

# Yurinsha Book News

*Lecture Notes in Mathematics,*

**Vol. 2230: Kesler, E.:**

**Supergeometry,**

No. 518-174

## **Super-Riemann Surfaces the Superconformal Action Functional**

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

280 pp.

9783030137571

8,500.

**Springer**

<http://www.yurinsha.com>

ホームページは毎月1日が更新予定日です

**No. 518**

**Mar. - Apr. 2019**

敬理科学 **友 隣 社** 洋書専門

*Courant Lecture Notes,***Vol. 29: Greenleaf, F. /Marques, F.:**

No. 518-019

**Linear Algebra I**

This book is the first of two volumes on linear algebra for graduate students in mathematics, the sciences, and economics, who have: a prior undergraduate course in the subject; a basic understanding of matrix algebra; and some proficiency with mathematical proofs. Proofs are emphasized and the overall objective is to understand the structure of linear operators as the key to solving problems in which they arise. This first volume re-examines basic notions of linear algebra: vector spaces, linear operators, duality, determinants, diagonalization, and inner product spaces, giving an overview of linear algebra with sufficient mathematical precision for advanced use of the subject. This book provides a nice and varied selection of exercises; examples are well-crafted and provide a clear understanding of the methods involved.

Mar. 2019 261 pp. 8,410.  
9781470448714

*Proceedings of Symposia in Pure Mathematics,***Vol. 101: Aizenbud, A.:**

No. 518-047

**Gourevitch, D. /Kazhdan, D. /Lapid, E.:****Representations of Reductive Groups**

This volume contains the proceedings of the Conference on Representation Theory and Algebraic Geometry, held in honor of Joseph Bernstein, from June 11-16, 2017, at the Weizmann Institute of Science and The Hebrew University of Jerusalem.

The topics reflect the decisive and diverse impact of Bernstein on representation theory in its broadest scope.

The themes include representations of  $p$ -adic groups and Hecke algebras in all characteristics, representations of real groups and supergroups, theta correspondence, and automorphic forms.

Apr. 2019 450 pp. 21,940.  
9781470442842

*Mathematical Surveys and Monographs,***Vol. 237: Morgan, J. /McDuff, D. /****Tehrani, M. /Fukaya Kenji /Joyce, D. (eds.):****Virtual Fundamental Cycles in Symplectic Topology**

The method of using the moduli space of pseudo-holomorphic curves on a symplectic manifold was introduced by Mikhail Gromov in 1985. No. 518-177 From the appearance of Gromov's original paper until today this approach has been the most important tool in global symplectic geometry.

To produce numerical invariants of these manifolds using this method requires constructing a fundamental cycle associated with moduli spaces. This volume brings together three approaches to constructing the "virtual" fundamental cycle for the moduli space of pseudo-holomorphic curves. All approaches are based on the idea of local Kuranishi charts for the moduli space.

Workers in the field will get a comprehensive understanding of the details of these constructions and the assumptions under which they can be made.

Apr. 2019 300 pp. 21,280.  
9781470450144

**A. M. S.**

*Pure and Applied Undergraduate Texts,***Vol. 35: Lozano-Robledo, A.:** No. 518-084**Number Theory and Geometry:****An Introduction to Arithmetic Geometry**

Geometry and the theory of numbers are as old as some of the oldest historical records of humanity.

Ever since antiquity, mathematicians have discovered many beautiful interactions between the two subjects and recorded them in such classical texts as Euclid's Elements and Diophantus's Arithmetica. Nowadays, the field of mathematics that studies the interactions between number theory and algebraic geometry is known as arithmetic geometry. This book is an introduction to number theory and arithmetic geometry, and the goal of the text is to use geometry as the motivation to prove the main theorems in the book.

May 2019 488 pp. 17,980.  
9781470450168

**Vol. 34: Clemens, H.:** No. 518-167**Two-Dimensional Geometries:****A Problem-Solving Approach**

This book on two-dimensional geometry uses a problem-solving approach to actively engage students in the learning process.

The aim is to guide readers through the story of the subject, while giving them room to discover and partially construct the story themselves.

The book bridges the study of plane geometry and the study of curves and surfaces of non-constant curvature in three-dimensional Euclidean space.

One useful feature is that the book can be adapted to suit different audiences.

The first half of the text covers plane geometry without and with Euclid's Fifth Postulate, followed by a brief synthetic treatment of spherical geometry through the excess angle formula.

This part only requires a background in high school geometry and basic trigonometry and is suitable for a quarter course for future high school geometry teachers.

A brief foray into the second half could complete a semester course.

Apr. 2019 142 pp. 14,680.  
9781470447601

*Theta Foundation International Book Series of  
Mathematical Texts,***Vol. 25: Mashreghi, J. /Prajitura, G. (eds.):** No. 518-135**The First Neam:****Conference Proceedings, Brockport 2016**

The volume contains the proceedings of the First Northeastern Analysis Meeting, held in Brockport between October 14 and 16, 2016.

It consists of a careful selection of papers covering a large range of subjects in mathematical analysis.

Among the topics discussed are:

- (1) classical complex function theory;
- (2) differential operators on trees;
- (3) integral operators;
- (4) operator theory on function spaces;
- (5) Fourier analysis; and (6) geometry of Banach spaces.

