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## Inverse Problems with Applications in Science and Engineering



Daniel Lesnic

Driven by the advancement of industrial mathematics and the need for impact case studies, *Inverse Problems with Applications in Science and Engineering* thoroughly examines the state-of-the-art of some representative classes of inverse and ill-posed problems for partial differential equations (PDEs). The natural practical applications of this examination arise in heat transfer, electrostatics, porous media, acoustics, fluid and solid mechanics — all of which are addressed in this text.



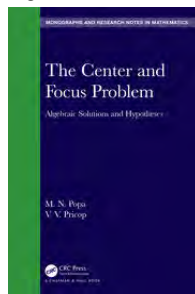
Chapman & Hall  
November 2021:358

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## The Center and Focus Problem

Algebraic Solutions and Hypotheses



M.N. Popa, V.V. Priscop

*Series: Chapman & Hall/CRC Monographs and Research Notes in Mathematics*

This book focuses on an old problem of the qualitative theory of differential equations, called the Center and Focus Problem. It is intended for mathematicians, researchers, professors and Ph.D. students working in the field of differential equations, as well as other specialists who are interested in the theory of Lie algebras, commutative graded algebras, the theory of generating functions and Hilbert series. The book reflects the results obtained by the authors in the last decades.

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## Nonlinear Systems and Their Remarkable Mathematical Structures, Volumes 1, 2, and 3



*Edited By* Norbert Euler, Maria Clara Nucci, Da-jun Zhang

This set of three volumes aims to describe the recent progress in nonlinear differential equations and nonlinear dynamical systems (both continuous and discrete). These volumes should be suitable for graduate and postgraduate students in mathematics, the natural sciences, and engineering sciences, as well as for researchers (both pure and applied) interested in nonlinear systems. The common theme throughout all the volumes is on solvable and integrable nonlinear systems of equations and methods/theories that can be applied to analyze those systems. Some applications are also discussed.

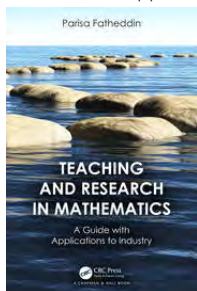
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## Teaching and Research in Mathematics

A Guide with Applications to Industry



Parisa Fatheddin

This book is meant to serve those who are interested in pursuing a career in mathematics education and research. The author's goal is to help students and others make a smooth transition to teachers and researchers of mathematics. Part I presents helpful techniques on teaching and conducting research. Part II introduces some modern research in mathematics in various industries. The aim is to expose the reader to modern applications and help him/her become acquainted with research papers and how to read and understand them.

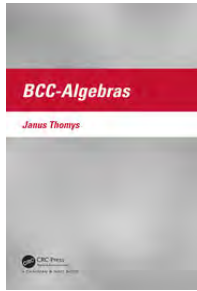
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## BCC-Algebras



Janus Thomys

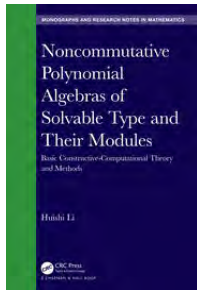
The subjects described in the book are BCC-algebras and an even wider class of weak BCC-algebras. The aim of the book is to summarize the achievements to date in the subject and to present them in the form of a logically created theory. The author describes the so-called solid weak BCC-algebras. They have some properties of BCI-algebras, but this requires completely new, often difficult, proofs. The important subclasses of weak BCC-algebras and the relationships between them are presented with many examples.

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## Noncommutative Polynomial Algebras of Solvable Type and Their Modules

Basic Constructive-Computational Theory and Methods



Huishi Li

*Series: Chapman & Hall/CRC Monographs and Research Notes in Mathematics*

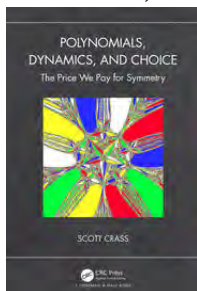
Noncommutative Polynomial Algebras of Solvable Type and Their Modules is the first book to systematically introduce the basic constructive-computational theory and methods developed for investigating solvable polynomial algebras and their modules. This book is perfectly suited to researchers and postgraduates researching noncommutative computational algebra and would also be an ideal resource for teaching an advanced lecture course.

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## Polynomials, Dynamics, and Choice

The Price We Pay for Symmetry



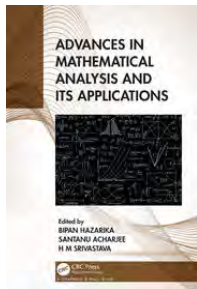
Scott Crass

Polynomials, Dynamics, and Choice: The Price We Pay for Symmetry is organized in two parts, the first of which develops an account of polynomial symmetry that relies on considerations of algebra and geometry. The second explores beyond polynomials to spaces consisting of choices ranging from mundane decisions to evolutionary algorithms that search for optimal outcomes. The two algorithms in Part I provide frameworks that capture structural issues that can arise in deliberative settings. While decision-making has been approached in mathematical terms, the novelty here is in the use of equation-solving algorithms to illuminate such problems.

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## Advances in Mathematical Analysis and its Applications



Edited By Bipan Hazarika, Santanu Acharjee, H M Srivastava

This book is designed as a reference text and highlights how MA is now being employed in many areas of scientific research. It discusses theory and problems in real and complex analysis, functional analysis, approximation theory, operator theory, analytic inequalities, the Radon transform, nonlinear analysis, and various applications of interdisciplinary research; some topics are also devoted to specific applications such as the three-body problem, finite element analysis in fluid mechanics, algorithms for difference of monotone operators, a vibrational approach to a financial problem, and more.

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## Summability Theory and Its Applications



Feyzi Başar

This book explains various aspects of summability and demonstrates its applications in a rigorous and coherent manner. The content can readily serve as a reference or as a useful series of lecture notes on the subject. This substantially revised new edition includes brand new material across several chapters as well as several corrections, including: the addition of the domain of Cesaro matrix  $C(m)$  of order  $m$  in the classical sequence spaces to Chapter 4; and introducing the domain of four-dimensional binomial matrix in the spaces of bounded, convergent in the Pringsheim's sense, both convergent in the Pringsheim's sense and bounded, and regularly convergent double sequences.

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## Handbook of Complex Analysis



Edited By Steven G. Krantz

The Handbook of Complex Analysis will be an entree for advanced undergraduates and beginning graduate students in the subject of complex analysis. The book should consist of contributions by major researchers in the subject, discussing topics that are dear to their hearts. The subject of complex analysis of increasing importance. Apart from its intrinsic beauty, it underlies many of the ideas in modern harmonic analysis, partial differential equations, engineering, and applied science. It is a powerful tool with many applications. And even the function theory of several complex variables has seen applications in cosmology, geophysics, and engineering.

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## The Stieltjes Integral



Gregory Convertito, David Cruz-Urbe

The Stieltjes Integral provides a detailed, rigorous treatment of the Stieltjes integral. It offers an accessible treatment of the subject to students who have had a one semester course in analysis. This book is suitable for a second semester course in analysis, and also for independent study or as the foundation for a senior thesis or Masters project. Features: Written to be rigorous without sacrificing readability. Accessible to undergraduate students who have taken a one-semester course on real analysis. Contains a large number of exercises from routine to challenging.

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## Sequence Space Theory with Applications



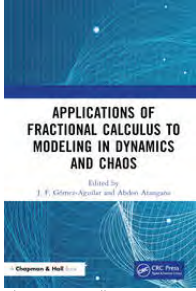
Edited By S. A. Mohiuddine, Bipan Hazarika

This book contains advance and modern techniques to define sequence spaces and obtain their applications. It discusses the idea of sequence spaces with a view of Jordan totient matrix and multiplier sequences. It introduces the paranormed Riesz difference sequence spaces of fractional order. It also includes techniques for studying the solutions of some integro-differential equations in Banach spaces technique and for obtaining necessary and sufficient Tauberian conditions.

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## Applications of Fractional Calculus to Modeling in Dynamics and Chaos



Edited By J. F. Gómez-Aguilar, Abdon Atangana

This book aims to present novel developments, trends, and applications of fractional-order derivatives with power law and Mittag-Leffler kernel in the areas of chemistry, mechanics, chaos, epidemiology, fluid mechanics, modeling, and engineering. Non-singular and non-local fractional-order derivatives have been applied in different chapters to describe complex problems. The book offers theory and practical applications for the solutions of real-life problems and will be of interest to graduate-level students, educators, researchers, and scientists interested in mathematical modelling and its diverse applications.

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## Computational Framework for the Finite Element Method in MATLAB® and Python



Pavel Sumets

This book aims to provide a programming framework for coding linear FEM using matrix-based MATLAB language and Python scripting language. It describes FEM algorithm implementation in the most generic formulation so that it is possible to apply this algorithm to as many application problems as possible. Readers can follow the step-by-step process of developing algorithms with clear explanations of its underlying mathematics and how to put it into MATLAB and Python code. The content is focused on aspects of numerical methods and coding FEM rather than FEM mathematical analysis.

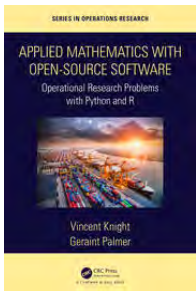
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## Applied Mathematics with Open-Source Software

Operational Research Problems with Python and R



Vincent Knight, Geraint Palmer

Series: *Chapman & Hall/CRC Series in Operations Research*

This book is aimed at a broad segment of readers who wish to learn how to use open-source software to solve problems in applied mathematics. The book has an innovative structure with 4 sections of two chapters covering a large range of applied mathematical techniques: probabilistic modelling, dynamical systems, emergent behaviour and optimisation. The pairs of chapters in each section demonstrate different families of solution approaches. Each chapter starts with a problem, gives an overview of the relevant theory, shows a solution approach in R and in Python, and finally gives wider context by including a number of published references.

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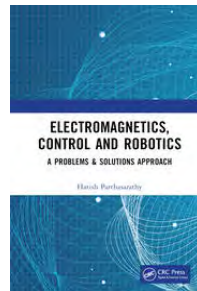
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## Electromagnetics, Control and Robotics

A Problems & Solutions Approach



Harish Parthasarathy

This book covers a variety of problems, and offers solutions to some, in: Statistical state and parameter estimation in nonlinear stochastic dynamical system in both the classical and quantum scenarios Propagation of electromagnetic waves in a plasma as described by the Boltzmann Kinetic Transport Equation Classical and Quantum General Relativity It will be of use to Engineering undergraduate students interested in analysing the motion of robots subject to random perturbation, and also to research scientists working in Quantum Filtering.

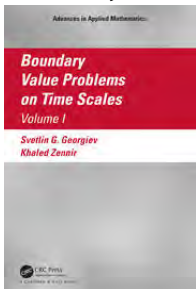
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## Boundary Value Problems on Time Scales, Volume I



Svetlin Georgiev, Khaled Zennir

Series: *Advances in Applied Mathematics*

This book is devoted to the qualitative theory of boundary value problems on time scales. It summarizes the most recent contributions in this area.

