Yurinsha Book News

*Ergebnisse der Mathematik und
ihrer Grenzgebiete 3 Folge*

Band 70: Schutt, M. /Shioda Tetsuji :
Mordell-Weil Lattices

This book lays out the theory of Mordell-Weil lattices, a very powerful
and influential tool at the crossroads of algebraic geometry and
number theory, which offers many fruitful connections to
other areas of mathematics.   No. 521-083
The book presents all the ingredients entering into the theory of
Mordell-Weil lattices in detail, notably, relevant portions of lattice
theory, elliptic curves, and algebraic surfaces. After defining Mordell-
Weil lattices, the authors provide several applications in depth.
They start with the classification of rational elliptic surfaces.
Then a useful connection with Galois representations is discussed.
By developing the notion of excellent families, the authors are able to
design many Galois representations with given Galois groups
such as the Weyl groups of E_6, E_7 and E_8. They also explain
a connection to the classical topic of the 27 lines on a cubic surface.
Two chapters deal with elliptic K3 surfaces, a pulsating area of
recent research activity which highlights many central properties of
Mordell-Weil lattices. Finally, the book turns to the rank problem-one
of the key motivations for the introduction of Mordell-Weil lattices.

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Dec. 2019   348 pp.

9789813293007   18,490.

Springer

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CBMS Regional Conference Series in Mathematics,

Vol. 133: **Freed, D.:**   No. 521-166
Lectures on Field Theory and Topology
Early lectures describe the geometric axiom systems introduced by Graeme Segal
and Michael Atiyah in the late 1980s, as well as subsequent extensions.
This material provides an entry point for mathematicians to delve into
quantum field theory.
Classification theorems in low dimensions are proved to illustrate the framework.
The later lectures turn to more specialized topics in field theory, including
the relationship between invertible field theories and stable homotopy
theory, extended unitarity, anomalies, and relativistic free fermion systems.
The accompanying mathematical explanations touch upon (higher)
category theory, duals to the sphere spectrum, equivariant spectra,
differential cohomology, and Dirac operators.
                    Sep. 2019   186 pp.
          9781470452063   9,010.

Colloquium Publications,

Vol. 65: **Lovasz, L.:**   No. 521-132
Graphs and Geometry
Graphs are usually represented as geometric objects drawn in the plane,
consisting of nodes and curves connecting them.
The main message of this book is that such a representation is not merely
a way to visualize the graph, but an important mathematical tool.
It is obvious that this geometry is crucial in engineering, for example, if you
want to understand rigidity of frameworks and mobility of mechanisms.
But even if there is no geometry directly connected to the graph-theoretic
problem, a well-chosen geometric embedding has mathematical meaning
and applications in proofs and algorithms.
This book surveys a number of such connections between graph theory and
geometry: among others, rubber band representations, coin representations,
orthogonal representations, and discrete analytic functions.
Applications are given in information theory, statistical physics,
graph algorithms and quantum physics.
                    Aug. 2019   444 pp.
          9781470450878   16,230.

Graduate Studies in Mathematics,

Vol. 201: **Lee, D.:**   No. 521-040
Geometric Relativity
The aim of this book is to present mathematical logic to students who are
inter-ested in what this field is but have no intention of specializing in it.
The point of view is totreat logic on an equal footing to any other topic in
the mathematical curriculum.
The bookstarts with a presentation of naive set theory, the theory of sets that
mathematicians use ona daily basis.
Each subsequent chapter presents one of the main areas of
mathematical logic:first order logic and formal proofs, model theory, recursion
theory, Godel's incompletenesstheorem, and, finally, the axiomatic set theory.
Each chapter includes several interesting highlights - outsideof logic when
possible - either in the main text, or as exercises or appendices.
Exercisesare an essential component of the book, and a good number of
them are designed toprovidean opening to additional topics of interest.
                    Oct. 2019   363 pp.
          9781470450816   15,570.

A. M. S.

Mathematical Surveys and Monographs,

Vol. 242: Cais, B. / No. 521-052
Bhatt, B. /Caraiani, A. /Kedlaya, K. /Scholze, P.:
Perfectoid Spaces:
Lectures From the 2017 Arizona Winter School

Thisbook, originating from a series of lectures givenat the 2017
Arizona Winter School onperfectoidspaces, providesa broad
introduction to the subject.
After an introduction withinsightinto the history and future of
the subject byPeter Scholze, Jared Weinstein givesa user friendly and
utilitarian account of the theory of adic spaces.
Kiran Kedlayafurther develops the foundational material, studies
vector bundles on Fargues-Fontaine curves,and introduces diamonds and
shtukas over them with a view toward the local Langlands correspondence.
Bhargav Bhatt explains the application of perfectoid spaces to
comparison isomorphisms in p-adic Hodge theory.
Finally, Ana Caraiani explains the application of perfectoid spaces to
the construction of Galois representations associated to torsion classes in
the cohomology of locally symmetric spaces for the general linear group.

Sep. 2019	312 pp.
9781470450151	21,140.

