the book is perfectly tailored to general relativity. There is also a fair number of good exercises.

—Roman Smirnov, *Dalhousie University*

The main notions of set theory (cardinals, ordinals, transfinite induction) are fundamental to all mathematicians, not only to those who specialize in mathematical logic or set-theoretic topology. Basic set theory is generally given a brief overview in courses on analysis, algebra, or topology, even though it is sufficiently important, interesting, and simple to merit its own dedicated treatment.

The text introduces all main subjects of “naive” (nonaxiomatic) set theory: functions, cardinalities, ordered and well-ordered sets, transfinite induction and its applications, ordinals, and operations on ordinals. With over 150 problems, the book is a complete and accessible introduction to the subject.

READERSHIP: Advanced undergraduates, graduate students, and research mathematicians.

2002; 116 pp.; softcover; ISBN: 978-0-8218-2731-4; List US\$22; AMS members US\$18; Order code: STML/17

ALSO AVAILABLE IN GEOMETRY AND TOPOLOGY

Computable FunctionsA. Shen, *Independent University of Moscow, Russia*, and N. K. Vereshchagin, *Moscow State Lomonosov University, Russia*

2003; 166 pp.; softcover; ISBN: 978-0-8218-2732-1; List US\$30; AMS members US\$24; Order code: STML/19

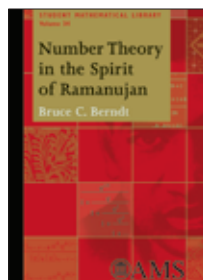
Number Theory

Number Theory in the Spirit of Ramanujan

Bruce C. Berndt, *University of Illinois, Urbana-Champaign, IL*

This slender volume is extremely well-written and contains a wealth of material. It is a lucid and accessible introduction to a rich and fascinating area of mathematics, written by the world's leading expert. For anyone with a knowledge of calculus wanting to learn about the mathematical work of Ramanujan, this book is the best place to start.

—*New Zealand Newsletter*



Steele Prize winner Bruce C. Berndt, the foremost authority on India's greatest mathematician, presents the first introduction to Ramanujan's work in number theory. The text addresses the important subjects of theta functions and q -series and discusses a number of topics in number theory that are intertwined with these disciplines. The author includes detailed proofs of theorems from some of Ramanujan's most famous writings.

READERSHIP: Undergraduate and graduate students interested in number theory, including q -series and theta functions.

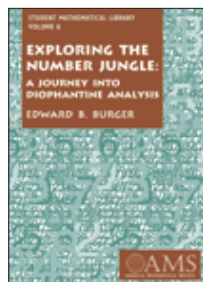
2006; 187 pp.; softcover; ISBN: 978-0-8218-4178-5; List US\$35; AMS members US\$28; Order code: STML/34

Exploring the Number Jungle: A Journey into Diophantine Analysis

Edward B. Burger, *Williams College, Williamstown, MA*

This short book presents a nice enjoyable introduction to Diophantine analysis, which invites the motivated reader to rediscover by himself or herself many of the fundamental results of the subject, with hints given in an appendix for the more difficult results.

—*Mathematical Reviews*

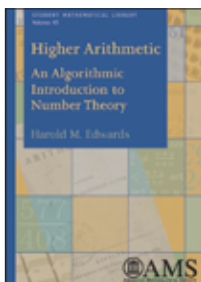


Welcome to diophantine analysis—an area of number theory in which we attempt to discover hidden treasures and truths within the jungle of numbers by exploring rational numbers. Diophantine analysis comprises two different but interconnected domains—diophantine approximation and diophantine equations. Through an engaging style, readers participate in a journey through these areas of number theory.

Each mathematical theme is presented in a self-contained manner and is motivated by very basic notions. The reader becomes an active participant in the explorations, as each module includes a sequence of numbered questions to be answered and statements to be verified. Many hints and remarks are provided to be freely used and enjoyed. Each module then closes with a Big Picture Question that invites the reader to step back from all the technical details and take a panoramic view of how the ideas at hand fit into the larger mathematical landscape. This book enlists the reader to build intuition, develop ideas and prove results in a very user-friendly and enjoyable environment.

