Brazilian Journal Of Probability And Statistics

Causality offers the first comprehensive coverage of causal analysis in many sciences, including recent advances using graphical methods. Pearl presents a unified account of the probabilistic, manipulative, counterfactual and structural approaches to causation, and devises simple mathematical tools for analyzing the relationships between causal connections, statistical associations, actions and observations. The book will open the way for including causal analysis in the standard curriculum of statistics, artificial intelligence,...

The use of Markov chain Monte Carlo (MCMC) methods for estimating hierarchical models involves complex data structures and is often described as a revolutionary development. An intermediate-level treatment of Bayesian hierarchical models and their applications, Applied Bayesian Hierarchical Methods demonstrates the advantages of a Bayesian approach to data sets involving inferences for collections of related units or variables and in methods where parameters can be treated as random collections. Emphasizing computational issues, the book provides examples of the following application settings: meta-analysis, data structured in space or time, multilevel and longitudinal data, multivariate data, nonlinear regression, and survival time data. For the worked examples, the text mainly employs the WinBUGS package, allowing readers to explore alternative likelihood assumptions, regression structures, and assumptions on prior densities. It also incorporates BayesX code, which is particularly useful in nonlinear regression. To demonstrate MCMC sampling from first principles, the author includes worked examples using the R package. Through illustrative data analysis and attention to statistical computing, this book focuses on the practical implementation of Bayesian hierarchical methods. It also discusses several issues that arise when applying Bayesian techniques in hierarchical and random effects models.

Quantile regression constitutes an ensemble of statistical techniques intended to estimate and draw inferences about conditional quantile functions. Median regression, as introduced in the 18th century by Boscovich and Laplace, is a special case. In contrast to conventional mean regression that minimizes sums of squared residuals, median regression minimizes sums of absolute residuals; quantile regression simply replaces symmetric absolute loss by asymmetric linear loss. Since its introduction in the 1970's by Koenker and Bassett, quantile regression has been gradually extended to a wide variety of data analytic settings including time series, survival analysis, and longitudinal data. By focusing attention on local slices of the conditional distribution of response variables it is capable of providing a more complete, more nuanced view of heterogeneous covariate effects. Applications of quantile regression can now be found throughout the sciences, including astrophysics, chemistry, ecology, economics, finance, genomics, medicine, and meteorology. Software for quantile regression is now widely available in all the major statistical computing environments. The objective of this volume is to provide a comprehensive review of recent developments of quantile regression methodology illustrating its applicability in a wide range of scientific settings. The intended audience of the volume is researchers and graduate students across a diverse set of disciplines.

Brazilian Journal of Probability and StatisticsThe Dominance of English as a Language of ScienceEffects on Other Languages and Language CommunitiesWalter de Gruyter

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.

Parameter estimation in stochastic differential equations and stochastic partial differential equations is the science, art and technology of modeling complex phenomena. The subject has attracted researchers from several areas of mathematics. This volume presents the estimation of the unknown parameters in the corresponding continuous models based on continuous and discrete observations and examines extensively maximum likelihood, minimum contrast and Bayesian methods.

?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.

The text shows to what degree English is now the dominant language of science. It gives a world-wide overview of various countries on all continents aiming beyond description at explanation and even prediction of future developments.

This book is the first of two volumes on random motions in Markov and semi-Markov random environments. This first volume focuses on homogenous random motions. This volume consists of two parts, the first describing the basic concepts and methods that have been developed for random evolutions. These methods are the foundational tools used in both volumes, and this description includes many results in potential operators. Some techniques to find closed-form expressions in relevant applications are also presented. The second part deals with asymptotic results and presents a variety of applications, including random motion with different types of boundaries, the reliability of storage systems and solutions of partial differential equations with constant coefficients, using commutative algebra techniques. It also presents an alternative formulation to the Black-Scholes formula in finance, fading evolutions and telegraph processes, including jump telegraph processes and the estimation of the number of level crossings for telegraph processes.

This book provides an accessible approach to Bayesian computing and data analysis, with an emphasis on the interpretation of real data sets. Following in the tradition of the

successful first edition, this book aims to make a wide range of statistical modeling applications accessible using tested code that can be readily adapted to the reader's own applications. The second edition has been thoroughly reworked and updated to take account of advances in the field. A new set of worked examples is included. The novel aspect of the first edition was the coverage of statistical modeling using WinBUGS and OPENBUGS. This feature continues in the new edition along with examples using R to broaden appeal and for completeness of coverage.

