Yurinsha Book News

Vol. 63: Drutu, C. /Kapovich, M.: Geometric Group Theory 508-068

The key idea in geometric group theory is to study infinite groups by endowing them with a metric and treating them as geometric spaces. This applies to many groups naturally appearing in topology, geometry, and algebra, such as fundamental groups of manifolds, groups of matrices with integer coefficients, etc.

The primary focus of geometric group theory is to cover the foundations of geometric group theory, including coarse topology, ultralimits and asymptotic cones, hyperbolic groups, isoperimetric inequalities, growth of groups, amenability, Kazhdan's Property (T) and the Haagerup property, as well as their characterizations in terms of group actions on median spaces and spaces with walls.

The book contains proofs of several fundamental results of geometric group theory, such as Gromov's theorem on groups of polynomial growth, Tits's alternative, Stallings's theorem on ends of groups, Dunwoody's accessibility theorem, the Mostow Rigidity Theorem, and quasiisometric rigidity theorems of Tukia and Schwartz. This is the first book in which geometric group theory is presented in a form accessible to advanced graduate students and young research mathematicians. It fills a big gap in the literature and will be used by researchers in geometric group theory and its applications.

Proceedings of Symposia in Pure Mathematics,

Vol. 95: Coskun, I. /de Fernex, T. (eds.):
No. 508-065

Surveys on Recent Developments in Algebraic Geometry

The algebraic geometry community has a tradition of running a summer
research institute every ten years. During these influential meetings a large
number of mathematicians from around the world convene to overview
the developments of the past decade and to outline the most fundamental and
far-reaching problems for the next. This volume collects ten surveys that grew
out of the Bootcamp, 2015, at University of Utah, Salt Lake City, Utah.
These papers give succinct and thorough introductions to some of the most
important and exciting developments in algebraic geometry in the last decade.
Included are descriptions of the striking advances in the Minimal Model
Program, moduli spaces, derived categories, Bridgeland stability, motivic
homotopy theory, methods in characteristic pp and Hodge theory.

July 2017 · 374 pp.

9781470435578 · 21,400.

Student Mathematical Library,

Vol. 84: Pollack, P.:
No. 508-091

A Conversational
Introduction to Algebraic Number Theory:
Arithmetic Beyond \Mathbb {Z}

Gauss famously referred to mathematics as the "queen of the sciences
and to number theory as the "queen of mathematics".
This book is an introduction to algebraic number theory, meaning the study of
arithmetic in finite extensions of the rational number field \mathbb{Q}.
Originating in the work of Gauss, the foundations of modern algebraic number
theory are due to Dirichlet, Dedekind, Kronecker, Kummer, and others.
This book lays out basic results, including the three "fundamental theorems":
unique factorization of ideals, finiteness of the class number, and
Dirichlet's units theorem. While these theorems are by now quite classical,
both the text and the exercises allude frequently to more recent developments.

Sep. 2017 · 311 pp.

9781470436537 · 8,830.

Vol. 83: Shemanske, T.:
No. 508-098

Modern Cryptography and Elliptic Curves

This book offers the beginning undergraduate student some of the vista of
modern mathematics by developing and presenting the tools needed to
gain an understanding of the arithmetic of elliptic curves over finite fields and
their applications to modern cryptography.
This gradual introduction also makes a significant effort to teach students how to
produce or discover a proof by presenting mathematics as an exploration, and at
the same time, it provides the necessary mathematical underpinnings to investi-
gate the practical and implementation side of elliptic curve cryptography (ECC).
Elements of abstract algebra, number theory, and affine and projective
geometry are introduced and developed, and their interplay is exploited.
Algebra and geometry combine to characterize congruent numbers via rational
points on the unit circle, and group law for the set of points on an elliptic curve
arises from geometric intuition provided by Bezout's theorem as well as
the construction of projective space.

Aug. 2017 · 261 pp.

9781470435820 · 8,830.