Vol. 241: Williams, D.: No. 521-153
A Tool Kit for Groupoid C^*-Algebras

This book provides a detailedintroduction to this vast subject and is
suitable for graduate students or any researcher who wants to use
groupoid C^*-algebras in their work.
The main focus is to equip the reader with modern versions of
the basic technical tools used in the subject, which will allow
the reader tounderstand fundamental results and make contributions to
various areas in the subject.
Thus, in addition to covering the basic properties and construction of
groupoid C^*-algebras, the focus is to give a modern treatment of
some of the major developments in the subject in recent years,
including the Equivalence Theorem and the Disintegration Theorem.

Sep. 2019	404 pp.
9781470451332	21,140.

Vol. 240: Fernandez Lopez, A.: No. 521-063
Jordan Structures in Lie Algebras

This book explores applications of Jordan theory to the theory of Lie algebras.
It begins with the general theory of nonassociative algebras and of Lie algebras
and then focuses on properties of Jordan elements of special types.
Then it proceeds to the core of the book, in which the author explains
how properties of the Jordan algebra attached to a Jordan element of
a Lie algebra can be used to reveal properties of the Lie algebra itself.
One of the special features of this book is that it carefully
explains Zelmanov's seminal results on infinite-dimensional Lie algebras
from this point of view.
The book is suitable for advanced graduate students and researchers who are
interested in learning how Jordan algebras can be used as a powerful tool to
understand Lie algebras, including infinite-dimensional Lie algebras.

Aug. 2019	299 pp.
9781470450861	21,140.

A. M. S.

Mathematical Surveys and Monographs,

Vol. 239: Arcozzi, N. /Rochberg, R. /Sawyer, E. /Wick, B.:
The Dirichlet Space and Related Function Spaces

The study of the classical Dirichlet space is one of the central topics on
the intersection of the theory of holomorphic functions and functional analysis.
It was introduced about 100 years ago and continues to be an area of
active current research. The theory is related to such important themes as
multipliers, reproducing kernels, and Besov spaces, among others. No. 521-098
The authors present the theory of the Dirichlet space and related spaces
starting with classical results and including some quite recent achievements
like Dirichlet-type spaces of functions in several complex variables and
the corona problem.
The first part of this book is an introduction to the function theory and operator
theory of the classical Dirichlet space, a space of holomorphic functions on
the unit disk defined by a smoothness criterion.
The Dirichlet space is also a Hilbert space with a reproducing kernel, and is the
model for the dyadic Dirichlet space, a sequence space defined on the dyadic tree.
These various viewpoints are used to study a range of topics including
the Pick property, multipliers, Carleson measures, boundary values, zero sets,
interpolating sequences, the local Dirichlet integral, shift invariant subspaces,
and Hankel forms.

Aug. 2019	560 pp.	
9781470450823		21,140.

Student Mathematical Library,

Vol. 89: Hils, M. /Loeser, F.:
A First Journey Through Logic   No. 521-037

The aim of this book is to present mathematical logic to students who are
interested in what this field is but have no intention of specializing in it.
The point of view is to treat logic on an equal footing to any other topic in
the mathematical curriculum.
The book starts with a presentation of naive set theory,
the theory of sets that mathematicians use on a daily basis.
Each subsequent chapter presents one of the main areas of
mathematical logic: first order logic and formal proofs, model theory, recursion
theory, Godel's incompleteness theorem, and, finally, the axiomatic set theory.

Sep. 2019	195 pp.	
9781470452728		9,000.

University Lecture Series,

Vol. 72: Mnev, P.:   No. 521-314
Quantum Field Theory:
Batalin-Vilkovisky Formalism and Its Applications

The book is oriented toward a graduate mathematical audience and does not
require any prior physics background.
To elucidate the picture, the exposition is mostly focused on finite-dimensional
models for gauge systems and path integrals, while giving comments on what has
to be amended in the infinite-dimensional case relevant to local field theory.
Motivating examples discussed in the book include Alexandrov-Kontsevich
-Schwarz-Zaboronsky sigma models, the perturbative expansion for Chern-
Simons invariants of 3-manifolds given in terms of integrals over configurations
of points on the manifold, the BF theory on cellular decompositions of manifolds,
and Kontsevich's deformation quantization formula.

Sep. 2019	192 pp.	
9781470452711		9,830.

A. M. S.

Studies in Universal Logic

Chatti, S.:
No. 521-033
Arabic Logic From Al-Farabi to Averroes
This monograph explores the logical systems of early logicians in
the Arabic tradition from a theoretical perspective, providing a complete panora-
ma of early Arabic logic and centering it within an expansive historical context.
By thoroughly examining the writings of the first Arabic logicians, al-Farabi to,
Avicenna and Averroes, the author analyzes their respective theories, discusses
their relationship to the syllogistics of Aristotle and his followers, and measures
their influence on later logical systems.

Nov. 2019   339 pp.

9783030274658   12,950.

ANHA: Applied and Numerical Harmonic Analysis

Ault, S. /Kicey, C.:
No. 521-100
Counting Lattice Paths Using Fourier Methods
This monograph introduces a novel and effective approach to counting lattice
paths by using the discrete Fourier transform (DFT) as a type of
periodic generating function.
Utilizing a previously unexplored connection between combinatorics and
Fourier analysis, this method will allow readers to move to higher-dimensional
lattice path problems with ease.