The book provides the background on simulating copulas and multivariate distributions in general. It unifies the scattered literature on the simulation of various families of copulas (elliptical, Archimedean, Marshall-Olkin type, etc.) as well as on different construction principles (factor models, pair-copula construction, etc.). The book is self-contained and unified in presentation and can be used as a textbook for graduate and advanced undergraduate students with a firm background in stochastics. Besides the theoretical foundation, ready-to-implement algorithms and many examples make the book a valuable tool for anyone who is applying the methodology.

This book constitutes the refereed proceedings of the 17th Brazilian Symposium on Artificial Intelligence, SBIA 2004, held in Sao Luis, Maranhao, Brazil in September/October 2004. The 54 revised full papers presented were carefully reviewed and selected from 208 submissions from 21 countries. The papers are organized in topical sections on logics, planning, and theoretical methods; search, reasoning, and uncertainty; knowledge representation and ontologies; natural language processing; machine learning, knowledge discovery and data mining; evolutionary computing, artificial life, and hybrid systems; robotics and compiler vision; and autonomous agents and multi-agent systems.

This book presents a concise introduction to Bartlett and Bartlett-type corrections of statistical tests and bias correction of point estimators. The underlying idea behind both groups of corrections is to obtain higher accuracy in small samples. While the main focus is on corrections that can be analytically derived, the authors also present alternative strategies for improving estimators and tests based on bootstrap, a data resampling technique and discuss concrete applications to several important statistical models.

SBIA, the Brazilian Symposium on Arti?cial Intelligence, is a biennial event intended to be the main forum of the AI community in Brazil. The SBIA 2004 was the 17th issue of the series initiated in 1984. Since 1995 SBIA has been accepting papers written and presented only in English, attracting researchers from all over the world. At that time it also started to have an international program committee, keynote invited speakers, and proceedings published in the Lecture Notes in Arti?cial Intelligence (LNAI) series of Springer (SBIA 1995, Vol. 991, SBIA 1996, Vol. 1159, SBIA 1998, Vol. 1515, SBIA 2000, Vol. 1952, SBIA 2002, Vol. 2507). SBIA 2004 was sponsored by the Brazilian Computer Society (SBC). It was held from September 29 to October 1 in the city of S ? ao Luis, in the northeast of Brazil, together with the Brazilian Symposium on Neural Networks (SBRN). This followed a trend of joining the AI and ANN communities to make the joint event a very exciting one. In particular, in 2004 these two events were also held togetherwiththeIEEEInternationalWorkshoponMachineLearningandSignal Processing (MMLP), formerly NNLP. The organizationalstructure of SBIA 2004was similar to other international scienti?cconferences.Thebackboneofthe conferencewasthe technicalprogram whichwascomplementedbyinvitedtalks,workshops,etc.onthemainAItopics.

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.

in Massen gefertigte Produkte können unmöglich einzeln auf ihre Qualität hin getestet werden. Um Aussagen über Zuverlässigkeit der Produktionsabläufe oder Qualität der Produkte zu treffen, bedarf es statistischer Methoden, die den Schluss von einer Stichprobe auf die gesamte Produktion erlauben. Mathematische Methoden der Zuverlässigkeitsanalyse und Qualitätssicherung kommen nicht nur in der industriellen Praxis, sondern auch in Forschung und Entwicklung zum Einsatz. Ein Schwerpunkt des Buches liegt in der exakten Darstellung der mathematischen Grundlagen. Aus den Formeln werden Methoden für die direkte Anwendung entwickelt. Die große Anzahl an Beispielen wird von den Eingabeparametern bis zu den Ergebnissen nachvollziehbar präsentiert und viele können als Vorlage für eine unmittelbare Umsetzung in die Praxis dienen.

This monograph of carefully collected articles reviews recent developments in theoretical and applied statistical science, highlights current noteworthy results and illustrates their applications; and points out possible new directions to pursue. With its enlightening account of statistical discoveries and its numerous figures and tables, Probability and Statistical Models with Applications is a must read for probabilists and theoretical and applied statisticians.

