

Stochastic Geometry And Its Applications 2nd Edition

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Analysis of Financial Time Series - Ruey S. Tsay 2010-08-30

This book provides a broad, mature, and systematic introduction to current financial econometric models and their applications to modeling and prediction of financial time series data. It utilizes real-world examples and real financial data throughout the book to apply the models and methods described. The author begins with basic characteristics of financial time series data before covering three main topics: Analysis and application of univariate financial time series The return series of multiple assets Bayesian inference in finance methods Key features of the new edition include additional coverage of modern day topics such as arbitrage, pair trading, realized volatility, and credit risk modeling; a smooth transition from S-Plus to R; and expanded empirical financial data sets. The overall objective of the book is to provide some knowledge of financial time series, introduce some statistical tools useful for analyzing these series and gain experience in financial applications of various econometric methods.

Spatial Tessellations - Atsuyuki Okabe 2009-09-25

Spatial data analysis is a fast growing area and Voronoi diagrams provide a means of naturally partitioning space into subregions to facilitate spatial data manipulation, modelling of spatial structures, pattern recognition and locational optimization. With such versatility, the Voronoi diagram and its relative, the Delaunay triangulation, provide valuable tools for the analysis of spatial data. This is a rapidly growing research area and in this fully updated second edition the authors provide an up-to-date and comprehensive unification of all the previous literature on the subject of Voronoi diagrams. Features: * Expands on the highly acclaimed first edition * Provides an up-to-date and comprehensive survey of the existing literature on Voronoi diagrams * Includes a useful compendium of applications * Contains an extensive bibliography A wide range of applications is discussed, enabling this book to serve as an important reference volume on this topic. The text will appeal to students and researchers studying spatial data in a number of areas, in particular, applied probability, computational geometry, and Geographic Information Science (GIS). This book will appeal equally to those whose interests in Voronoi diagrams are theoretical, practical or both.

Foundations of Linear and Generalized Linear Models - Alan Agresti 2015-02-23

A valuable overview of the most important ideas and results in statistical modeling Written by a highly-experienced author, Foundations of Linear and Generalized Linear Models is a clear and comprehensive guide to the key concepts and results of linear statistical models. The book presents a broad, in-depth overview of the most commonly used statistical models by discussing the theory underlying the models, R software applications, and examples with crafted models to elucidate key ideas and promote practical modelbuilding. The book begins by illustrating the fundamentals of linear models, such as how the model-fitting projects the data onto a model vector subspace and how orthogonal decompositions of the data yield information about the effects of explanatory variables. Subsequently, the book covers the most popular generalized linear models, which include binomial and multinomial logistic regression for categorical data, and Poisson and negative binomial loglinear models for count data. Focusing on the theoretical

underpinnings of these models, Foundations of Linear and Generalized Linear Models also features: An introduction to quasi-likelihood methods that require weaker distributional assumptions, such as generalized estimating equation methods An overview of linear mixed models and generalized linear mixed models with random effects for clustered correlated data, Bayesian modeling, and extensions to handle problematic cases such as high dimensional problems Numerous examples that use R software for all text data analyses More than 400 exercises for readers to practice and extend the theory, methods, and data analysis A supplementary website with datasets for the examples and exercises An invaluable textbook for upper-undergraduate and graduate-level students in statistics and biostatistics courses, Foundations of Linear and Generalized Linear Models is also an excellent reference for practicing statisticians and biostatisticians, as well as anyone who is interested in learning about the most important statistical models for analyzing data.

Stochastic Geometry and Its Applications - Sung Nok Chiu 2013-06-27

An extensive update to a classic text Stochastic geometry and spatial statistics play a fundamental role in many modern branches of physics, materials sciences, engineering, biology and environmental sciences. They offer successful models for the description of random two- and three-dimensional micro and macro structures and statistical methods for their analysis. The previous edition of this book has served as the key reference in its field for over 18 years and is regarded as the best treatment of the subject of stochastic geometry, both as a subject with vital applications to spatial statistics and as a very interesting field of mathematics in its own right. This edition: Presents a wealth of models for spatial patterns and related statistical methods. Provides a great survey of the modern theory of random tessellations, including many new models that became tractable only in the last few years. Includes new sections on random networks and random graphs to review the recent ever growing interest in these areas. Provides an excellent introduction to theory and modelling of point processes, which covers some very latest developments. Illustrate the forefront theory of random sets, with many applications. Adds new results to the discussion of fibre and surface processes. Offers an updated collection of useful stereological methods. Includes 700 new references. Is written in an accessible style enabling non-mathematicians to benefit from this book. Provides a companion website hosting information on recent developments in the field www.wiley.com/go/cskm Stochastic Geometry and its Applications is ideally suited for researchers in physics, materials science, biology and ecological sciences as well as mathematicians and statisticians. It should also serve as a valuable introduction to the subject for students of mathematics and statistics.