Oct. 2019   128 pp.

9783030266950   11,100.

Trends in Mathematics

Daftardar-Gejji, V. (ed.):
No. 521-108
Fractional Calculus and Fractional Differential Equations
This book provides a broad overview of the latest developments in
fractional calculus and fractional differential equations (FDEs) with
an aim to motivate the readers to venture into these areas.
It also presents original research describing the fractional operators of
variable order, fractional-order delay differential equations, chaos
and related phenomena in detail.

Oct. 2019   169 pp.

9789811392269   24,310.

Birkhauser

EMS Series of Congress Report

Baake, M. /Gotze, F. /Hoffmann, W.:
No. 521-101
Spectral Structures and
Topological Methods in Mathematics
This book is a collection of survey articles about spectral structures and
the application of topological methods bridging different mathematical
disciplines, from pure to applied. The topics are based on work done in
the Collaborative Research Centre (SFB) 701.
Notable examples are non-crossing partitions, which connect
representation theory, braid groups, non-commutative probability as well as
spectral distributions of random matrices.
The local distributions of such spectra are universal, also representing
the local distribution of zeros of L-functions in number theory.
An overarching method is the use of zeta functions in the asymptotic counting of
sublattices, group representations etc.

July 2019   433 pp.

9783037191972   16,460.

European Mathematical Society

Cambridge Studies in Advanced Mathematics,

Vol. 184: Demeter, C.:   No. 521-110
Fourier Restriction, Decoupling and Applications

The last fifteen years have seen a flurry of exciting developments in
Fourier restriction theory, leading to significant new applications in diverse fields.
This timely text brings the reader from the classical results to state-of-the-art
advances in multilinear restriction theory, the Bourgain-Guth induction on
scales and the polynomial method.
Also discussed in the second part are decoupling for curved manifolds
and a wide variety of applications in geometric analysis, PDEs (Strichartz
estimates on tori, local smoothing for the wave equation) and number theory
(exponential sum estimates and the proof of the Main Conjecture for
Vinogradov's Mean Value Theorem).
More than 100 exercises in the text help reinforce these important but often
difficult ideas, making it suitable for graduate students as well as specialists.
Written by an author at the forefront of the modern theory, this book will be of
interest to everybody working in harmonic analysis.

             Jan. 2020   325 pp.
         9781108499705   10,230.

Vol. 183: Yekutieli, A.:   No. 521-090
Derived Categories

There have been remarkably few systematic expositions of the theory of
derived categories since its inception in the work of Grothendieck and
Verdier in the 1960s.
This book is the first in-depth treatment of this important component of
homological algebra.
It carefully explains the foundations in detail before moving on to key
applications in commutative and noncommutative algebra, many otherwise
unavailable outside of research articles.
These include commutative and noncommutative dualizing complexes,
perfect DG modules, and tilting DG bimodules.
Written with graduate students in mind, the emphasis here is on explicit
constructions (with many examples and exercises) as opposed to axiomatics,
with the goal of demystifying this difficult subject. Beyond serving as a thorough
introduction for students, it will serve as an important reference for researchers
in algebra, geometry and mathematical physics.

             Jan. 2020   ....
         9781108419338   13,560.

Vol. 182: Nikolski, N.:   No. 521-137
Toeplitz Matrices and Operators

The theory of Toeplitz matrices and operators is a vital part of modern analysis,
with applications to moment problems, orthogonal polynomials, approximation
theory, integral equations, bounded- and vanishing-mean oscillations, and
asymptotic methods for large structured determinants, among others.
This friendly introduction to Toeplitz theory covers the classical spectral theory
of Toeplitz forms and Wiener-Hopf integral operators and their manifestations
throughout modern functional analysis.
Numerous solved exercises illustrate the results of the main text and
introduce subsidiary topics, including recent developments.
Each chapter ends with a survey of the present state of the theory,
making this a valuable work for the beginning graduate student and
established researcher alike.

             Jan. 2020   410 pp.
         9781107198500   12,520.

Cambridge

| *London Mathematical Society Lecture Note Series,* |

Vol. 459: **Donagi, R. /Shaska, T.:**   No. 521-058
Integrable Systems and Algebraic Geometry, Vol. 2
Created as a celebration of mathematical pioneer Emma Previato, this
comprehensive book highlights the connections between algebraic geometry
and integrable systems, differential equations, mathematical physics, and
many other areas. The authors, many of whom have been at the forefront of
research into these topics for the last decades, have all been influenced by
Previato's research, as her collaborators, students, or colleagues.
The diverse articles in the book demonstrate the wide scope of Previato's work
and the inclusion of several survey and introductory articles makes the text
accessible to graduate students and non-experts, as well as researchers.
The articles in this second volume discuss areas related to algebraic geometry,
one of the central areas of mathematics, and cover a wide scope of topics,
including the Bergman tau-function and Jacobi inversion formulae.