Dec. 2018 166 pp. 7,920.  
9786068443119

**A. M. S.**

*Contemporary Mathematics,***Vol. 726: Plotkin, E.:** No. 518-088**Groups, Algebras and Identities**

The papers in this volume cover various topics of universal algebra, universal algebraic geometry, logic geometry, and algebraic logic, as well as applications of universal algebra to computer science, geometric ring theory, small cancellation theory, and Boolean algebras.

May 2019 242 pp. 19,300.  
9781470437138

**Vol. 725: Zheng, S. /Beceanu, M. /** No. 518-160**Bona, J. /Chen, G. /Van Phan, T. /Soffer, A. (eds.):****Nonlinear Dispersive Waves and Fluids**

These two sessions shared the underlying theme of the analysis aspect of evolutionary PDEs and mathematical physics.

The articles address the latest trends and perspectives in the area of nonlinear dispersive equations and fluid flows.

The topics mainly focus on using state-of-the-art methods and techniques to investigate problems of depth and richness arising in quantum mechanics, general relativity, and fluid dynamics.

May 2019 275 pp. 19,300.  
9781470441098

**Vol. 724: Beshaj, L. /Shaska, T.:** No. 518-057**Algebraic Curves and Their Applications**

This volume contains a collection of papers on algebraic curves and their applications. While algebraic curves traditionally have provided a path toward modern algebraic geometry, they also provide many applications in number theory, computer security and cryptography, coding theory, differential equations, and more.

Papers cover topics such as the rational torsion points of elliptic curves, arithmetic statistics in the moduli space of curves, combinatorial descriptions of semistable hyperelliptic curves over local fields, heights on weighted projective spaces, automorphism groups of curves, hyperelliptic curves, dessins d'enfants, applications to Painleve equations, descent on real algebraic varieties, quadratic residue codes based on hyperelliptic curves, and Abelian varieties and cryptography.

Mar. 2019 344 pp. 19,300.  
9781470442477

**Vol. 723: Danielli, D. /Petrosyan, A. /Pop, C. (eds.):** No. 518-115**New Developments in  
the Analysis of Nonlocal Operators**

Over the last decade there has been a resurgence of interest in problems involving nonlocal operators, motivated by applications in many areas such as analysis, geometry, and stochastic processes.

Problems represented in this volume include uniqueness for weak solutions to abstract parabolic equations with fractional time derivatives, the behavior of the one-phase Bernoulli-type free boundary near a fixed boundary and its relation to a Signorini-type problem, connections between fractional powers of the spherical Laplacian and zeta functions from the analytic number theory and differential geometry, and obstacle problems for a class of not stable-like nonlocal operators for asset price models widely used in mathematical finance.

Mar. 2019 214 pp. 19,300.  
9781470441104

A. M. S.

**Vol. 328: Aubert, A.-M. /Mishra, M. /** No. 518-053  
**Roche, A. /Spallone, S. (eds.):**

**Representations of Reductive p-Adic Groups:**

**International Conference, IISER, Pune, 2017**

The survey gives a precise and accessible formulation of many aspects of the conjectures, highlighting recent refinements, due to the author and her collaborators, and their current status.

It also features an extensive account by Colin Bushnell of his work with Henniart on the fine structure of the local Langlands correspondence for general linear groups, beginning with a clear overview of Bushnell-Kutzko's construction of cuspidal types for such groups.

The remaining papers touch on a range of topics in this active area of modern mathematics: group actions on root data, explicit character formulas, classification of discrete series representations, unicity of types, local converse theorems, completions of Hecke algebras, p-adic symmetric spaces. All meet a high level of exposition.

The book should be a valuable resource to graduate students and experienced researchers alike.

June 2019 275 pp. No. 518-162  
 9789811366277 16,060.

**Vol. 327: Ruzhansky, M. /Suragan, D.:**  
**Hardy Inequalities on Homogeneous Groups:**

**100 Years of Hardy Inequalities.**

This open access book provides an extensive treatment of Hardy inequalities and closely related topics from the point of view of Folland and Stein's homogeneous (Lie) groups.

The place where Hardy inequalities and homogeneous groups meet is a beautiful area of mathematics with links to many other subjects.

While describing the general theory of Hardy, Rellich, Caffarelli-Kohn-Nirenberg, Sobolev, and other inequalities in the setting of general homogeneous groups, the authors pay particular attention to the special class of stratified groups.

In this environment, the theory of Hardy inequalities becomes intricately intertwined with the properties of sub-Laplacians and subelliptic partial differential equations.

Feb. 2019 588 pp. 9,450.  
 9783030028947

**Vol. 106: Amann, H.:**  
**Linear and Quasilinear Parabolic Problems, Vol. II:**

**Function Spaces** No. 518-100

This volume discusses an in-depth theory of function spaces in an Euclidean setting, including several new features, not previously covered in the literature.

In particular, it develops a unified theory of anisotropic Besov and Bessel potential spaces on Euclidean corners, with

infinite-dimensional Banach spaces as targets. It especially highlights the most important subclasses of Besov spaces, namely Slobodeckii and Holder spaces.

In this case, no restrictions are imposed on the target spaces, except for reflexivity assumptions in duality results.