READERSHIP: Undergraduate and graduate students and mathematicians interested in number theory.

2000; 151 pp.; softcover; ISBN: 978-0-8218-2640-9; List US\$21; AMS members US\$17; Order code: STML/8



Higher Arithmetic

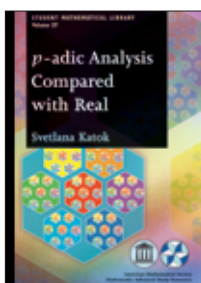
An Algorithmic Introduction to Number Theory

Harold M. Edwards, *New York University, NY*

This text demonstrates the shift in the focus of studies in number theory toward arithmetical computations. Students can use the text to master the fundamental ideas of basic number theory through the application of algorithms to computational examples. Exercises, many with answers given, appear at the end of nearly every chapter.

READERSHIP: Undergraduates, graduate students, and research mathematicians interested in number theory.

2008; 210 pp.; softcover; ISBN: 978-0-8218-4439-7; List US\$39; AMS members US\$31; Order code: STML/45



p -adic Analysis Compared with Real

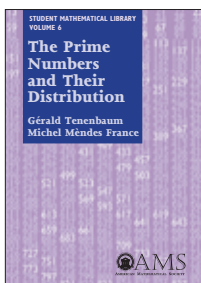
Svetlana Katok, *Pennsylvania State University, University Park, PA*

This book examines p -adic numbers from the point of view of number theory, topology and analysis, unlike other texts that look at only one of these three areas. Several topics from real analysis and elementary topology that are not usually covered in undergraduate courses are included. A large number of exercises are provided, along with hints and solutions for most.

READERSHIP: Undergraduate and graduate students interested in p -adic numbers.

This book is co-published with Mathematics Advanced Study Semesters.

2007; 152 pp.; softcover; ISBN: 978-0-8218-4220-1; List US\$29; AMS members US\$23; Order code: STML/37



The Prime Numbers and Their Distribution

Gérald Tenenbaum, *Université Henri Poincaré, Nancy I, France*, and
Michel Mendès France, *Université Bordeaux I, France*

A wealth of information ... The treatment is concise and the level is high. The authors have chosen to highlight some of the most important points of the area, and the exposition and the translation are excellent. Reading this book is equivalent to ascending a major summit. —MAA Monthly

One notable new direction this century in the study of primes has been the influx of ideas from probability. The goal of this book is to provide insights into the prime numbers and to describe how a sequence so tautly determined can incorporate such a striking amount of randomness.

The book opens with some classic topics of number theory. It ends with a discussion of some of the outstanding conjectures in number theory. In between are an excellent chapter on the stochastic properties of primes and a walk through an elementary proof of the Prime Number Theorem.

This book is suitable for anyone who has had a little number theory and some advanced calculus involving estimates. Its engaging style and invigorating point of view will make refreshing reading for advanced undergraduates through research mathematicians.

READERSHIP: Advanced undergraduates, graduate students, and research mathematicians.

2000; 115 pp.; softcover; ISBN: 978-0-8218-1647-9; List US\$18; AMS members US\$14; Order code: STML/6

Probability

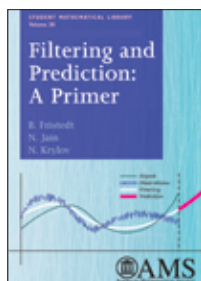
Filtering and Prediction: A Primer

B. Fristedt, N. Jain, and N. Krylov, *University of Minnesota, Minneapolis, MN*

This book maintains a rigorous treatment of the theory of filtering and prediction for random processes without burdening the reader with unnecessary technical machinery. The goal is to present an introduction to the modern theory of filtering and prediction on the examples of Markov chains in discrete and continuous time and on stationary sequences. Numerous exercises appear in each chapter.

READERSHIP: Undergraduate and graduate students interested in filtering and prediction for random processes.