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## Mathematics and Statistics for the Quantitative Sciences



Matthew Betti

This book serves as a foundational text in everyday mathematics in a way that is both engaging and practically useful. The book seeks to teach the mathematics needed to start to answer fundamental questions like 'why' or 'how'. These questions require a different way of thinking — a quantitative intuition that goes beyond rote memorization and equips readers to meet the quantitative challenges inherent in any applied discipline.

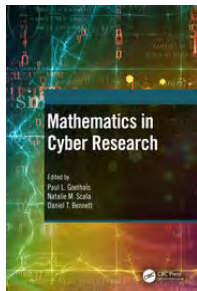
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## Mathematics in Cyber Research



Edited By Paul L. Goethals, Natalie M. Scala, Daniel T. Bennett

At the very foundation or root of cyberspace systems and processes are tenets and rules governed by principles in mathematics. This book aims to familiarize educators and young researchers with the breadth of mathematics in cyber-related research. Each chapter introduces a mathematical sub-field, describes relevant work in this field associated with the cyber domain, provides methods and tools, as well as details cyber research examples or case studies.

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Venkata Bhaskar Rao Dodla

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## Star Origami

The Starrygami™ Galaxy of Modular Origami Stars, Rings and Wreaths



Tung Ken Lam

Series: *AK Peters/CRC Recreational Mathematics Series*

This book is an exciting collection of origami rings, stars and wreaths made using the modular technique, including clear instructions for making them. Features Hundreds of clear step-by-step instructions show you how, based on the technique of folding a small number of simple units and joining them together as a satisfying puzzle. Secrets tips to make new shapes just by varying a few lengths and angles. Suitable for teaching and learning art, geometry and mathematics. Teachers will appreciate the practical advice to succeed in using origami for education.

A K Peters/CRC Press  
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## Artificial Intelligence

An Introduction for the Inquisitive Reader



Robert H. Chen, Chelsea C. Chen

This book guides readers through the history and development of AI, from its early mathematical beginnings through to the exciting possibilities of its potential future applications. To make this journey as accessible as possible, the authors build their narrative around accounts of some of the more popular and well-known demonstrations of artificial intelligence including Deep Blue, AlphaGo and even Texas Hold'em, followed by their historical background, so that AI can be seen as a natural development of mathematics and computer science.



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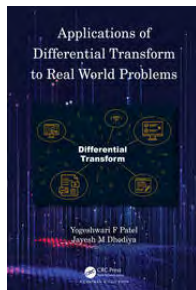
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## Applications of Differential Transform to Real World Problems



Yogeshwari F Patel, Jayesh M Dhodiya

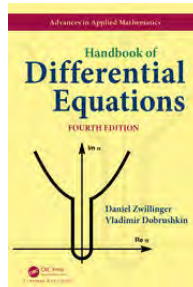
This book is an invaluable resource for applied researchers to find the analytical solution of differential equations describing the dynamical system with less computational effort and time. This book describes the basic concepts of differential transform method and solution of various real-world problems. It provides a computational technique which is not only conceptually simple and easy to use but also readily adaptable for computer coding. Different chapters of the book deals with the basic differential equation involve in the physical phenomena as well complicated system of differential described by the mathematical model.

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## Handbook of Differential Equations



Daniel Zwillinger, Vladimir Dobrushkin

Series: *Advances in Applied Mathematics*

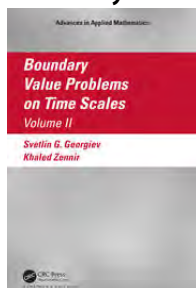
Through the previous three editions, this book has proven an invaluable reference for anyone working within the field of mathematics, including academics, students, scientists, and professional engineers. The book is a compilation of methods for solving and approximating differential equations. These include the most widely applicable methods for solving and approximating differential equations, as well as numerous methods. Topics include methods for ordinary differential equations, partial differential equations, stochastic differential equations, and systems of such equations.

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## Boundary Value Problems on Time Scales, Volume II



Svetlin Georgiev, Khaled Zennir

Series: *Advances in Applied Mathematics*

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## Introduction to Traveling Waves



Anna R. Ghazaryan, Stéphane Lafortune, Vahagn Manukian

This book is an invitation to research focused on traveling waves for undergraduate and masters level students. Traveling waves are not typically covered in the undergraduate curriculum, and topics related to traveling waves are usually only covered in research papers, except for a few texts designed for students. This book includes techniques that are not covered in those texts.

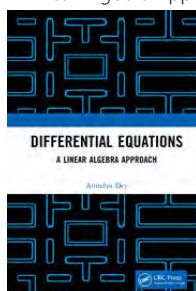
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## Differential Equations

A Linear Algebra Approach



Anindya Dey

Differential Equations: A Linear Algebra Approach follows an innovative approach of inculcating linear algebra and elementary functional analysis in the backdrop of even the simple methods of solving ordinary differential equations. The contents of the book have been made user-friendly through concise useful theoretical discussions and numerous illustrative examples practical and pathological.

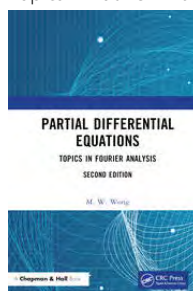
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## Partial Differential Equations

Topics in Fourier Analysis



M. W. Wong

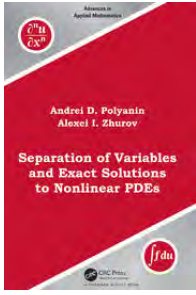
Designed for a one-semester course, this text provides a bridge between the standard PDE course for undergraduate students in science and engineering and the PDE course for graduate students in mathematics who are pursuing a research career in analysis. Through its coverage of fundamental examples of PDEs, the book prepares students for studying more advanced topics such as pseudo-differential operators. It also helps them appreciate PDEs as beautiful structures in analysis, rather than a bunch of isolated ad-hoc techniques.

Chapman & Hall  
August 2022:208

Hb: 978-1-032-07316-3: £82.99 **Special price: £71.00**

\* For full contents and more information, visit: [www.routledge.com/9781032073163](http://www.routledge.com/9781032073163)

## Separation of Variables and Exact Solutions to Nonlinear PDEs



Andrei D. Polyanin, Alexei I. Zhurov

*Series: Advances in Applied Mathematics*

The book is devoted to describing and applying methods of generalized and functional separation of variables used to find exact solutions of nonlinear PDEs. It also presents the direct method of symmetry reductions and its more general version. In addition, the authors describe the differential constraint method, which generalizes many other exact methods. The book contains much new material previously unpublished in monographs. It is intended for a broad audience of scientists, engineers, instructors, and students specializing in applied and computational mathematics, theoretical physics, mechanics, control theory, chemical engineering science, and other disciplines.

Chapman & Hall  
November 2021:401

Hb: 978-0-367-48689-1: £130.00 **Special price: £111.00**

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## Foundations of Quantitative Finance, Book I: Measure Spaces and Measurable Functions



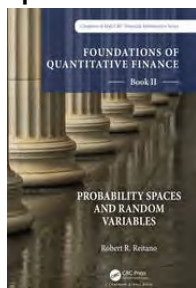
Robert R. Reitano

*Series: Chapman & Hall/CRC Finance Series*

Book 1 in a nine-book, sequential series written for professionals. The series is designed to fill the gap between popular finance textbooks and advanced theoretical texts to present practical, rigorous, and detailed development of the quantitative materials needed in finance, without unnecessary and distracting generalization, and also to provide enough linkages with finance theories so that the reader can appreciate how these mathematical tools are used. In addition, these books are extensively self-referenced and indexed so readers can enter anywhere and easily navigate to earlier needed materials.

Chapman & Hall  
October 2022:318  
Hb: 978-1-032-19120-1: **£180.00 Special price: £153.00**  
Pb: 978-1-032-19118-8: **£68.99 Special price: £59.00**  
\* For full contents and more information, visit: [www.routledge.com/9781032191188](http://www.routledge.com/9781032191188)

## Foundations of Quantitative Finance Book II: Probability Spaces and Random Variables



Robert R. Reitano

*Series: Chapman & Hall/CRC Finance Series*

Published under the collective title of Foundations of Quantitative Finance, these books present the theory most do not learn in undergraduate and graduate courses. As a high-level industry executive & authoritative instructor, Robert Reitano presents the mathematical theories he encountered in nearly three decades in the financial industry and two decades in teaching in highly respected graduate programs. Readers should be quantitatively literate and familiar with the developments in the first book in the set, Foundations of Quantitative Finance Book I: Measure Spaces and Measurable Functions.

Chapman & Hall  
December 2022:275  
Hb: 978-1-032-19718-0: **£180.00 Special price: £153.00**  
Pb: 978-1-032-19717-3: **£68.99 Special price: £59.00**  
\* For full contents and more information, visit: [www.routledge.com/9781032197173](http://www.routledge.com/9781032197173)

## Foundations of Reinforcement Learning with Applications in Finance

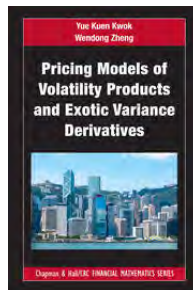


Ashwin Rao, Tikhon Jelvis

This book aims to demystify Reinforcement Learning, and to make it a practically useful tool for those studying and working in applied areas — especially finance. RL is emerging as a viable and powerful technique for solving a variety of complex problems across industries that involve Sequential Optimal Decisioning under Uncertainty. Its penetration in high-profile problems like self-driving cars, robotics, and strategy games points to a future where Reinforcement Learning algorithms will have decisioning abilities far superior to humans. This book introduces the foundations of RL in a way that balances depth of understanding with clear, minimally technical delivery.

Chapman & Hall  
December 2022:522  
Hb: 978-1-032-12412-4: **£74.99 Special price: £64.00**  
\* For full contents and more information, visit: [www.routledge.com/9781032124124](http://www.routledge.com/9781032124124)

## Pricing Models of Volatility Products and Exotic Variance Derivatives



Yue Kuen Kwok, Wendong Zheng

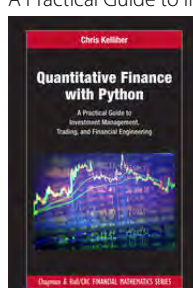
*Series: Chapman and Hall/CRC Financial Mathematics Series*

Pricing Models of Volatility Products and Exotic Variance Derivatives summarizes most of the recent research results in pricing models of derivatives on discrete realized variance and VIX. It begins with the presentation of volatility trading and uses of variance derivatives, and then moves on to discuss the robust replication strategy of continuously monitored variance swaps using portfolio of options, which is one of the major milestones in pricing theory of variance derivatives. The replication procedure provides the theoretical foundation of the construction of VIX.