A. M. S.

Mathematical Surveys and Monographs,

Vol. 223: **Aubrun, G. /Szarek, S.:**   No. 508-109

Alice and Bob Meet Banach: The Interface of Asymptotic Geometric Analysis and Quantum Information Theory

This book builds a bridge between two scientific areas.
The first area, Asymptotic Geometric Analysis (AGA), studies the geometry of
Banach spaces through their subspaces or subsets of finite but large dimension.
Geometric and probabilistic techniques, such as concentration of measure, play
a fundamental role. The second area, Quantum Information Theory (QIT),
provides the mathematical framework for manipulation of information in
the quantum world, and for using quantum phenomena to transmit or store data.
Both fields are given a detailed presentation, which includes a discussion of
selected important results. One of the main goals of the book is to show how by
combining these two areas, one can get deep recent results about the geometry of
entanglement or superadditivity of quantum channel capacities.
The book is aimed at multiple audiences connected through their interest in
the interface of QIT and AGA: at quantum information researchers
who want to learn AGA or apply its tools; at mathematicians interested in
learning QIT, or at least the part of QIT that is relevant to functional analysis/
convex geometry/random matrix theory and related areas; and at beginning
researchers in either field.

| Oct. 2017   .... |
| 9781470434687   19,710. |

Graduate Studies in Mathematics,

Vol. 165 and 180: **Rotman, J.:**   No. 508-094

Advanced Modern Algebra: Third ed. Parts 1 and 2
2 Vols. Set

This new edition, now in two parts, has been significantly reorganized and many
sections have been rewritten. The first part, designed for a first year of
graduate algebra, consists of two courses: Galois theory and Module theory.
Topics covered in the first course are classical formulas for solutions of
cubic and quartic equations, classical number theory, commutative algebra,
groups, and Galois theory. Topics in the second course are Zorn's lemma,
canonical forms, inner product spaces, categories and limits,
tensor products, projective, injective, and flat modules, multilinear algebra,
affine varieties, and Grobner bases.

| Oct. 2017   .... |
| 9781470441746   29,560. |

Vol. 180: **Rotman, J.:**   No. 508-095

Advanced Modern Algebra: Third ed. Part 2

This book is the second part of the new edition of Advanced Modern Algebra
(the first part published as Graduate Studies in Mathematics, Volume 165).
Compared to the previous edition, the material has been significantly
reorganized and many sections have been rewritten.
The book presents many topics mentioned in the first part in greater depth and
in more detail. The five chapters of the book are devoted to group theory,
representation theory, homological algebra, categories, and commutative
algebra, respectively. The book can be used as a text for a second abstract
algebra graduate course, as a source of additional material to a first abstract
algebra graduate course, or for self-study.

| Oct. 2017   .... |
| 9781470423117   15,970. |

A. M. S.

Progress in Mathematics,

Vol. 324: Auroux, D. /Katzarkov, L. /Pantev, T. / Soibelman, Y. /Tschinkel, Y. (eds.):
Algebra, Geometry, and Physics in the 21 Century

This volume is a tribute to Maxim Kontsevich, one of the most original
and influential mathematicians of our time.   No. 508-049
Maxim's vision has inspired major developments in many areas of mathematics,
ranging all the way from probability theory to motives over finite fields,
and brought forth a paradigm shift at the interface of modern geometry
and mathematical physics.
Many of his papers have opened completely new directions of research
and leading to solutions of many classical problems.
This book collects papers by leading experts, working on
topics close to Maxim's heart.

Sep. 2017	364 pp.
9783319599380	20,680.

Vol. 323: Cogdell, J. /Kim, J. /Zhu, C. (eds.):   No. 508-061
Representation Theory,
Number Theory, and Invariant Theory:
In Honor of Roger Howe on the Occasion of His 70th Birthday

This book contains selected papers based on talks given at the
"Representation Theory, Number Theory, and Invariant Theory"
conference held at Yale University from June 1 to June 5, 2015.
The meeting and this resulting volume are in honor of Professor Roger Howe,
on the occasion of his 70th birthday, whose work and insights have been deeply
influential in the development of these fields.
The speakers who contributed to this work include Roger Howe's doctoral
students, Roger Howe himself, and other world renowned mathematicians.
Topics covered include automorphic forms, invariant theory, representation
theory of reductive groups over local fields, and related subjects.

Oct. 2017	544 pp.
9783319597270	25,380.

