Large Deviations at Saint-Flour

Contents: Azencott, R.: Large deviations and applications.- Freidlin, Mark I. Semi-linear PDE’s and limit theorems for large deviations.- Varadhan, Srinivasa R.S.: Large deviations and applications.

Fields of interest
Probability Theory and Stochastic Processes; Partial Differential Equations

Target groups
Research

Product category
Contributed volume

Mathematical Modeling and Validation in Physiology

Applications to the Cardiovascular and Respiratory Systems

Contents

Fields of interest
Mathematical and Computational Biology; Human Physiology; Computer Appl. in Life Sciences

Target groups
Research

Product category
Contributed volume

Due October 2012

Based on original French edition: "Ecole d’Ete de Probabilites de Saint-Flour VIII", 1978

2013. Approx. 400 p. (Probability at Saint-Flour) Softcover
► € (D) 48,10 | € (A) 49,45 | sFr 60,00
► € 44,95 | £40.99
ISBN 978-3-642-33199-2

Due November 2012

2013. X, 290 p. 83 illus., 34 in color. (Lecture Notes in Mathematics / Mathematical Biosciences Subseries, Volume 2064) Softcover
► € (D) 74,85 | € (A) 76,95 | sFr 93,50
► € 69,95 | £62.99
ISBN 978-3-642-32881-7

Due December 2012

2013. XVIII, 342 p. 14 illus., 12 in color. (Probability and Its Applications) Hardcover
► € (D) 101,60 | € (A) 104,45 | sFr 126,50
► € 94,95 | £85.50
ISBN 978-3-642-33130-5
Variable Lebesgue Spaces
Foundations and Harmonic Analysis

This book provides an accessible introduction to the theory of variable Lebesgue spaces. These spaces generalize the classical Lebesgue spaces by replacing the constant exponent $p$ by a variable exponent $p(x)$. They were introduced in the early 1990s but have become the focus of renewed interest since the early 1990s because of their connection with the calculus of variations and partial differential equations with nonstandard growth conditions, and for their applications to problems in physics and image processing. The book begins with the development of the basic function space properties. It avoids a more abstract, functional analysis approach, instead emphasizing an hands-on approach that makes clear the similarities and differences between the variable and classical Lebesgue spaces. The subsequent chapters are devoted to harmonic analysis on variable Lebesgue spaces.

Contents
- Introduction
- Structure of Variable Lebesgue Spaces
- The Hardy-Littlewood Maximal Function
- Extrapolation in the Variable Lebesgue Spaces
- Basic Properties of Variable Sobolev Spaces
- Beyond Log-Hölder Continuity
- Spaces
- Open Problems
- Bibliography
- Symbol Index
- Author Index
- Subject Index

Features
- All articles carefully selected and written by well-known experts
- Provides a survey of the current state of the field
- Includes original research results

The Courant–Friedrichs–Lewy (CFL) Condition
80 Years After its Discovery

This volume comprises a carefully selected collection of articles emerging from and pertinent to the 2010 CFL-80 conference in Rio de Janeiro, celebrating the 80th anniversary of the Courant-Friedrichs-Lewy (CFL) condition.

Features
- Master course on the relationship between coding theory and the theory of integral lattices
- Linking classical mathematics to modern aspects in the design of codes
- With many examples and connections to number theory and geometry

Contents
- Foreword
- Stability of Different Schemes
- Mathematical Intuition: Poincaré, Pólya, Dewey
- Three-dimensional Plasma Arc Simulation using Resistive MHD
- A Numerical Algorithm for Ambrosi Prodi Type Operators
- On the Quadratic Finite Element Approximation of 1-D Waves: Propagation, Observation, Control, and Numerical Implementation
- Space-Time Adaptive Multiresolution Techniques for Compressible Euler Equations
- A Framework for Late-time/stiff Relaxation Asymptotics
- Is the CFL Condition Sufficient? Some Remarks
- Fast Chaotic Artificial Time Integration
- Appendix A: Hans Lewy’s Recovered String Trio
- Appendix B: Appendix C
- Appendix D

Fields of interest
- Computational Mathematics and Numerical Analysis
- Partial Differential Equations
- Theory of Computation