<p align="center">Feb. 2020   ....</p>
<p align="center">9781108715775   12,520.</p>

Vol. 458: **Donagi, R. /Shaska, T.:**   No. 521-059
Integrable Systems and Algebraic Geometry, Vol. 1
This first volume covers a wide range of areas related to integrable systems.
Each chapter gives a different perspective of the domain, from
Franco Magri's exploration of Kowalewski's top from the viewpoint of
bi-Hamiltonian geometry, to Horst Knorrer's discussion of the global symmetries
of the three-dimensional Kepler problem.

<p align="center">Feb. 2020   450 pp.</p>
<p align="center">9781108715744   12,520.</p>

Vol. 457: **Haines, T. /Harris, M.:**
<p align="right">**Shimura Varieties** No. 521-066</p>
This is the second volume of a series of mainly expository articles on
the arithmetic theory of automorphic forms.
It forms a sequel to On the Stabilization of the Trace Formula published by
International Press in 2011.
The books are intended primarily for two groups of readers:
those interested in the structure of automorphic forms on reductive groups over
number fields, and specifically in qualitative information on multiplicities of
automorphic representations; and those interested in the classification of
l-adic representations of Galois groups of number fields. Langlands conjectures
elaborate on the notion that these two problems overlap considerably.
These volumes present convincing evidence supporting this, clearly and
succinctly enough that readers can pass with minimal effort between the two
points of view. Over a decade's worth of progress toward the stabilization of
the Arthur-Selberg trace formula, culminating in Ngo Bau Chau's proof of
the Fundamental Lemma, makes this series timely.

<p align="center">Nov. 2019   320 pp.</p>
<p align="center">9781108704861   18,780.</p>

Vol. 454: **Hagen, M. /Webb, R. /Wilton, H.:**   No. 521-167
Beyond Hyperbolicity
Since the notion was introduced by Gromov in the 1980s, hyperbolicity of groups
and spaces has played a significant role in geometric group theory; hyperbolic
groups have good geometric properties that allow us to prove strong results.
However, many classes of interest in our exploration of the universe of
finitely generated groups contain examples that are not hyperbolic.
Thus we wish to go 'beyond hyperbolicity' to find good generalisations

that nevertheless permit similarly strong results. This book is the ideal resource
for researchers wishing to contribute to this rich and active field.
The first two parts are devoted to mini-courses and expository articles on coarse
median spaces, semihyperbolicity, acylindrical hyperbolicity,
Morse boundaries, and hierarchical hyperbolicity.
The topics of the surveys (and more) re-appear in the research articles
that make up Part III, presenting the latest results beyond hyperbolicity.

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Sep. 2019   243 pp.

9781108447294   10,440.

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| *London Mathematical Society Student Texts,* |

Vol. 95: Digne, F. /Michel, J.:   No. 521-056/057

Representations of Finite Groups of Lie Type, 2nd ed.

This second edition features new material to reflect the continuous evolution of
the subject, including entirely new chapters on Hecke algebras,
Green functions and Lusztig families.
The authors cover the basic theory of representations of finite groups of Lie type,
such as linear, unitary, orthogonal and symplectic groups.
They emphasise the Curtis-Alvis duality map and Mackey's theorem and
the results that can be deduced from it, before moving on to
a discussion of Deligne-Lusztig induction and
Lusztig's Jordan decomposition theorem for characters.

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Feb. 2020   272 pp.

9781108481489/9781108722629   16,700./7,300. (Paper ed.)

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Vol. 94: Tointon, M.:   No. 521-148/149

Introduction to Approximate Groups

This text collects, for the first time in book form, the main concepts and
techniques into a single, self-contained introduction.
The author presents a number of recent developments in the field, including
an exposition of his recent result classifying nilpotent approximate groups.
The book also features a considerable amount of previously unpublished
material, as well as numerous exercises and motivating examples.
It closes with a substantial chapter on applications, including an exposition of
Breuillard, Green and Tao's celebrated approximate-group proof of
Gromov's theorem on groups of polynomial growth.

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Feb. 2020   216 pp.

9781108470735/9781108456449   16,490./7,100. (Paper ed.)

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| *New Mathematical Monographs,* |

Vol. 38: Varopoulos, N.:   No. 521-088

Potential Theory and Geometry on Lie Groups

This book provides a complete and reasonably self-contained account of
a new classification of connected Lie groups into two classes.
The first part describes the use of tools from potential theory to establish
the classification and to show that the analytic and algebraic approaches to
the classification are equivalent.
Part II covers geometric theory of the same classification and a proof
that it is equivalent to the algebraic approach.
Part III is a new approach to the geometric classification that requires more
advanced geometric technology, namely homotopy, homology and
the theory of currents.
Using these methods, a more direct, but also more sophisticated, approach to
the equivalence of the geometric and algebraic classification is made.

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Oct. 2019   611 pp.

9781107036499   28,180.

