Nonparametric Methods In Change Point Problems Mathematics And Its Applications

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Probability Theory and Mathematical Statistics B. Grigelionis 2020-05-18

Challenges in Automation, Robotics and Measurement Techniques Roman Szewczyk 2016-02-15 This book presents the set of papers accepted for presentation at the International Conference Automation, held in Warsaw, 2-4 March of 2016. It presents the research results presented by top experts in the fields of industrial automation, control, robotics and measurement techniques. Each chapter presents a thorough analysis of a specific technical problem which is usually followed by numerical analysis, simulation, and description of results of implementation of the solution of a real world problem. The presented theoretical results, practical solutions and guidelines will be valuable for both researchers working in the area of engineering sciences and for practitioners solving industrial problems.

Non-Parametric Statistical Diagnosis E. Brodsky 2013-03-14 Non-Parametric Statistical Diagnosis

Mathematical Methods of Statistics 2007

Mathematical Methods in Queuing Theory Vladimir V. Kalashnikov 1993-12-31 The material of this book is based on several courses which have been delivered for a long time at the Moscow Institute for Physics and Technology. Some parts have formed the subject of lectures given at various universities throughout the world: Freie Universitat of Berlin, Chalmers University of Technology and the University of Goteborg, University of California at Santa Barbara and others. The subject of the book is the theory of queues. This theory, as a mathematical discipline, begins with the work of A. Erlang, who examined a model of a telephone station and obtained the famous formula for the distribution of the number of busy lines which is named after him. Queueing theory has been applied to the study of numerous models: emergency aid, road traffic, computer systems, etc. Besides, it has lead to several related disciplines such as reliability and inventory theories which deal with similar models. Nevertheless, many parts of the theory of queues were developed as a "pure science" with no practical applications. The aim of this book is to give the reader an insight into the mathematical methods which can be used in queueing theory and to present examples of solving problems with the help of these methods. Of course, the choice of the methods is quite subjective. Thus, many prominent results have not even been mentioned.

Applied Change Point Problems in Statistics Bimal K. Sinha 1995

Data Traffic Monitoring and Analysis Ernst Biersack 2013-03-02 This book was prepared as the Final Publication of COST Action IC0703 "Data Traffic Monitoring and Analysis: theory, techniques, tools and applications for the future networks". It contains 14 chapters which demonstrate the results, quality,and the impact of European research in the field of TMA in line with the scientific objective of the Action. The book is structured into three parts: network and topology measurement and modelling, traffic classification and anomaly detection, quality of experience.

Journal of Statistical Planning and Inference 2002

Bayesian Missing Data Problems Ming T. Tan 2009-08-26 Bayesian Missing Data Problems: EM, Data Augmentation and Noniterative Computation presents solutions to missing data problems through explicit or noniterative sampling calculation of Bayesian posteriors. The methods are based on the inverse Bayes formulae discovered by one of the author in 1995. Applying the Bayesian approach to important real-world problems, the authors focus on exact numerical solutions, a conditional sampling approach via data augmentation, and a noniterative sampling approach via EM-type algorithms. After introducing the missing data problems, Bayesian approach, and posterior computation, the book succinctly describes EM-type algorithms, Monte Carlo simulation, numerical techniques, and optimization methods. It then gives exact posterior solutions for problems, such as nonresponses in surveys and cross-over trials with missing values. It also provides noniterative posterior sampling solutions for problems, such as contingency tables with supplemental margins, aggregated responses in surveys, zero-inflated Poisson, capture-recapture models, mixed effects models, right-censored regression model, and constrained parameter models. The text concludes with a discussion on compatibility, a fundamental issue in Bayesian inference. This book offers a unified treatment of an array of statistical problems that involve missing data and constrained parameters. It shows how Bayesian procedures can be useful in solving these problems.

Principles of Cognitive Radio Ezio Biglieri 2012-11-15 Expert authors draw on fundamental theory to explain the core principles and key design considerations for developing cognitive radio systems.

Sequential Analysis Alexander Tartakovsky 2014-08-27 Sequential Analysis: Hypothesis Testing and Changepoint Detection systematically develops the theory of sequential hypothesis testing and quickest changepoint detection. It also describes important applications in which theoretical results can be used efficiently. The book reviews recent accomplishments in hypothesis testing and changepoint detecti

Recent Advances in Statistics and Probability 2020-05-26

Asymptotic Analysis of Random Walks: Light-Tailed Distributions A.A. Borovkov 2020-10-29 A systematic modern treatise on large deviation theory for random walks with light tails, from one of its key creators.