Target groups
- Research

Product category
- Monograph

ISBN 978-3-0348-0547-6

Lattices and Codes
A Course Partially Based on Lectures by Friedrich Hirzebruch

The purpose of coding theory is the design of efficient systems for the transmission of information. The mathematical treatment leads to certain finite structures: the error-correcting codes. Surprisingly problems which are interesting for the design of codes turn out to be closely related to problems studied partly earlier and independently in pure mathematics. In this book, examples of such connections are presented. The relation between lattices studied in number theory and geometry and error-correcting codes is discussed. The book provides at the same time an introduction to the theory of integral lattices and modular forms and to coding theory. In the 3rd edition, again numerous corrections and improvements have been made and the text has been updated.

Features
- Master course on the relationship between coding theory and the theory of integral lattices
- Linking classical mathematics to modern aspects in the design of codes
- With many examples and connections to number theory and geometry

Contents
- Lattices and Codes
- Theta Functions and Weight Enumerators
- Even Unimodular Lattices
- Leech Lattice
- Lattices over Integers of Number Fields
- Self-Dual Codes

Fields of interest
- Mathematics, general; Algebra

Target groups
- Graduate

Product category
- Graduate Advanced undergraduate textbook

ISBN 978-3-658-00359-3
Guts of Surfaces and the Colored Jones Polynomial

This monograph derives direct and concrete relations between colored Jones polynomials and the topology of incompressible spanning surfaces in knot and link complements. Under mild diagrammatic hypotheses, we prove that the growth of the degree of the colored Jones polynomials is a boundary slope of an essential surface in the knot complement. We show that certain coefficients of the polynomial measure how far this surface is from being a fiber for the knot; in particular, the surface is a fiber if and only if a particular coefficient vanishes. We also relate hyperbolic volume to colored Jones polynomials. Our method is to generalize the checkerboard decompositions of alternating knots.

Features
- Relates all central areas of modern 3-dimensional topology
- The first monograph which initiates a systematic study of relations between quantum and geometric topology
- Appeals to a broad audience of 3-dimensional topologists: combines tools from mainstream areas of 3-dimensional topology

Contents
1 Introduction.
2 Decomposition into 3–balls.
3 Ideal Polyhedra.
4 I–bundles and essential products.
5 Guts and fibers.
6 Recognizing product disks.
7 Diagrams without non-prime arcs.
8 Montesinos links.
9 Applications.
10 Discussion and questions.

Fields of interest
Manifolds and Cell Complexes (incl. Diff.Topology); Hyperbolic Geometry

Target groups
Research

Product category
Monograph

Regular Functions of a Quaternionic Variable

The theory of slice regular functions over quaternions is the central subject of the present volume. This recent theory has expanded rapidly, producing a variety of new results that have caught the attention of the international research community. At the same time, the theory has already developed sturdy foundations. The richness of the theory of the holomorphic functions of one complex variable and its wide variety of applications are a strong motivation for the study of its analogs in higher dimensions.

Features
- The book is entirely devoted to a new theory.
- Presents a state of the art survey of the theory of slice regular functions.
- The theory presented in the book is the basis for the solution to an outstanding problem, the construction of functional calculus in non commutative settings.

Contents
Introduction.
1. Definitions and Basic Results.
2. Regular Power Series.
4. Infinite Products.
5. Singularities.
6. Integral Representations.
7. Maximum Modulus Theorem and Applications.
9. Fractional Transformations and the Unit Ball.

Fields of interest
Functions of a Complex Variable; Sequences, Series, Summability; Functional Analysis

Target groups
Research

Product category
Monograph

Regular Functions of a Quaternionic Variable

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9. Fractional Transformations and the Unit Ball.

Fields of interest
Functions of a Complex Variable; Sequences, Series, Summability; Functional Analysis

Target groups
Research

Product category
Monograph

Stochastic Calculus with Infinitesimals

Stochastic analysis is not only a thriving area of pure mathematics with intriguing connections to partial differential equations and differential geometry. It also has numerous applications in the natural and social sciences (for instance in financial mathematics or theoretical quantum mechanics) and therefore appears in physics and economics curricula as well.