Für Studium und Weiterbildung werden institutionelle Rahmenbedingungen, wissenschaftstheoretische Grundlagen, methodische Gütekriterien und praktische Verfahren für empirische Untersuchungen psychologischer, evaluativer und verwandter Probleme dargestellt. Im Mittelpunkt steht die Validität und damit die Güte und Qualität von Untersuchungen wissenschaftlicher und praktischer Fragestellungen. Diese umfasst vor allem die Adäquatheit von Begriffen, deduktiven und induktiven Argumenten, kausalen Aussagen, Gesetzeshypothesen und Theorien, die Kontrolle störender Einflüsse bei Beobachtungen, Befragungen, Einschätzungen (ratings), Messungen, Tests, Experimenten, Quasi-Experimenten, Fall-Kontroll- und Einzelgruppenstudien sowie die sachgerechte Anwendung und Interpretation von statistischen Zusammenhängen und Tests, Varianz-, Regressions- und Meta-Analysen, festen, zufälligen und hierarchisierten Faktoren. Ziel ist ein tiefergehendes Verständnis wesentlicher

Qualitätsmerkmale empirischer Untersuchungen, um fundiert Methoden einsetzen und Ergebnisse interpretieren zu können.

This volume presents some of the most influential papers published by Rabi N. Bhattacharya, along with commentaries from international experts, demonstrating his knowledge, insight, and influence in the field of probability and its applications. For more than three decades, Bhattacharya has made significant contributions in areas ranging from theoretical statistics via analytical probability theory, Markov processes, and random dynamics to applied topics in statistics, economics, and geophysics. Selected reprints of Bhattacharya's papers are divided into three sections: Modes of Approximation, Large Times for Markov Processes, and Stochastic Foundations in Applied Sciences. The accompanying articles by the contributing authors not only help to position his work in the context of other achievements, but also provide a unique assessment of the state of their individual fields, both historically and for the next generation of researchers. Rabi N. Bhattacharya: Selected Papers will be a valuable resource for young researchers entering the diverse areas of study to which Bhattacharya has contributed. Established researchers will also appreciate this work as an account of both past and present developments and challenges for the future.

This book is the second of two volumes on random motions in Markov and semi-Markov random environments. This second volume focuses on high-dimensional random motions. This volume consists of two parts. The first expands many of the results found in Volume 1 to higher dimensions. It presents new results on the random motion of the realistic three-dimensional case, which has so far been barely mentioned in the literature, and deals with the interaction of particles in Markov and semi-Markov media, which has, in contrast, been a topic of intense study. The second part contains applications of Markov and semi-Markov motions in mathematical finance. It includes applications of telegraph processes in modeling stock price dynamics and investigates the pricing of variance, volatility, covariance and correlation swaps with Markov volatility and the same pricing swaps with semi-Markov volatilities.

This volume contains the extended versions of papers presented at the 3rd International Conference on Computer Science, Applied Mathematics and Applications (ICCSAMA 2015) held on 11-13 May, 2015 in Metz, France. The book contains 5 parts: 1. Mathematical programming and optimization: theory, methods and software, Operational research and decision making, Machine learning, data security, and bioinformatics, Knowledge information system, Software engineering. All chapters in the book discuss theoretical and algorithmic as well as practical issues connected with computation methods & optimization methods for knowledge engineering and machine learning techniques.

The Most Comprehensive Book on the Subject Chronicles the Development of the Weibull Distribution in Statistical Theory and Applied Statistics Exploring one of the most important distributions in statistics, The Weibull Distribution: A Handbook focuses on its origin, statistical properties, and related distributions. The book also presents various approaches to estimate the parameters of the Weibull distribution under all possible situations of sampling data as well as approaches to parameter and goodness-of-fit testing. Describes the Statistical Methods, Concepts, Theories, and Applications of This Distribution Compiling findings from dozens of scientific journals and hundreds of research papers, the author first gives a careful and thorough mathematical description of the Weibull distribution and all of its features. He then deals with Weibull analysis, using classical and Bayesian approaches along with graphical and linear maximum likelihood techniques to estimate the three Weibull parameters. The author also explores the inference of Weibull processes, Weibull parameter testing, and different types of goodness-of-fit tests and methods. Successfully Apply the Weibull Model By using inferential procedures for estimating, testing, forecasting, and simulating data, this self-contained, detailed handbook shows how to solve statistical life science and engineering problems.