Cambridge

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Lecture Notes in Mathematics,

Vol. 2248: Braverman, A. /Finkelberg, M. /Negut, A. / Oblomkov, A. /Bruzzo, U. /Grassi, A. /Sala, F. (eds.): Geometric Representation Theory and Gauge Theory: Cetraro, Italy 2018 No. 521-048

This book offers a review of the vibrant areas of geometric representation theory and gauge theory, which are characterized by a merging of traditional techniques in representation theory with the use of powerful tools from algebraic geometry, and with strong inputs from physics
The notes are based on lectures delivered at the CIME school "Geometric Representation Theory and Gauge Theory held in Cetraro, Italy, in June 2018. They comprise three contributions, due to Alexander Braverman and Michael Finkelberg, Andrei Negut, and Alexei Oblomkov, respectively. Braverman and Finkelberg's notes review the mathematical theory of the Coulomb branch of 3D N=4 quantum gauge theories.

Dec. 2019 110 pp.
9783030268558 9,250.

Vol. 2247: Kammeyer, H.: Introduction to l^2-Invariants No. 521-164

This book introduces the reader to the most important concepts and problems in the field of l^2-invariants.
After some foundational material on group von Neumann algebras, l^2-Betti numbers are defined and their use is illustrated by several examples.
The text continues with Atiyah's question on possible values of l^2-Betti numbers and the relation to Kaplansky's zero divisor conjecture.
The general definition of l^2-Betti numbers allows for applications in group theory. A whole chapter is dedicated to Luck's approximation theorem and its generalizations. The final chapter deals with l^2-torsion, twisted variants and the conjectures relating them to torsion growth in homology.
The text provides a self-contained treatment that constructs the required specialized concepts from scratch. It comes with numerous exercises and examples, so that both graduate students and researchers will find it useful for self-study or as a basis for an advanced lecture course.

Oct. 2019 181 pp.
9783030282967 7,400.

Vol. 2246: Dinew, S. /Picard, S. /Teleman, A. /Verjovsky, A. / Angella, D. /Arosio, L. /Di Nezza, E.: Complex Non-Kahler Geometry: No. 521-074 Cetraro, Italy 2018

Collecting together the lecture notes of the CIME Summer School held in Cetraro in July 2018, the aim of the book is to introduce a vast range of techniques which are useful in the investigation of complex manifolds.
The school consisted of four courses, focusing on both the construction of non-Kahler manifolds and the understanding of a possible classification of complex non-Kahler manifolds.
In particular, the courses by Alberto Verjovsky and Andrei Teleman introduced tools in the theory of foliations and analytic techniques for the classification of compact complex surfaces and compact Kahler manifolds, respectively.
The courses by Sebastien Picard and Slawomir Dinew focused on analytic techniques in Hermitian geometry, more precisely, on special Hermitian metrics and geometric flows, and on pluripotential theory in complex non-Kahler geometry.

Nov. 2019 200 pp.
9783030258825 8,410.

Springer

Lecture Notes in Mathematics,

Vol. 2244: Dyckerhoff, T. /Kapranov, M.:
Higher Segal Spaces

No. 521-060

This monograph initiates a theory of new categorical structures that
generalize the simplicial Segal property to higher dimensions.
The authors introduce the notion of a d-Segal space, which is
a simplicial space satisfying locality conditions related to triangulations of
d-dimensional cyclic polytopes.
Focus here is on the 2-dimensional case. Many important constructions are
shown to exhibit the 2-Segal property, including Waldhausen's S-construction,
Hecke-Waldhausen constructions, and configuration spaces of flags.
The relevance of 2-Segal spaces in the study of Hall and
Hecke algebras is discussed.

Oct. 2019	190 pp.	
9783030271220		7,400.

Vol. 2233: Johnson, K.:
Group Matrices, Group Determinants and
Representation Theory

No. 521-073

This book sets out an account of the tools which Frobenius used to
discover representation theory for nonabelian groups and describes its
modern applications.
It provides a new viewpoint from which one can examine various aspects of
representation theory and areas of application, such as probability theory
and harmonic analysis.
For example, the focal objects of this book, group matrices, can be thought of
as a generalization of the circulant matrices which are behind many
important algorithms in information science.

Nov. 2019	285 pp.	
9783030282998		8,320.

Vol. 2230: Kesler, E.:
Supergeometry, Super-Riemann Surfaces and
the Superconformal Action Functional

No. 521-172

This book treats the two-dimensional non-linear supersymmetric sigma model or
spinning string from the perspective of supergeometry.
The objective is to understand its symmetries as geometric properties of
super Riemann surfaces, which are particular complex super manifolds of
dimension 1|1.
The first part gives an introduction to the super differential geometry of
families of super manifolds.
Appropriate generalizations of principal bundles, smooth families of
complex manifolds and integration theory are developed.
The second part studies uniformization, U(1)-structures and connections on
Super Riemann surfaces and shows how the latter can be viewed as
extensions of Riemann surfaces by a gravitino field.
A natural geometric action functional on super Riemann surfaces is
shown to reproduce the action functional of the non-linear supersymmetric
sigma model using a component field formalism.
The conserved currents of this action can be identified as infinitesimal
deformations of the super Riemann surface.
This is in surprising analogy to the theory of Riemann surfaces and
the harmonic action functional on them.