Chapman & Hall  
May 2022:282  
Hb: 978-1-032-19902-3: **£99.99 Special price: £85.00**  
\* For full contents and more information, visit: [www.routledge.com/9781032199023](http://www.routledge.com/9781032199023)

## Quantitative Finance with Python

A Practical Guide to Investment Management, Trading, and Financial Engineering



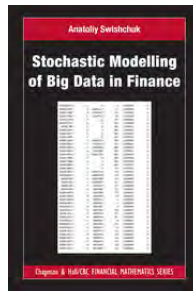
Chris Kelliher

*Series: Chapman and Hall/CRC Financial Mathematics Series*

This book bridges the gap between the theory of mathematical finance and the practical applications of these concepts for derivative pricing and portfolio management. The book provides students with a very hands-on, rigorous introduction to foundational topics in quant finance, such as options pricing, portfolio optimization and machine learning. Simultaneously, the reader benefits from a strong emphasis on the practical applications of these concepts for institutional investors.

Chapman & Hall  
May 2022:697  
Hb: 978-1-032-01443-2: **£99.99 Special price: £85.00**  
\* For full contents and more information, visit: [www.routledge.com/9781032014432](http://www.routledge.com/9781032014432)

## Stochastic Modelling of Big Data in Finance



Anatoliy Swishchuk

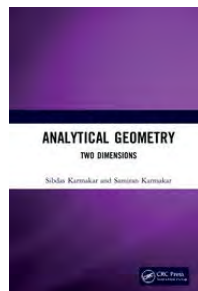
*Series: Chapman and Hall/CRC Financial Mathematics Series*

This book provides a rigorous overview and exploration of stochastic modelling of big data in finance (BDF). The book describes various stochastic models, including multivariate models, to deal with big data in finance. This includes data in high-frequency and algorithmic trading, specifically in limit order books (LOB), and shows how those models can be applied to different datasets to describe the dynamics of LOB, and to figure out which model is the best with respect to a specific data set. The results of the book may be used to also solve acquisition, liquidation and market making problems, and other optimization problems in finance.

Chapman & Hall  
November 2022:304  
Hb: 978-1-032-20926-5: **£74.99 Special price: £64.00**  
\* For full contents and more information, visit: [www.routledge.com/9781032209265](http://www.routledge.com/9781032209265)

## Analytical Geometry

Two Dimensions



Sibdas Karmakar, Samiran Karmakar

This book is a compilation of all basic topics of Analytical Geometry of Two Dimensions and is intended to serve as an introductory text aimed towards undergraduate and graduate students in science and technology. An understanding of basic school level algebra and geometry can serve as the prerequisite for following this book. Please note: Taylor & Francis does not sell or distribute the Hardback in India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka.

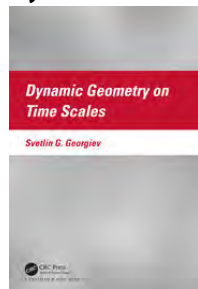
CRC Press

April 2022:316

Hb: 978-1-032-27020-3: £99.99 **Special price: £85.00**

\* For full contents and more information, visit: [www.routledge.com/9781032270203](http://www.routledge.com/9781032270203)

## Dynamic Geometry on Time Scales



Svetlin Georgiev

This book provides the first and second fundamental forms of surfaces on time scales. They are introduced minimal surfaces and geodesics on time scales. In the book are studied the covariant derivatives on time scales, pseudo-spherical surfaces and  $\sigma_1$ ,  $\sigma_2$  manifolds on time scales.

Chapman & Hall

December 2021:396

Hb: 978-1-032-07078-0: £145.00 **Special price: £123.00**

\* For full contents and more information, visit: [www.routledge.com/9781032070780](http://www.routledge.com/9781032070780)

## Banach Limit and Applications



Gokulananda Das, Sudarsan Nanda

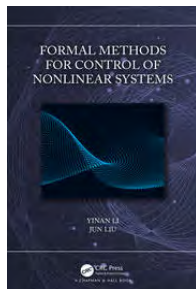
This book provides all the results in the area of Banach limit, its extensions, generalizations and applications to various fields in one go (as far as possible). Sublinear functionals generating and dominating Banach Limit, unique Branch Limit (almost convergence), invariant means and invariant limits, absolute and strong almost convergence, applications to ergodicity, law of large number, Fourier series, uniform distribution of sequences, uniform density, core theorems, functional Banach limits are discussed in this book. The book is suitable for one or two semester course work for Ph. D. students, M.S. Students of North America and Europe, M. Phil and Masters Students of India.

Chapman & Hall  
November 2021:230

Hb: 978-0-367-69865-2: £130.00 **Special price: £111.00**

\* For full contents and more information, visit: [www.routledge.com/9780367698652](http://www.routledge.com/9780367698652)

## Formal Methods for Control of Nonlinear Systems



Yinan Li, Jun Liu

Analysis and design of nonlinear control design plays an important role across many disciplines of engineering and applied sciences, ranging from the control of an aircraft engine to the design of genetic circuits in synthetic biology. While linear control is a well-established subject, analysis and design of nonlinear control systems remains a challenging topic due to some of the fundamental difficulties caused by nonlinearity. This book provides a unified computational approach to analysis and design of nonlinear systems.

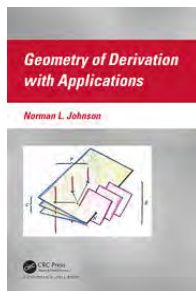
Chapman & Hall  
December 2022:272

Hb: 978-0-367-21999-4: £89.99 **Special price: £76.00**

\* For full contents and more information, visit: [www.routledge.com/9780367219994](http://www.routledge.com/9780367219994)

## Observability and Mathematics

Fluid Mechanics, Solutions of Navier-Stokes Equations, and Modeling



Boris Khots

*Series: Advances in Applied Mathematics*

The author approaches an old classic problem - the existence of solutions of Navier-Stokes eqs. The main objective is to model and derive of equation of continuity, Euler equation of fluid motion, energy flux equation, Navier-Stokes eqs from the observer point of view and solve classic problem for this interpretation of fluid motion laws. Observability in maths were developed by the author based on denial of infinity idea. He introduces observers into arithmetic, and arithmetic becomes dependent on observers. And after that the basic maths also become dependent on observers.

Chapman & Hall  
November 2021:228

Hb: 978-1-032-00813-4: £99.99 **Special price: £85.00**

\* For full contents and more information, visit: [www.routledge.com/9781032008134](http://www.routledge.com/9781032008134)

## A Guide to Business Mathematics



Gerard O'Regan

This book provides a valuable self-study guide to business practitioners, business students and the general reader to enable them to gain an appropriate insight into the mathematics used in business. This book offers an accessible introduction to essential mathematics for the business field. The author uses modelling and applications to motivate the material, demonstrating how mathematics is used in the financial sector. In addition to the role of the actuary and the banker, the book covers operations research including game theory, trade discounts, and the fundamentals of statistics and probability.

Chapman & Hall  
August 2022:412

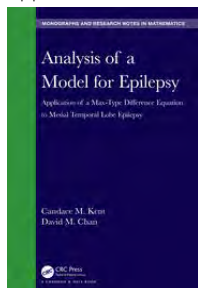
Hb: 978-1-032-31119-7: £190.00 **Special price: £162.00**

Pb: 978-1-032-31116-6: £74.99 **Special price: £64.00**

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## Analysis of a Model for Epilepsy

Application of a Max-Type Difference Equation to Mesial Temporal Lobe Epilepsy



Candace M. Kent, David M. Chan

*Series: Chapman & Hall/CRC Monographs and Research Notes in Mathematics*

Recently, the authors of this book and their colleagues investigated the first known application of a "max-type" difference equation. Their equation is a phenomenological model of epileptic seizures. In this book, the authors expand on that research and present a more comprehensive development of mathematical, numerical, and biological results. Additionally, they describe the first documented instance of a novel dynamical behavior that they call rippled almost periodic behavior, which can be described as an unpredictable pseudo-periodic behavior.

Chapman & Hall

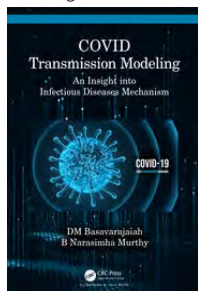
June 2022:172

Hb: 978-1-032-25538-5: £150.00 **Special price: £128.00**

\* For full contents and more information, visit: [www.routledge.com/9781032255385](http://www.routledge.com/9781032255385)

## COVID Transmission Modeling

An Insight into Infectious Diseases Mechanism



DM Basavarajaiah, B Narasimha Murthy

The present book will explore and formulate new mathematical/statistical and epidemiological modelling based on the research findings. It covers all the aspects of mitigation/control measures, estimation of transmission rate, control measures, economic impact assessment, genetic complexity of COVID, herd immunity and various methods including newer mathematical, statistical and epidemiological models in the analysis of COVID19 pandemic outbreak. This book is aimed at postgraduate students in medical, mathematics and statistical Information. Researchers will also find this book helpful.

Chapman & Hall

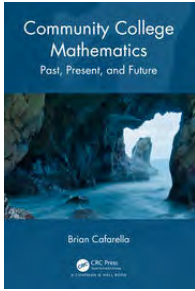
June 2022:384

Hb: 978-1-032-06970-8: £150.00 **Special price: £128.00**

\* For full contents and more information, visit: [www.routledge.com/9781032069708](http://www.routledge.com/9781032069708)

## Community College Mathematics

Past, Present, and Future



**Brian Cafarella**

This book explores the rich history of community college math with a specific focus on gatekeeper math classes. Gatekeeper math classes include courses such as college algebra, introduction to statistics, and all developmental math classes. Such classes are generally introductory classes for community college students. Throughout the book, the author presents a decade-by-decade analysis of the history of community college math. He employs a mix of conceptual, empirical, and quantitative research. He also explores math curricula as well as trends, initiatives, teaching practices, and mandates that have impacted community college math.

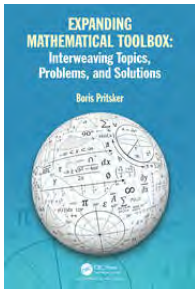
Chapman & Hall

June 2022:278

Hb: 978-1-032-26232-1: **£24.99** **Special price: £21.00**

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## Expanding Mathematical Toolbox: Interweaving Topics, Problems, and Solutions



**Boris Pritsker**

This book offers several topics from different mathematical disciplines and show how closely they are related. The purpose of the book is to direct the attention of readers who have an interest in and talent for mathematics to engaging and thought-provoking problems that should help them change their ways of thinking, entice further exploration, and could lead to independent research and projects in mathematics. With just a few exceptions, in spite of the many problems' challenging character, solutions require no more than a basic knowledge covered in a high school math curriculum.

Chapman & Hall

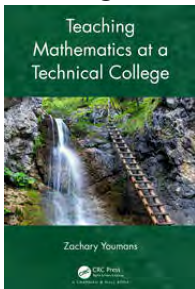
February 2023:220

Hb: 978-1-032-41738-7: **£120.00** **Special price: £102.00**

Pb: 978-1-032-41735-6: **£44.99** **Special price: £38.00**

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## Teaching Mathematics at a Technical College



**Zachary Youmans**

Not much has been written about technical colleges, especially teaching mathematics at one. Much had been written about community college mathematics. This book addresses this disparity. Mathematics is a beautiful subject worthy to be taught at the technical college level. The author sheds light on technical colleges and their importance in the higher education system. Technical colleges are more affordable for students and provide many career opportunities. These careers are becoming or have become as lucrative as careers requiring a four-year-degree. The interest in technical college education is likely to continue to grow.