Apr. 2019 459 pp. 18,900.  
 9783030117627

**Birkhauser**

***Progress in Nonlinear Differential Equations & Their Applications,*****Vol. 93: Munteanu, I.:**

No. 518-137

**Boundary Stabilization of Parabolic Equations**

This monograph presents a technique, developed by the author, to design asymptotically exponentially stabilizing finite-dimensional boundary proportional-type feedback controllers for nonlinear parabolic-type equations. The potential control applications of this technique are wide ranging in many research areas, such as Newtonian fluid flows modeled by the Navier-Stokes equations; electrically conducted fluid flows; phase separation modeled by the Cahn-Hilliard equations; and deterministic or stochastic semi-linear heat equations arising in biology, chemistry, and population dynamics modeling.

The text provides answers to the following problems, which are of great practical importance: Designing the feedback law using a minimal set of eigenfunctions of the linear operator obtained from the linearized equation around the target state Designing observers for the considered control systems Constructing time-discrete controllers requiring only partial knowledge of the state

Mar. 2019  
9783030110987

199 pp.

16,060.

***Pseudo-Differential Operators,*****Vol. 15: Sjostrand, J.:**

No. 518-152

**Non-Self-Adjoint Differential Operators,  
Spectral Asymptotics and Random Perturbations**

The asymptotic distribution of eigenvalues of self-adjoint differential operators in the high-energy limit, or the semi-classical limit, is a classical subject going back to H. Weyl of more than a century ago. In the last decades there has been a renewed interest in non-self-adjoint differential operators which have many subtle properties such as instability under small perturbations.

Quite remarkably, when adding small random perturbations to such operators, the eigenvalues tend to distribute according to Weyl's law (quite differently from the distribution for the unperturbed operators in analytic cases).

Sep. 2019  
9783030108182

490 pp.

15,120.

***International Series of Numerical Mathematics,*****Vol. 170: Hosseini, S. /****Mordukhovich, B. /Uschmajew, A. (eds.):****Nonsmooth Optimization and Its Applications**

Since nonsmooth optimization problems arise in a diverse range of real-world applications, the potential impact of efficient methods for solving such problems is undeniable.

No. 518-242

Even solving difficult smooth problems sometimes requires the use of nonsmooth optimization methods, in order to either reduce the problem's scale or simplify its structure.

Accordingly, the field of nonsmooth optimization is an important area of mathematical programming that is based on by now classical concepts of variational analysis and generalized derivatives, and has developed a rich and sophisticated set of mathematical tools at the intersection of theory and practice.

Apr. 2019  
9783030113698

136 pp.

16,060.

**Birkhauser**

*London Mathematical Society Lecture Note Series,*

**Vol. 455: Campbell, C. /Quick, . M. (eds.):** No. 518-061  
**Groups St Andrews 2017 in Birmingham**

Every four years leading researchers gather to survey the latest developments in all aspects of group theory. Initially held in St Andrews, these meetings have become the premier forum for group theory across the whole of the UK. Since 1981, the proceedings of "Groups St Andrews" have provided a regular snapshot of the state of the art in group theory and helped to shape the direction of research in the field. This volume contains papers from the 2017 meeting held in Birmingham. It includes expository articles from the invited speakers, and further surveys contributed by the participants.

Topics include: generation of finite simple groups, block theory, fusion systems, algebraic groups, one-relator groups, geometric group theory and Beauville groups.

Apr. 2019 509 pp. 14,120.  
 9781108728744

**Vol. 454: Hagen, M. /Webb, R.:** No. 518-170  
**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.

These serve as an introduction for students and a reference for experts. The topics of the surveys (and more) re-appear in the research articles that make up Part III, presenting the latest results beyond hyperbolicity.

Apr. 2019 243 pp. 10,860.  
 9781108447294

*New Mathematical Monographs*

**Vol. 37: Defant, A. /Garcia, D. /Maestre, M. /Sevilla-Peris, P.:**  
**Dirichlet Series and Holomorphic Functions in High Dimensions**

Over 100 years ago Harald Bohr identified a deep problem about the convergence of Dirichlet series, and introduced an ingenious idea relating Dirichlet series and holomorphic functions in high dimensions.

Elaborating on this work, almost 20 years later Bohnenblust and Hille solved the problem posed by Bohr. In recent years there has been a substantial revival of interest in the research area opened up by these early contributions. This involves the intertwining of the classical work with modern functional analysis, harmonic analysis, infinite dimensional holomorphy and probability theory as well as analytic number theory.

New challenging research problems have crystallized and been solved in recent decades. The goal of this book is to describe in detail some of the key elements of this new research area to a wide audience.

Oct. 2019 709 pp. 31,490.  
 9781108476713

**Cambridge**

*Cambridge Tracts in Mathematics,***Vol. 217: Artemov, S. /Fitting, M.:**

No. 518-038

**Justification Logic:****Reasoning with Reasons**

Classical logic is concerned, loosely, with the behaviour of truths.

Epistemic logic similarly is about the behaviour of known or believed truths.

Justification logic is a theory of reasoning that enables the tracking of evidence for statements and therefore provides a logical framework for the reliability of assertions.

This book, the first in the area, is a systematic account of the subject, progressing from modal logic through to the establishment of an arithmetic interpretation of intuitionistic logic.

The presentation is mathematically rigorous but in a style that will appeal to readers from a wide variety of areas to which the theory applies.

June 2019

267 pp.

9781108424912

20,630.

*Cambridge Monographs on Mathematical Physics***Ahluwalia, D.:**

No. 518-280

**Mass Dimension One Fermions**

In 2005, Dharam Ahluwalia and Daniel Grumiller reported an unexpected theoretical discovery of mass dimension one fermions.