Advanced Courses in Mathematics - CRM Barcelona

Aramayona, J. /Diekert, V. /Leininger, C. /Silva, P. /Weis, A.:
Algorithmic and Geometric Topics   No. 508-048
Around Free Groups and Automorphisms

This volume contains the lecture notes of the three summer courses given by
the authors during the program "Automorphisms of Free Groups: Geometry,
Topology, and Dynamics" held at the Centre de Recerca Matematica.
The first two chapters present the basic tools from formal language theory
(regular and context-free languages, automata, rewriting systems, transducers,
etc) and emphasize their connections to group theory, mostly relating to free
and virtually-free groups.
The material covered is enough to present full proofs of many of the existing
interesting characterizations of virtually-free groups. The last chapter describes,
in a comprehensive exposition, Bonahon's construction of Thurston's
compactification of Teichmuller space, in terms of geodesic currents on surfaces.
It also includes several interesting extensions of the notion of
geodesic current to various other more general settings.

Nov. 2017	....
9783319609393	4,700.

Birkhauser

Cambridge Studies in Advanced Mathematics,

Vol. 170: Milne, J.:
No. 508-089
Algebraic Groups:
Th e Theory of Algebraic Group Schemes over Fields
Algebraic groups play much the same role for algebraists as
Lie groups play for analysts. This book is the first comprehensive
introduction to the theory of algebraic group schemes over fields that includes
the structure theory of semisimple algebraic groups, and is written in
the language of modern algebraic geometry.
The first eight chapters study general algebraic group schemes over a field and
culminate in a proof of the Barsotti-Chevalley theorem, realizing every
algebraic group as an extension of an abelian variety by an affine group.
After a review of the Tannakian philosophy, the author provides short
accounts of Lie algebras and finite group schemes.

Sep. 2017	682 pp.	
9781107167483		16,990.

Vol. 169: Landsberg, J.:
No. 508-188
Geometry and Complexity Theory
Two central problems in computer science are P vs NP and the complexity of
matrix multiplication. The first is also a leading candidate for the greatest un-
solved problem in mathematics.
The second is of enormous practical and theoretical importance.
Algebraic geometry and representation theory provide fertile ground for
advancing work on these problems and others in complexity.
This introduction to algebraic complexity theory for graduate students
and researchers in computer science and mathematics features concrete
examples that demonstrate the application of geometric techniques to
real world problems.
Written by a noted expert in the field, it offers numerous open questions to
motivate future research. Complexity theory has rejuvenated classical geometric
questions and brought different areas of mathematics together in new ways.

Aug. 2017	316 pp.	
9781107199231		11,040.

Vol. 165: Gille, P. /Szamuely, T.:
No. 508-078
Central Simple Algebras and
Galois Cohomology, 2nd ed.
The first comprehensive, modern introduction to the theory of central simple
algebras over arbitrary fields, this book starts from the basics and reaches
such advanced results as the Merkurjev-Suslin theorem, a culmination of
work initiated by Brauer, Noether, Hasse and Albert, and
the starting point of current research in motivic cohomology theory by
Voevodsky, Suslin, Rost and others.
Assuming only a solid background in algebra, the text covers the basic theory
of central simple algebras, methods of Galois descent and Galois cohomology,
Severi-Brauer varieties, and techniques in Milnor K-theory and K-cohomology,
leading to a full proof of the Merkurjev-Suslin theorem and
its application to the characterization of reduced norms.
The final chapter rounds off the theory by presenting the results in positive
characteristic, including the theorems of Bloch-Gabber-Kato and Izhboldin.

July 2017	416 pp.	
9781107156371/9781316609880		13,330./7,500. (Paper ed.)

Cambridge

Encyclopedia of Mathematics and its Applications,

Vol. 165: Broughan, K.:
No. 508-053

Equivalents of the Riemann Hypothesis, Vol. 2:
Analytic Equivalents

The Riemann hypothesis (RH) is perhaps the most important outstanding
problem in mathematics.
This two-volume text presents the main known equivalents to
RH using analytic and computational methods.
The book is gentle on the reader with definitions repeated, proofs
split into logical sections, and graphical descriptions of the relations
between different results.
It also includes extensive tables, supplementary computational tools,
and open problems suitable for research.
Accompanying software is free to download.
These books will interest mathematicians who wish to update their knowledge,
graduate and senior undergraduate students seeking accessible research
problems in number theory, and others who want to explore and
extend results computationally.
Each volume can be read independently.
Volume 1 presents classical and
modern arithmetic equivalents to RH, with some analytic methods.
Volume 2 covers equivalences with a strong analytic orientation, supported by
an extensive set of appendices containing fully developed proofs.