Stochastic Geometry - Wilfrid S. Kendall 2019-06-10

Stochastic geometry involves the study of random geometric structures, and blends geometric, probabilistic, and statistical methods to provide powerful techniques for modeling and analysis. Recent developments in computational statistical analysis, particularly Markov chain Monte Carlo, have enormously extended the range of feasible applications. Stochastic Geometry: Likelihood and Computation provides a coordinated collection of chapters on important aspects of the rapidly

developing field of stochastic geometry, including: o a "crash-course" introduction to key stochastic geometry themes o considerations of geometric sampling bias issues o tessellations o shape o random sets o image analysis o spectacular advances in likelihood-based inference now available to stochastic geometry through the techniques of Markov chain Monte Carlo

Robust Statistics - Frank R. Hampel 2011-09-20

The Wiley-Interscience Paperback Series consists of selected books that have been made more accessible to consumers in an effort to increase global appeal and general circulation. With these new unabridged softcover volumes, Wiley hopes to extend the lives of these works by making them available to future generations of statisticians, mathematicians, and scientists. "This is a nice book containing a wealth of information, much of it due to the authors. . . . If an instructor designing such a course wanted a textbook, this book would be the best choice available. . . . There are many stimulating exercises, and the book also contains an excellent index and an extensive list of references." —Technometrics "[This] book should be read carefully by anyone who is interested in dealing with statistical models in a realistic fashion." —American Scientist Introducing concepts, theory, and applications, Robust Statistics is accessible to a broad audience, avoiding allusions to high-powered mathematics while emphasizing ideas, heuristics, and background. The text covers the approach based on the influence function (the effect of an outlier on an estimator, for example) and related notions such as the breakdown point. It also treats the change-of-variance function, fundamental concepts and results in the framework of estimation of a single parameter, and applications to estimation of covariance matrices and regression parameters.

Spatial Point Process Modelling and Its Applications - Adrian Baddeley 2004

Este libro de proceedings se edita para ponerlo a disposición de los asistentes a la Internacional Conference on Spatial Point Process Modelling and its Applications (SPPA), realizada en Benicàssim en abril de 2004.

Loss Models - Stuart A. Klugman 2012-09-04

Praise for the Third Edition "This book provides in-depth coverage of modelling techniques used throughout many branches of actuarial science. . . . The exceptional high standard of this book has made it a pleasure to read." —Annals of Actuarial Science Newly organized to focus exclusively on material tested in the Society of Actuaries' Exam C and the Casualty Actuarial Society's Exam 4, Loss Models: From Data to Decisions, Fourth Edition continues to supply actuaries with a practical approach to the key concepts and techniques needed on the job. With updated material and extensive examples, the book successfully provides the essential methods for using available data to construct models for the frequency and severity of future adverse outcomes. The book continues to equip readers with the tools needed for the construction and analysis of mathematical models that describe the process by which funds flow into and out of an insurance system. Focusing on the loss process, the authors explore key quantitative techniques including random variables, basic distributional quantities, and the recursive method, and discuss techniques for classifying and creating distributions. Parametric, non-parametric, and Bayesian estimation methods are thoroughly covered along with advice for choosing an appropriate model. New features of this Fourth Edition include: Expanded discussion of working with large data sets, now including more practical elements of constructing decrement tables Added coverage of methods for simulating several special situations An updated presentation of Bayesian estimation, outlining conjugate prior distributions and the linear exponential family as well as related computational issues Throughout the book, numerous examples showcase the real-world applications of the presented concepts, with an emphasis on calculations and spreadsheet implementation. A wealth of new exercises taken from previous Exam C/4 exams allows readers to test their comprehension of the material, and a related FTP site features the book's data sets. Loss Models, Fourth Edition is an indispensable resource for students and aspiring actuaries who are preparing to take the SOA and CAS examinations. The book is also a valuable reference for professional actuaries, actuarial students, and anyone who works with loss and risk models. To explore our additional offerings in actuarial exam preparation visit www.wiley.com/go/c4actuarial.

Time Series - Ngai Hang Chan 2011-01-25

A new edition of the comprehensive, hands-on guide to financial time series, now featuring S-Plus® and R software Time Series: Applications to Finance with R and S-Plus®, Second Edition is designed to present an in-depth introduction to the conceptual underpinnings and modern ideas of time series analysis. Utilizing interesting, real-world applications and the latest software packages, this book successfully helps readers grasp the technical and conceptual manner of the topic in order to gain a deeper understanding of the ever-changing dynamics of the financial world. With balanced coverage of both theory and applications, this Second Edition includes new content to accurately reflect the current state-of-the-art nature of financial time series analysis. A new chapter on Markov Chain Monte Carlo presents Bayesian methods for time series with coverage of Metropolis-Hastings algorithm, Gibbs sampling, and a case study that explores the relevance of these techniques for understanding activity in the Dow Jones Industrial Average. The author also supplies a new presentation of statistical arbitrage that includes discussion of pairs trading and cointegration. In addition to standard topics such as forecasting and spectral analysis, real-world financial examples are used to illustrate recent developments in nonstandard techniques, including: Nonstationarity Heteroscedasticity Multivariate time series State space modeling and stochastic volatility Multivariate GARCH Cointegration and common trends The book's succinct and focused organization allows readers to grasp the important ideas of time series. All examples are systematically illustrated with S-Plus® and R software, highlighting the relevance of time series in financial applications. End-of-chapter exercises and selected solutions allow readers to test their comprehension of the presented material, and a related Web site features additional data sets. Time Series: Applications to Finance with R and S-Plus® is an excellent book for courses on financial time series at the upper-undergraduate and beginning graduate levels. It also serves as an indispensable resource for practitioners working with financial data in the fields of statistics, economics, business, and risk management.

Mathematics of Planet Earth - Eulogio Pardo-Igúzquiza 2013-10-07

It is widely recognized that the degree of development of a science is given by the transition from a mainly descriptive stage to a more quantitative stage. In this transition, qualitative interpretations (conceptual models) are complemented with quantification (numerical models, both, deterministic and stochastic). This has been the main task of mathematical geoscientists during the last forty years - to establish new frontiers and new challenges in the study and understanding of the natural world. Mathematics of Planet Earth comprises the proceedings of the International Association for Mathematical Geosciences Conference (IAMG2013), held in Madrid from September 2-6, 2013. The Conference addresses researchers, professionals and students. The proceedings contain more than 150 original contributions and give a multidisciplinary vision of mathematical geosciences.