An important factor that affects the duration, complexity and cost of a clinical trial is the endpoint used to study the treatment's efficacy. When a true endpoint is difficult to use because of such factors as long follow-up times or prohibitive cost, it is sometimes possible to use a surrogate endpoint that can be measured in a more convenient or cost-effective way. This book focuses on the use of surrogate endpoint evaluation methods in practice, using SAS and R.

This volume collects together research and survey papers written by invited speakers of the conference celebrating the 70th birthday of László Lovász. The topics covered include classical subjects such as extremal graph theory, coding theory, design theory, applications of linear algebra and combinatorial optimization, as well as recent trends such as extensions of graph limits, online or statistical versions of classical combinatorial problems, and new methods of derandomization. László Lovász is one of the pioneers in the interplay between discrete and continuous mathematics, and is a master at establishing unexpected connections, "building bridges" between seemingly distant fields. His invariably elegant and powerful ideas have produced new subfields in many areas, and his outstanding scientific work has defined and shaped many research directions in the last 50 years. The 14 contributions presented in this volume, all of which are connected to László Lovász's areas of research, offer an excellent overview of the state of the art of combinatorics and related topics and will be of interest to experienced specialists as well as young researchers.

This book provides the reader with a background on simulating copulas and multivariate distributions in general. It unifies the scattered literature on the simulation of various families of copulas (elliptical, Archimedean, Marshall-Olkin type, etc.) as well as on different construction principles (factor models, pair-copula construction, etc.). The book is self-contained and unified in presentation and can be used as a textbook for advanced undergraduate or graduate students with a firm background in stochastics. Alongside the theoretical foundation, ready-to-implement algorithms and many examples make this book a valuable tool for anyone who is applying the methodology.Errata(s)Errata (128 KB)

Methods and Applications of Statistics in Clinical Trials,Volume 2: Planning, Analysis, and Inferential Methods includesupdates of established literature from the Wiley Encyclopedia ofClinical Trials as well as original material based on the latestdevelopments in clinical trials. Prepared by a leading expert, thesecond volume includes numerous contributions from currentprominent experts in the field of medical research. In addition,the volume features: • Multiple new articles exploring emerging topics, such asevaluation methods with threshold, empirical likelihood methods,nonparametric ROC analysis, over- and under-dispersed models, andmulti-armed bandit problems • Up-to-date research on the Cox proportional hazardmodel, frailty models, trial reports, intrarater reliability,conditional power, and the kappa index • Key qualitative issues including cost-effectivenessanalysis, publication bias, and regulatory issues, which arecrucial to the planning and data management of clinical trials

The first edition of Bayesian Methods: A Social and Behavioral Sciences Approach helped pave the way for Bayesian approaches to become more prominent in social science methodology. While the focus remains on practical modeling and basic theory as well as on intuitive explanations and derivations without skipping steps, this second edition incorporates the latest methodology and recent changes in software offerings. New to the Second Edition Two chapters on Markov chain Monte Carlo (MCMC) that cover ergodicity, convergence, mixing, simulated annealing, reversible jump MCMC, and coupling Expanded coverage of Bayesian linear and hierarchical models More technical and philosophical details on prior distributions A dedicated R package (BaM) with data and code for the examples as well as a set of functions for practical purposes such as calculating highest posterior density (HPD) intervals Requiring only a basic working knowledge of linear algebra and calculus, this text is one of the few to offer a graduate-level introduction to Bayesian statistics for social scientists. It first introduces Bayesian statistics

and inference, before moving on to assess model quality and fit. Subsequent chapters examine hierarchical models within a Bayesian context and explore MCMC techniques and other numerical methods. Concentrating on practical computing issues, the author includes specific details for Bayesian model building and testing and uses the R and BUGS software for examples and exercises.