Emerging Management Mechanisms for the Future Internet Guillaume Doyen 2013-06-20 This book constitutes the refereed proceedings of the 7th IFIP WG 6.6 International Conference on Autonomous Infrastructure, Management, and Security, AIMS 2013, held in Barcelona, Spain, in June 2013. The 11 full papers presented were carefully reviewed and selected from 32 submissions. The volume also includes 7 papers presented at the AIMS Ph.D. workshop. They were reviewed and selected from 14 submissions. The papers are organized in topical sections on traffic engineering and quality-of-service; monitoring and modeling; security management; content distribution and multimedia; autonomous management; and monitoring mechanisms.

Stochastic Models, Statistics and Their Applications Ansgar Steland 2015-02-04 This volume presents the latest advances and trends in stochastic models and related statistical procedures. Selected peer-reviewed contributions focus on statistical inference, quality control, change-point analysis and detection, empirical processes, time series analysis, survival analysis and reliability, statistics for stochastic processes, big data in technology and the sciences, statistical genetics, experiment design, and stochastic models in engineering. Stochastic models and related statistical procedures play an important part in furthering our understanding of the challenging problems currently arising in areas of application such as the natural sciences, information technology, engineering, image analysis, genetics, energy and finance, to name but a few. This collection arises from the 12th Workshop on Stochastic Models, Statistics and Their Applications, Wroclaw, Poland.

Asymptotics, Nonparametrics, and Time Series Subir Ghosh 1999-02-18 "Contains over 2500 equations and exhaustively covers not only nonparametrics but also parametric, semiparametric, frequentist, Bayesian, bootstrap, adaptive, univariate, and multivariate statistical methods, as well as practical uses of Markov chain models."

Tatra Mountains Mathematical Publications 1992

Long-Memory Processes Jan Beran 2013-05-14 Long-memory processes are known to play an important part in many areas of science and technology, including physics, geophysics, hydrology, telecommunications, economics, finance, climatology, and network engineering. In the last 20 years enormous progress has been made in understanding the probabilistic foundations and statistical principles of such processes. This book provides a timely and comprehensive review, including a thorough discussion of mathematical and probabilistic foundations and statistical methods, emphasizing their practical motivation and mathematical justification. Proofs of the main theorems are provided and data examples illustrate practical aspects. This book will be a valuable resource for researchers and graduate students in statistics, mathematics, econometrics and other quantitative areas, as well as for practitioners and applied researchers who need to analyze data in which long memory, power laws, self-similar scaling or fractal properties are relevant.

Transactions on Engineering Technologies Sio-Iong Ao 2018-02-09 This volume contains a selection of revised and extended research articles written by prominent researchers participating in the 25th International MultiConference of Engineers and Computer Scientists (IMECS 2017) which was held in Hong Kong, 15-17 March, 2017. Topics covered include electrical engineering, communications systems, engineering mathematics, engineering physics, and industrial applications. With contributions carefully chosen to represent the most cutting-edge research presented during the conference, the book offers the state of art in engineering technologies and physical science and applications, and also serves as an excellent reference work for researchers and graduate students working with/on engineering technologies and physical science and applications.

Non-Parametric Statistical Diagnosis E. Brodsky 2000-04-30 Non-Parametric Statistical Diagnosis

Asymptotic Methods in Probability and Statistics B. Szyszkowicz 1998-10-29 One of the aims of the conference on which this book is based, was to provide a platform for the exchange of recent findings and new ideas inspired by the so-called Hungarian construction and other approximate methodologies. This volume of 55 papers is dedicated to Miklós Csörgő a co-founder of the Hungarian construction school by the invited speakers and contributors to ICAMPS'97. This excellent treatize reflects the many developments in this field, while pointing to new directions to be explored. An unequalled contribution to research in probability and statistics.

Density Ratio Estimation in Machine Learning Masashi Sugiyama 2012-02-20 This book introduces theories, methods and applications of density ratio estimation, a newly emerging paradigm in the machine learning community.

Robustness and Complex Data Structures Claudia Becker 2014-07-08 This Festschrift in honour of Ursula Gather's 60th birthday deals with modern topics in the field of robust statistical methods, especially for time series and regression analysis, and with statistical methods for complex data structures. The individual contributions of leading experts provide a textbook-style overview of the topic, supplemented by current

research results and questions. The statistical theory and methods in this volume aim at the analysis of data which deviate from classical stringent model assumptions, which contain outlying values and/or have a complex structure. Written for researchers as well as master and PhD students with a good knowledge of statistics.