July 2019	310 pp.	
9783030137571		8,590.

Springer

Graduate Texts in Mathematics,

Vol. 281: Maxim, L.:

Intersection Homology and Perverse Sheaves:
With Applications to Singularities

This textbook provides a gentle introduction to intersection homology and
perverse sheaves, where concrete examples and geometric applications
motivate concepts throughout. By giving a taste of the main ideas in the field,
the author welcomes new readers to this exciting area at the crossroads of
topology, algebraic geometry, analysis, and differential equations.
Those looking to delve further into the abstract theory will find ample references
to facilitate navigation of both classic and recent literature.
Beginning with an introduction to intersection homology from a geometric and
topological viewpoint, the text goes on to evelop the sheaf-theoretical perspective.
Then algebraic geometry comes to the fore: a brief discussion of constructibility
opens onto an in-depth exploration of perverse sheaves.
Highlights from the following chapters include a detailed account of the proof
of the Beilinson-Bernstein-Deligne-Gabber (BBDG) decomposition theorem,
applications of perverse sheaves to hypersurface singularities, and a discussion of
Hodge-theoretic aspects of intersection homology via Saito's deep theory of
mixed Hodge modules.

Nov. 2019	270 pp.	
9783030276430		11,100.

Vol. 280: Heil, C.:

Introduction to Real Analysis

Developed over years of classroom use, this textbook provides a clear and
accessible approach to real analysis.
This modern interpretation is based on the author's lecture notes and has been
meticulously tailored to motivate students and inspire readers to explore
the material, and to continue exploring even after they have finished the book.
The definitions, theorems, and proofs contained within are presented with
mathematical rigor, but conveyed in an accessible manner and with
language and motivation meant for students who have not taken a previous
course on this subject.
The text covers all of the topics essential for an introductory course, including
Lebesgue measure, measurable functions, Lebesgue integrals, differentiation,
absolute continuity, Banach and Hilbert spaces, and more.
Throughout each chapter, challenging exercises are presented, and the end of
each section includes additional problems.

Sep. 2019	384 pp.	
9783030269012		12,020.

Universitext

Casas Alvero, E.:

Algebraic Curves, the Brill and Noether Way

The book presents the central facts of the local, projective and
intrinsic theories of complex algebraic plane curves, with complete proofs
and starting from low-level prerequisites.
It includes Puiseux series, branches, intersection multiplicity, Bezout theorem,
rational functions, Riemann-Roch theorem and rational maps.
It is aimed at graduate and advanced undergraduate students, and also
at anyone interested in algebraic curves or in an introduction to
algebraic geometry via curves.

Oct. 2019	230 pp.	
9783030290153		10,170.

Springer

Universitext

Morosanu, G.: No. 521-136
Functional Analysis for the Applied Sciences
This advanced graduate textbook presents main results and
techniques in Functional Analysis and uses them to explore
other areas of mathematics and applications.
Special attention is paid to creating appropriate frameworks towards solving
significant problems involving di?erential and integral equations.
Exercises at the end of each chapter help the reader to understand
the richness of ideas and methods offered by Functional Analysis.
Some of the exercises supplement theoretical material,
while others relate to the real world.
This textbook, with its friendly exposition, focuses on different problems in
physics and other applied sciences and uniquely provides solutions to
most of the exercises.

Nov. 2019	425 pp.	
9783030271527		10,170.

Kohatsu-Higa, A. /Takeuchi Atsushi : No. 521-204
Jump SDE's and the Study of Their Densities:
A Self-Study Book
The present book deals with a streamlined presentation of
Levy processes and their densities.
It is directed at advanced undergraduates who have already completed
a basic probability course.
Poisson random variables, exponential random variables, and the introduction of
Poisson processes are presented first, followed by the introduction of Poisson
random measures in a simple case.
With these tools the reader proceeds gradually to compound Poisson processes,
finite variation Levy processes and finally one-dimensional stable cases.
This step-by-step progression guides the reader into the construction and study
of the properties of general Levy processes with no Brownian component.
In particular, in each case the corresponding Poisson random measure,
the corresponding stochastic integral, and the corresponding
stochastic differential equations (SDEs) are provided.

Dec. 2019	340 pp.	
9789813297401		価格未定

Laraki, R. /Renault, J. /Sorin, S.: No. 521-248
Mathematical Foundations of Game Theory
This book gives a concise presentation of the mathematical foundations of
Game Theory, with an emphasis on strategic analysis linked to
information and dynamics.
It is largely self-contained, with all of the key tools and concepts defined in
the text.
Combining the basics of Game Theory, such as value existence theorems in
zero-sum games and equilibrium existence theorems for non-zero-sum games,
with a selection of important and more recent topics such as the equilibrium
manifold and learning dynamics, the book quickly takes the reader close to
the state of the art.
Applications to economics, biology, and learning are included, and
the exercises, which often contain noteworthy results, provide
an important complement to the text.

Dec. 2019	246 pp.	
9783030266455		10,280.