These are an entirely new class of spin one half particles, and because of their mass dimensionality mismatch with the standard model fermions they are a first-principle dark matter candidate.

Written by one of the physicists involved in the discovery, this is the first book to outline the discovery of mass dimension one fermions. Using a foundation of Lorentz algebra it provides a detailed construction of the eigenspinors of

the charge conjugation operator (Elko) and their properties.

The theory of dual spaces is then covered, before mass dimension one fermions are discussed in detail.

With mass dimension one fermions having applications to cosmology and high energy physics, this book is essential for graduate students and researchers in quantum field theory, mathematical physics, and particle theory.

July 2019

150 pp.

9781107094093

23,890

**Lusanna, L.:**

No. 518-297

**Non-Inertial Frames and Dirac Observables in Relativity**

Interpreting general relativity relies on a proper description of non-inertial frames and Dirac observables.

This book describes global non-inertial frames in special and general relativity.

The first part covers special relativity and Minkowski space time, before covering general relativity, globally hyperbolic Einstein space-time, and the application of the 3+1 splitting method to general relativity.

The author uses a Hamiltonian description and the Dirac-Bergmann theory of constraints to show that the transition between one non-inertial frame and another is a gauge transformation, extra variables describing the frame are gauge variables, and the measurable matter quantities are gauge invariant Dirac observables.

Aug. 2019

400 pp.

9781108480826

26,060.

**Cambridge**



Zhu, K.:

No. 518-036

**Handbook of Analytic Operator Theory**

This handbook concerns the subject of holomorphic function spaces and operators acting on them.

Topics include Bergman spaces, Hardy spaces, Besov/Sobolev spaces, Fock spaces, and the space of Dirichlet series.

Operators discussed in the book include Toeplitz operators, Hankel operators, composition operators, and Cowen-Douglas class operators

July 2019 384 pp. 24,950.  
9781138486416

Nicholson, N.:

No. 518-044

**A Transition to Proof:****An Introduction to Advanced Mathematics**

Mathematics is and can be creative. The author describes writing proofs as a creative process. He writes at length about the "intuitive" level of knowing a definition. The importance of definitions is reiterated multiple times in the book. The author's urges students to work to define their mathematical voice. Proofs can be personalized.

Both style tips and strict "mathematical do's and don'ts" are pulled out and presented in "text-boxes" throughout the text. Common mistakes are discussed and reasoned throughout.

Apr. 2019 450 pp. 16,270.  
9780367201579

Krantz, S.:

No. 518-131

**Complex Variables:****A Physical Approach with Applications, 2nd ed.**

Complex analysis is a central part of modern analytical thinking.

It is used in engineering, physics, mathematics, astrophysics, and many other fields. It provides powerful tools for analysis and often yields pleasing and unanticipated answers.

The purpose is to make complex analysis accessible to mathematics, engineering, and many other students. There are incisive applications throughout. Because complex analysis is a visual subject, the book has a large number of figures. One unifying theme is partial differential equations.

The Cauchy-Riemann equations and the Laplacian have central roles in our exposition. Other differential equations—such as Euler's equation—also make an appearance.

Apr. 2019 348 pp. 19,310.  
9780367222673

Mitani, J.:

No. 518-176

**Curved-Folding Origami Design**

The origami introduced in this book is based on simple techniques. Some were previously known by origami artists and some were discovered by the author.

Curved-Folding Origami Design shows a way to explore new area of origami composed of curved folds.

Each technique is introduced in a step-by-step fashion, followed by some beautiful artwork examples. A commentary explaining the theory behind the technique is placed at the end of each chapter.

Apr. 2019 102 pp. 6,510.  
9780367180256

**Chapman & Hall/C R C Press**

*Trends in Logic,*

**Vol. 50: Esakia, L. /Bezhanishvili, G. /Holliday, W. (eds.):  
Heyting Algebras: Duality Theory** No. 518-041

This book presents an English translation of a classic Russian text on duality theory for Heyting algebras.

Written by Georgian mathematician Leo Esakia, the text proved popular among Russian-speaking logicians. This translation helps make the ideas accessible to a wider audience and pays tribute to an influential mind in mathematical logic.

Mar. 2019 93 pp. 14,170.  
9783030120955

*Algebra and Applications,*

**Vol. 25: Barot, M. /Jimenez Gonzalez, J. /de la Pena, J.:  
Quadratic Forms: Combinatorics and Numerical Results** No. 518-055

This monograph presents combinatorial and numerical issues on integral quadratic forms as originally obtained in the context of representation theory of algebras and derived categories.

Some of these beautiful results remain practically unknown to students and scholars, and are scattered in papers written between 1970 and the present day.

Feb. 2019 265 pp. 17,010.  
9783030056261

*Problem Books in Mathematics*

**Borodzik, M. /Goldstein, P. /  
Rybka, P. /Zatorska-Goldstein, A.:**

**Problems on Partial Differential Equations**

This book covers a diverse range of topics in Mathematical Physics, linear and nonlinear PDEs.

Though the text reflects the classical theory, the main emphasis is on introducing readers to the latest developments based on the notions of weak solutions and Sobolev spaces.

In numerous problems, the student is asked to prove a given statement, e.g. to show the existence of a solution to a certain PDE.