2007; 252 pp.; softcover; ISBN: 978-0-8218-4333-8; List US\$39; AMS members US\$31; Order code: STML/38



Heads or Tails

An Introduction to Limit Theorems in Probability

Emmanuel Lesigne, *Université François Rabelais, Tours, France*

(It) is helpful for the probability community to have access to this book, which contains a unified and elementary presentation of limit theorems ... very attractive...

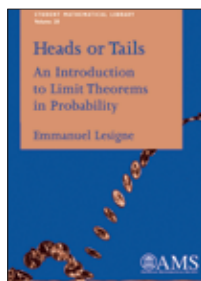
—*Zentralblatt MATH*

Everyone knows some of the basics of probability, perhaps enough to play cards. Beyond the introductory ideas, there are many wonderful results that are unfamiliar to the layman, but which are well within our grasp to understand and appreciate. Some of the most remarkable results in probability are those that are related to limit theorems—statements about what happens when the trial is repeated many times. The most famous of these is the Law of Large Numbers, which mathematicians, engineers, economists, and many others use every day.

In this book, Lesigne has made these limit theorems accessible by stating everything in terms of a game of tossing of a coin: heads or tails. In this way, the analysis becomes much clearer, helping establish the reader's intuition about probability. Moreover, very little generality is lost, as many situations can be modelled from combinations of coin tosses.

READERSHIP: Undergraduates and beginning graduate students interested in mathematical probability.

2005; 150 pp.; softcover; ISBN: 978-0-8218-3714-6; List US\$29; AMS members US\$23; Order code: STML/28



ALSO AVAILABLE IN PROBABILITY

Lectures on Contemporary Probability

Gregory F. Lawler, *Duke University, Durham, NC*, and **Lester N. Coyle**, *Loyola College, Baltimore, MD*

1999; 99 pp.; softcover; ISBN: 978-0-8218-2029-2; List US\$18; AMS members US\$14; Order code: STML/2

Index

- Agricola, Ilka 11
- Almgren, Frederick J., Jr. 14
- Arvanitoyeorgos, Andreas 14
- Basic Set Theory*. 14
- Berndt, Bruce C. 15
- Bewersdorff, Jörg 3
- Blair, David E. 14
- Bohun, C. Sean 8
- Burger, Edward B. 15
- Chebotarevsky, B. D. 3
- Codes and Curves* 6
- Computable Functions*. 14
- Coyle, Lester N. 17
- Cryptography:*
An Introduction 9
- Differential Geometry* 11
- Duzhin, S. V. 3
- Edwards, Harold M. 16
- Elementary Algebraic
 Geometry*. 4
- Elementary Geometry* 11
- Enumerative Geometry
 and String Theory*. 5
- Exploring the Number Jungle:
 A Journey into Diophantine
 Analysis*. 15
- Filtering and Prediction:
 A Primer*. 17
- Finite Fields and Applications*. 5
- A First Course in Topology* 12
- Fischer, Gerd 4
- Frames for Undergraduates* 4
- Friedrich, Thomas 11
- Fristedt, B. 17
- Galois Theory for Beginners* 3
- The Game's Afoot!
 Game Theory in
 Myth and Paradox*. 11
- Geometry and Billiards* 13
- Han, Deguang 4
- Hardt, Robert 8
- Heads or Tails*. 17
- Higher Arithmetic*. 16
- Hulek, Klaus 4
- Illner, Reinhard 8
- An Introduction to Game-
 Theoretic Modelling* 9
- An Introduction to Lie Groups
 and the Geometry
 of Homogeneous Spaces*. 14
- An Introduction to the
 Mathematical Theory
 of Waves* 9
- Introduction to Topology* 13
- Invariant Theory*. 6
- Inversion Theory and
 Conformal Mapping* 14
- Invitation to Ergodic Theory* 8
- Iosevich, Alex 10
- Jain, N. 17
- Kaczor, W. J. 7, 8
- Katok, Svetlana 16
- Katz, Sheldon 5
- Katznelson, Yitzhak 5
- Katznelson, Yonatan R. 5
- Knobel, Roger 9
- Kornelson, Keri 4
- Krylov, N. 17
- Kühnel, Wolfgang 11
- Landman, Bruce M. 10
- Lando, S. K. 10
- Larson, David 4
- Lawler, Gregory F. 17
- Lectures in Geometric
 Combinatorics* 10
- Lectures on Contemporary
 Probability*. 17
- Lectures on Generating
 Functions*. 10
- Lesigne, Emmanuel 17
- Mathematical Modelling* 8
- The Mathematics of Soap
 Films: Explorations
 with Maple®* 12
- Matrix Groups for
 Undergraduates* 6
- McCleary, John 12
- McCollum, Samantha 8
- Mehlmann, Alexander 11
- Mendès France, Michel 16
- Mesterton-Gibbons, Mike 9
- Miles of Tiles*. 14
- Mullen, Gary L. 5
- Mummert, Carl 5
- Neusel, Mara D. 6
- Nowak, M. T. 7, 8
- Number Theory in the Spirit
 of Ramanujan*. 15
- Oprea, John 12
- p-adic Analysis Compared
 with Real* 16
- Plane Algebraic Curves*. 4
- Plateau's Problem* 14
- The Prime Numbers and
 Their Distribution*. 16
- Problems in Mathematical
 Analysis I* 7
- Problems in Mathematical
 Analysis II*. 7
- Problems in Mathematical
 Analysis III* 8
- Radin, Charles 14
- Ramsey Theory on
 the Integers* 10
- Robertson, Aaron 10
- Shen, A. 14
- Silva, C. E. 8
- Six Themes on Variation* 8
- Tabachnikov, Serge 13
- Tapp, Kristopher. 6
- Tenenbaum, Gérald 16
- A (Terse) Introduction
 to Linear Algebra* 5
- Thomas, Rekha R. 10
- Transformation Groups for
 Beginners*. 3
- van Rooode, Thea 8
- Vassiliev, V. A. 13
- Vereshchagin, N. K. 14
- A View from the Top* 10
- Walker, Judy L. 6
- Weber, Eric. 4
- Yaschenko, V. V. 9