<table>
<tr><td>Dec. 2017</td><td>350 pp.</td></tr>
<tr><td>9781107197121</td><td>21,230.</td></tr>
</table>

Vol. 164: Broughan, K.:
Equivalents of the Riemann Hypothesis, Vol. 1:
Arithmetic Equivalents

<table>
<tr><td>Dec. 2017</td><td>400 pp.</td></tr>
<tr><td>9781107197046</td><td>21,230.</td></tr>
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Australian Math. Society Lecture Series,

Vol. 26: Cameron, P.:
No. 508-057/058

Notes on Counting:
An Introduction to Enumerative Combinatorics

Enumerative combinatorics, in its algebraic and analytic forms, is vital to
many areas of mathematics, from model theory to statistical mechanics.
This book, which stems from many years experience of teaching, invites students
into the subject and prepares them for more advanced texts.
It is suitable as a class text or for individual study.
The author provides proofs for many of the theorems to show
the range of techniques available, and uses examples to link enumerative
combinatorics to other areas of study.
The main section of the book introduces the key tools of the subject
(generating functions and recurrence relations), which are then used to study
the most important combinatorial objects, namely subsets,
partitions, and permutations of a set.
Later chapters deal with more specialised topics, including permanents,
SDRs, group actions and the Redfield-Pólya theory of cycle indices,
Möbius inversion, the Tutte polynomial, and species.

<table>
<tr><td>June 2017</td><td>....</td></tr>
<tr><td>9781108417365/9781108404952</td><td>15,000./6,330.</td></tr>
</table>

Cambridge

London Mathematical Society Lecture Note Series,

Vol. 443: Daude, T. /Hafner, D. /Nicolas, J.-P.:   No. 508-313
Asymptotic Analysis in General Relativity
This volume compiles notes from four mini courses given at
the summer school on asymptotic analysis in general relativity, held at
the Institut Fourier in Grenoble, France.
It contains an up-to-date panorama of modern techniques in the asymptotic
analysis of classical and quantum fields in general relativity.
<div align="center">Jan. 2018   ....</div>

<div align="center">9781316649404   16,820.</div>

Vol. 442: Walker, G. /Wood, R.:   No. 508-200
Polynomials and the Mod 2 Steenrod Algebra, Vol. 2:
Representations of Gl $(n, F2)$
Volume 2 broadens the discussion to include modular representations of
matrix groups.
<div align="center">Jan. 2018   ....</div>
<div align="center">9781108414456   16,820.</div>

Vol. 441: Walker, G. /Wood, R.:   No. 508-199
Polynomials and the Mod 2 Steenrod Algebra, Vol. 1:
The Peterson Hit Problem
This is the first book to link the mod 2 Steenrod algebra, a classical object of
study in algebraic topology, with modular representations of
matrix groups over the field F of two elements.
The link is provided through a detailed study of Peterson's 'hit problem'
concerning the action of the Steenrod algebra on polynomials,
which remains unsolved except in special cases.
The topics range from decompositions of integers as sums of
'powers of 2 minus 1', to Hopf algebras and the Steinberg representation of
GL(n,F).
Volume 1 develops the structure of the Steenrod algebra from
an algebraic viewpoint and can be used as a graduate-level textbook.
<div align="center">Jan. 2018   ....</div>
<div align="center">9781108414487   16,820.</div>

Vol. 439: Ammari, K. /Gerbi, S.:   No. 508-108
Evolution Equations:
Long Time Behavior and Control
The proceedings of the summer school held at the Universite Savoie Mont Blanc,
France, 'Mathematics in Savoie 2015'.
The event was attended by world-leading researchers from the community of
control theory, as well as young researchers from around the globe.
This volume contains surveys of active research topics, along
with original research papers containing exciting new results on
the behavior of evolution equations.
It will therefore benefit both graduate students and researchers.
Key topics include the recent view on the controllability of parabolic systems
that permits the reader to overview the moment method for parabolic equations,
as well as numerical stabilization and control of partial differential equations.
<div align="center">Dec. 2017   ....</div>
<div align="center">9781108412308   13,590.</div>

<div align="center"># Cambridge</div>

Encyclopaedia of Mathematical Sciences,

Vol. 136: Freudenburg, G.:   No. 508-072

Algebraic Theory of Locally Nilpotent Derivations

The author provides a unified treatment of the subject,
beginning with 16 First Principles on which the theory is based.
These are used to establish classical results, such as Rentschler's Theorem for
the plane and the Cancellation Theorem for Curves.
More recent results, such as Makar-Limanov's theorem for locally nilpotent
derivations of polynomial rings, are also discussed.
Topics of special interest include progress in classifying additive actions on
three-dimensional affine space, finiteness questions (Hilbert's 14th Problem),
algorithms, the Makar-Limanov invariant, and connections to the Cancellation
Problem and the Embedding Problem.