Networked Group Communication - Jon Crowcroft 2003-06-30

This book constitutes the refereed proceedings of the Third International COST264 Workshop on Networked Group Communication, NGC 2001, held in London, UK, in November 2001. The 14 revised full papers presented were carefully reviewed and selected from 40 submissions. All current issues in the area are addressed. The papers are organized in topical sections on application-level aspects, group management, performance topics, security, and topology.

Generalized Linear Models - Raymond H. Myers 2012-01-20

Praise for the First Edition "The obvious enthusiasm of Myers, Montgomery, and Vining and their reliance on their many examples as a major focus of their pedagogy make Generalized Linear Models a joy to read. Every statistician working in any area of applied science should buy it and experience the excitement of these new approaches to familiar activities." —Technometrics Generalized Linear Models: With Applications in Engineering and the Sciences, Second Edition continues to provide a clear introduction to the theoretical foundations and key applications of generalized linear models (GLMs). Maintaining the same nontechnical approach as its predecessor, this update has been thoroughly extended to include the latest developments,

relevant computational approaches, and modern examples from the fields of engineering and physical sciences. This new edition maintains its accessible approach to the topic by reviewing the various types of problems that support the use of GLMs and providing an overview of the basic, related concepts such as multiple linear regression, nonlinear regression, least squares, and the maximum likelihood estimation procedure. Incorporating the latest developments, new features of this Second Edition include: A new chapter on random effects and designs for GLMs A thoroughly revised chapter on logistic and Poisson regression, now with additional results on goodness of fit testing, nominal and ordinal responses, and overdispersion A new emphasis on GLM design, with added sections on designs for regression models and optimal designs for nonlinear regression models Expanded discussion of weighted least squares, including examples that illustrate how to estimate the weights Illustrations of R code to perform GLM analysis The authors demonstrate the diverse applications of GLMs through numerous examples, from classical applications in the fields of biology and biopharmaceuticals to more modern examples related to engineering and quality assurance. The Second Edition has been designed to demonstrate the growing computational nature of GLMs, as SAS®, Minitab®, JMP®, and R software packages are used throughout the book to demonstrate fitting and analysis of generalized linear models, perform inference, and conduct diagnostic checking. Numerous figures and screen shots illustrating computer output are provided, and a related FTP site houses supplementary material, including computer commands and additional data sets. Generalized Linear Models, Second Edition is an excellent book for courses on regression analysis and regression modeling at the upper-undergraduate and graduate level. It also serves as a valuable reference for engineers, scientists, and statisticians who must understand and apply GLMs in their work.

Environmental Statistics - Vic Barnett 2005-12-13

In modern society, we are ever more aware of the environmental issues we face, whether these relate to global warming, depletion of rivers and oceans, despoliation of forests, pollution of land, poor air quality, environmental health issues, etc. At the most fundamental level it is necessary to monitor what is happening in the environment – collecting data to describe the changing scene. More importantly, it is crucial to formally describe the environment with sound and validated models, and to analyse and interpret the data we obtain in order to take action. Environmental Statistics provides a broad overview of the statistical methodology used in the study of the environment, written in an accessible style by a leading authority on the subject. It serves as both a textbook for students of environmental statistics, as well as a comprehensive source of reference for anyone working in statistical investigation of environmental issues. Provides broad coverage of the methodology used in the statistical investigation of environmental issues. Covers a wide range of key topics, including sampling, methods for extreme data, outliers and robustness, relationship models and methods, time series, spatial analysis, and environmental standards. Includes many detailed practical and worked examples that illustrate the applications of statistical methods in environmental issues. Authored by a leading authority on environmental statistics.

Ultra-Dense Networks for 5G and Beyond - Trung Q. Duong 2019-01-31

Offers comprehensive insight into the theory, models, and techniques of ultra-dense networks and applications in 5G and other emerging wireless networks The need for speed—and power—in wireless communications is growing exponentially. Data rates are projected to increase by a factor of ten every five years—and with the emerging Internet of Things (IoT) predicted to wirelessly connect trillions of devices across the globe, future mobile networks (5G) will grind to a halt unless more capacity is created. This book presents new research related to the theory and practice of all aspects of ultra-dense networks, covering recent advances in ultra-dense networks for 5G networks and beyond, including cognitive radio networks, massive multiple-input multiple-output (MIMO), device-to-device (D2D) communications, millimeter-wave communications, and energy harvesting communications. Clear and concise throughout, *Ultra-Dense Networks for 5G and Beyond - Modelling, Analysis, and Applications* offers a comprehensive coverage on such

topics as network optimization; mobility, handoff control, and interference management; and load balancing schemes and energy saving techniques. It delves into the backhaul traffic aspects in ultra-dense networks and studies transceiver hardware impairments and power consumption models in ultra-dense networks. The book also examines new IoT, smart-grid, and smart-city applications, as well as novel modulation, coding, and waveform designs. One of the first books to focus solely on ultra-dense networks for 5G in a complete presentation Covers advanced architectures, self-organizing protocols, resource allocation, user-base station association, synchronization, and signaling Examines the current state of cell-free massive MIMO, distributed massive MIMO, and heterogeneous small cell architectures Offers network measurements, implementations, and demos Looks at wireless caching techniques, physical layer security, cognitive radio, energy harvesting, and D2D communications in ultra-dense networks *Ultra-Dense Networks for 5G and Beyond - Modelling, Analysis, and Applications* is an ideal reference for those who want to design high-speed, high-capacity communications in advanced networks, and will appeal to postgraduate students, researchers, and engineers in the field.