Drawing on advanced probability theory, Ambit Stochastics is used to model stochastic processes which depend on both time and space. This monograph, the first on the subject, provides a reference for this burgeoning field, complete with the applications that have driven its development. Unique to Ambit Stochastics are ambit sets, which allow the delimitation of space-time to a zone of interest, and ambit fields, which are particularly well-adapted to modelling stochastic volatility or intermittency. These attributes lend themselves notably to applications in the statistical theory of turbulence and financial econometrics. In addition to the theory and applications of Ambit Stochastics, the book also contains new theory on the simulation of ambit fields and a comprehensive stochastic integration theory for Volterra processes in a non-semimartingale context. Written by pioneers in the subject, this book will appeal to researchers and graduate students interested in empirical stochastic modelling.

This is the first book in longitudinal categorical data analysis with parametric correlation models developed based on dynamic relationships among repeated categorical responses. This book is a natural generalization of the longitudinal binary data analysis to the multinomial data setup with more than two categories. Thus, unlike the existing books on cross-sectional categorical data analysis using log linear models, this book uses multinomial probability models both in cross-sectional and longitudinal setups. A theoretical foundation is provided for the analysis of univariate multinomial responses, by developing models systematically for the cases with no covariates as well as categorical covariates, both in cross-sectional and longitudinal setups. In the longitudinal setup, both stationary and non-stationary covariates are considered. These models have also been extended to the bivariate multinomial setup along with suitable covariates. For the inferences, the book uses the generalized quasi-likelihood as well as the exact likelihood approaches. The book is technically rigorous, and, it also presents illustrations of the statistical analysis of various real life data involving univariate multinomial responses both in cross-sectional and longitudinal setups. This book is written mainly for the graduate students and researchers in statistics and social sciences, among other applied statistics research areas. However, the rest of the book, specifically the chapters from 1 to 3, may also be used for a senior undergraduate course in statistics.

Das Buch behandelt die Zuverlässigkeitsbewertung mechatronischer Systeme – speziell in frühen Entwicklungsphasen. Herausforderung hierbei ist vor allem die ganzheitliche Betrachtung der Domänen Mechanik, Elektronik und Software sowie der unsicheren bzw. unvollständigen Daten. Neben der domänenübergreifenden Betrachtungsweise vertiefen die Autoren einzelne Themenaspekte, die der Zuverlässigkeitsbewertung in frühen Entwicklungsphasen dienen.

A useful guide for researchers and professionals, graduate and senior undergraduate students, this book provides an in-depth look at applied and geometrical probability with an emphasis on statistical distributions. A meticulous treatment of geometrical probability, kept at a level to appeal to a wider audience including applied researchers who will find the book to be both functional and practical with the large number of problems chosen from different disciplines A few topics such as packing and covering problems that have a vast literature are introduced here at a peripheral level for the purpose of familiarizing readers who are new to the area of research.

Praise for the Second Edition "As a comprehensive statistics reference book for quality improvement, it certainly is one of the best books available." —Technometrics This new edition continues to provide the most current, proven statistical methods for quality control and quality improvement The use of quantitative methods offers numerous benefits in the fields of industry and business, both through identifying existing trouble spots and alerting management and technical personnel to potential problems. Statistical Methods for Quality Improvement, Third Edition guides readers through a broad range of tools and techniques that make it possible to quickly identify and resolve both current and potential trouble spots within almost any manufacturing or nonmanufacturing process. The book provides detailed coverage of the application of control charts, while also exploring critical topics such as regression, design of experiments, and Taguchi methods. In this new edition, the author continues to explain how to combine the many statistical methods explored in the book in order to optimize quality control and improvement. The book has been thoroughly revised and updated to reflect the latest research and practices in statistical methods and quality control, and new features include: Updated coverage of control charts, with newly added tools The latest research on the monitoring of linear profiles and other types of profiles Sections on generalized likelihood ratio charts and the effects of parameter estimation on the properties of CUSUM and EWMA procedures New discussions on design of experiments that include conditional effects and fraction of design space plots New material on Lean Six Sigma and Six Sigma programs and training Incorporating the latest software applications, the author has added coverage on how to use Minitab software to obtain probability limits for attribute charts. new exercises have been added throughout the book, allowing readers to put the latest statistical methods into practice. Updated references are also provided, shedding light on the current literature and providing resources for further study of the topic. Statistical Methods for Quality Improvement, Third Edition is an excellent book for courses on quality control and design of experiments at the upper-undergraduate and graduate levels. the book also serves as a valuable reference for practicing statisticians, engineers, and physical scientists interested in statistical quality improvement.