Aug. 2017 ....

9783662553480   20,680.

Ergebnisse der Mathematik und ihrer Grenzgebiete 3 Folge

Band 66: Ribes, L.:   No. 508-093

Profinite Graphs and Groups

This book offers a detailed introduction to graph theoretic methods in
profinite groups and applications to abstract groups.
It is the first to provide a comprehensive treatment of the subject.
The author begins by carefully developing relevant notions in topology,
profinite groups and homology, including free products of profinite groups,
cohomological methods in profinite groups, and fixed points of
automorphisms of free pro-p groups.
The final part of the book is dedicated to applications of the profinite theory to
abstract groups, with sections on finitely generated subgroups of free groups,
separability conditions in free and amalgamated products, and algorithms in
free groups and finite monoids.

Sep. 2017   482 pp.

9783319610412   20,680.

Band 56: Forstneric, F.:

Stein Manifolds and Holomorphic Mappings:

The Homotopy Principle in Complex Analysis, 2nd ed.

Oka theory is the field of complex analysis dealing with global problems on
Stein manifolds which admit analytic solutions in the absence of
topological obstructions.   No. 508-129
The exposition in the present volume focuses on the notion of
an Oka manifold introduced by the author in 2009.
It explores connections with elliptic complex geometry initiated by Gromov in
1989, with the Andersen-Lempert theory of holomorphic automorphisms of
complex Euclidean spaces and of Stein manifolds with the density property,
and with topological methods such as homotopy theory and
the Sciberg-Witten theory.
Researchers and graduate students interested in the homotopy principle in
complex analysis will find this book particularly useful.
It is currently the only work that offers a comprehensive introduction to
both the Oka theory and the theory of holomorphic automorphisms of
complex Euclidean spaces and of other complex manifolds
with large automorphism groups.

Sep. 2017   577 pp.

9783319610573   24,440.

Springer

Vol. 276: Einsiedler, M. /Ward, T.: No. 508-126

Functional Analysis, Spectral Theory, and Applications

This textbook provides a careful treatment of functional analysis and some of
its applications in analysis, number theory, and ergodic theory.
In addition to discussing core material in functional analysis,
the authors cover more recent and advanced topics, including Weyl's law for
eigenfunctions of the Laplace operator, amenability and property (T),
the measurable functional calculus, spectral theory for unbounded operators,
and an account of Tao's approach to the prime number theorem
using Banach algebras.
The book further contains numerous examples and exercises, making it
suitable for both lecture courses and self-study.

July 2017 614 pp.
9783319585390 15,040.

Vol. 20: Conca, A. /Gubeladze, J. /Romer, T. (eds.): No. 508-063

Homological and Computational Methods in
Commutative Algebra

The volume - as well as the meeting - is dedicated to Prof. Winfried Bruns on
the occasion of his 70th birthday.
The volume is a unique collection of up-to-date contributions in the field of
commutative algebra with relation to algebraic geometry, homological algebra,
computational algebra and combinatorics.
The book offers a unique resource, both for young researchers and for
more experienced ones seeking comprehensive overviews and extensive
bibliographic references.

Dec. 2017 240 pp.
9783319619422 17,860.

Vol. 19: Callegaro, F. /Carnovale, G. /Caselli, F. / No. 508-056
De Concini, C. /De Sole, A. (eds.):

Perspectives in Lie Theory

This book gathers the key outcomes of this period, addressing topics such as:
structure and representation theory of vertex algebras, Lie algebras and
superalgebras, as well as hyperplane arrangements with different approaches,
ranging from geometry and topology to combinatorics.

July 2017 450 pp.
9783319589701 17,860.

Vol. 18: Michelangeli, A. /Dell'Antonio, G. (eds.): No. 508-332

Advances in Quantum Mechanics:
Contemporary Trends and Open Problems

This volume collects recent contributions on the contemporary trends in
the mathematics of quantum mechanics, and more specifically in mathematical
problems arising in quantum many-body dynamics, quantum graph theory,
cold atoms, unitary gases, with particular emphasis on the developments of
the specific mathematical tools needed, including: linear and non-linear
Schrodinger equations, topological invariants, non-commutative geometry,
resonances and operator extension theory, among other

Aug. 2017 300 pp.
9783319589039 17,860.