Features
- A demonstrably consistent use of infinitesimals permits a radically simplified approach to stochastic calculus.
- Chapters on asset pricing, Lévy processes and the Feynman path integral introduce readers to applications.
- Appendices explore the relationship with Internal Set Theory and Robinsonian nonstandard analysis.

Contents
1. Infinitesimal calculus, consistently and accessibly.
2. Radically elementary probability theory.
3. Radically elementary stochastic integrals.
4. The radically elementary Girsanov theorem and the diffusion invariance principle.
5. Excursion to nancial economics: A radically elementary approach to the fundamental theorems of asset pricing.
8. Excursion to mathematical physics: A radically elementary definition of Feynman path integrals.
10. Final remarks.

Fields of interest
Mathematical Logic and Foundations; Probability Theory and Stochastic Processes; Game Theory, Economics, Social and Behav. Sciences

Target groups
Research

Product category
Monograph
The Tower of Hanoi – Myths and Maths

This is the first comprehensive monograph on the mathematical theory of the solitaire game “The Tower of Hanoi” which was invented in the 19th century by the French number theorist Édouard Lucas. The book comprises a survey of the historical development from the game’s predecessors up to recent research in mathematics and applications in computer science and psychology.

**Features**
- The first comprehensive monograph on the topic
- Thorough presentation of the historical development
- Numerous attractive figures and original photos
- Connections to various mathematical fields and applications to fields like computer science and psychology
- Exercises with hints and solutions
- No special knowledge of advanced mathematics assumed from the reader

**Contents**

**Fields of interest**
Mathematics; general; History of Mathematical Sciences; Sequences, Series, Summability

**Target groups**
Upper undergraduate

**Product category**
Monograph

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**Automation, Communication and Cybernetics in Science and Engineering 2011/2012**

S. Jeschke, I. Isenhardt, F. Hees, K. Henning, RWTH Aachen University, Germany (Eds)

**Automation, Communication and Cybernetics in Science and Engineering 2011/2012**

**Contents**

**Fields of interest**
Computational Science and Engineering; Artificial Intelligence (incl. Robotics); Robotics and Automation

**Target groups**
Research

**Product category**
Contributed volume

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**Graphs, Networks and Algorithms**

D. Jungnickel, University of Augsburg, Germany

**Graphs, Networks and Algorithms**

From the reviews of the previous editions
- The book is a first class textbook and seems to be indispensable for everybody who has to teach combinatorial optimization. It is very helpful for students, teachers, and researchers in this area.
- The author finds a striking synthesis of nice and interesting mathematical results and practical applications. ... the author pays much attention to the inclusion of well-chosen exercises. The reader does not remain helpless; solutions or at least hints are given in the appendix. Except for some small basic mathematical and algorithmic knowledge the book is self-contained ...

**Features**
- Thoroughly revised new edition
- Further material added
- Additional exercises
- Additional references

**Contents**

**Fields of interest**
Combinatorics; Optimization; Mathematics of Computing

**Target groups**
Graduate

**Product category**
Graduate/Advanced undergraduate textbook
Operator Theory, Pseudo-Differential Equations, and Mathematical Physics

The Vladimir Rabinovich Anniversary Volume

This volume is a collection of papers devoted to the 70th birthday of Professor Vladimir Rabinovich. The opening article (by Stefan Samko) includes a short biography of Vladimir Rabinovich, along with some personal recollections and bibliography of his work. It is followed by twenty research and survey papers in various branches of analysis (pseudodifferential operators and partial differential equations, Toeplitz, Hankel, and convolution type operators, variable Lebesgue spaces, etc.) close to Professor Rabinovich’s research interests. Many of them are written by participants of the International workshop “Analysis, Operator Theory, and Mathematical Physics” (Ixtapa, Mexico, January 23–27, 2012) having a long history of scientific collaboration with Vladimir Rabinovich, and are partially based on the talks presented there.