Mathematical Principles of the Internet, Volume 2 - Nirdosh Bhatnagar 2018-11-21

This two-volume set on *Mathematical Principles of the Internet* provides a comprehensive overview of the mathematical principles of Internet engineering. The books do not aim to provide all of the mathematical foundations upon which the Internet is based. Instead, they cover a partial panorama and the key principles. Volume 1 explores Internet engineering, while the supporting mathematics is covered in Volume 2. The chapters on mathematics complement those on the engineering episodes, and an effort has been made to make this work succinct, yet self-contained. Elements of information theory, algebraic coding theory, cryptography, Internet traffic, dynamics and control of Internet congestion, and queueing theory are discussed. In addition, stochastic networks, graph-theoretic algorithms, application of game theory to the Internet, Internet economics, data mining and knowledge discovery, and quantum computation, communication, and cryptography are also discussed. In order to study the structure and function of the Internet, only a basic knowledge of number theory, abstract algebra, matrices and determinants, graph theory, geometry, analysis, optimization theory, probability theory, and stochastic processes, is required. These mathematical disciplines are defined and developed in the books to the extent that is needed to develop and justify their application to Internet engineering.

Applied Linear Regression - Sanford Weisberg 2005-04-01

Master linear regression techniques with a new edition of a classic text *Reviews of the Second Edition*: "I found it enjoyable reading and so full of interesting material that even the well-informed reader will probably find something new . . . a necessity for all of those who do linear regression." —*Technometrics*, February 1987 "Overall, I feel that the book is a valuable addition to the now considerable list of texts on applied linear regression. It should be a strong contender as the leading text for a first serious course in regression analysis." —*American Scientist*, May–June 1987 *Applied Linear Regression, Third Edition* has been thoroughly updated to help students master the theory and applications of linear regression modeling. Focusing on model building, assessing fit and reliability, and drawing conclusions, the text demonstrates how to develop estimation, confidence, and testing procedures primarily through the use of least squares regression. To facilitate quick learning, the Third Edition stresses the use of graphical methods in an effort to find appropriate models and to better understand them. In that spirit, most analyses and homework problems use graphs for the discovery of structure as well as for the summarization of results. The Third Edition incorporates new material reflecting the latest advances, including: Use of smoothers to summarize a scatterplot Box-Cox and graphical methods for selecting transformations Use of the delta method for inference about complex combinations of parameters Computationally intensive methods and simulation, including the bootstrap method Expanded chapters on nonlinear and logistic regression Completely revised chapters on multiple regression, diagnostics, and generalizations of regression Readers will also find helpful pedagogical tools and learning aids, including: More than 100 exercises, most based on

interesting real-world data Web primers demonstrating how to use standard statistical packages, including R, S-Plus®, SPSS®, SAS®, and JMP®, to work all the examples and exercises in the text. A free online library for R and S-Plus that makes the methods discussed in the book easy to use. With its focus on graphical methods and analysis, coupled with many practical examples and exercises, this is an excellent textbook for upper-level undergraduates and graduate students, who will quickly learn how to use linear regression analysis techniques to solve and gain insight into real-life problems.

Linear Statistical Inference and its Applications - C. Radhakrishna Rao 2009-09-25

"C. R. Rao would be found in almost any statistician's list of five outstanding workers in the world of Mathematical Statistics today. His book represents a comprehensive account of the main body of results that comprise modern statistical theory." -W. G. Cochran "[C. R. Rao is] one of the pioneers who laid the foundations of statistics which grew from ad hoc origins into a firmly grounded mathematical science." -B. Efron Translated into six major languages of the world, C. R. Rao's *Linear Statistical Inference and Its Applications* is one of the foremost works in statistical inference in the literature. Incorporating the important developments in the subject that have taken place in the last three decades, this paperback reprint of his classic work on statistical inference remains highly applicable to statistical analysis. Presenting the theory and techniques of statistical inference in a logically integrated and practical form, it covers: * The algebra of vectors and matrices * Probability theory, tools, and techniques * Continuous probability models * The theory of least squares and the analysis of variance * Criteria and methods of estimation * Large sample theory and methods * The theory of statistical inference * Multivariate normal distribution. Written for the student and professional with a basic knowledge of statistics, this practical paperback edition gives this industry standard new life as a key resource for practicing statisticians and statisticians-in-training.

Time Series Analysis and Forecasting by Example - Søren Bisgaard 2011-08-24

An intuition-based approach enables you to master time series analysis with ease. *Time Series Analysis and Forecasting by Example* provides the fundamental techniques in time series analysis using various examples. By introducing necessary theory through examples that showcase the discussed topics, the authors successfully help readers develop an intuitive understanding of seemingly complicated time series models and their implications. The book presents methodologies for time series analysis in a simplified, example-based approach. Using graphics, the authors discuss each presented example in detail and explain the relevant theory while also focusing on the interpretation of results in data analysis. Following a discussion of why autocorrelation is often observed when data is collected in time, subsequent chapters explore related topics, including: Graphical tools in time series analysis Procedures for developing stationary, non-stationary, and seasonal models How to choose the best time series model Constant term and cancellation of terms in ARIMA models Forecasting using transfer function-noise models The final chapter is dedicated to key topics such as spurious relationships, autocorrelation in regression, and multiple time series. Throughout the book, real-world examples illustrate step-by-step procedures and instructions using statistical software packages such as SAS®, JMP, Minitab, SCA, and R. A related Web site features PowerPoint slides to accompany each chapter as well as the book's data sets. With its extensive use of graphics and examples to explain key concepts, *Time Series Analysis and Forecasting by Example* is an excellent book for courses on time series analysis at the upper-undergraduate and graduate levels. It also serves as a valuable resource for practitioners and researchers who carry out data and time series analysis in the fields of engineering, business, and economics.