Statistische Methoden haben in den letzten Jahrzehnten kontinuierlich an Bedeutung gewonnen. Entsprechend wichtig sind profunde Kenntnisse der Prämissen, auf denen solche Verfahren beruhen, sowie die Fähigkeit, sich mit den Ergebnissen und der Interpretation einer statistischen Analyse kritisch auseinanderzusetzen. In bewährter Weise werden in diesem Lehrbuch grundlegende Begriffe und Verfahren der Statistik erläutert und können anhand von Aufgaben erprobt werden. Das Buch umfasst die Bereiche deskriptive Statistik, Wahrscheinlichkeitsrechnung und induktive Statistik sowie weitere wichtige Teilgebiete der Statistik, wie etwa Prognoserechnung, Ökonometrie, multivariate Verfahren, statistische Entscheidungstheorie und statistische Software. Für die Arbeit mit dem Buch sind mathematische Vorkenntnisse, die üblicherweise im ersten Studienabschnitt in wirtschafts- und sozialwissenschaftlichen Studiengängen vermittelt werden, ausreichend.

Introduction to Robust Estimating and Hypothesis Testing, 4th Editon, is a 'how-to' on the application of robust methods using available software. Modern robust methods provide improved techniques for dealing with outliers, skewed distribution curvature and heteroscedasticity that can provide substantial gains in power as well as a deeper, more accurate and more nuanced understanding of data. Since the last edition, there have been numerous advances and improvements. They include new techniques for comparing groups and measuring effect size as well as new methods for comparing quantiles. Many

new regression methods have been added that include both parametric and nonparametric techniques. The methods related to ANCOVA have been expanded considerably. New perspectives related to discrete distributions with a relatively small sample space are described as well as new results relevant to the shift function. The practical importance of these methods is illustrated using data from real world studies. The R package written for this book now contains over 1200 functions. New to this edition 35% revised content Covers many new and improved R functions New techniques that deal with a wide range of situations Extensive revisions to cover the latest developments in robust regression Covers latest improvements in ANOVA Includes newest rank-based methods Describes and illustrated easy to use software

The cost for bringing new medicine from discovery to market has nearly doubled in the last decade and has now reached $2.6 billion. There is an urgent need to make drug development less time-consuming and less costly. Innovative trial designs/ analyses such as the Bayesian approach are essential to meet this need. This book will be the first to provide comprehensive coverage of Bayesian applications across the span of drug development, from discovery, to clinical trial, to manufacturing with practical examples. This book will have a wide appeal to statisticians, scientists, and physicians working in drug development who are motivated to accelerate and streamline the drug development process, as well as students who aspire to work in this field. The advantages of this book are: Provides motivating, worked, practical case examples with easy to grasp models, technical details, and computational codes to run the analyses Balances practical examples with best practices on trial simulation and reporting, as well as regulatory perspectives Chapters written by authors who are individual contributors in their respective topics Dr. Mani Lakshminarayanan is a researcher and statistical consultant with more than 30 years of experience in the pharmaceutical industry. He has published over 50 articles, technical reports, and book chapters besides serving as a referee for several journals. He has a PhD in Statistics from Southern Methodist University, Dallas, Texas and is a Fellow of the American Statistical Association. Dr. Fanni Natanegara has over 15 years of pharmaceutical experience and is currently Principal Research Scientist and Group Leader for the Early Phase Neuroscience Statistics team at Eli Lilly and Company. She played a key role in the Advanced Analytics team to provide Bayesian education and statistical consultation at Eli Lilly. Dr. Natanegara is the chair of the cross industry-regulatory-academic DIA BSWG to ensure that Bayesian methods are appropriately utilized for design and analysis throughout the drug-development process.

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, morphometics and image analysis .