Features
- Introduction to finite elements only based on calculus and linear algebra
- Covers theory, implementation, and applications. Focus on basic mathematical principles and consequent use of the same approach in different applications
- Matlab programs included
- Wide range of applications including solid mechanics, electromagnetics, and fluid mechanics
- Covers modern topics such as adaptivity based on duality arguments

Contents

Fields of interest
Computational Science and Engineering; Partial Differential Equations; Theoretical and Applied Mechanics

Target groups
Upper undergraduate

Product category
Graduate/Advanced undergraduate textbook

Due November 2012

Y. I. Karlovich, Universidad Autónoma del Estado de Morelos, Cuernavaca, MO, Mexico; L. Rodino, University of Turin, Italy; B. Silbermann, Technical University Chemnitz, Germany; I. M. Spitkovsky, College of William and Mary, Williamsburg, VA, USA (Eds)

Due December 2012

L. Lebedev, Universidad Nacional de Colombia, Bogota, Colombia; M. Cloud, Lawrence Technological University, MI, USA; I. I. Vorovich

Functional Analysis in Mechanics

This book offers a brief, practically complete, and relatively simple introduction to functional analysis. It also illustrates the application of functional analytic methods to the science of continuum mechanics. Abstract but powerful mathematical notions are tightly interwoven with physical ideas in the treatment of nontrivial boundary value problems for mechanical objects. This second edition includes more extended coverage of the classical and abstract portions of functional analysis. Taken together, the first three chapters now constitute a regular text on applied functional analysis.

Features
- The mathematical material is treated in a non-abstract manner and is fully illuminated by the underlying mechanical ideas
- Exercises and examples are included throughout with detailed solutions provided in the appendix

Contents

Fields of interest
Functional Analysis; Partial Differential Equations; Mechanics

Target groups
Research

Product category
Monograph

Birkhäuser

Due December 2012

M. G. Larson, F. Bengzon, Umeå University, Umeå, Sweden

The Finite Element Method: Theory, Implementation, and Applications

This book gives an introduction to the finite element method as a general computational method for solving partial differential equations approximately.

Features
- Introduction to finite elements only based on calculus and linear algebra
- Covers theory, implementation, and applications. Focus on basic mathematical principles and consequent use of the same approach in different applications
- Matlab programs included
- Wide range of applications including solid mechanics, electromagnetics, and fluid mechanics
- Covers modern topics such as adaptivity based on duality arguments

Contents

Fields of interest
Computational Science and Engineering; Partial Differential Equations; Theoretical and Applied Mechanics

Target groups
Upper undergraduate

Product category
Graduate/Advanced undergraduate textbook

Due December 2012

ISBN 978-1-4614-5867-8
E. Lord, Bangalore

Symmetry and Pattern in Projective Geometry

Symmetry and Pattern in Projective Geometry is a self-contained study of projective geometry which compares and contrasts the analytic and axiomatic methods. The analytic approach is based on homogeneous coordinates, and brief introductions to Plücker coordinates and Grassmann coordinates are presented. This book looks carefully at linear, quadratic, cubic and quartic figures in two, three and higher dimensions. It deals at length with the extensions and consequences of basic theorems such as those of Pappus and Desargues. The emphasis throughout is on special configurations that have particularly interesting symmetry properties. The intricate and novel ideas of ‘Donald’ Coxeter, who is considered one of the great geometers of the twentieth century, are also discussed throughout the text.

Features
- Provides a self-contained and easy-to-read introduction to projective geometry
- Compares and contrasts both analytic and synthetic methods
- Makes accessible subjects and theorems which are often considered quite complicated
- Compares and contrasts both analytic and synthetic methods
- Makes accessible subjects and theorems which are often considered quite complicated
- Makes accessible subjects and theorems which are often considered quite complicated
- Fills a gap in the literature
- Many new results, and practical applications as for example in cosmology and earthquake engineering

Contents
- Finite Geometries

Fields of interest
- Projective Geometry; Symbolic and Algebraic Manipulation; Mathematics, general

Target groups
- Upper undergraduate

Product category
- Undergraduate textbook

A. Malyarenko, Mälardalen University, Västerås, Sweden

Invariant Random Fields on Spaces with a Group Action

Foreword by: N. Leonenko, Cardiff University, Wales, UK

The author describes the current state of the art in the theory of invariant random fields. This theory is based on several different areas of mathematics, including Probability Theory, Differential Geometry, Harmonic Analysis, and Special Functions. The present volume unifies many results scattered throughout the mathematical, physical, and engineering literature, as well as it introduces new results from this area first proved by the author. The book also presents many practical applications, in particular in such highly interesting areas as approximation theory, cosmology and earthquake engineering. It is intended for researchers and specialists working in the fields of Stochastic Processes, Statistics, Functional Analysis, Astronomy, and Engineering.