Theoretical Foundations of Functional Data Analysis, with an Introduction to Linear Operators - Tailen Hsing 2015-04-07

Theoretical Foundations of Functional Data Analysis, with an Introduction to Linear Operators provides a uniquely broad compendium of the key mathematical concepts and results that are relevant for the theoretical development of functional data analysis (FDA). The self-contained

treatment of selected topics of functional analysis and operator theory includes reproducing kernel Hilbert spaces, singular value decomposition of compact operators on Hilbert spaces and perturbation theory for both self-adjoint and non self-adjoint operators. The probabilistic foundation for FDA is described from the perspective of random elements in Hilbert spaces as well as from the viewpoint of continuous time stochastic processes. Nonparametric estimation approaches including kernel and regularized smoothing are also introduced. These tools are then used to investigate the properties of estimators for the mean element, covariance operators, principal components, regression function and canonical correlations. A general treatment of canonical correlations in Hilbert spaces naturally leads to FDA formulations of factor analysis, regression, MANOVA and discriminant analysis. This book will provide a valuable reference for statisticians and other researchers interested in developing or understanding the mathematical aspects of FDA. It is also suitable for a graduate level special topics course.

Biogeography - Glen MacDonald 2002-02-28

Illustrative examples from recent research publications and "classic" studies are prominently featured throughout the book. Research techniques are highlighted in "special interest" boxes. Illustrations and descriptions of research techniques are provided with examples such as fire-scars from trees used to reconstruct disturbance, fossil pollen used to reconstruct vegetation change and plant migration, transect and quadrat sampling. Includes key biogeographical theories that link space and time to the distribution of life. Some of these theories include: 1. Ranges, Refuges, Corridors, Barriers, 2. Centers of Origins, 3. Cladistics, 4. Variance, 5. Island Biogeography, 6. Diversity Theory, 7. Gap Analysis for Conservation.

Applied Longitudinal Analysis - Garrett M. Fitzmaurice 2011-08-30

Praise for the First Edition ". . . [this book] should be on the shelf of everyone interested in . . . longitudinal data analysis." —Journal of the American Statistical Association Features newly developed topics and applications of the analysis of longitudinal data. *Applied Longitudinal Analysis, Second Edition* presents modern methods for analyzing data from longitudinal studies and now features the latest state-of-the-art techniques. The book emphasizes practical, rather than theoretical, aspects of methods for the analysis of diverse types of longitudinal data that can be applied across various fields of study, from the health and medical sciences to the social and behavioral sciences. The authors incorporate their extensive academic and research experience along with various updates that have been made in response to reader feedback. The Second Edition features six newly added chapters that explore topics currently evolving in the field, including: Fixed effects and mixed effects models Marginal models and generalized estimating equations Approximate methods for generalized linear mixed effects models Multiple imputation and inverse probability weighted methods Smoothing methods for longitudinal data Sample size and power Each chapter presents methods in the setting of applications to data sets drawn from the health sciences. New problem sets have been added to many chapters, and a related website features sample programs and computer output using SAS, Stata, and R, as well as data sets and supplemental slides to facilitate a complete understanding of the material. With its strong emphasis on multidisciplinary applications and the interpretation of results, *Applied Longitudinal Analysis, Second Edition* is an excellent book for courses on statistics in the health and medical sciences at the upper-undergraduate and graduate levels. The book also serves as a valuable reference for researchers and professionals in the medical, public health, and pharmaceutical fields as well as those in social and behavioral sciences who would like to learn more about analyzing longitudinal data.

Geometry Driven Statistics - Ian L. Dryden 2015-09-28

A timely collection of advanced, original material in the area of statistical methodology motivated by geometric problems, dedicated to the influential work of Kanti V. Mardia. This volume celebrates Kanti V. Mardia's long and influential career in statistics. A common theme unifying much of Mardia's work is the importance of geometry in statistics, and to highlight the areas emphasized in his research this book brings together 16 contributions from high-profile

researchers in the field. Geometry Driven Statistics covers a wide range of application areas including directional data, shape analysis, spatial data, climate science, fingerprints, image analysis, computer vision and bioinformatics. The book will appeal to statisticians and others with an interest in data motivated by geometric considerations. Summarizing the state of the art, examining some new developments and presenting a vision for the future, Geometry Driven Statistics will enable the reader to broaden knowledge of important research areas in statistics and gain a new appreciation of the work and influence of Kanti V. Mardia.

Opportunistic Spectrum Sharing in Cognitive Radio Networks - Zhe Wang 2015-03-18

This Springer Brief investigates spectrum sharing with limited channel feedback in various cognitive radio systems, such as point-to-point, broadcast scheduling and ad-hoc networks. The design aim is to optimally allocate the secondary resources to improve the throughput of secondary users while maintaining a certain quality of service for primary users. The analytical results of optimal resource allocation are derived via optimization theory and are verified by the numerical results. The results demonstrate the secondary performance is significantly improved by limited feedback and is further improved by more feedback bits, more secondary receivers and more primary side information.