Building a Platform for Data-Driven Pandemic Prediction Dani Gamerman 2021-09-14 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. The focus is on the integration of statistics and computing tools rather than on an in-depth analysis of all possibilities on each side. 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. Features: A general but parsimonious class of models to perform statistical prediction for epidemics, using a Bayesian approach Implementation of automated routines to obtain daily prediction results How to interactively visualize the model results Strategies for monitoring the performance of the predictions and identifying potential issues in the results Discusses the many decisions required to develop and publish online platforms Supplemented by an R package and its specific functionalities to model epidemic outbreaks The book is geared towards practitioners with an interest in the development and presentation of results in an online platform of statistical analysis of epidemiological data. The primary audience includes applied statisticians, biostatisticians, computer scientists, epidemiologists, and professionals interested in learning more about epidemic modelling in general, including the COVID-19 pandemic, and platform building. The authors are professors at the Statistics Department at Universidade Federal de Minas Gerais. Their research records exhibit contributions applied to a number of areas of Science, including Epidemiology. Their research activities include books published with Chapman and Hall/CRC and papers in high quality journals. They have also been involved with academic management of graduate programs in Statistics and one of them is currently the President of the Brazilian Statistical Association.

Modelling Under Risk and Uncertainty Etienne de Rocquigny 2012-04-30 "This volume addresses a concern of very high relevance and growing interest for large industries or environmentalists: risk and uncertainty in complex systems. It gives new insight on the peculiar mathematical challenges generated by recent industrial safety or environmental control analysis, focusing on implementing decision theory choices related to risk and uncertainty analysis through statistical estimation and computation, in the presence of physical modeling and risk analysis. The result will lead statisticians and associated professionals to formulate and solve new challenges at the frontier between statistical modeling, physics, scientific computing, and risk analysis"--

Change-point Problems Edward G. Carlstein 1994

Decision and Game Theory for Security John S. Baras 2011-11-02 This book constitutes the refereed proceedings of the Second International Conference on Decision and Game Theory for Security, GameSec 2011, held in College Park, Maryland, USA, in November 2011. The 16 revised full papers and 2 plenary keynotes presented were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on attacks, adversaries, and game theory, wireless adhoc and sensor networks, network games, security insurance, security and trust in social networks and security investments.

Multivariate Total Quality Control Carlo Lauro 2012-12-06 In the last decades, the production of goods and the offer of services have become quite complex activities mostly because of the markets globalisation, of the continuous push to the innovation and of the constant requests from more and more demanding markets. The main objective of a company system has become the achievement of the quality for the business management cycle. This cycle goes from the design (Plan) to the production (Do), from the control (Check) to the man agement (Action), as well as to the marketing and distribution. Nowadays, the Total Quality of the company system is evaluated, according to the ISO 9000 regulations, in terms of its capacity to adjust the design and the pro duction to the needs expressed (explicitly or implictly) by the final users of a product/service. In this process, the use of statistical techniques is essential not only in the classical approach of Quality Control of a product but also, and most importantly, in the Quality Design oriented to the satisfaction of customers. Thus, Total Quality refers to the global capacity of a company to fit its system to the real needs of its customers by designing products which are able to match the customers' taste and by implementing a statistical control of both the product and the Customer Satisfaction. In such a process of design and evaluation, several statistical variables are involved and with a different nature (numerical, categorical, ordinal).

Probability Theory, Random Processes and Mathematical Statistics Y. Rozanov 2012-12-06 Probability Theory, Theory of Random Processes and Mathematical Statistics are important areas of modern mathematics and its applications. They develop rigorous models for a proper treatment for various 'random' phenomena which we encounter in the real world. They provide us with numerous tools for an analysis, prediction and, ultimately, control of random phenomena. Statistics itself helps with choice of a proper mathematical model (e.g., by estimation of unknown parameters) on the basis of statistical data collected by observations. This volume is intended to be a concise textbook for a graduate level course, with carefully selected topics representing the most important areas of modern Probability, Random Processes and Statistics. The first part (Ch. 1-3) can serve as a self-contained, elementary introduction to Probability, Random Processes and Statistics. It contains a number of relatively sim ple and typical examples of random phenomena which allow a natural introduction of general structures and methods. Only knowledge of elements of real/complex analysis, linear algebra and ordinary differential equations is required here. The second part (Ch. 4-6) provides a foundation of Stochastic Analysis, gives information on basic models of

random processes and tools to study them. Here a familiarity with elements of functional analysis is necessary. Our intention to make this course fast-moving made it necessary to present important material in a form of examples.