Springer

Lecture Notes in Mathematics,

Vol. 2191: Abrams, G. /Ara, P. /Siles Molina, M.:   No. 508-045
Leavitt Path Algebras

This book offers a comprehensive introduction by three of the leading experts in
the field, collecting fundamental results and open problems in a single volume.
Since Leavitt path algebras were first defined in 2005, interest in these algebras
has grown substantially, with ring theorists as well as researchers working in
graph C*-algebras, group theory and symbolic dynamics attracted to the topic.
Providing a historical perspective on the subject, the authors review existing
arguments, establish new results, and outline the major themes and ring-
theoretic concepts, such as the ideal structure, Z-grading and the close link
between Leavitt path algebras and graph C*-algebras.
The book also presents key lines of current research, including
the Algebraic Kirchberg Phillips Question, various additional classification
questions, and connections to noncommutative algebraic geometry.
Leavitt Path Algebras will appeal to graduate students and researchers working
in the field and related areas, such as C*-algebras and symbolic dynamics.
With its descriptive writing style, this book is highly accessible.

Nov. 2017	200 pp.
9781447173434	8,460.

No. 508-103

Vol. 2188: Wehrung, F.:
Refinement Monoids, Equidecomposability Types,
and Boolean Inverse Semigroups

Adopting a new universal algebraic approach, this book explores and
consolidates the link between Tarski's classical theory of equidecomposability
types monoids, abstract measure theory (in the spirit of
Hans Dobbertin's work on monoid-valued measures on Boolean algebras) and
the nonstable K-theory of rings.
This is done via the study of a monoid invariant, defined on Boolean inverse
semigroups, called the type monoid.
The new techniques contrast with the currently available topological approaches.
Many positive results, but also many counterexamples, are provided.

Oct. 2017	215 pp.
9783319615981	6,580.

Vol. 2187: Kuhn, F.:   No. 508-222
Levy Matters VI: Levy-Type Processes:
Moments, Construction and Heat Kernel Estimates

Presenting some recent results on the construction and the moments of
Levy-type processes, the focus of this volume is on a new existence theorem,
which is proved using a parametrix construction.
Applications range from heat kernel estimates for a class of Levy-type
processes to existence and uniqueness theorems for Levy-driven stochastic
differential equations with Holder continuous coefficients. Moreover, necessary
and sufficient conditions for the existence of moments of Levy-type processes are
studied and some estimates on moments are derived.
Levy-type processes behave locally like Levy processes but, in contrast to
Levy processes, they are not homogeneous in space.
Typical examples are processes with varying index of stability and solutions of
Levy-driven stochastic differential equations.

Sep. 2017	230 pp.
9783319608877	6,580.

Springer

Vol. 2186: Carrillo, J. /del Pino, M. /Figalli, A. /   No. 508-116
Mingione, G. /Vazquez, J.:
Nonlocal and Nonlinear Diffusions and Interactions:
New Methods and Directions: Cetraro, 2016

Presenting a selection of topics in the area of nonlocal and nonlinear diffusions,
this book places a particular emphasis on new emerging subjects such as nonlocal
operators in stationary and evolutionary problems and their applications,
swarming models and applications to biology and mathematical physics,
and nonlocal variational problems.
The authors are some of the most well-known mathematicians in
this innovative field, which is presently undergoing rapid development.
The intended audience includes experts in elliptic and parabolic equations
who are interested in extending their expertise to the nonlinear setting,
as well as Ph.D. or postdoctoral students who want to enter into
the most promising research topics in the field.

Oct. 2017   290 pp.

9783319614939   6,580.

Vol. 2184: Najman, L. /Romon, P. (eds.):   No. 508-192
Modern Approaches to Discrete Curvature

In the recent years, a very active field of research has appeared,
blending discrete mathematics, differential geometry, probabilities and
computer graphics, as much as a theoretical development as in response to
unforeseen challenges coming from applications.
Discrete and continuous geometries have turned out to be intimately connected,
and the bridges between the two are manifold, and involve numerous fields:
metric spaces, Riemannian and Euclidean geometries, geometric measure theory,
topology, partial differential equations, calculus of variations, gradient flows,
asymptotic analysis, probabilities, harmonic analysis, graph theory, etc.
In spite of the crucial importance both in theoretical mathematics and in
applications, there are, up to now, almost no books providing a coherent outlook
on this emerging field.