Usually there is no closed-formula answer available, which is why there is no answer section, although helpful hints are often provided.

July 2019 217 pp. 10,390.  
9783030147334

*Developments in Mathematics,*

**Vol. 58: Andrews, G. /Krattenthaler, C. /Krinik, A. (eds.):  
Lattice Path Combinatorics and Applications** No. 518-037

The most recent methods in various branches of lattice path and enumerative combinatorics along with relevant applications are nicely grouped together and represented in this research contributed volume.

Contributions to this edited volume will be mainly research articles however it will also include several captivating, expository articles (along with pictures) on the life and mathematical work of leading researchers in lattice path combinatorics and beyond.

Mar. 2019 411 pp. 18,900.  
9783030111014

**Springer**

Vol. 2237: Couplier, D. (ed.):

No. 518-190

**Stochastic Geometry:****Modern Research Frontiers**

Since 2014, the yearly meeting of the French research structure GDR GeoSto has been preceded by two introductory courses.

This book contains five of these introductory lectures.

The first chapter is a historically motivated introduction to Stochastic Geometry which relates four classical problems (the Buffon needle problem, the Bertrand paradox, the Sylvester four-point problem and the bicycle wheel problem) to current topics.

The remaining chapters give an application motivated introduction to contemporary Stochastic Geometry, each one devoted to a particular branch of the subject: understanding spatial point patterns through intensity and conditional intensities; stochastic methods for image analysis; random fields and scale invariance; and the theory of Gibbs point processes.

June 2019

218 pp.

9783030135461

8,500.

*Springer Undergraduate Mathematics*

Bresar, M.:

No. 518-059

**Undergraduate Algebra:****A Unified Approach**

This textbook offers an innovative approach to abstract algebra, based on a unified treatment of similar concepts across different algebraic structures. This makes it possible to express the main ideas of algebra more clearly and to avoid unnecessary repetition.

The book consists of two parts: The Language of Algebra and Algebra in Action. The unified approach to different algebraic structures is a primary feature of the first part, which discusses the basic notions of algebra at an elementary level. The second part is mathematically more complex, covering topics such as the Sylow theorems, modules over principal integral domains, and Galois theory. Intended for an undergraduate course or for self-study, the book is written in a readable, conversational style, is rich in examples, and contains over 700 carefully selected exercises.

July 2019

315 pp.

9783030140526

6,610.

*Universitext*

Franke, J. /Hardle, W. /Hafner, C.:

No. 518-196

**Statistics of Financial Markets:****An Introduction, 5th ed.**

Now in its fifth edition, this book offers a detailed yet concise introduction to the growing field of statistical applications in finance.

The reader will learn the basic methods for evaluating option contracts, analyzing financial time series, selecting portfolios and managing risks based on realistic assumptions about market behavior.

The focus is both on the fundamentals of mathematical finance and financial time series analysis, and on applications to specific problems concerning financial markets, thus making the book the ideal basis for lectures, seminars and crash courses on the topic.

All numerical calculations are transparent and reproducible using quantlets.

July 2019

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9783030137502

15,120.

**Springer**

*De Gruyter Reference/  
Handbook of Fractional Calculus with Applications,*

**Vol. 8: Baleanu, D. /Mendes Lopes, A.:**  
**Applications in Engineering,** No. 518-223

**Life and Social Sciences, Part B**

This multi-volume handbook is the most up-to-date and comprehensive reference work in the field of fractional calculus and its numerous applications.

This eighth volume collects authoritative chapters covering several applications of fractional calculus in engineering, life and social sciences, including applications in signal and image analysis, and chaos.

Mar. 2019 321 pp. 24,560.  
9783110570922

**Vol. 7: Baleanu, D. /Mendes Lopes, A.:**  
**Applications in Engineering,  
Life and Social Sciences, Part A**

Mar. 2019 288 pp. 24,560.  
9783110570915

**Vol. 6: Petras, I. (ed.):**  
**Applications in Control** No. 518-142

Feb. 2019 427 pp. 24,560.  
9783110570908

**Vol. 5: Tarasov, V.:**  
**Applications in Physics, Part B**

Feb. 2019 319 pp. 24,560.  
9783110570892

**Vol. 4: Tarasov, V.:**  
**Applications in Physics, Part A** No. 518-154

Feb. 2019 306 pp. 24,560.  
9783110570885

**Vol. 3: Karniadakis, G.:**  
**Numerical Methods**

Mar. 2019 343 pp. 24,560.  
9783110570830

**Vol. 2: Kochubei, A. /Luchko, Y.:**  
**Fractional Differential Equations** No. 518-129

This second volume collects authoritative chapters covering the mathematical theory of fractional calculus, including ordinary and partial differential equations of fractional order, inverse problems, and evolution equations.

Feb. 2019 519 pp. 24,560.  
9783110570823

**Vol. 1: Kochubei, A. /Luchko, Y.:**  
**Basic Theory** No. 518-130

This first volume collects authoritative chapters covering the mathematical theory of fractional calculus, including fractional-order operators, integral transforms and equations, special functions, calculus of variations, and probabilistic and other aspects.

Feb. 2019 481 pp. 24,560.  
9783110570816

**de Gruyter**

*Advances in Analysis and Geometry,***Vol. I: Xiao, J.:**

No. 518-159

**Q<sub>a</sub>Analysis on Euclidean Spaces**

Starting with the fundamentals of Q<sub>a</sub> spaces and their relationships to Besov spaces, this book presents all major results around Q<sub>a</sub> spaces obtained in the past 16 years.