Features
- Highly interdisciplinary nature
- Provides rapid access to the frontiers of research in this field

Contents
- Introduction
- Spectral Expansions
- Theory of Invariant Random Fields
- Sample Path Properties of Gaussian Invariant Random Fields
- Applications
- Mathematical Background
- References
- Index

Fields of interest
- Functions of a Complex Variable; Functional Analysis
- Several Complex Variables and Analytic Spaces

Target groups
- Research

Product category
- Monograph

Due September 2012

2013. XII, 212 p. 103 illus., 20 in color. Softcover
- € (D) 42,75 | € (A) 43,95 | sFr 53,50
- € 39,95 | £35.99
ISBN 978-3-642-33405-4

Due December 2012

2013. XVIII, 246 p. (Probability and Its Applications) Hardcover
- € (D) 90,90 | € (A) 93,45 | sFr 113,50
- € 84,95 | £76.50
ISBN 978-3-642-33405-4

Due November 2012

2013. XI, 169 p. (Fields Institute Monographs, Volume 31) Hardcover
- € (D) 90,90 | € (A) 93,45 | sFr 113,50
- € 84,95 | £76.50
ISBN 978-1-4614-5610-0

J. Mashreghi, Université Laval, Quebec, QC, Canada

Derivatives of Inner Functions

Inner functions form an important subclass of bounded analytic functions. Since they have unimodular boundary values, they appear in many extremal problems of complex analysis. They have been extensively studied since early last century, and the literature on this topic is vast. Therefore, this book is devoted to a concise study of derivatives of these objects, and confined to treating the integral means of derivatives and presenting a comprehensive list of results on Hardy and Bergman means. The goal is to provide rapid access to the frontiers of research in this field. This monograph will allow researchers to get acquainted with essentials on inner functions, and it is self-contained, which makes it accessible to graduate students.

Features
- Includes a comprehensive list of results on integral means taken from several research papers
- Text is concise and self-contained, making it easily accessible to graduate students
- Provides rapid access to the frontiers of research in this field

Contents
- Preface
- 1. Inner Functions
- 2. The Exceptional Set of an Inner Function
- 3. The Derivative of Finite Blaschke Products
- 4. Angular Derivative
- 5. Hp-Means of S
- 6. Bp-Means of S
- 7. The Derivative of a Blaschke Product
- 8. Hp-Means of B
- 10. The Growth of Integral Means of B
- References
- Index

Fields of interest
- Functions of a Complex Variable; Functional Analysis
- Several Complex Variables and Analytic Spaces

Target groups
- Research

Product category
- Monograph
Spectral Theory and Quantum Mechanics

with an Introduction to the Algebraic Formulation of Quantum Theories

V. Moretti, Università di Trento, Italy

Contents

Fields of interest
Applications of Mathematics; Theoretical, Mathematical and Computational Physics; Mathematical Methods in Physics

Target groups
Graduate

Product category
Graduate/Advanced undergraduate textbook

Mathematics

I. Nourdin, Université de Lorraine, Nancy, France

Selected Aspects of Fractional Brownian Motion

Fractional Brownian motion (fBm) is a stochastic process which deviates significantly from Brownian motion and semimartingales, and others classically used in probability theory. As a centered Gaussian process, it is characterized by the stationarity of its increments and a medium- or long-memory property which is in sharp contrast with martingales and Markov processes. fBm has become a popular choice for applications where classical processes cannot model the non-trivial properties; for instance long memory, which is also known as persistence, is of fundamental importance for financial data and in internet traffic.