Parametric Statistical Change Point Analysis Jie Chen 2013-11-11 Recently there has been a keen interest in the statistical analysis of change point detec tion and estimation. Mainly, it is because change point problems can be encountered in many disciplines such as economics, finance, medicine, psychology, geology, litera ture, etc. , and even in our daily lives. From the statistical point of view, a change point is a place or time point such that the observations follow one distribution up to that point and follow another distribution after that point. Multiple change points problem can also be defined similarly. So the change point(s) problem is two fold: one is to de cide if there is any change (often viewed as a hypothesis testing problem), another is to locate the change point when there is a change present (often viewed as an estimation problem). The earliest change point study can be traced back to the 1950s. During the fol lowing period of some forty years, numerous articles have been published in various journals and proceedings. Many of them cover the topic of single change point in the means of a sequence of independently normally distributed random variables. Another popularly covered topic is a change point in regression models such as linear regres sion and autoregression. The methods used are mainly likelihood ratio, nonparametric, and Bayesian. Few authors also considered the change point problem in other model settings such as the gamma and exponential.

Asymptotic Nonparametric Statistical Analysis of Stationary Time Series Daniil Ryabko 2019-03-07 Stationarity is a very general, qualitative assumption, that can be assessed on the basis of application specifics. It is thus a rather attractive assumption to base statistical analysis on, especially for problems for which less general qualitative assumptions, such as independence or finite memory, clearly fail. However, it has long been considered too general to be able to make statistical inference. One of the reasons for this is that rates of convergence, even of frequencies to the mean, are not available under this assumption alone. Recently, it has been shown that, while some natural and simple problems, such as homogeneity, are indeed provably impossible to solve if one only assumes that the data is stationary (or stationary ergodic), many others can be solved with rather simple and intuitive algorithms. The latter include clustering and change point estimation among others. In this volume these results are summarize. The emphasis is on asymptotic consistency, since this the strongest property one can obtain assuming stationarity alone. While for most of the problem for which a solution is found this solution is algorithmically realizable, the main objective in this area of research, the objective which is only partially attained, is to understand what is possible and what is not possible to do for stationary time series. The considered problems include homogeneity testing (the so-called two sample problem), clustering with respect to distribution, clustering with respect to independence, change point estimation, identity testing, and the general problem of composite hypotheses testing. For the latter problem, a topological criterion for the existence of a consistent test is presented. In addition, a number of open problems is presented.

Advances and Challenges in Multisensor Data and Information Processing Eric Lefebvre 2007-01-01 " Information fusion resulting from multi-source processing, often called multisensor data fusion when sensors are the main sources of information, is a relatively young (less than 20 years) technology domain. It provides techniques and methods for: Integrating data from multiple sources and using the complementarity of this data to derive maximum information about the phenomenon being observed; Analyzing and deriving the meaning of these observations; Selecting the best course of action; and Controlling the actions. Various sensors have been designed to detect some specific phenomena, but not others. Data fusion applications can combine synergically information from many sensors, including data provided by satellites and contextual and encyclopedic knowledge, to provide enhanced ability to detect and recognize anomalies in the environment, compared with conventional means. Data fusion is an integral part of multisensor processing, but it can also be applied to fuse non-sensor information (geopolitical, intelligence, etc.) to provide decision support for a timely and effective situation and threat assessment. One special field of application for data fusion is satellite imagery, which can provide extensive information over a wide area of the electromagnetic spectrum using several types of sensors (Visible, Infra-Red (IR), Thermal IR, Radar, Synthetic Aperture Radar (SAR), Polarimetric SAR (PolSAR), Hyperspectral...). Satellite imagery provides the coverage rate needed to identify and monitor human activities from agricultural practices (land use, crop types identification...) to defence-related surveillance (land/sea target detection and classification). By acquiring remotely sensed imagery over earth regions that land sensors cannot access, valuable information can be gathered for the defence against terrorism. This books deals with the following research areas: Target recognition/classification and tracking; Sensor systems; Image processing; Remote sensing and remote control; Belief functions theory; and Situation assessment. "

Analytical Methods in Statistics Jaromír Antoch 2017-01-24 This volume collects authoritative contributions on analytical methods and mathematical statistics. The methods presented include resampling techniques; the minimization of divergence; estimation theory and regression, eventually under shape or other constraints or long memory; and iterative approximations when the optimal solution is difficult to achieve. It also investigates probability distributions with respect to their stability, heavy-tailness, Fisher information and other aspects, both asymptotically and non-asymptotically. The book not only presents the latest mathematical and statistical methods and their extensions, but also offers solutions to real-world problems including option pricing. The selected, peer-reviewed contributions were originally presented at the workshop on Analytical Methods in Statistics, AMISTAT 2015, held in Prague, Czech Republic, November 10-13, 2015.