Stochastic Geometry and Its Applications - Dietrich Stoyan 1987

Image Processing and Jump Regression Analysis - Peihua Qiu 2005-05-20

The first text to bridge the gap between image processing and jump regression analysis. Recent statistical tools developed to estimate jump curves and surfaces have broad applications, specifically in the area of image processing. Often, significant differences in technical terminologies make communication between the disciplines of image processing and jump regression analysis difficult. In easy-to-understand language, *Image Processing and Jump Regression Analysis* builds a bridge between the worlds of computer graphics and statistics by addressing both the connections and the differences between these two disciplines. The author provides a systematic analysis of the methodology behind nonparametric jump regression analysis by outlining procedures that are easy to use, simple to compute, and have proven statistical theory behind them. Key topics include: Conventional smoothing procedures Estimation of jump regression curves Estimation of jump location curves of regression surfaces Jump-preserving surface reconstruction based on local smoothing Edge detection in image processing Edge-preserving image restoration With mathematical proofs kept to a minimum, this book is uniquely accessible to a broad readership. It may be used as a primary text in nonparametric regression analysis and image processing as well as a reference guide for academicians and industry professionals focused on image processing or curve/surface estimation.

Statistical Shape Analysis - Ian L. Dryden 2016-09-06

A thoroughly revised and updated edition of this introduction to modern statistical methods for shape analysis. Shape analysis is an important tool in the many disciplines where objects are compared using geometrical features. Examples include comparing brain shape in schizophrenia; investigating protein molecules in bioinformatics; and describing growth of organisms in biology. This book is a significant update of the highly-regarded 'Statistical Shape Analysis' by the same authors. The new edition lays the foundations of landmark shape analysis, including geometrical concepts and statistical techniques, and extends to include analysis of curves, surfaces, images and other types of object data. Key definitions and concepts are discussed throughout, and the relative merits of different approaches are presented. The authors have included substantial new material on recent statistical developments and offer numerous examples throughout the text. Concepts are introduced in an accessible manner, while retaining sufficient detail for more specialist statisticians to appreciate the challenges and opportunities of this new field. Computer code has been included for instructional use, along with exercises to enable readers to implement the applications themselves in R and to follow the key ideas by hands-on analysis. *Statistical Shape Analysis: with Applications in R* will offer a valuable introduction to this fast-moving

research area for statisticians and other applied scientists working in diverse areas, including archaeology, bioinformatics, biology, chemistry, computer science, medicine, morphometrics and image analysis.

Adaptive Wireless Communications - Daniel W. Bliss 2013-05-09

History -- Notational and mathematical preliminaries

The Subjectivity of Scientists and the Bayesian Approach - S. James Press 2012-01-20

Comparing and contrasting the reality of subjectivity in the work of history's great scientists and the modern Bayesian approach to statistical analysis. Scientists and researchers are taught to analyze their data from an objective point of view, allowing the data to speak for themselves rather than assigning them meaning based on expectations or opinions. But scientists have never behaved fully objectively. Throughout history, some of our greatest scientific minds have relied on intuition, hunches, and personal beliefs to make sense of empirical data—and these subjective influences have often aided in humanity's greatest scientific achievements. The authors argue that subjectivity has not only played a significant role in the advancement of science, but that science will advance more rapidly if the modern methods of Bayesian statistical analysis replace some of the classical twentieth-century methods that have traditionally been taught. To accomplish this goal, the authors examine the lives and work of history's great scientists and show that even the most successful have sometimes misrepresented findings or been influenced by their own preconceived notions of religion, metaphysics, and the occult, or the personal beliefs of their mentors. Contrary to popular belief, our greatest scientific thinkers approached their data with a combination of subjectivity and empiricism, and thus informally achieved what is more formally accomplished by the modern Bayesian approach to data analysis. Yet we are still taught that science is purely objective. This innovative book dispels that myth using historical accounts and biographical sketches of more than a dozen great scientists, including Aristotle, Galileo Galilei, Johannes Kepler, William Harvey, Sir Isaac Newton, Antoine Lavoisier, Alexander von Humboldt, Michael Faraday, Charles Darwin, Louis Pasteur, Gregor Mendel, Sigmund Freud, Marie Curie, Robert Millikan, Albert Einstein, Sir Cyril Burt, and Margaret Mead. Also included is a detailed treatment of the modern Bayesian approach to data analysis. Up-to-date references to the Bayesian theoretical and applied literature, as well as reference lists of the primary sources of the principal works of all the scientists discussed, round out this comprehensive treatment of the subject. Readers will benefit from this cogent and enlightening view of the history of subjectivity in science and the authors' alternative vision of how the Bayesian approach should be used to further the cause of science and learning well into the twenty-first century.

Preparing for the Worst - Hrishikesh (Rick) D. Vinod 2004-11-11

A timely approach to downside risk and its role in stock market investments. When dealing with the topic of risk analysis, most books on investments treat downside and upside risk equally. *Preparing for the Worst* takes an entirely novel approach by focusing on downside risk and explaining how to incorporate it into investment decisions. Highlighting this asymmetry of the stock market, the authors describe how existing theories miss the downside and follow with explanations of how it can be included. Various techniques for calculating downside risk are demonstrated. This book presents the latest ideas in the field from the ground up, making the discussion accessible to mathematicians and statisticians interested in applications in finance, as well as to finance professionals who may not have a mathematical background. An invaluable resource for anyone wishing to explore the critical issues of finance, portfolio management, and securities pricing, this book: Incorporates Value at Risk into the theoretical discussion Uses many examples to illustrate downside risk in U.S., international, and emerging market investments Addresses downside risk arising from fraud and corruption Includes step-by-step instructions on how to implement the methods introduced in this book Offers advice on how to avoid pitfalls in calculations and computer programming Provides software use information and tips

Mathematical Foundations of Image Processing and Analysis - Jean-Charles Pinoli 2014-07-22