Chapman & Hall

November 2022:137

Hb: 978-1-032-26243-7: **£56.99** **Special price: £48.00**

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\* For full contents and more information, visit: [www.routledge.com/9781032262420](http://www.routledge.com/9781032262420)



## A Criminologist's Guide to R

Crime by the Numbers



Jacob Kaplan

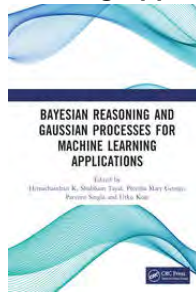
Series: *Chapman & Hall/CRC The R Series*

A Criminologist's Guide to R: Crime by the Numbers introduces the programming language R and covers the necessary skills to conduct quantitative research in criminology. By the end of this book, a person without any prior programming experience can take raw crime data, be able to clean it, visualize the data, present it using R Markdown, and change it to a format ready for analysis. A Criminologist's Guide to R focuses on skills specifically for criminology such as spatial joins, mapping, and scraping data from PDFs, however any social scientist looking for an introduction to R for data analysis will find this useful.

Chapman & Hall  
December 2022:432  
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## Bayesian Reasoning and Gaussian Processes for Machine Learning Applications



Edited By Hemachandran K, Shubham Tayal, Preetha Mary George, Parveen Singla, Utku Kose

Bayesian methods are applied in many areas such as game development, decision making and drug discovery. It is a very effective for machine learning algorithms for handling missing data and extracting information from small datasets. This book talks about Bayesian Reasoning and Gaussian Processes in machine learning applications. It contains recent advancement in machine learning and highlights the applications of machine learning algorithms. It addresses the challenges related to bayesian reasoning and gaussian processes in machine learning and offers both quantitative and qualitative research, including case studies.

Chapman & Hall  
April 2022:147  
Hb: 978-0-367-75847-9: £105.00 **Special price: £89.00**

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## Backseat Driver

The Role of Data in Great Car Safety Debates



Norma Faris Hubele

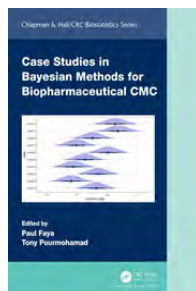
Series: *ASA-CRC Series on Statistical Reasoning in Science and Society*

Buying the safest car for your family shouldn't be up for debate. Yet for decades, car safety advocates, manufacturers, and lawmakers in the United States have clashed over whether to make automobiles safer. All sides armed themselves with data in the hopes of winning the great car safety debates. In this way, crash statistics and the analysts who studied them made history. But data was always in the backseat, merely supporting different points of view. That is, until now. "With car safety, it's the value we place on every human life that counts."

Chapman & Hall  
August 2022:200  
Hb: 978-0-367-47407-2: £82.99 **Special price: £71.00**  
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## Case Studies in Bayesian Methods for Biopharmaceutical CMC



Edited By Paul Faya, Tony Pourmohamad

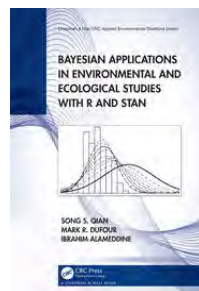
Series: *Chapman & Hall/CRC Biostatistics Series*

The subject of this book is applied Bayesian methods for chemistry, manufacturing, and control (CMC) studies in the biopharmaceutical industry. The collection of case studies covers a broad array of CMC topics, including stability analysis, analytical method development, specification setting, process development and optimization, process control, experimental design, dissolution testing, and comparability studies. The analysis of each case study includes a presentation of code and reproducible output. This book is written with an academic level aimed at practicing nonclinical biostatisticians, most of whom have graduate degrees in statistics.

Chapman & Hall  
December 2022:354  
Hb: 978-1-032-18548-4: £130.00 **Special price: £111.00**

\* For full contents and more information, visit: [www.routledge.com/9781032185484](http://www.routledge.com/9781032185484)

## Bayesian Applications in Environmental and Ecological Studies with R and Stan



Song S. Qian, Mark R. DuFour, Ibrahim Alameddine

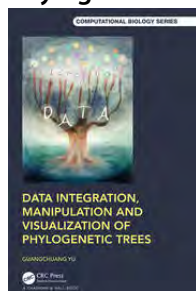
Series: *Chapman & Hall/CRC Applied Environmental Statistics*

This book gives an overview of structural equation modeling (SEM) specifically for applications in health and medicine. SEM is a very general, very powerful technique that is primarily used in the social sciences. Its use in the medical sciences is increasingly prevalent, and there is a real need for a book like this that presents the methods together with applications and software. It is designed to be accessible to applied researchers with a solid background in statistics, with necessary background in SEM included, and a focus on application rather than the theoretical details of the methods.

Chapman & Hall  
August 2022:415  
Hb: 978-1-138-49739-9: £99.99 **Special price: £85.00**

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## Data Integration, Manipulation and Visualization of Phylogenetic Trees



Guangchuang Yu

Series: *Chapman & Hall/CRC Computational Biology Series*

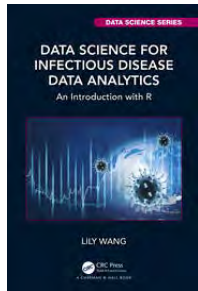
Data Integration, Manipulation and Visualization of Phylogenetic Trees introduces and demonstrates data integration, manipulation and visualization of phylogenetic trees using a suite of R packages, tidytree, treeio, ggtree and ggtreeExtra. Using the most comprehensive packages for phylogenetic data integration and visualization, contains numerous examples that can be used for teaching and learning. Ideal for undergraduate readers and researchers with a working knowledge of R and ggplot2.

Chapman & Hall  
August 2022:276  
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## Data Science for Infectious Disease Data Analytics

An Introduction with R



Lily Wang

*Series: Chapman & Hall/CRC Data Science Series*

This book provides an overview of modern data science tools and methods that have been developed specifically to analyze infectious disease data. With a quick start guide to epidemiological data visualization and analysis in R, this book spans the gulf between academia and practices providing many lively, instructive data analysis examples using the most up-to-date data, such as the newly discovered coronavirus disease (COVID-19). Aimed at readers with an undergraduate knowledge of mathematics and statistics, this book is an ideal introduction to the development and implementation of data science in epidemiology.

Chapman & Hall  
December 2022:419  
Hb: 978-1-032-18742-6: **£74.99** **Special price: £64.00**

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## Digital Therapeutics

Strategic, Scientific, Developmental, and Regulatory Aspects



*Edited By Oleksandr Sverdlov, Joris van Dam*

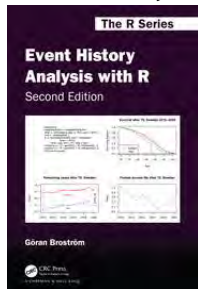
*Series: Chapman & Hall/CRC Biostatistics Series*

Digital Therapeutics: Scientific, Statistical, Clinical, and Regulatory Aspects is an unparalleled summary of the current scientific, statistical, developmental, and regulatory aspects of DTx which is poised to become the fastest growing area of the biopharmaceutical and digital medicine product development. This edited volume intends to provide a systematic exposition to digital therapeutics through 19 peer-reviewed chapters written by subject matter experts in this emerging field.

Chapman & Hall  
December 2022:462  
Hb: 978-0-367-86159-9: **£170.00** **Special price: £145.00**

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## Event History Analysis with R



Göran Broström

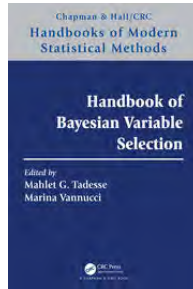
*Series: Chapman & Hall/CRC The R Series*

This is the second edition of a practical book on using R for survival and event history analysis. There is an emphasis on applying the methods to problems from the social sciences through detailed real-world examples. The mathematical details are kept to a minimum, so the book is accessible to an applied audience. The book has been updated with new chapters on reproducible research and register-based data methods, and updates throughout notably to the computing and graphics.

Chapman & Hall  
November 2021:340  
Hb: 978-1-138-58771-7: **£82.99** **Special price: £71.00**

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## Handbook of Bayesian Variable Selection



*Edited By Mahlet G. Tadesse, Marina Vannucci*

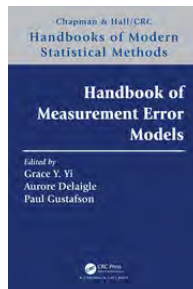
*Series: Chapman & Hall/CRC Handbooks of Modern Statistical Methods*

The Handbook of Bayesian Variable Selection provides a comprehensive review of theoretical, methodological and computational aspects of Bayesian methods for variable selection. The topics covered include spike-and-slab priors, continuous shrinkage priors, Bayes factors, Bayesian model averaging, partitioning methods, as well as variable selection in decision trees and edge selection in graphical models. The handbook targets graduate students and established researchers who seek to understand the latest developments in the field. It also provides a valuable reference for all interested in applying existing methods and/or pursuing methodological extensions.

Chapman & Hall  
December 2021:490  
Hb: 978-0-367-54376-1: **£150.00** **Special price: £128.00**

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## Handbook of Measurement Error Models



*Edited By Grace Y. Yi, Aurore Delaigle, Paul Gustafson*

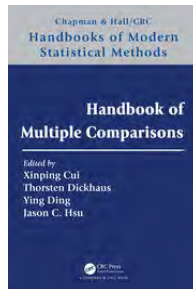
*Series: Chapman & Hall/CRC Handbooks of Modern Statistical Methods*

Reference text for statistical methods and applications for measurement error models for: researchers who work with error-contaminated data, graduate students from statistics and biostatistics, analysts in multiple fields, including medical research, biosciences, nutritional studies, epidemiological studies and environmental studies.

Chapman & Hall  
October 2021:592  
Hb: 978-1-138-10640-6: **£205.00** **Special price: £174.00**

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## Handbook of Multiple Comparisons



*Edited By Xinpeng Cui, Thorsten Dickhaus, Ying Ding, Jason C. Hsu*

*Series: Chapman & Hall/CRC Handbooks of Modern Statistical Methods*

The handbook will treat the topics of multiple comparisons, simultaneous and selective inference from a variety of different perspectives. The handbook will be useful for researchers, students/lecturers, and practitioners. The need for such a systematic treatment of the field originates from the relevance of multiple comparisons in many applications (medicine, industry, economics), and from the diversity of approaches and developments, which shall be described here in a coherent manner. The readers' background should consist of basic knowledge of probability theory and statistics on the basis of an undergraduate course.

Chapman & Hall  
November 2021:418  
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## Multiple Imputation of Missing Data in Practice

Basic Theory and Analysis Strategies



Yulei He, Guangyu Zhang, Chiu-Hsieh Hsu

Multiple Imputation of Missing Data in Practice: Basic Theory and Analysis Strategies provides a comprehensive introduction to the multiple imputation approach to missing data problems that are often encountered in data analysis. Over the past 40 years or so, multiple imputation has gone through rapid development in both theories and applications. It is nowadays the most versatile, popular, and effective missing-data strategy that is used by researchers and practitioners across different fields. There is a strong need to better understand and learn about multiple imputation in the research and practical community.