The applications of Q<sub>a</sub> spaces in the study of the incompressible Navier-Stokes system and its stationary form are also discussed.

This self-contained book can be used as an essential reference for researchers and graduates in analysis and partial differential equations.

Apr. 2019 200 pp. 17,940.  
9783110601121

*de Gruyter Studies in Mathematics,***Vol. 41: Knauer, U. /Knauer, K.:**

No. 518-080

**Algebraic Graph Theory:****Morphisms, Monoids and Matrices, 2nd Revised ed.**

Graph models are extremely useful for a large number of applications as they play an important role as structuring tools.

They allow to model net structures - like roads, computers, telephones, social networks - instances of abstract data structures - like lists, stacks, trees - and functional or object oriented programming.

The focus of this highly self-contained book is on homomorphisms and endomorphisms, matrices and eigenvalues.

Aug. 2019 370 pp. 19,650.  
9783110616125

**Vol. \*\*: Costabile, F.:**

No. 518-113

**Modern Umbral Calculus:****An Elementary Introduction with Applications to****Linear Interpolation and Operator Approximation Theory**

This book presents a novel approach to umbral calculus, which uses only elementary linear algebra (matrix calculus) based on the observation that there is an isomorphism between Sheffer polynomials and Riordan matrices, and that Sheffer polynomials can be expressed in terms of determinants.

Additionally, applications to linear interpolation and operator approximation theory are presented in many settings related to various families of polynomials.

Aug. 2019 266 pp. 19,650.  
9783110649963

*de Gruyter Series in Nonlinear Analysis and Applications,***Vol. 29: Ortega, R.:**

No. 518-140

**Periodic Differential Equations in the Plane:****A Topological Perspective**

The most traditional approach to study these equations is based on the introduction of small parameters, but the search of nonlocal results leads to the application of several topological tools.

Examples are fixed point theorems, degree theory, or bifurcation theory.

These well-known methods are valid for equations of arbitrary dimension and they are mainly employed to prove the existence of periodic solutions.

June 2019 200 pp. 18,890.  
9783110550405

**de Gruyter**

Garibi, I. /Goodman, D.:

No. 518-013/014

**The Soma Puzzle Book:****A New Approach to the Classic Pieces**

A NEW TWIST ON A POPULAR PUZZLE CUBE! Invented by Piet Hein, the Soma cube is one of the most famous mechanical puzzles in the world. The traditional challenge and outcome is to build a cube or other structures from all seven pieces.

CHANGE THE RULES, CHANGE THE OUTCOME! The puzzles in this unique Soma-inspired collection are no longer predicated upon using all seven pieces at one time!

By varying the number of pieces, there are many new and versatile puzzle challenges, from all types of recreational mathematics fields. For example, you will find symmetry puzzles, cover-up puzzles, and even fraction puzzles. The chapters are divided according to the number of pieces used; from single-piece puzzles to puzzles requiring a complete set.

June 2019 166 pp.  
9789813275317/9789813275942 7,920./4,620. (Paper ed.)

*Series on University Mathematics**Vol. 10: Moh, T.-T.:***Linear Algebra and Its Applications** No. 518-085

From Tzuong-Tsieng Moh, a long-time expert in algebra, comes a new book for students to better understand linear algebra.

Writing from an experienced standpoint, Moh touches on the many facets surrounding linear algebra, including but not limited to, echelon forms, matrix algebra, linear transformations, determinants, dual space, inner products, the Gram-Schmidt Theorem, Hilbert space, and more.

It is ideal for both newcomers and seasoned readers who want to attain a deeper understanding on both the basics and advanced topics of linear algebra and its vast applications.

The wide range of topics combined with the depth of each discussion make it essential to be on the shelf of every mathematical beginner and enthusiast.

Aug. 2019 274 pp.  
9789813235427 16,170.

*Series on Number Theory and Its Applications,**Vol. 15: Snaith, V.:*

No. 518-094

**Derived Langlands:****Monomial Resolutions of Admissible Representations**

The Langlands Programme is one of the most important areas in modern pure mathematics. The importance of this volume lies in its potential to recast many aspects of the programme in an entirely new context.

For example, the morphisms in the monomial category of a locally  $p$ -adic Lie group have a distributional description, due to Bruhat in his thesis.

Admissible representations in the programme are often treated via convolution algebras of distributions and representations of Hecke algebras.

The monomial embedding, introduced in this book, elegantly fits together these two uses of distribution theory.

The author follows up this application by giving the monomial category treatment of the Bernstein Centre, classified by Deligne-Bernstein-Zelevinski.

This book gives a new categorical setting in which to approach topics well-known to the Langlands Programme experts.

July 2019 350 pp.  
9789813275744 21,120.

**World Scientific Pub.**

**Kastner, R.:**

**Adventures in Quantumland:**

No. 518-025

Exploring Our Unseen Reality.

This title is a self-contained follow-up to *Understanding Our Unseen Reality: Solving Quantum Riddles (2015)*. Intended for the general reader but including more advanced material and an appendix of technical references for physics students and researchers, it reviews the basics of the transactional interpretation of quantum mechanics in its newer incarnation as a fully relativistic, realist interpretation of quantum theory, while embarking on further explorations of the implications of quantum theory.