Sep. 2017   352 pp.

9783319580012   13,160.

Vol. 2180: Tonon, D. /Aronna, M. /Kalise, D. (eds.):
Optimal Control: No. 508-281
Novel Directions and Applications

Focusing on applications to science and engineering, this book presents
the results of the ITN-FP7 SADCO network's innovative research in
optimization and control in the following interconnected topics: optimality
conditions in optimal control, dynamic programming approaches to
optimal feedback synthesis and reachability analysis, and computational
developments in model predictive control.
The novelty of the book resides in the fact that it has been developed by
early career researchers, providing a good balance between clarity
and scientific rigor.
Each chapter features an introduction addressed to PhD students and
some original contributions aimed at specialist researchers.
Requiring only a graduate mathematical background, the book is self-contained.

Sep. 2017   340 pp.

9783319607702   13,160.

Springer

Universitext

Lototsky, L. /Rozovsky, B.:   No. 508-145
Stochastic Partial Differential Equations
Taking readers with a basic knowledge of probability and real analysis to
the frontiers of a very active research discipline, this textbook provides all
the necessary background from functional analysis and the theory of PDEs.
It covers the main types of equations (elliptic, hyperbolic and parabolic)
and discusses different types of random forcing.
The objective is to give the reader the necessary tools to understand
the proofs of existing theorems about SPDEs (from other sources) and
perhaps even to formulate and prove a few new ones.
Most of the material could be covered in about 40 hours of lectures,
as long as not too much time is spent on the general discussion of
stochastic analysis in infinite dimensions.

July 2017	482 pp.	
9783319586458		12,590.

Steinmetz, N.:   No. 508-162
Nevanlinna Theory, Normal Families,
and Algebraic Differential Equations
This book offers a modern introduction to Nevanlinna theory and its intricate
relation to the theory of normal families, algebraic functions, asymptotic series,
and algebraic differential equations.Following a comprehensive treatment of
Nevanlinna's theory of value distribution, the author presents advances made
since Hayman's work on the value distribution of differential polynomials and
illustrates how value- and pair-sharing problems are linked to algebraic curves
and Briot-Bouquet differential equations.
In addition to discussing classical applications of Nevanlinna theory,
the book outlines state-of-the-art research, such as the effect of the Yosida
and Zalcman-Pang method of re-scaling to algebraic differential equations, and
presents the Painleve-Yosida theorem, which relates Painleve transcendents and
solutions to selected 2D Hamiltonian systems to certain Yosida classes of
meromorphic functions.

July 2017	235 pp.	
9783319597997		10,710.

Jost, J.:   No. 508-186
Riemannian Geometry and Geometric Analysis, 7th ed.
It offers insight into a wide range of topics, including fundamental concepts of
Riemannian geometry, such as geodesics, connections and curvature; the basic
models and tools of geometric analysis, such as harmonic functions, forms,
mappings, eigenvalues, the Dirac operator and the heat flow method; as well as
the most important variational principles of theoretical physics, such as Yang-
Mills, Ginzburg-Landau or the nonlinear sigma model of quantum field theory.
The present volume connects all these topics in a systematic geometric
framework. At the same time, it equips the reader with the working tools of
the field and enables her or him to delve into geometric research.
The 7th edition has been systematically reorganized and updated.
Almost no page has been left unchanged.
It also includes new material, for instance on symplectic geometry,
as well as the Bishop-Gromov volume growth theorem which elucidates
the geometric role of Ricci curvature.

Dec. 2017	673 pp.	
9783319618593		13,160.

Springer

Springer Monographs in Mathematics

Halbeisen, L.:   No. 508-040
Combinatorial Set Theory:
With a Gentle Introduction to Forcing, 2nd ed.
This book, now in a thoroughly revised second edition, provides
a comprehensive and accessible introduction to modern set theory.
Following an overview of basic notions in combinatorics and first-order logic,
the author outlines the main topics of classical set theory in the second part,
including Ramsey theory and the axiom of choice.
Here the new edition has been extended to contain a new Shelah-type
permutation model in order to prove the consistency of a surprising relation
between two cardinals in set theory without the axiom of choice.
The third part explains the sophisticated technique of forcing in great detail,
now including a separate chapter on Suslin's problem.
The technique is used to show that certain statements, such as the continuum
hypothesis, are neither provable nor disprovable from the axioms of set theory.
In the final part, some topics of classical set theory are revisited and further
developed in light of forcing, with new chapters on Sacks Forcing and Shelah's
astonishing construction of a model with finitely many Ramsey ultrafilters.
                    Dec. 2017   609 pp.
            9783319602301   24,440.