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## Quantitative Drug Safety and Benefit Risk Evaluation

Practical and Cross-Disciplinary Approaches



Edited By William Wang, Melvin Munsaka, James Buchanan, Judy Li  
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Quantitative Methodologies and Process for Safety Monitoring and Ongoing Benefit Risk Evaluation provides a comprehensive coverage on safety monitoring methodologies, covering both global trends and regional initiatives. Pharmacovigilance has traditionally focused on the handling of individual adverse event reports however recently there had been a shift towards aggregate analysis to better understand the scope of product risks.

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## Promoting Statistical Practice and Collaboration in Developing Countries



Edited By O. Olawale Awe, Kim Love, Eric A. Vance

Promoting Statistical Practice and Collaboration in Developing Countries provides new insights into the current issues and opportunities in international statistics education, statistical consulting, and collaboration, particularly in developing countries around the world. The book addresses the topics of individual chapters from the perspectives of the historical context, the present state, and future directions of statistical training and practice, so that readers may fully understand the challenges and opportunities in the field of statistics and data science, especially in developing countries.

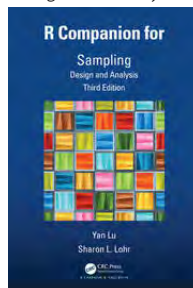
Chapman & Hall  
June 2022:634

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## R Companion for Sampling

Design and Analysis, Third Edition



Yan Lu, Sharon L. Lohr

This manual contains information for using R software with the examples in the textbook Sampling: Design and Analysis, 3rd edition by Sharon L. Lohr.

Chapman & Hall  
November 2021:222

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## Protecting Your Privacy in a Data-Driven World



Claire McKay Bowen

*Series: ASA-CRC Series on Statistical Reasoning in Science and Society*

At what point does the sacrifice to our personal information outweigh the public good? If public policymakers had access to our personal and confidential data, they could make more evidence-based, data-informed decisions that could accelerate economic recovery and improve COVID-19 vaccine distribution. However, access to personal data comes at a steep privacy cost for contributors, especially underrepresented groups.

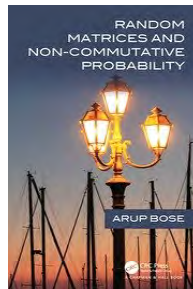
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## Random Matrices and Non-Commutative Probability



Arup Bose

Free Probability/Non-commutative Probability has gained much attention and significant advances have been made since its initiation in the 1990's. The subject has grown with increasing rapidity in the last decade. Though it started as a branch of Mathematics, it has found significant applications in statistics, wireless communication etc, particularly through deep and interesting connections with Random Matrix Theory.

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## Rasch Measurement Theory Analysis in R



Stefanie Wind, Cheng Hua

Series: *Chapman & Hall/CRC The R Series*

Rasch Measurement Theory Analysis in R provides researchers and practitioners with a step-by-step guide for conducting Rasch measurement theory analyses using R. It includes theoretical introductions to major Rasch measurement principles and techniques, demonstrations of analyses using several R packages that contain Rasch measurement functions, and sample interpretations of results. This book is designed for graduate students, researchers, and practitioners across the social, health, and behavioral sciences who have a basic familiarity with Rasch measurement theory and with R.

Chapman & Hall

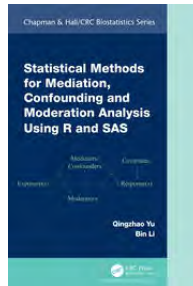
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## Statistical Methods for Mediation, Confounding and Moderation Analysis Using R and SAS



Qingzhao Yu, Bin Li

Series: *Chapman & Hall/CRC Biostatistics Series*

Statistical Methods for Mediation, Confounding and Moderation Analysis Using R and SAS introduces general definitions of third-variable effects that are adaptable to all different types of response (categorical or continuous), exposure, or third-variables. Using this method, multiple third-variables of different types can be considered simultaneously, and the indirect effect carried by individual third-variables can be separated from the total effect. Readers of all disciplines familiar with introductory statistics will find this a valuable resource for analysis.

Chapman & Hall

March 2022:294

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## Real-World Evidence in a Patient-Centric Digital Era



Edited By Kelly H. Zou, Lobna A. Salem, Amrit Ray

Series: *Chapman & Hall/CRC Biostatistics Series*

Real-world Evidence in a Patient-Centric Digital Era presents an overview of key analytical issues and best practices. Special attention is paid to the development, methodologies, and other salient features of the statistical and data science techniques that are customarily used to generate real-world evidence. It provides a review of key topics and emerging trends in cutting-edge data science and health innovation. This book will be a vital reference for medical researchers, health technology innovators, data scientists, epidemiologists, population health analysts, health economists, outcomes researchers, as well as policymakers and analysts in the healthcare industry.

Chapman & Hall

August 2022:208

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## Supervised Machine Learning for Text Analysis in R



Emil Hvitfeldt, Julia Silge

Series: *Chapman & Hall/CRC Data Science Series*

This book is designed to provide practical guidance and directly applicable knowledge for data scientists and analysts who want to integrate text into their modeling pipelines. Additionally this book is useful for journalists and others in digital humanities.

Chapman & Hall

October 2021:402

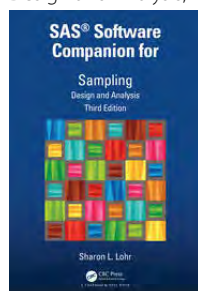
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## SAS® Software Companion for Sampling

Design and Analysis, Third Edition



Sharon L. Lohr

This manual contains information for using SAS® software with the examples in the textbook *Sampling: Design and Analysis*, 3rd edition by Sharon L. Lohr. The survey design and analysis procedures in SAS/STAT® software provide a powerful platform for selecting samples and performing any analysis you would care to do with survey data. This manual shows how to use SAS for the examples and exercises in the textbook, but it is not a comprehensive guide to all of the analyses that the software can do. The author presents some of the most frequently used commands for selecting samples and analyzing survey data.

Chapman & Hall

November 2021:248

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## The History of the International Biometric Society



Lynne Billard

The History of the International Biometric Society presents a deep dive into the voluminous archival records, with primary focus on IBS's first fifty years. It contains numerous photos and extracts from the archival materials, and features many photos of important leaders who served IBS across the decades.

Chapman & Hall

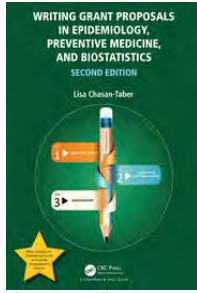
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## Writing Grant Proposals in Epidemiology, Preventive Medicine, and Biostatistics



Lisa Chasan-Taber

Written by an established NIH reviewer with inside knowledge and an impressive track record of funding, *Writing Grant Proposals in Epidemiology, Preventive Medicine, and Biostatistics, Second Edition* is an essential cookbook of the appropriate ingredients needed to construct a winning grant proposal. The text is not only relevant for early-stage investigators including graduate students, medical students/residents, and postdoctoral fellows, but also valuable for more experienced faculty, clinicians, epidemiologists, and other health professionals who cannot seem to break the barrier to obtain NIH-funded research.

Chapman & Hall

June 2022:396

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## Advanced Statistics in Regulatory Critical Clinical Initiatives



*Edited By* Wei Zhang, Fangrong Yan, Feng Chen, Shein-Chung Chow

*Series:* Chapman & Hall/CRC Biostatistics Series

This book is focused on the critical clinical initiatives introduced by the 21st Century Cure Act passed by the United States Congress in December 2016. The book covers everything from the outline of the initiatives to analysis on the effect on biopharmaceutical research and development. The book provides innovative ways to resolve common challenges in statistical research of rare diseases such as small sample sizes and provides guidance for combined use of data. With analysis from regulatory and scientific perspectives this book is an ideal companion for researchers in biostatistics, pharmaceutical development, and policy makers in related fields.

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May 2022:317  
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## Mixed-Mode Official Surveys

Design and Analysis



Barry Schouten, Jan van den Brakel, Bart Buelens, Deirdre Giesen, Annemieke Luiten, Vivian Meertens

*Series:* Chapman & Hall/CRC Statistics in the Social and Behavioral Sciences

The survey mode is the design feature with the strongest impact on all survey errors and causes the greatest disparities in survey costs. The design and analysis of mixed-mode surveys, therefore, need to be handled carefully. There is currently no comprehensive monograph on using mixed-mode data collection methods and its consequences for the entire survey process from design, data collection, and estimation. This book fills that gap by bringing together authors from all methodological areas and backgrounds. It is an invaluable resource for professionals involved in survey research and analysis, graduate students of survey methodology and academics working in the area.

Chapman & Hall  
September 2023:326  
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## Big Data Analytics in Oncology with R



Atanu Bhattacharjee

Big Data Analytics in Oncology with R serves the analytical approaches for big data analysis. There is huge progressed in advanced computation with R. But there are several technical challenges faced to work with big data. These challenges are with computational aspect and work with fastest way to get computational results. Clinical decision through genomic information and survival outcomes are now unavoidable in cutting-edge oncology research. This book is intended to provide a comprehensive text to work with some recent development in the area. This book is aimed primarily at graduates and researchers studying survival analysis or statistical methods in genetics.

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## Modern Applied Regressions

Bayesian and Frequentist Analysis of Categorical and Limited Response Variables with R and Stan



Jun Xu

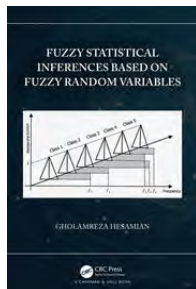
*Series:* Chapman & Hall/CRC Statistics in the Social and Behavioral Sciences

Modern Applied Regressions creates an intricate and colorful mural with mosaics of categorical and limited response variable (CLRV) models using both Bayesian and Frequentist approaches. Written for graduate students, junior researchers, and quantitative analysts in behavioral, health, and social sciences, this text provides details for doing Bayesian and frequentist data analysis of CLRV models. This book first scaffolds both Bayesian and frequentist paradigms for regression analysis, and then moves onto different types of categorical and limited response variable models, including binary, ordered, multinomial, count, and survival regression.

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## Fuzzy Statistical Inferences Based on Fuzzy Random Variables



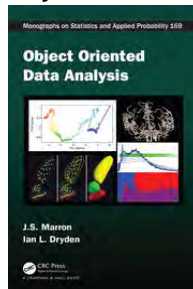
Gholamreza Hesamian

This book presents the most commonly used techniques for the most statistical inferences based on fuzzy data. It brings together many of the main ideas used statistical inferences in one place based on fuzzy information including fuzzy data. This book covers a much wider range of topics than a typical introductory text on fuzzy statistics. It includes common topics like elementary probability, descriptive statistics, hypothesis tests, one-way ANOVA, control-charts, reliability systems and regression models. The reader is assumed to know calculus and a little fuzzy set theory. The conventional knowledge of probability and statistics is required.