Ordering Information

TO PLACE YOUR ORDER

Online:

www.ams.org/bookstore

Mail:

Send orders with payment enclosed to:
American Mathematical Society
P. O. Box 845904
Boston, MA 02284-5904 USA

Toll-Free Phone Number:

For callers in the United States and Canada, the Society's toll-free number is **1-800-321-4AMS (4267)**. Callers outside the U.S. and Canada, please call **1-401-455-4000**. Business hours are 8:00 a.m. to 5:00 p.m., Eastern Time, Monday through Friday, except on U.S. holidays.

Fax:

Worldwide: 1-401-455-4046

PRICING AND PAYMENT

- All orders must be prepaid in U.S. currency drawn on a U.S. bank.
- Prices and publication dates are correct as of March 15, 2008.
- Prices, special offers, and publication dates are subject to change without notice.
- We accept orders by check, credit card, or bank transfer.

YOU CAN PAY BY

- Check or Money Order
- American Express • Discover
- MasterCard • VISA

If using a credit card, please include the name, number, and expiration date of the card.

ORDERS FROM OUTSIDE THE UNITED STATES

Orders worldwide are accepted online at www.ams.org/bookstore or through the following exclusive agents:

- Europe, Middle East, Africa: Oxford University Press (Oxford, UK)
- Japan: Maruzen Co. Ltd. (Tokyo), Neutrino Inc. (Tokyo)
- India: Hindustan Book Agency (New Delhi), India Book House (New Delhi), Segment Book Distributors (New Delhi)

For book orders in SE Asia, China, South America, or other regions, please contact the Member and Customer Services Department at 1-401-455-4000 or send email to macs-com@ams.org.

DOWNLOAD AN ORDER FORM

www.ams.org/bookstore/pspdf/orderform.pdf

EMAIL NOTIFICATION OF NEW AMS PUBLICATIONS

AMS Bookstore New Title Notification is a service made available by the AMS for those who wish to get an email announcing new titles or AMS catalogs as soon as they become available on the AMS Bookstore. Sign up at: www.ams.org/bookstore-email.