Apr. 2019    304 pp.  
 9781786346414/9781786346575                      11,220./6,270. (Paper ed.)

**Atanasiu, D. /Mikusinski, P.:**

**A Bridge to Linear Algebra**

No. 518-051

The book makes a first course in linear algebra more accessible to the majority of students and it assumes no prior knowledge of the subject. It provides a careful presentation of particular cases of all core topics. Students will find that the explanations are clear and detailed in manner. It is considered as a bridge over the obstacles in linear algebra and can be used with or without the help of an instructor.

May 2019    504 pp.  
 9789811200229/9789811201462                      24,420./14,520. (Paper ed.)

**Hibi Takayuki /Tsuchiya Akiyoshi :  
 Algebraic & Geometric Combinatorics on Lattice Polytopes -**

*Proceedings of the Summer Workshop on Lattice Polytopes*

This volume consists of research papers and expository survey articles presented by the invited speakers of the workshop                      No. 518-074

'Algebraic and Geometric Combinatorics on Lattice Polytopes'. Topics include enumerative, algebraic and geometric combinatorics on lattice polytopes, topological combinatorics, commutative algebra and toric varieties. Readers will find that this volume showcases current trends on lattice polytopes and stimulates further development of many research areas surrounding lattice polytopes.

With the survey articles, research papers and open problems, graduate students can learn fundamental materials on lattice polytopes and researchers can find exciting activities and avenues for further exploration on lattice polytopes.

May 2019                                      500 pp.  
 9789811200472                                      670.

*Series on Knots and Everything,*

**Avrin, J.:**

**On Complementarity:**

No. 518-163

**A Universal Organizing Principle**

It is not uncommon for the Principle of Complementarity to be invoked in either Science or Philosophy, viz. the ancient oriental philosophy of Yin and Yang whose symbolic representation is portrayed on the cover of the book.

Or Niels Bohr's use of it as the basis for the so-called Copenhagen interpretation of Quantum Mechanics.

June 2019                                      160 pp.  
 9789813278974                                      12,870.

**World Scientific Pub.**

**Turaev, V. /Kadokami Teruhisa /Suzuki Masaaki :**  
**Applications of Reidemeister Torsions** No. 518-180  
**to 3-Dimensional Topology**

This lecture notes is based on a sequence of lectures on Reidemeister torsions by V Turaev. J Milnor showed that Reidemeister torsions and the Alexander polynomials are deeply related.

By the surgery formulas of Reidemeister torsions, we can apply them to Dehn surgery problems, namely to lens and Seifert surgery problems, and to amphicheirality problem of a link.

Since Reidemeister torsions of rational homology 3-spheres are elements in cyclotomic fields, we need algebraic number theoretical studies.

Recently P Ozsvath and Z Szabo defined the Heegaard Floer homology which is a powerful invariant to study 3-manifolds.

It induces the Reidemeister-Turaev torsion. We also explain it here.

June 2019 150 pp. 11,220.  
 9789813233706

**Yang, C. /Ge, M.-L.:** No. 518-182  
**Topology and Physics.**

Since its birth in Poincare's seminal 1894 'Analysis Situs' topology has become a cornerstone of mathematics.

As with all beautiful mathematical concepts, topology inevitably resonating with that Wignerian principle of the effectiveness of mathematics in the natural sciences finds its prominent role in physics.

From Chern-Simons theory to topological quantum field theory, from knot invariants to Calabi-Yau compactification in string theory, from spacetime topology in cosmology to the recent Nobel Prize winning work on topological insulators, the interactions between topology and physics have been a triumph over the past few decades.

Feb. 2019 220 pp. 14,520./4,620. (Paper ed.)  
 9789813278493/9789813278509

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May 2019 380 pp. 12,870.  
 9789813278035

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 Multiscale Complex System**

This volume is devoted to original research results and survey articles reviewing recent developments in reduction for stochastic PDEs with multiscale as well as application to science and technology, and to present some future research direction.

This volume includes a dozen chapters by leading experts in the area, with a broad audience in mind.

June 2019 300 pp. 19,470.  
 9789811200342

**World Scientific Pub.**



*Texts and Readings in Mathematics,*

Vol. 77: Kesavan, S.: No. 518-127

**Measure and Integration**

It starts with the Riemann integral and points out some of its shortcomings which motivate the theory of measure and the Lebesgue integral. Starting with abstract measures and outer-measures, the Lebesgue measure is constructed and its important properties are highlighted. Measurable functions, different notions of convergence, the Lebesgue integral, the fundamental theorem of calculus, product spaces, and signed measures are studied. There is a separate chapter on the change of variable formula and one on  $L_p$ -spaces. Most of the material in this book can be covered in a one-semester course.

Feb. 2019 252 pp. 7,420.  
9789386279774

A.M.S./Hindustan Book Agency

*The DOLCIANI Mathematical Expositions,*

Vol. \*\*: Lehman, J.: No. 518-081

**Quadratic Number Theory:**

**An Invitation to Algebraic Methods in the Higher Arithmetic**  
This book is an introduction to algebraic number theory for readers with a moderate knowledge of elementary number theory and some familiarity with the terminology of abstract algebra. By restricting attention to questions about squares the author achieves the dual goals of making the presentation accessible to undergraduates and reflecting the historical roots of the subject.