Mathematical Imaging is currently a rapidly growing field in applied mathematics, with an increasing need for theoretical mathematics. This book, the second of two volumes, emphasizes the role of mathematics as a rigorous basis for imaging sciences. It provides a comprehensive and convenient overview of the key mathematical concepts, notions, tools and frameworks involved in the various fields of gray-tone and binary image processing and analysis, by proposing a large, but coherent, set of symbols and notations, a complete list of subjects and a detailed bibliography. It establishes a bridge between the pure and applied mathematical disciplines, and the processing and analysis of gray-tone and binary images. It is accessible to readers who have neither extensive mathematical training, nor peer knowledge in Image Processing and Analysis. It is a self-contained book focusing on the mathematical notions, concepts, operations, structures, and frameworks that are beyond or involved in Image Processing and Analysis. The notations are simplified as far as possible in order to be more explicative and consistent throughout the book and the mathematical aspects are systematically discussed in the image processing and analysis context, through practical examples or concrete illustrations. Conversely, the discussed applicative issues allow the role of mathematics to be highlighted. Written for a broad audience – students, mathematicians, image processing and analysis specialists, as well as other scientists and practitioners – the author hopes that readers will find their own way of using the book, thus providing a mathematical companion that can help mathematicians become more familiar with image processing and analysis, and likewise, image processing and image analysis scientists, researchers and engineers gain a deeper understanding of mathematical notions and concepts.

Multivariate Density Estimation - David W. Scott 2015-03-30

Clarifies modern data analysis through nonparametric density estimation for a complete working knowledge of the theory and methods. Featuring a thoroughly revised presentation, *Multivariate Density Estimation: Theory, Practice, and Visualization, Second Edition* maintains an intuitive approach to the underlying methodology and supporting theory of density estimation. Including new material and updated research in each chapter, the Second Edition presents additional clarification of theoretical opportunities, new algorithms, and up-to-date coverage of the unique challenges presented in the field of data analysis. The new edition focuses on the various density estimation techniques and methods that can be used in the field of big data. Defining optimal nonparametric estimators, the Second Edition demonstrates the density estimation tools to use when dealing with various multivariate structures in univariate, bivariate, trivariate, and quadrivariate data analysis. Continuing to illustrate the major concepts in the context of the classical histogram, *Multivariate Density Estimation: Theory, Practice, and Visualization, Second Edition* also features: Over 150 updated figures to clarify theoretical results and to show analyses of real data sets. An updated presentation of graphic visualization using computer software such as R. A clear discussion of selections of important research during the past decade, including mixture estimation, robust parametric modeling algorithms, and clustering. More than 130 problems to help readers reinforce the main concepts and ideas presented. Boxed theorems and results allowing easy identification of crucial ideas. Figures in color in the digital versions of the book. A website with related data sets. *Multivariate Density Estimation: Theory, Practice, and Visualization, Second Edition* is an ideal reference for theoretical and applied statisticians, practicing engineers, as well as readers interested in the theoretical aspects of nonparametric estimation and the application of these methods to multivariate data. The Second Edition is also useful as a textbook for introductory courses in kernel statistics, smoothing, advanced computational statistics, and general forms of statistical distributions.

Spatial and Spatio-Temporal Geostatistical Modeling and Kriging - José-María Montero 2015-08-19

Statistical Methods for Spatial and Spatio-Temporal Data Analysis provides a complete range of spatio-temporal covariance functions and discusses ways of constructing them. This book is a unified approach to modeling spatial and spatio-temporal data together with significant developments in statistical methodology with applications in R. This book includes: Methods for selecting valid covariance functions from the empirical counterparts that overcome the existing

limitations of the traditional methods. The most innovative developments in the different steps of the kriging process. An up-to-date account of strategies for dealing with data evolving in space and time. An accompanying website featuring R code and examples.

Analysis of Ordinal Categorical Data - Alan Agresti 2010-04-19

Statistical science's first coordinated manual of methods for analyzing ordered categorical data, now fully revised and updated, continues to present applications and case studies in fields as diverse as sociology, public health, ecology, marketing, and pharmacy. *Analysis of Ordinal Categorical Data, Second Edition* provides an introduction to basic descriptive and inferential methods for categorical data, giving thorough coverage of new developments and recent methods. Special emphasis is placed on interpretation and application of methods including an integrated comparison of the available strategies for analyzing ordinal data. Practitioners of statistics in government, industry (particularly pharmaceutical), and academia will want this new edition.

Mathematical Principles of the Internet, Two Volume Set - Nirdosh Bhatnagar 2019-03-18

This two-volume set on *Mathematical Principles of the Internet* provides a comprehensive overview of the mathematical principles of Internet engineering. The books do not aim to provide all of the mathematical foundations upon which the Internet is based. Instead, these cover only a partial panorama and the key principles. Volume 1 explores Internet engineering, while the supporting mathematics is covered in Volume 2. The chapters on mathematics complement those on the engineering episodes, and an effort has been made to make this work succinct, yet self-contained. Elements of information theory, algebraic coding theory, cryptography, Internet traffic, dynamics and control of Internet congestion, and queueing theory are discussed. In addition, stochastic networks, graph-theoretic algorithms, application of game theory to the Internet, Internet economics, data mining and knowledge discovery, and quantum computation, communication, and cryptography are also discussed. In order to study the structure and function of the Internet, only a basic knowledge of number theory, abstract algebra, matrices and determinants, graph theory, geometry, analysis, optimization theory, probability theory, and stochastic processes, is required. These mathematical disciplines are defined and developed in the books to the extent that is needed to develop and justify their application to Internet engineering.