Features
- Except for very few exception, every result stated in this book is proved in details: the book is then perfectly tailored for self-learning.
- My guiding thread was to develop only the most aesthetic topics related to fractional Brownian motion: the book will appeal to readers who are not necessarily familiar with fractional Brownian motion and who like beautiful mathematics.
- A special chapter on a recent link between fractional Brownian motion and free probability introduces the reader to a new and promising line of research.

Contents

Fields of interest
Probability Theory and Stochastic Processes; Quantitative Finance

Target groups
Research

Product category
Monograph

Finite and Boundary Element Tearing and Interconnecting Solvers for Multiscale Problems

C. Pechstein

Due November 2012
2013. XVI, 304 p. 51 illus., 1 in color. (Lecture Notes in Computational Science and Engineering, Volume 90) Hardcover
- *€ (D) 101,60 | € (A) 104,45 | sFr 126,50
- *€ 94,95 | £85.50
ISBN 978-3-642-23387-7

Due October 2012
2013. Approx. 600 p. 100 illus. (UNITEXT / La Matematica per il 3+2) Softcover
- approx. *€ (D) 53,45 | € (A) 54,95 | sFr 66,50
- approx. € 49,95 | £44,99
ISBN 978-88-470-2834-0

Due November 2012
2013. Approx. 140 p. (Bocconi & Springer Series) Hardcover
- approx. *€ (D) 90,90 | € (A) 93,45 | sFr 113,50
- approx. € 84,95 | £76.50

Due November 2012
2013. Approx. 300 p. 1 in color. (UNITEXT / La Matematica per il 3+2) Hardcover
- *€ (D) 101,60 | € (A) 104,45 | sFr 126,50
- *€ 94,95 | £85.50
ISBN 978-3-642-23387-7
Mathematics

A. Quarteroni, Politecnico di Milano, Italy

Modellistica Numerica per Problemi Differenziali

In questo testo si introducono i concetti di base per la modellistica numerica di problemi differenziali alle derivate parziali. Si considerano le classiche equazioni lineari ellittiche, paraboliche ed iperboliche, ma anche altre equazioni, quali quelle di diffusione e trasporto, di Navier-Stokes e le leggi di conservazione; si forniscono inoltre numerosi esempi fisici che stanno alla base di tali equazioni.

Features

- Non presuppone una approfondita conoscenza matematica delle equazioni alle derivate parziali.
- Numerosi esercizi corredano i diversi capitoli.
- Rispetto alle edizioni precedenti, tutti i capitoli sono stati rivisti ed integrati, anche con nuovi risultati numerici.

Contents


Fields of interest
Mathematics, general; Analysis; Numerical Analysis

Target groups
Research

Product category
Libro di testo introduttivo

L. Rüschendorf, University of Freiburg, Germany

Mathematical Risk Analysis

Dependence, Risk Bounds, Optimal Allocations and Portfolios

The author’s particular interest in the area of risk measures is to combine this theory with the analysis of dependence properties.

Features

- Up-to-date treatment of the main concepts and techniques used in mathematical risk analysis.
- Clearly structured guide.
- Gives orientation and help to acquire a solid fundament for working in this area.

Contents


Fields of interest
Probability Theory and Stochastic Processes; Quantitative Finance; Actuarial Sciences

Target groups
Professional/practitioner

Product category
Monograph

Due December 2012

M. Senechal, Smith College, Northampton, MA, USA (Ed)

Shaping Space

Exploring Polyhedra in Nature, Art, and the Geometrical Imagination

Contents


Fields of interest
Geometry; Crystallography; Design, general

Target groups
Popular/general

Product category
Contributed volume

Pubblicazione prevista per il mese di September 2012

Due December 2012

Shaping Space

Exploring Polyhedra in Nature, Art, and the Geometrical Imagination

Contents


Fields of interest
Geometry; Crystallography; Design, general

Target groups
Popular/general

Product category
Contributed volume
E. Spodarev, University of Ulm, Germany (Ed)

Stochastic Geometry, Spatial Statistics and Random Fields

Asymptotic Methods

This volume provides a modern introduction to stochastic geometry, random fields and spatial statistics at a (post)graduate level. It is focused on asymptotic methods in geometric probability including weak and strong limit theorems for random spatial structures (point processes, sets, graphs, fields) with applications to statistics.