Mar. 2019 394 pp. 8,580.  
9781470447373

Vol. 54: Bashmakova, I.:

**Diophantus and Diophantine Equations** 1997 MAA Printing

This book tells the story of Diophantine analysis, a subject that, owing to its thematic proximity to algebraic geometry, became fashionable in the last half century and has remained so ever since. No. 518-006  
This new treatment of the methods of Diophantus—a person whose very existence has long been doubted by most historians of mathematics—will be accessible to readers who have taken some university mathematics.

Jan. 2019 90 pp. 4,450.  
9781470450489

Vol. 53: Simoson, A.:

**Exploring Continued Fractions:  
From the Integers to Solar Eclipses**

There is a nineteen-year recurrence in the apparent position of the sun and moon against the background of the stars, a pattern observed long ago by the Babylonians. In the course of those nineteen years the Earth experiences 235 lunar cycles.

Suppose we calculate the ratio of Earth's period about the sun to the moon's period about Earth.

That ratio has 235/19 as one of its early continued fraction convergents, which explains the apparent periodicity.

May 2019 371 pp. 8,580.  
9781470447953

A.M.S./MAA Press

*Numero 158: Lupu, T.:*

No. 518-204

**Poisson Ensembles of  
Loops of One-Dimensional Diffusions**

There is a natural measure on loops (time-parametrized trajectories that in the end return to the origin), which one can associate to a wide class of Markov processes.

The Poisson ensembles of Markov loops are Poisson point processes with intensity proportional to these measures.

In wide generality, these Poisson ensembles of Markov loops are related, at intensity parameter  $1/2$ , to the Gaussian free field, and at intensity parameter  $1$ , to the loops done by a Markovian sample path.

Here, we study the specific case when the Markov process is a one-dimensional diffusion.

After a detailed description of the measure, we study the Poisson point processes of loops, their occupation fields, and explain how to sample these Poisson ensembles of loops out of diffusion sample path perturbed at their successive minima.

Finally, we introduce a couple of interwoven determinantal point processes on the line, which is a dual through Wilson's algorithm of Poisson ensembles of loops, and study the properties of these determinantal point processes.

Dec. 2018

162 pp.

9782856298916

価格未定

*Numero 157: Spitzweck, M.:*

No. 518-095

**A Commutative P1-Spectrum Representing  
Motivic Cohomology Over Dedekind Domains**

We construct a motivic Eilenberg-MacLane spectrum with a highly structured multiplication over general base schemes which represents

Levine's motivic cohomology, defined via Bloch's cycle complexes, over smooth schemes over Dedekind domains.

Our method is by gluing  $p$ -completed and rational parts along an arithmetic square. Hereby the finite coefficient spectra are obtained by truncated étale sheaves (relying on the now proven Bloch-Kato conjecture) and a variant of Geisser's version of syntomic cohomology, and the rational spectra are the ones which represent Beilinson motivic cohomology.

As an application the arithmetic motivic cohomology groups can be realized as Ext-groups in a triangulated category of motives with integral coefficients.

Our spectrum is compatible with base change giving rise to a formalism of six functors for triangulated categories of motivic sheaves over general base schemes including the localization triangle.

Further applications are a generalization of the Hopkins-Morel isomorphism and a structure result for the dual motivic Steenrod algebra in the case where the coefficient characteristic is invertible on the base scheme.

Dec. 2018

114 pp.

9782856298909

価格未定

*Numero 156: Sabbah, C.:*

No. 518-093

**Irregular Hodge Theory**

We introduce the category of irregular mixed Hodge modules consisting of possibly irregular holonomic  $D$ -modules which can be endowed in a canonical way with a filtration, called the irregular Hodge filtration.

Mixed Hodge modules with their Hodge filtration naturally belong to this category, as well as their twist by the exponential of any meromorphic function.

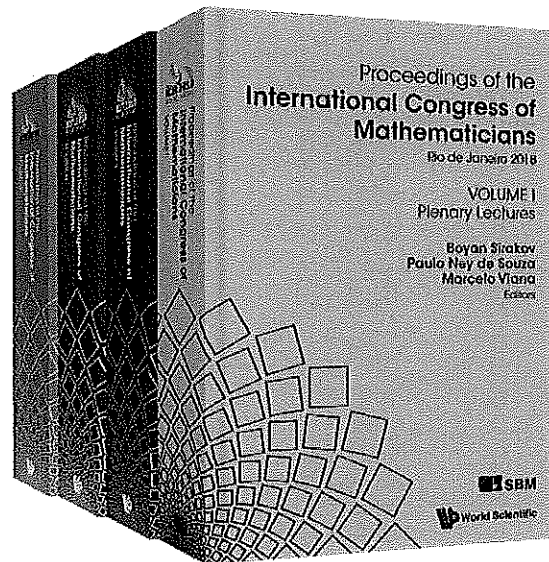
Dec. 2018

126 pp.

9782856298879

9,700.

**Societe Mathematique de France**



数学界最大、最高の学術大会の会議録

## **International Congress of Mathematicians 2018**

(ICM 2018)

The Proceedings of the ICM publishes the talks, by invited speakers, at the conference organized by the International Mathematical Union every 4 years. It covers several areas of Mathematics and it includes the Fields Medal and Nevanlinna, Gauss and Leelavati Prizes and the Chern Medal laudatios.

5396pp

Apr 2019

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