Long Memory in Economics Gilles Teyssière 2006-09-22 Assembles three different strands of long memory analysis: statistical literature on the properties of, and tests for, LRD processes; mathematical literature on the

stochastic processes involved; and models from economic theory providing plausible micro foundations for the occurrence of long memory in economics.

Journal of statistical planning and inference Elsevier Science (Firm) 1996

Studies on Time Series Applications in Environmental Sciences Alina Bărbulescu 2016-03-12 Time series analysis and modelling represent a large study field, implying the approach from the perspective of the time and frequency, with applications in different domains. Modelling hydro-meteorological time series is difficult due to the characteristics of these series, as long range dependence, spatial dependence, the correlation with other series. Continuous spatial data plays an important role in planning, risk assessment and decision making in environmental management. In this context, in this book we present various statistical tests and modelling techniques used for time series analysis, as well as applications to hydro-meteorological series from Dobrogea, a region situated in the south-eastern part of Romania, less studied till now. Part of the results are accompanied by their R code.

Nonparametric Methods in Change Point Problems E. Brodsky 2013-03-14 The explosive development of information science and technology puts in new problems involving statistical data analysis. These problems result from higher re quirements concerning the reliability of statistical decisions, the accuracy of math ematical models and the quality of control in complex systems. A new aspect of statistical analysis has emerged, closely connected with one of the basic questions of cynergetics: how to "compress" large volumes of experimental data in order to extract the most valuable information from data observed. De tection of large "homogeneous" segments of data enables one to identify "hidden" regularities in an object's behavior, to create mathematical models for each seg ment of homogeneity, to choose an appropriate control, etc. Statistical methods dealing with the detection of changes in the characteristics of random processes can be of great use in all these problems. These methods have accompanied the rapid growth in data beginning from the middle of our century. According to a tradition of more than thirty years, we call this sphere of statistical analysis the "theory of change-point detection. " During the last fifteen years, we have witnessed many exciting developments in the theory of change-point detection. New promising directions of research have emerged, and traditional trends have flourished anew. Despite this, most of the results are widely scattered in the literature and few monographs exist. A real need has arisen for up-to-date books which present an account of important current research trends, one of which is the theory of non parametric change--point detection.

The Radon Transform and Local Tomography Alexander G. Ramm 2020-07-16 Over the past decade, the field of image processing has made tremendous advances. One type of image processing that is currently of particular interest is "tomographic imaging," a technique for computing the density function of a body, or discontinuity surfaces of this function. Today, tomography is widely used, and has applications in such fields as medicine, engineering, physics, geophysics, and security. The Radon Transform and Local Tomography clearly explains the theoretical, computational, and practical aspects of applied tomography. It includes sufficient background information to make it essentially self-contained for most readers.

Stochastic Disorder Problems Albert N. Shiryaev 2019-03-12 This monograph focuses on those stochastic quickest detection tasks in disorder problems that arise in the dynamical analysis of statistical data. These include quickest detection of randomly appearing targets, of spontaneously arising effects, and of arbitrage (in financial mathematics). There is also currently great interest in quickest detection methods for randomly occurring intrusions in information systems and in the design of defense methods against cyber-attacks. The author shows that the majority of quickest detection problems can be reformulated as optimal stopping problems where the stopping time is the moment the occurrence of disorder is signaled. Thus, considerable attention is devoted to the general theory of optimal stopping rules, and to its concrete problem-solving methods. The exposition covers both the discrete time case, which is in principle relatively simple and allows step-by-step considerations, and the continuous-time case, which often requires more technical machinery such as martingales, supermartingales, and stochastic integrals. There is a focus on the well-developed apparatus of Brownian motion, which enables the exact solution of many problems. The last chapter presents applications to financial markets. Researchers and graduate students interested in probability, decision theory and statistical sequential analysis will find this book useful.

Algorithmic Learning Theory Sanjay Jain 2013-09-27 This book constitutes the proceedings of the 24th International Conference on Algorithmic Learning Theory, ALT 2013, held in Singapore in October 2013, and co-located with the 16th International Conference on Discovery Science, DS 2013. The 23 papers presented in this volume were carefully reviewed and selected from 39 submissions. In addition the book contains 3 full papers of invited talks. The papers are organized in topical sections named: online learning, inductive inference and grammatical inference, teaching and learning from queries, bandit theory, statistical learning theory, Bayesian/stochastic learning, and unsupervised/semi-supervised learning.