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## Object Oriented Data Analysis



J. S. Marron, Ian L. Dryden

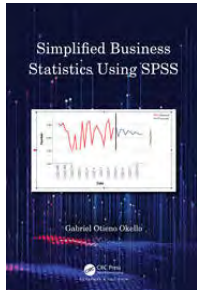
*Series:* Chapman & Hall/CRC Monographs on Statistics and Applied Probability

Object Oriented Data Analysis (OODA) provides a useful general framework for the consideration of many types of Complex Data. It is deliberately intended to be particularly useful in the analysis of data in complicated situations which are typically not easily represented as an unconstrained matrix of numbers.

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## Simplified Business Statistics Using SPSS



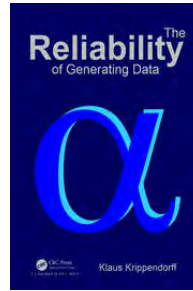
Gabriel Otieno Okello

Statistics are used throughout businesses to present and analyse data and decide on best practice. Simplified Business Statistics Using SPSS provides a practical approach to these concepts and their applications in business, economics, and other areas of data analytics. This book guides the reader through these concepts without assuming prior knowledge and would make an ideal reference for business analytics students and researchers in related fields.

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 October 2022:468  
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## The Reliability of Generating Data



Klaus Krippendorff

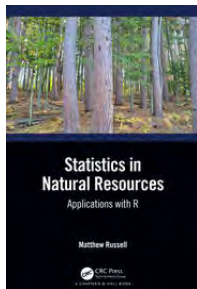
This book expands on the author's seminal work in content analysis and develops methods for assessing the reliability of the kind of data that previously defied evaluations for this purpose. It opens with a discussion of the epistemology of reliable data, then presents the most basic alpha coefficient for the single-valued coding of predefined units. This familiar way of measuring reliability provides the platform for the succeeding chapters which start with an overview of alternative coefficients and then expand alpha one quality after another, including to cope with the reliabilities of multi-valued coding, segmenting texts into meaningful units, information retrievals etc.

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 December 2022:328  
 Hb: 978-0-367-63071-3: £99.99 **Special price: £85.00**

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## Statistics in Natural Resources

Applications with R



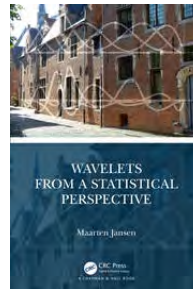
Matthew Russell

To manage our environment sustainably, professionals must understand the quality and quantity of our natural resources. Statistical analysis provides information that supports management decisions and is universally used across scientific disciplines. This book focuses on the application of statistical analyses in the environmental, agricultural, and natural resources disciplines. This is a book well suited for current or aspiring natural resource professionals that are required to analyze data and perform statistical analyses in their daily work. More seasoned professionals that have previously had a course or two in statistics will also find the content familiar.

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 August 2022:354  
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## Wavelets from a Statistical Perspective



Maarten Jansen

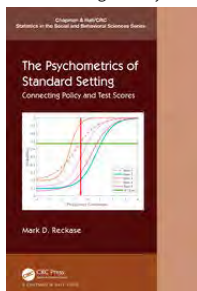
Wavelets from a Statistical Perspective offers a modern, 2nd generation look on wavelets, far beyond the rigid setting of the equispaced, dyadic wavelets in the early days. With the methods of this book, based on the lifting scheme, researchers can set up a wavelet or another multiresolution analysis adapted to their data, ranging from images to scattered data or other irregularly spaced observations. Whereas classical wavelets stand a bit apart from other nonparametric methods, this book adds a multiscale touch to your spline, kernel or local polynomial smoothing procedure, thereby extending its applicability to nonlinear, nonparametric processing for piecewise smooth data.

Chapman & Hall  
 April 2022:346  
 Hb: 978-1-032-20067-5: £99.99 **Special price: £85.00**

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## The Psychometrics of Standard Setting

Connecting Policy and Test Scores



Mark D. Reckase

*Series: Chapman & Hall/CRC Statistics in the Social and Behavioral Sciences*

This book provides a unifying structure for the activities that fall under the process typically called "standard setting" on tests of proficiency. Standard setting refers to the methodology used to identify performance standards on tests of proficiency. The results from standard setting studies are critical for supporting the use of many types of tests. The process is frequently applied to educational, psychological, licensure/certification, and other types of tests and examination systems. This text provides a framework for going beyond specific standard setting methods to gain an understanding of the goals for the methods and how to evaluate whether the goals have been achieved.

Chapman & Hall  
 December 2022:274  
 Hb: 978-1-498-72211-7: £89.99 **Special price: £76.00**

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## Analysis of Distributional Data



Edited By Paula Brito, Sonia Dias

Data where for each entity and variable a distribution is given is called distributional data. In the era of "Big Data," this type of data is becoming more and more prevalent. This edited book presents a synthesis of research in this area over the last twenty years or so. It has been carefully edited to ensure it is consistent with respect to style, level, notation, etc. Each chapter includes real data examples to illustrate the topics and software where appropriate.

Chapman & Hall  
May 2022:404  
Hb: 978-1-498-72545-3: £105.00 **Special price: £89.00**

\* For full contents and more information, visit: [www.routledge.com/9781498725453](http://www.routledge.com/9781498725453)

## Bayesian Modeling of Spatio-Temporal Data with R



Sujit Sahu

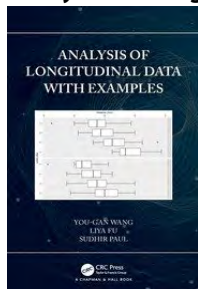
Series: Chapman & Hall/CRC Interdisciplinary Statistics

The book will be very useful for graduate students and researchers working on research in this field. Those already with some knowledge of spatial statistics will gain an understanding of the use of Bayesian methods in their field. The practical examples and integrated R code, based on many years of teaching experience, make the book ideal as a textbook for a course on spatio-temporal data modelling.

Chapman & Hall  
March 2022:434  
Hb: 978-0-367-27798-7: £89.99 **Special price: £76.00**

\* For full contents and more information, visit: [www.routledge.com/9780367277987](http://www.routledge.com/9780367277987)

## Analysis of Longitudinal Data with Examples



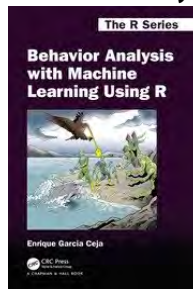
You-Gan Wang, Liya Fu, Sudhir Paul

Development in methodology on longitudinal data is fast. Currently, there are a lack of intermediate /advanced level textbooks which introduce students and practicing statisticians to the updated methods on correlated data inference. This book will present a discussion of the modern approach to semiparametric inference, including the links between the theories of random effects models, likelihood functions and estimators, and various types of efficient statistical models. The theory will be supported with practical examples of R-codes and R-packages applied to interesting case-studies from a number of different areas.

Chapman & Hall  
January 2022:252  
Hb: 978-1-498-76460-3: £82.99 **Special price: £71.00**

\* For full contents and more information, visit: [www.routledge.com/9781498764603](http://www.routledge.com/9781498764603)

## Behavior Analysis with Machine Learning Using R



Enrique Garcia Ceja

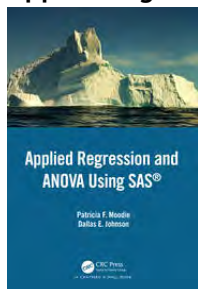
Series: Chapman & Hall/CRC The R Series

This book introduces machine learning and deep learning concepts and algorithms applied to a diverse set of behavior analysis problems. It focuses on the practical aspects of solving such problems based on data collected from sensors or stored in electronic records. This book is intended for undergraduate/graduate students and researchers from ubiquitous computing, behavioral ecology, psychology, e-health, and other disciplines who want to learn the basics of machine learning and deep learning and for the more experienced individuals who want to apply machine learning to analyze behavioral data.

Chapman & Hall  
November 2021:432  
Hb: 978-1-032-06704-9: £82.99 **Special price: £71.00**

\* For full contents and more information, visit: [www.routledge.com/9781032067049](http://www.routledge.com/9781032067049)

## Applied Regression and ANOVA Using SAS



Patricia F. Moodie, Dallas E. Johnson

Designed for researchers primarily interested in what their data are revealing, this book presents rigorous statistical methods without burdening readers with matrix algebra and calculus. For each method, the book discusses its characteristic features, the reasons readers would want to use it, and its underlying assumptions. A step-by-step approach then guides readers in applying each method, with SAS code to implement the steps. The book shows how high resolution, publication-ready graphics associated with regression and ANOVA methods are produced with virtually no effort by the SAS user.

Chapman & Hall  
June 2022:428  
Hb: 978-1-439-86951-2: £74.99 **Special price: £64.00**

\* For full contents and more information, visit: [www.routledge.com/9781439869512](http://www.routledge.com/9781439869512)

## Building a Platform for Data-Driven Pandemic Prediction

From Data Modelling to Visualisation - The CovidLP Project



Edited By Dani Gamerman, Marcos O. Prates, Thais Paiva, Vinicius D.

Mayrink

This book is about building platforms for pandemic prediction. It provides an overview of probabilistic prediction for pandemic modeling based on a data-driven approach. It also provides guidance on building platforms with currently available technology using tools such as R, Shiny, and interactive plotting programs. Readers can follow different reading paths through the book, depending on their needs. The book is meant as a basis for further investigation of statistical modelling, implementation tools, monitoring aspects, and software functionalities.

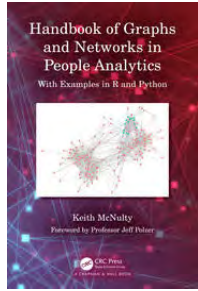
Chapman & Hall  
September 2021:382  
Hb: 978-0-367-70999-0: £145.00 **Special price: £123.00**  
Pb: 978-0-367-70997-6: £56.99 **Special price: £48.00**

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## Handbook of Graphs and Networks in People Analytics

With Examples in R and Python



Keith McNulty

Handbook of Graphs and Networks in People Analytics: With Examples in R and Python covers the theory and practical implementation of graph methods in R and Python for the analysis of people and organizational networks. Starting with an overview of the origins of graph theory and its current applications in the social sciences, the book proceeds to give in-depth technical instruction on how to construct and store graphs from data, how to visualize those graphs compellingly and how to convert common data structures into graph-friendly form.

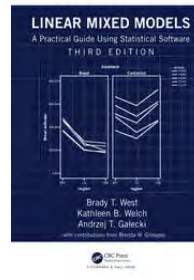
Chapman & Hall  
June 2022:268  
Hb: 978-1-032-21124-4: £170.00 **Special price: £145.00**

Pb: 978-1-032-20497-0: £66.99 **Special price: £57.00**

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## Linear Mixed Models

A Practical Guide Using Statistical Software



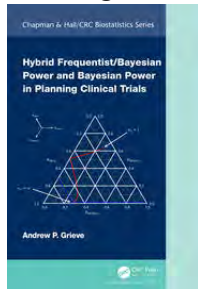
Brady T. West, Kathleen B. Welch, Andrzej T Galecki

The third edition provides a comprehensive update of the available tools for fitting linear mixed-effects models in the newest versions of SAS, SPSS, R, Stata, and HLM. All examples have been updated, with a focus on new tools for visualization of results and interpretation. New conceptual and theoretical developments in mixed-effects modeling have been included. This book eliminates the need to read multiple software-specific texts by covering the most popular software programs for fitting LMMs in one handy guide. The authors illustrate the models and methods through real-world examples that enable comparisons of model-fitting options and results across the software procedures.