Introduction: Mathematicians and statisticians have made significant academic progress on the subject of distribution theory in the last two decades, and this area of study is becoming one of the main statistical tools for the analysis of lifetime (survival) data. In many ways, lifetime distributions are the common language of survival dialogue because the framework subsumes many statistical properties of interest, such as reliability, entropy and maximum likelihood. Recent Advances in Lifetime and Reliability Models provides a comprehensive account of models and methods for lifetime models. Building from primary definitions such as density and hazard rate functions, this book presents readers a broad framework on distribution theory in survival analysis. This framework covers classical methods - such as the exponentiated distribution method – as well as recent models explaining lifetime distributions, such as the beta family and compounding models. Additionally, a detailed discussion of mathematical and statistical properties of each family, such as mixture representations, asymptotes, types of moments, order statistics, quantile functions, generating functions and estimation is presented in the book. Key Features: - presents information about classical and modern lifetime methods - covers key properties of different models in detail - explores regression models for the beta generalized family of distributions - focuses information on both theoretical fundamentals and practical aspects of implementing different models - features examples relevant to business engineering and biomedical sciences Recent Advances in Lifetime and Reliability Models will equip students, researchers and working professionals with the information to make extensive use of observational data in a variety of fields to create inferential models that make sense of lifetime data.

This book introduces a number of new sampling plans, such as time truncated life tests, skip sampling plans, resubmitted plans, mixed sampling plans, sampling plans based on the process capability index and plans for big data, which can be used for testing and inspecting products, from the raw-materials stage to the final product, in every industry using statistical process control techniques. It also presents the statistical theory, methodology and applications of acceptance sampling from truncated life tests. Further, it discusses the latest reliability, quality and risk analysis methods based on acceptance sampling from truncated life, which engineering and statisticians require in order to make decisions, and which are also useful for researchers in the areas of quality control, lifetime analysis, censored data analysis, goodness-of-fit and statistical software applications. In its nine chapters, the book addresses a wide range of testing/inspection sampling schemes for discrete and continuous data collected in various production processes. It includes a chapter on sampling plans for big data and offers several illustrative examples of the procedures presented. Requiring a basic knowledge of probability distributions, inference and estimation, and lifetime and quality analysis, it is a valuable resource for graduate and senior undergraduate engineering students, and practicing engineers, more specifically it is useful for quality engineers, reliability engineers, consultants, black belts, master black belts, students and researchers interested in applying reliability and risk and quality methods.

The papers contained in this volume were originally presented at the 2015 International Conference on Complex Systems in Business, Administration, Science and Engineering. Included are the latest works of practitioners from a variety of disciplines who have developed new approaches for resolving complex issues that cannot be formulated using conventional, mathematical or software models. Complex Systems occur in an infinite variety of problems, not only in the realm of physical sciences and engineering, but also in such diverse fields as economics, the environment, humanities, and social and political sciences. The papers in the book cover such topics as: Complex ecological systems; Complexity science and urban developments; Complex energy systems; Complex issues in biological and medical sciences; Extreme events: natural and human made disasters; Climate change; Complexity of the internet-based global market; Complex business processes; Supply chain complexity; Transportation complexity; Logistics complexity; Closed and open systems; Attractions and chaotic systems; Complex adaptive software; Complexity of big data; Management of complexity; Global economy as a complex system; Complexity in social systems; Complex political systems; Administrations as complex systems; Complexity in engineering; Complexity and environment; Complexity and evolution; Complexity in linguistics, literature and arts.

Robust Bayesian analysis aims at overcoming the traditional objection to Bayesian analysis of its dependence on subjective inputs, mainly the prior and the loss. Its purpose is the determination of the impact of the inputs to a Bayesian analysis (the prior, the loss and the model) on its output when the inputs range in certain classes. If the impact is considerable, there is sensitivity and we should attempt to further refine the information the incumbent classes available, perhaps through additional constraints on and/ or obtaining additional data; if the impact is not important, robustness holds and no further analysis and refinement would be required. Robust Bayesian analysis has been widely accepted by Bayesian statisticians; for a while it was even a main research topic in the field. However, to a great extent, their impact is yet to be seen in applied settings. This volume, therefore, presents an overview of the current state of robust Bayesian methods and their applications and identifies topics of further in terest in the area. The papers in the volume are divided into nine parts covering the main aspects of the field. The first one provides an overview of Bayesian robustness at a non-technical level. The paper in Part II con cerns foundational aspects and describes decision-theoretical axiomatisa tions leading to the robust Bayesian paradigm, motivating reasons for which robust analysis is practically unavoidable within Bayesian analysis.