Springer

Springer Monographs in Mathematics

Farah, I.: No. 521-036

Combinatorial Set Theory of C*-Algebras

This book explores and highlights the fertile interaction between logic and
operator algebras, which in recent years has led to the resolution of
several long-standing open problems on C*-algebras.
The interplay between logic and operator algebras (C*-algebras, in particular) is
relatively young and the author is at the forefront of this interaction.
The deep level of scholarship contained in these pages is evident and opens doors
to operator algebraists interested in learning about the set-theoretic methods
relevant to their field, as well as to set-theorists interested in expanding their view
to the non-commutative realm of operator algebras.
Enough background is included from both subjects to make the book
a convenient, self-contained source for students.
A fair number of the exercises form an integral part of the text.
They are chosen to widen and deepen the material from the corresponding
chapters. Some other exercises serve as a warmup for the latter chapters.

Oct. 2019 483 pp.
9783030270919 18,500.

Borodachov, S. /Hardin, D. /Saff, E.: No. 521-156

Discrete Energy on Rectifiable Sets

This book aims to provide an introduction to the broad and dynamic
subject of discrete energy problems and point configurations.
Written by leading authorities on the topic, this treatise is designed with
the graduate student and further explorers in mind.
The presentation includes a chapter of preliminaries and an extensive Appendix
that augments a course in Real Analysis and makes the text self-contained.
Along with numerous attractive full-color images, the exposition conveys
the beauty of the subject and its connection to several branches of mathematics,
computational methods, and physical/biological applications.

Oct. 2019 621 pp.
9780387848075 22,200.

Fields Institute Communications,

Vol. 83: Miller, P. /Perry, P. /Saut, J. /Sulem, C.: No. 521-134
Nonlinear Dispersive
Partial Differential Equations and Inverse Scattering

This volume contains lectures and invited papers from the Focus Program on
"Nonlinear Dispersive Partial Differential Equations and Inverse Scattering held
at the Fields Institute from July 31-August 18, 2017.
The conference brought together researchers in completely integrable systems
and PDE with the goal of advancing the understanding of qualitative and
long-time behavior in dispersive nonlinear equations.
The program included Percy Deifts Coxeter lectures, which appear in
this volume together with tutorial lectures given during
the first week of the focus program.
The research papers collected here include new results on
the focusing nonlinear Schrodinger (NLS) equation, the massive Thirring model,
and the Benjamin-Bona-Mahoney equation as dispersive PDE in one space
dimension, as well as the Kadomtsev-Petviashvili II equation,
the Zakharov-Kuznetsov equation, and the Gross-Pitaevskii equation as
dispersive PDE in two space dimensions.

Nov. 2019 430 pp.
9781493998050 18,700.

Springer

Bruzzo, U. /Grana Otero, B.:

No. 521-050

Derived Functors and Sheaf Cohomology

The first part of the book provides the foundational material:
Chapter 1 deals with category theory and homological algebra.
Chapter 2 is devoted to the development of the theory of derived functors,
based on the notion of injective object.
In particular, the universal properties of derived functors is stressed, with a view
to make the proofs in the following chapters as simple and natural as possible.
Chapter 3 provides a rather thorough introduction to sheaves, in
a general topological setting.
Chapter 4 introduces sheaf cohomology as a derived functor, and, after also
defining Cech cohomology, develops a careful comparison between the two
cohomologies which is a detailed analysis not easily available in the literature.
Chapter 5 offers a friendly approach to the rather intricate theory of spectral
sequences by means of the theory of derived triangles, which is precise and
relatively easy to grasp.

Apr. 2020   200 pp.
9789811207280   14,610.

Grandis, M.:

Higher Dimensional Categories:
From Double to Multiple Categories

"The study of higher dimensional categories has mostly been developed in
the globular form of 2-categories, n-categories, omega-categories
and their weak versions.   No. 521-065
Here we study a different form: double categories, n-tuple categories and
multiple categories, with their weak and lax versions.
We want to show the advantages of this form for the theory of adjunctions and
limits. Furthermore, this form is much simpler in higher dimension,
starting with dimension three where weak 3-categories (also called tricategories)
are already quite complicated, much more than weak or lax triple categories.
This book can be used as a textbook for graduate and postgraduate studies, and
as a basis for research. Notions are presented in a 'concrete' way, with examples
and exercises; the latter are endowed with a solution or hints.
Part I, devoted to double categories, starts at basic category theory and is
kept at a relatively simple level. Part II, on multiple categories, can be used
independently by a reader acquainted with 2-dimensional categories.

Aug. 2019   530 pp.
9789811205101   24,570.

Vol. 64: Fiedler, T.:

No. 521-165

Polynomial One-Cocycles for Knots and Closed Braids

Traditionally, knot theory deals with diagrams of knots and the search of invari-
ants of diagrams which are invariant under the well known Reidemeister moves.
This book goes one step beyond: it gives a method to construct invariants for
one parameter famillies of diagrams and which are invariant under 'higher'
Reidemeister moves.
Luckily, knots in 3-space, often called classical knots, can be transformed
into knots in the solid torus without loss of information.
It turns out that knots in the solid torus have a particular rich
topological moduli space.

Sep. 2019   250 pp.
9789811210297   16,070.