An Introduction to the Theory of Point Processes - D.J. Daley 2007-12-29

This is the second volume of the reworked second edition of a key work on Point Process Theory. Fully revised and updated by the authors who have reworked their 1988 first edition, it brings together the basic theory of random measures and point processes in a unified setting and continues with the more theoretical topics of the first edition: limit theorems, ergodic theory, Palm theory, and evolutionary behaviour via martingales and conditional intensity. The very substantial new material in this second volume includes expanded discussions of marked point processes, convergence to equilibrium, and the structure of spatial point processes.

Meta Analysis - Elena Kulinskaya 2008-04-15

Meta Analysis: A Guide to Calibrating and Combining Statistical Evidence acts as a source of basic methods for scientists wanting to combine evidence from different experiments. The authors aim to promote a deeper understanding of the notion of statistical evidence. The book is comprised of two parts – The Handbook, and The Theory. The Handbook is a guide for combining and interpreting experimental evidence to solve standard statistical problems. This section allows someone with a rudimentary knowledge in general statistics to apply the methods. The Theory provides the motivation, theory and results of simulation experiments to justify the methodology. This is a coherent introduction to the statistical concepts required to understand the authors' thesis that evidence in a test statistic can often be calibrated when transformed to the right scale.

Stereology and Stochastic Geometry - John E. Hilliard 2003-11-30

Somebody had to do it. The Chinese speak of deep water wells called "grandfather wells" because they take three generations of diggers to complete. Imagine the thought of such a well being

abandoned incomplete by the third generation. What a loss! This book is like a grandfather well except that it has taken only two generations, John Hilliard's and mine, to finish. When I saw his manuscript lying in a heap, I decided that I must spend the time to put it and his notes into a publishable form. Now, it is done. This book is mostly about performing spatial measurements through the statistical sampling of images; it is a text on classical stereology as John Hilliard saw it. His vision of the subject was broad. Consequently, its title is broad too. It presents this subject and some of its modern extensions from the classical perspective of the one of the founders of the field, and my first advisor at Northwestern University, John Hilliard. There is nothing new in this book but much that may have been lost over time. It rediscovers many useful discussions about such subjects as the variances of stereo logical measurements, anisotropy etc. It recovers some of the dialogues between John Hilliard and his students on such topics as fractals and Monte Carlo simulations. It recaptures a little of John Hilliard's unique and subtle wit.

The Newcom++ Vision Book - Sergio Benedetto 2012-04-07

The Book contains the Vision of the researchers of the European Network of Excellence NEWCOM++ (Network of Excellence on Wireless COMmunication) on the present and future status of Wireless Communication Networks. In its content, the community of NEWCOM++ researchers, shaped under the common ground of a mainly academic network of excellence, have distilled their scientific wisdom in a number of areas characterized by the common denominator of wireless communications, by identifying the medium-long term research tendencies/problems, describing the tools to face them and providing a relatively large number of references for the interested reader. The identified areas and the researchers involved in their redaction reflect the intersection of the major topics in wireless communications with those that are deeply investigated in NEWCOM++; they are preceded by an original description of the main trends in user/society needs and the degree of fulfilment that ongoing and future wireless communications standards will more likely help achieving. The appendix of the Book contains a list of "Millenium Problems", seminal problems in the area of wireless communication networks, characterized by being crucial and still unsolved. The problems have been identified by NEWCOM++ researchers and filtered by the editors of the Vision Book.

Multivariate Statistics - Yasunori Fujikoshi 2011-08-15

A comprehensive examination of high-dimensional analysis of multivariate methods and their real-world applications Multivariate Statistics: High-Dimensional and Large-Sample Approximations is the first book of its kind to explore how classical multivariate methods can be

revised and used in place of conventional statistical tools. Written by prominent researchers in the field, the book focuses on high-dimensional and large-scale approximations and details the many basic multivariate methods used to achieve high levels of accuracy. The authors begin with a fundamental presentation of the basic tools and exact distributional results of multivariate statistics, and, in addition, the derivations of most distributional results are provided. Statistical methods for high-dimensional data, such as curve data, spectra, images, and DNA microarrays, are discussed. Bootstrap approximations from a methodological point of view, theoretical accuracies in MANOVA tests, and model selection criteria are also presented. Subsequent chapters feature additional topical coverage including: High-dimensional approximations of various statistics High-dimensional statistical methods Approximations with computable error bound Selection of variables based on model selection approach Statistics with error bounds and their appearance in discriminant analysis, growth curve models, generalized linear models, profile analysis, and multiple comparison Each chapter provides real-world applications and thorough analyses of the real data. In addition, approximation formulas found throughout the book are a useful tool for both practical and theoretical statisticians, and basic results on exact distributions in multivariate analysis are included in a comprehensive, yet accessible, format. Multivariate Statistics is an excellent book for courses on probability theory in statistics at the graduate level. It is also an essential reference for both practical and theoretical statisticians who are interested in multivariate analysis and who would benefit from learning the applications of analytical probabilistic methods in statistics.

Exploratory Data Mining and Data Cleaning - Tamraparni Dasu 2003-08-01

Written for practitioners of data mining, data cleaning and database management. Presents a technical treatment of data quality including process, metrics, tools and algorithms. Focuses on developing an evolving modeling strategy through an iterative data exploration loop and incorporation of domain knowledge. Addresses methods of detecting, quantifying and correcting data quality issues that can have a significant impact on findings and decisions, using commercially available tools as well as new algorithmic approaches. Uses case studies to illustrate applications in real life scenarios. Highlights new approaches and methodologies, such as the DataSphere space partitioning and summary based analysis techniques. Exploratory Data Mining and Data Cleaning will serve as an important reference for serious data analysts who need to analyze large amounts of unfamiliar data, managers of operations databases, and students in undergraduate or graduate level courses dealing with large scale data analysis and data mining.