Malle, G. /Matzat, H.:   No. 508-088
Inverse Galois Theory, 2nd ed.
This book is the second edition of Inverse Galois Theory.
It is concerned with the question of which finite groups occur as
Galois Groups over a given field.
In particular, this includes the question of the structure and the representations
of the absolute Galois group of K and also the question about its
finite epimorphic images, the so-called inverse problem of Galois theory.
In all these areas important progress was made in the last few years.
The aim of the book is to give a consistent and reasonably complete survey of
these results, with the main emphasis on the rigidity method and its applications.
Among others the monograph presents the most successful known
existence theorems and construction methods for Galois extensions and
solutions of embedding problems combined with a collection of
the existing Galois realizations.
                    Nov. 2017   ....
            9783662554197   15,040.

Bogachev, V. /Smolyanov, O.:   No. 508-112
Topological Vector Spaces and Their Applications
This book gives a compact exposition of the fundamentals of the theory of locally
convex topological vector spaces. Furthermore it contains a survey of the most
important results of a more subtle nature, which cannot be regarded as basic,
but knowledge which is useful for understanding applications. Finally, the book
explores some of such applications connected with differential calculus and
measure theory in infinite-dimensional spaces. These applications are a central
aspect of the book, which is why it is different from the wide range of existing
texts on topological vector spaces. Overall, this book develops differential and
integral calculus on infinite-dimensional locally convex spaces by using methods
and techniques of the theory of locally convex spaces.
                    June 2017   456 pp.
            9783319571164   20,680.
Springer

EMS Textbooks in Mathematics

No. 508-102

Skowronski, A. /Yamagata Kunio :
Frobenius Algebras II:
Tilted and Hochschild Extension Algebras

The first part of the book is devoted to fundamental results of
the representation theory of finite dimensional hereditary algebras and
their tilted algebras, which allow to describe the representation theory of
prominent classes of Frobenius algebras.
The second part is devoted to basic classical and recent results concerning
the Hochschild extensions of finite dimensional algebras by
duality bimodules and their module categories.
Moreover, the shapes of connected components of the stable Auslander-Reiten
quivers of Frobenius algebras are described.

May 2017	629 pp.	
9783037191743		10,610.

EMS Series of Congress Report

No. 508-123

Dittrich, J. /Kovarik, H. /Laptev, A. (eds.):
Functional Analysis and Operator Theory for
Quantum Physics

Several authors considered problems related to systems with mixed-dimensions
such as quantum waveguides, quantum layers and quantum graphs.
Eigenvalues and eigenfunctions of Laplace and Schrodinger operators are
discussed too, as well as systems with adiabatic time evolution.
Although most of the problems treated in the book have a quantum
mechanical background, some contributions deal with issues which go well
beyond this framework; for example the Cayley-Hamilton theorem,
approximation formulae for contraction semigroups or factorization of
analytic operator-valued Fredholm functions.

May 2017	597 pp.	
9783037191750		17,930.

European Mathematical Society

MSJ Memoirs,

No. 508-073

Vol. 35: Fujino Osamu :
Foundations of the Minimal Model Program

One of the main purposes of this book is to establish the fundamental theorems
of the minimal model program, that is, various Kodaira type vanishing theorems,
the cone and contraction theorem, and so on, for quasi-log schemes.
The notion of quasi-log schemes was introduced by Florin Ambro and is now
indispensable for the study of semi-log canonical pairs from the cohomological
point of view. By the recent developments of the minimal model program,
we know that the appropriate singularities to permit on the varieties at the
boundaries of moduli spaces are semi-log canonical.
In order to achieve this goal, we generalize Kollar's injectivity, torsion-free,
and vanishing theorems for reducible varieties by using the theory of
mixed Hodge structures on cohomology with compact support.
We also review many important classical Kodaira type vanishing theorems in
detail and explain the basic results of the minimal model program for
the reader's convenience.

May 2017	289 pp.	
9784864970457		4,750.

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