World Scientific Pub.

Publications mathematiques,

Vol. 130: Guillarmou, C. /Rhodes, R. /Vargas, V.: No. 521-013
Polyakov's Formulation of 2d Bosonic String Theory,
and others 2 articles
Galatius,S./Kupers,A./Randal-Williams,O.: E2 -cells and mapping class groups
Benoist,O.: The period-index problem for real surfaces
Nov. 2019 ....
9781000023862 価格未定

Vol. 129: Campana, F. /Paun, M.: No. 521-007
Foliations with Positive Slopes and
Birational Stability of Orbifold Cotangent Bundles,
and others 4 articles
Radchenko,D./Viazovska,M.: Fourier interpolation on the real line
Einsiedler,M./Lindenstrauss,E.: Joinings of higher rank torus actions on
   homogeneous spaces
Dudas,O./Varagnolo,M./Vasserot,E.: Categorical actions on
   unipotent representations of finite unitary groups
Bhatt,B./Morrow,M./Scholze,P.: Topological Hochschild homology and
   integral p -adic Hodge theory
Aug. 2019 310 pp.
9781000023855 価格未定

I. H. E. S.

Advanced Lectures in Mathematics,

Vol. 46: Oort, F. (ed.): No. 521-022
Open Problems in Arithmetic Algebraic Geometry
This book originated in the idea that open problems act as crystallization points
in mathematical research. Mathematical books usually deal with
fully developed theories.
But here we present work at an earlier stage --- when challenging questions can
give new directions to mathematical research.
In mathematics, significant progress is often made by looking at
the underlying structures of open problems and discovering new directions
that are developed to find solutions.
In that process, the search for finding the "true" nature of the problem at
hand is the impetus for our thoughts.
It is only much later, in retrospect, that we see the "flow of mathematics"
--- from problem to theory and new insight.
This is the gist of the present volume.
July 2019 344 pp.
9781571463739 8,200.

Vol. 45: Ji, L. /Poon, Y.-S. /Yau, S.-T. (eds.): No. 521-016
Tsinghua Lectures in Mathematics
This volume presents a selection of work based upon lectures given by
distinguished mathematicians at the Yau Mathematical Sciences Center
at Tsinghua University, and at the Tsinghua Sanya
International Mathematics Forum.
Mathematics is very diversified and broad, but there are some basic
underlying themes.
The editors hope that the diversity of material presented here conveys
the richness and unity of mathematics.
July 2019 526 pp.
9781571463722 8,200.

Intrnational Press

Vol. 412: Herscovich, E.:
Renormalizaiton in Quantum Field Theory
(After R. Borcherds)

The aim of this manuscript is to provide a complete and precise formulation of
the renormalization picture for perturbative Quantum Field Theory (pQFT)
on general curved spacetimes introduced by R. Borcherds in [10].
More precisely, we give a full proof of the free and transitive action of
the group of renormalizations on the set of Feynman measures associated with
a local precut propagator, and that such a set is nonempty if
the propagator is further assumed to be manageable and of cut type.
Even though we follow the general principles laid by Borcherds in [10],
we have in many cases proceeded differently to prove his claims,
and we have also needed to add some hypotheses to be able to prove
the corresponding statements.

Vol. 411: David, G.:
Local regularity properties of almost-and
quasiminimal sets with a sliding boundary condition

We study the boundary regularity of almost minimal and quasiminimal sets
that satisfy sliding boundary conditions.
The competitors of a set E are defined as $F=\phi 1(E)$, where $\{\phi t\}$ is a one
parameter family of continuous mappings defined on E, and that preserve
a given collection of boundary pieces.
We generalize known interior regularity results, and in particular we show
that the quasiminimal sets are locally Ahlfors-regular, rectifiable, and
some times uniformly rectifiable, that our classes are stable under limits, and
that for almost minimal sets the density of Hausdorff measure in
balls centered on the boundary is almost nondecreasing.

Vol. 410: Berger, P. /Yoccoz, J.-C.:
Strong Regularity

The strong regularity program was initiated by Jean-Christophe Yoccoz
during his first lecture at College de France.
As explained in the first article of this volume, this program aims to show
the abundance of dynamics displaying a non-uniformly hyperbolic attractor.
It proposes a topological and combinatorial definition of such mappings
using the formalism of puzzle pieces.
Their combinatorics enable to deduce the wished analytical properties.
In 1997, this method enabled Jean-Christophe Yoccoz to give
an alternative proof of the Jakobson theorem: the existence of a set of
positive Lebesgue measure of parameters aa such that the map $x \rightarrow x^2 + a$ has
an attractor which is non-uniformly hyperbolic.
This proof is the second article of this volume.
In the third article, this method is generalized in dimension 2 by Pierre Berger
to show the following theorem.
For every C^2-perturbation of the family of maps $(x,y) \rightarrow (x^2+a,0)$, there exists
a parameter set of positive Lebesgue measure at which these maps display
a non-uniformly hyperbolic attractor. This gives in particular an alternative
proof of the Benedicks-Carleson Theorem.

Societe Mathematique de France