Chapman & Hall  
June 2022:490  
Hb: 978-1-032-01932-1: £89.99 **Special price: £76.00**

\* For full contents and more information, visit: [www.routledge.com/9781032019321](http://www.routledge.com/9781032019321)

## Hybrid Frequentist/Bayesian Power and Bayesian Power in Planning Clinical Trials



Andrew P. Grieve

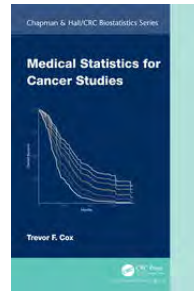
Series: *Chapman & Hall/CRC Biostatistics Series*

This book presents an overview of unconditional (absolute) approaches, essentially Bayesian in flavour, which can be used both in the planning phase of a clinical trial and during an interim analysis to adjust the sample size or in the extreme case to halt the study for futility. These approaches account for the current uncertainty in our knowledge of the treatment effect and have variously been called the strength, the expected power, the average power, the predictive power, and the assurance of the test.

Chapman & Hall  
June 2022:212  
Hb: 978-1-032-11129-2: £99.99 **Special price: £85.00**

\* For full contents and more information, visit: [www.routledge.com/9781032111292](http://www.routledge.com/9781032111292)

## Medical Statistics for Cancer Studies



Trevor F. Cox

Series: *Chapman & Hall/CRC Biostatistics Series*

Cancer is a dreaded disease. One in two people will be diagnosed with cancer within their lifetime. This textbook shows how cancer data can be analysed in a variety of ways, covering cancer clinical trial data, epidemiological data, biological data, and genetic data. It gives some background in cancer biology and genetics, followed by detailed overviews of survival analysis, clinical trials, regression analysis, epidemiology, meta-analysis, biomarkers, and cancer informatics. It includes lots of examples using real data from the author's many years of experience working in a cancer clinical trials unit.

Chapman & Hall  
June 2022:334  
Hb: 978-0-367-48615-0: £82.99 **Special price: £71.00**

\* For full contents and more information, visit: [www.routledge.com/9780367486150](http://www.routledge.com/9780367486150)

## Intensive Longitudinal Analysis of Human Processes



Kathleen M. Gates, Sy-Miin Chow, Peter C. M. Molenaar

Series: *Chapman & Hall/CRC Statistics in the Social and Behavioral Sciences*

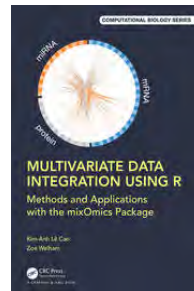
This book focuses on a span of statistical topics relevant to researchers who seek to conduct person-specific analysis of human data. The primary audience are students and researchers in psychometrics, quantitative psychology, psychophysiology and neurocognition. The book balances mathematical concepts with information needed for using these statistical approaches in applied settings, such as interpretative caveats and issues to consider when selecting an approach. Our book provides a comprehensive resource for those who are just beginning to learn about person-specific analysis as well as those who seek to further deepen their knowledge and learn new tools.

Chapman & Hall  
January 2023:260  
Hb: 978-1-482-23059-8: £89.99 **Special price: £76.00**

\* For full contents and more information, visit: [www.routledge.com/9781482230598](http://www.routledge.com/9781482230598)

## Multivariate Data Integration Using R

Methods and Applications with the mixOmics Package



Kim-Anh Lê Cao, Zoe Marie Welham

Series: *Chapman & Hall/CRC Computational Biology Series*

The book is suitable for researchers from a wide range of scientific disciplines wishing to apply these methods to obtain new and deeper insights into biological mechanisms and biomedical problems. The suite of tools introduced in this book will enable students and scientists to work at the interface between, and provide critical collaborative expertise to, biologists, bioinformaticians, statisticians and clinicians.

Chapman & Hall  
November 2021:316  
Hb: 978-0-367-46094-5: £82.99 **Special price: £71.00**

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## Outstanding User Interfaces with Shiny



David Granjon

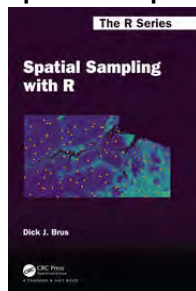
*Series: Chapman & Hall/CRC The R Series*

Outstanding User Interfaces with Shiny provides the reader with necessary knowledge to develop beautiful and highly interactive user interfaces. It gives the minimum requirements in HTML/JavaScript and CSS to be able to extend already existing Shiny layouts or develop new templates from scratch. Suitable for anyone with some experience of Shiny, package development and software engineering best practices, this book is an ideal guide for graduates and professionals who wish to bring their app design to the next level.

Chapman & Hall  
August 2022:510  
Hb: 978-0-367-64526-7: **£145.00** **Special price: £123.00**  
Pb: 978-0-367-64365-2: **£56.99** **Special price: £48.00**

\* For full contents and more information, visit: [www.routledge.com/9780367643652](http://www.routledge.com/9780367643652)

## Spatial Sampling with R



Dick J. Brus

*Series: Chapman & Hall/CRC The R Series*

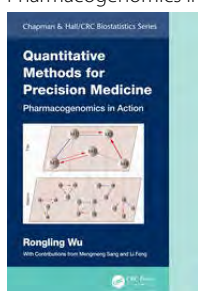
Scientific research often starts with data collection. However, many researchers pay insufficient attention to this first step in their research. The author, researcher at Wageningen University and Research, often had to conclude that the data collected by fellow researchers were suboptimal, or in some cases even unsuitable for their aim. One reason is that sampling is frequently overlooked in statistics courses. Another reason is the lack of practical textbooks on sampling. Numerous books have been published on the statistical analysis and modelling of data using R, but to date no book has been published in this series on how these data can best be collected.

Chapman & Hall  
September 2022:548  
Hb: 978-1-032-19385-4: **£99.99** **Special price: £85.00**

\* For full contents and more information, visit: [www.routledge.com/9781032193854](http://www.routledge.com/9781032193854)

## Quantitative Methods for Precision Medicine

Pharmacogenomics in Action



Rongling Wu

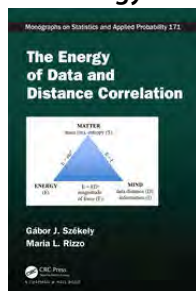
*Series: Chapman & Hall/CRC Biostatistics Series*

This book presents the advanced statistical methods for mapping pharmacogenetic control by integrating pharmacokinetic and pharmacodynamic principles of drug-body interactions. It is suitable for graduate students and researchers in the field of biology, medicine, bioinformatics and drug design and delivery interested in statistical and computational modelling of biological processes.

Chapman & Hall  
December 2022:306  
Hb: 978-1-482-21945-6: **£84.99** **Special price: £72.00**

\* For full contents and more information, visit: [www.routledge.com/9781482219456](http://www.routledge.com/9781482219456)

## The Energy of Data and Distance Correlation



Gábor J. Székely, Maria L. Rizzo

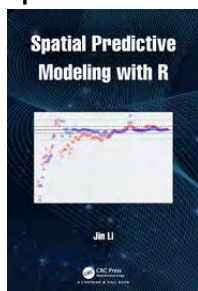
*Series: Chapman & Hall/CRC Monographs on Statistics and Applied Probability*

Energy distance is a statistical distance between the distributions of random vectors, which characterizes equality of distributions. The name energy derives from Newton's gravitational potential energy, and there is an elegant relation to the notion of potential energy between statistical observations. Energy statistics are functions of distances between statistical observations in metric spaces. The Energy of Data and Distance Correlation is intended for teachers and students looking for dedicated material on energy statistics but can serve as a supplement to a wide range of courses and areas, and provides an overview of the development of energy statistics.

Chapman & Hall  
February 2023:466  
Hb: 978-1-482-24274-4: **£89.99** **Special price: £76.00**

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## Spatial Predictive Modeling with R



Jin Li

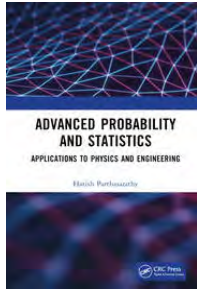
This book provides an introduction to the new discipline of spatial predictive modelling (SPM), covering the whole modelling process from data acquisition and preparation, method selection, model optimisation, to the generation and visualisation of spatial predictions. It covers a broad range of topics, including recent advances in the field, and novel accuracy-based parameter and variable selection methods. It includes lots of real examples to illustrate the methods, with R code for their implementation.

Chapman & Hall  
February 2022:404  
Hb: 978-0-367-55054-7: **£99.99** **Special price: £85.00**

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## Advanced Probability and Statistics

Applications to Physics and Engineering



**Harish Parthasarathy**

This book surveys some of the important research work carried out by Indian scientists in the field of pure and applied probability, quantum probability, quantum scattering theory, group representation theory and general relativity. It reviews the axiomatic foundations of probability theory by A.N. Kolmogorov and how the Indian school of probabilists and statisticians used this theory effectively to study a host of applied probability and statistics problems like parameter estimation, convergence of a sequence of probability distributions, and martingale characterization of diffusions.

Chapman & Hall  
November 2022:426  
Hb: 978-1-032-38437-5: £120.00 **Special price: £102.00**

\* For full contents and more information, visit: [www.routledge.com/9781032384375](http://www.routledge.com/9781032384375)

## Data Science, AI, and Machine Learning in Drug Development



*Edited By Harry Yang*

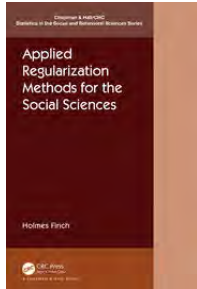
*Series: Chapman & Hall/CRC Biostatistics Series*

The confluence of big data, AI, and machine learning has led to a paradigm shift in how innovative medicines are developed and healthcare delivered. To fully capitalize on these technological advances, it is essential to systematically harness data from diverse sources and leverage digital technologies and advanced analytics to enable data-driven decisions. Data science stands at a unique moment of opportunity to lead such a transformative change.

Chapman & Hall  
October 2022:334  
Hb: 978-0-367-70807-8: £99.99 **Special price: £85.00**

\* For full contents and more information, visit: [www.routledge.com/9780367708078](http://www.routledge.com/9780367708078)

## Applied Regularization Methods for the Social Sciences



**Holmes Finch**

*Series: Chapman & Hall/CRC Statistics in the Social and Behavioral Sciences*

Researchers in the social sciences are faced with complex data sets in which they have relatively small samples and many variables (high dimensional data). Unlike the various technical guides currently on the market, Applied Regularization Methods for the Social Sciences provides an overview of a variety of models alongside clear examples of hands-on application. Each chapter in this book covers a specific application of regularization techniques with a user-friendly technical description, followed by examples that provide a thorough demonstration of the methods in action.