Written as a contributed volume of lecture notes, it will be useful not only for students but also for lecturers and researchers interested in geometric probability and related subjects.

Features
- Comprises introductory material as well as advances topics with a significant number of proofs
- Numerous images ease the understanding of complex mathematical notions
- Includes a large number of exercises for active reading
- Provides vast research bibliography

Contents
1 Foundations of stochastic geometry and theory of random sets
2 Introduction into integral geometry and stereology
3 Spatial point patterns - models and statistics
4 Asymptotic methods in statistics of random point processes
5 Random tessellations and Cox processes
6 Asymptotic methods for random tessellations
7 Limit theorems in discrete stochastic geometry
8 Limit theorems in random fields
9 Central limit theorems for weakly dependent random fields
10 Strong limit theorems for increments of random fields
11 Geometry of large random trees: SPDE approximation

Fields of interest
- Convex and Discrete Geometry
- Probability Theory and Stochastic Processes
- Statistical Theory and Methods

Target groups
- Research

Product category
- Contributed volume

K. Vajravelu, R. A. Van Gorder, University of Central Florida, Orlando, FL 32816-1364, USA

Nonlinear Flow Phenomena and Homotopy Analysis

Fluid Flow and Heat Transfer

Since most of the problems arising in science and engineering are nonlinear, they are inherently difficult to solve. Traditional analytical approximations are valid only for weakly nonlinear problems, and often fail when used for problems with strong nonlinearity. "Nonlinear Flow Phenomena and Homotopy Analysis: Fluid Flow and Heat Transfer" presents the current theoretical developments of the analytical method of homotopy analysis. This book not only addresses the theoretical framework for the method, but also gives a number of examples of nonlinear problems that have been solved by means of the homotopy analysis method.

Features
- A powerful analytical method for strongly nonlinear differential equations
- Latest developments in theory and applications
- Varieties of very recent and interesting applications in science and engineering

Contents
Part I: Theoretical Considerations
- Principles of the Homotopy Analysis Method
- Methods for the Control of Convergence in Obtained Solutions
- Additional Techniques
Part II: Applications to Physical Problems
- Application of the Homotopy Analysis Method to Fluid Flow Problems
- Application of the Homotopy Analysis Method to Heat Transfer Problems
- Application of the Homotopy Analysis Method to More Advanced Problems

Fields of interest
- Computational Mathematics and Numerical Analysis
- Engineering Fluid Dynamics
- Theoretical, Mathematical and Computational Physics

Target groups
- Research

Product category
- Monograph
X. Wang, South China Normal University, Guangzhou, China; D. Pei, Guangzhou University, China

**Modular Forms with Integral and Half-Integral Weights**

“Modular Forms with Integral and Half-Integral Weights” focuses on the fundamental theory of modular forms of one variable with integral and half-integral weights. The main theme of the book is the theory of Eisenstein series.

**Features**
- The first book available on modular forms dealing with integral and half-integral weights in a unified framework
- The first book dealing with in detail Eisenstein series with half-integral weights
- Includes all necessary basic material for reading modern research literature on modular forms with half-integral weights
- Offers some very beautiful applications of modular forms of half-integral weights to some arithmetic problems of definite positive quadratic forms

**Contents**
- Theta Functions and Their Transformation Formulas
- Eisenstein Series
- The Modular Group and Its Subgroups
- Modular Forms with Integral Weight or Half-integral Weight
- Operators on the Space of Modular Forms
- New Forms and Old Forms
- Construction of Eisenstein Series
- Weil Representation and Shimura Lifting
- Trace Formula
- Integers Represented by Positive Definite Quadratic Forms

**Fields of interest**
- Number Theory; Algebraic Geometry; Functions of a Complex Variable

**Target groups**
- Research

**Product category**
- Monograph

**Available**
Distribution rights in China: Science Press Ltd

2013. Approx. 400 p. 3 illus. Hardcover
- € (D) 101,60 | € (A) 104,45 | sFr 126,50
- £94.95 | £85.50
ISBN 978-3-642-29301-6