Chapman & Hall  
March 2022:305  
Hb: 978-0-367-40878-7: £74.99 **Special price: £64.00**

\* For full contents and more information, visit: [www.routledge.com/9780367408787](http://www.routledge.com/9780367408787)

## Doing Meta-Analysis with R

A Hands-On Guide



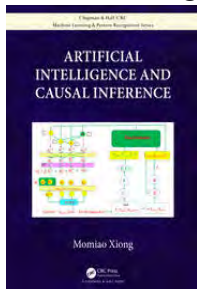
**Mathias Harrer, Pim Cuijpers, Toshi Furukawa, David Ebert**

This book serves as an accessible introduction into how meta-analyses can be conducted in R. Essential steps for meta-analysis are covered, including pooling of outcome measures, forest plots, heterogeneity diagnostics, subgroup analyses, meta-regression, methods to control for publication bias, risk of bias assessments and plotting tools. Advanced, but highly relevant topics such as network meta-analysis, multi-/three-level meta-analyses, Bayesian meta-analysis approaches, SEM meta-analysis are also covered.

Chapman & Hall  
September 2021:500  
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\* For full contents and more information, visit: [www.routledge.com/9780367610074](http://www.routledge.com/9780367610074)

## Artificial Intelligence and Causal Inference



**Momiao Xiong**

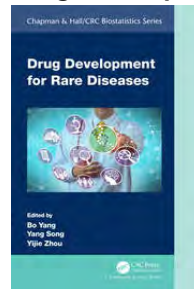
*Series: Chapman & Hall/CRC Machine Learning & Pattern Recognition*

This Book address the recent development of relationships between artificial intelligence (AI) and causal inference. Despite significant progress in AI, a great challenge in AI development we are still facing is to understand mechanism underlying intelligence, including reasoning, planning and imagination. Understanding, transfer and generalization are major principles that give rise intelligence. One of a key component for understanding is causal inference. Causal inference includes intervention, domain shift learning, temporal structure and counterfactual thinking as major concepts to understand causation and reasoning.

Chapman & Hall  
March 2022:394  
Hb: 978-0-367-85940-4: £105.00 **Special price: £89.00**

\* For full contents and more information, visit: [www.routledge.com/9780367859404](http://www.routledge.com/9780367859404)

## Drug Development for Rare Diseases



*Edited By Bo Yang, Yang Song, Yijie Zhou*

*Series: Chapman & Hall/CRC Biostatistics Series*

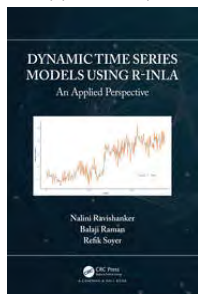
A disease is defined as rare if the prevalence is fewer than 200,000 in the United States. It is estimated that there are more than 7,000 rare diseases. This book is proposed to give an overview of the common issues facing rare disease drug developers, summarize challenges specific to clinical development in small populations, discuss drug development strategies in the evolving regulatory environment, explain generation and utilization of different data and evidence inside and beyond clinical trials, and use recent examples to demonstrate these challenges and the development strategies that respond to the challenges.

Chapman & Hall  
February 2023:232  
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## Dynamic Time Series Models using R-INLA

An Applied Perspective



Nalini Ravishanker, Balaji Raman, Refik Soyer

Dynamic Time Series Models using R-INLA: An Applied Perspective is the outcome of a joint effort to systematically describe the use of R-INLA for analysing time series and showcasing the code and description by several examples. This book introduces the underpinnings of R-INLA and the tools needed for modelling different types of time series using an approximate Bayesian framework. The book is an ideal reference for statisticians and scientists who work with time series data. It provides an excellent resource for teaching a course on Bayesian analysis using state space models for time series.

Chapman & Hall  
August 2022:296  
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## Engineering Production-Grade Shiny Apps



Colin Fay, Sébastien Rochette, Vincent Guyader, Cervan Girard

Series: *Chapman & Hall/CRC The R Series*

This book helps people build production-grade shiny applications, by providing advice, tools, and a methodology to work on web applications with R. Starting with an overview of the challenges which arise from any big web application project: organizing work, thinking about the user interface, challenges of teamwork & production environment, it then moves to a step by step methodology that goes from the idea to the end application. Each part of this process will cover in detail a series of tools and methods to use while building production-ready shiny applications. Finally, it ends with a series of approaches and advice about optimizations for production.

Chapman & Hall  
September 2021:398  
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Pb: 978-0-367-46602-2: £48.99 **Special price: £42.00**

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## Machine Learning for Knowledge Discovery with R

Methodologies for Modeling, Inference and Prediction



Kao-Tai Tsai

'Machine Learning for Knowledge Discovery with R' contains methodologies and examples for statistical modelling, inference, and prediction of data analysis. It includes most recent supervised and unsupervised machine learning methodologies such as recursive partitioning tree-based modelling, regularized regression, support vector machine, neural network, clustering, and causal-effect inference. Additionally, it emphasizes the use of graphical methods for data exploration to understand the internal structure of data sets. The book includes many examples based on real-world big data from life-science, finance, etc. to illustrate the applications of the methods described therein.

Chapman & Hall  
September 2023:260  
Hb: 978-1-032-06536-6: £82.99 **Special price: £71.00**

\* For full contents and more information, visit: [www.routledge.com/9781032071596](http://www.routledge.com/9781032071596)

## Mathematical Puzzle Tales from Mount Olympus



Andy Liu

Series: *AK Peters/CRC Recreational Mathematics Series*

Mathematical Puzzle Tales from Mount Olympus uses fascinating tales from Greek Mythology as the background for introducing mathematics puzzles to the general public. A background in high school mathematics will be ample preparation for using this book, and it should appeal to anyone who enjoys puzzles and recreational mathematics. Features: Combines the arts and science, and emphasizes the fact that mathematics straddles both domains. Great resource for students preparing for mathematics competitions, and the trainers of such students.

A K Peters/CRC Press  
December 2022:210  
Hb: 978-1-032-42454-5: £56.99 **Special price: £48.00**  
Pb: 978-1-032-42418-7: £22.99 **Special price: £20.00**

\* For full contents and more information, visit: [www.routledge.com/9781032424187](http://www.routledge.com/9781032424187)

## Methodologies in Biosimilar Product Development



Edited By Sang Joon Lee, Shein-Chung Chow

Series: *Chapman & Hall/CRC Biostatistics Series*

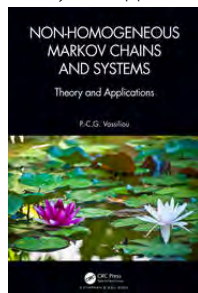
Methodologies in Biosimilar Product Development covers the practical and challenging issues that are commonly encountered during the development, review, and approval of a proposed biosimilar product. This book embraces innovative thinking of design and analysis for biosimilar studies, which are required for review and approval of biosimilar regulatory submissions.

Chapman & Hall  
September 2023:392  
Hb: 978-0-367-89634-8: £180.00 **Special price: £153.00**

\* For full contents and more information, visit: [www.routledge.com/9781032071800](http://www.routledge.com/9781032071800)

## Non-Homogeneous Markov Chains and Systems

Theory and Applications



P.-C.G. Vassiliou

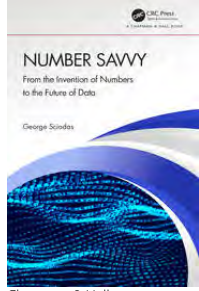
This self-contained book is devoted to the study of non-homogeneous Markov chains and the evolution of the theory and applications of non-homogeneous Markov systems (populations). This book requires a moderate background in basic probability theory and linear algebra, common to most undergraduate programs in mathematics, statistics, and applied probability. The book is primarily aimed at postgraduate students, researchers and practitioners in applied probability and statistics, and the presentation has been planned and structured in a way to provide flexibility in topic selection so that the text can be adapted to meet the demands of different courses.

Chapman & Hall  
December 2022:474  
Hb: 978-1-138-03452-5: £120.00 **Special price: £102.00**

\* For full contents and more information, visit: [www.routledge.com/9781138034525](http://www.routledge.com/9781138034525)

## Number Savvy

From the Invention of Numbers to the Future of Data



George Sciadas

This book is written for the love of numbers. It tells their story, shows how they were invented and used to quantify our world, and explains what quantitative data mean for our lives. It aspires to contribute to overall numeracy through a tour de force presentation of the production, use, and evolution of data. It discusses the significance of standards, the use of taxonomies, and clarifies a series of misconceptions regarding the making of data. The book then describes the switch to a new research paradigm and its implications, highlights the arrival of microdata, illustrates analytical uses of data, and closes with a look at the future of data and our own role in it.

Chapman & Hall  
 December 2022:312  
 Hb: 978-1-032-36215-1: **£56.99 Special price: £48.00**  
 Pb: 978-1-032-35721-8: **£22.99 Special price: £20.00**  
 \* For full contents and more information, visit: [www.routledge.com/9781032357218](http://www.routledge.com/9781032357218)

## Semiparametric Odds Ratio Model and Its Applications

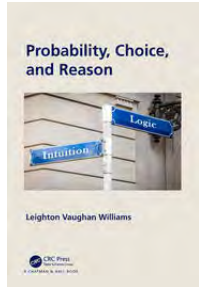


Hua Yun Chen

Beginning with familiar models and moving onto advanced semiparametric modelling tools Semiparametric Odds Ratio Model and its Applications introduces readers to a new range of flexible statistical models and provides guidance on their application using real data examples. This books range of real-world examples and exploration of common statistical problems makes it an invaluable reference for research professionals and graduate students of biostatistics, statistics, and other quantitative fields.

Chapman & Hall  
 December 2021:306  
 Hb: 978-1-138-48532-7: **£130.00 Special price: £111.00**  
 \* For full contents and more information, visit: [www.routledge.com/9781138485327](http://www.routledge.com/9781138485327)

## Probability, Choice, and Reason



Leighton Vaughan Williams

This book should serve as an invaluable and fascinating resource for university, college, and high school students who wish to extend their reading, as well as for teachers and lecturers who want to liven up their courses while retaining academic rigour. It will also appeal to anyone who wishes to develop skills with numbers or has an interest in the many statistical and other paradoxes that permeate our lives. Indeed, anyone studying the sciences, social sciences, or humanities on a formal or informal basis will enjoy and benefit from this book.

Chapman & Hall  
 September 2021:310  
 Hb: 978-0-367-53893-4: **£140.00 Special price: £119.00**  
 Pb: 978-0-367-53891-0: **£52.99 Special price: £45.00**  
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## Simultaneous Global New Drug Development

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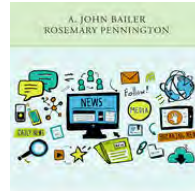
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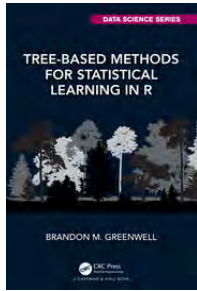
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