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Doing Bayesian Data Analysis

There is an explosion of interest in Bayesian statistics, primarily because recently created computational methods have finally made Bayesian analysis tractable and accessible to a wide audience. *Doing Bayesian Data Analysis, A Tutorial Introduction with R and BUGS*, is for first year graduate students or advanced undergraduates and provides an accessible approach, as all mathematics is explained intuitively and with concrete examples. It assumes only algebra and 'rusty' calculus. Unlike other textbooks, this book begins with the basics, including essential concepts of probability and random sampling. The book gradually climbs all the way to advanced hierarchical modeling methods for realistic data. The text provides complete examples with the R programming language and BUGS software (both freeware), and begins with basic programming examples, working up gradually to complete programs for complex analyses and presentation graphics. These templates can be easily adapted for a large variety of students and their own research needs. The textbook bridges the students from their undergraduate training into modern Bayesian methods. Accessible, including the basics of essential concepts of probability and random sampling -Examples with R programming language and BUGS software -Comprehensive coverage of all scenarios addressed by non-bayesian textbooks- t-tests, analysis of variance (ANOVA) and comparisons in ANOVA, multiple regression, and chi-square (contingency table analysis).-Coverage of experiment planning -R and BUGS computer programming code on website -Exercises have explicit purposes and guidelines for accomplishment.

Doing Bayesian Data Analysis

A Tutorial Introduction with R

Academic Press There is an explosion of interest in Bayesian statistics, primarily because recently created computational methods have finally made Bayesian analysis tractable and accessible to a wide audience. *Doing Bayesian Data Analysis, A Tutorial Introduction with R and BUGS*, is for first year graduate students or advanced undergraduates and provides an accessible approach, as all mathematics is explained intuitively and with concrete examples. It assumes only algebra and 'rusty' calculus. Unlike other textbooks, this book begins with the basics, including essential concepts of probability and random sampling. The book gradually climbs all the way to advanced hierarchical modeling methods for realistic data. The text provides complete examples with the R programming language and BUGS software (both freeware), and begins with basic programming examples, working up gradually to complete programs for complex analyses and presentation graphics. These templates can be easily adapted for a large variety of students and their own research needs. The textbook bridges the students from their undergraduate training into modern Bayesian methods. Accessible, including the basics of essential concepts of probability and random sampling Examples with R programming language and BUGS software Comprehensive coverage of all scenarios addressed by non-bayesian textbooks- t-tests, analysis of variance (ANOVA) and comparisons in ANOVA, multiple regression, and chi-square (contingency table analysis). Coverage of experiment planning R and BUGS computer programming code on website Exercises have explicit purposes and guidelines for accomplishment

Doing Bayesian Data Analysis

A Tutorial with R, JAGS, and Stan

Academic Press *Doing Bayesian Data Analysis: A Tutorial with R, JAGS, and Stan, Second Edition* provides an accessible approach for conducting Bayesian data analysis, as material is explained clearly with concrete examples. Included are step-by-step instructions on how to carry out Bayesian data analyses in the popular and free software R and WinBugs, as well as new programs in JAGS and Stan. The new programs are designed to be much easier to use than the scripts in the first edition. In particular, there are now compact high-level scripts that make it easy to run the programs on your own data sets. The book is divided into three parts and begins with the basics: models, probability, Bayes' rule, and the R programming language. The discussion then moves to the fundamentals applied to inferring a binomial probability, before concluding with chapters on the generalized linear model. Topics include metric-predicted variable on one or two groups; metric-predicted variable with one metric predictor; metric-predicted variable with multiple metric predictors; metric-predicted variable with one nominal predictor; and metric-predicted variable with multiple nominal predictors. The exercises found in the text have explicit purposes and guidelines for accomplishment. This book is intended for first-year graduate students or advanced undergraduates in statistics, data analysis, psychology, cognitive science, social sciences, clinical sciences, and consumer sciences in business. Accessible, including the basics of essential concepts of probability and random sampling Examples with R programming language and JAGS software Comprehensive coverage of all scenarios addressed by non-Bayesian textbooks: t-tests, analysis of variance (ANOVA) and comparisons in ANOVA, multiple regression, and chi-square (contingency table analysis) Coverage of experiment planning R and JAGS computer programming code on website Exercises have explicit purposes and guidelines for accomplishment Provides step-by-step instructions on how to conduct Bayesian data analyses in the popular and free software R and WinBugs

Bayesian Data Analysis in Ecology Using Linear Models with R, BUGS, and Stan

Academic Press *Bayesian Data Analysis in Ecology Using Linear Models with R, BUGS, and STAN* examines the Bayesian and frequentist methods of conducting data analyses. The book provides the theoretical background in an easy-to-understand approach, encouraging readers to examine the processes that generated their data. Including discussions of model selection, model checking, and multi-model inference, the book also uses effect plots that allow a natural interpretation of data. *Bayesian Data Analysis in Ecology Using Linear Models with R, BUGS, and STAN* introduces Bayesian software, using R for the simple modes, and flexible Bayesian software (BUGS and Stan) for the more complicated ones. Guiding the ready from easy toward more complex (real) data analyses in a step-by-step manner, the book presents problems and solutions—including all R codes—that are most often applicable to other data and questions, making it an invaluable resource for analyzing a variety of data types. Introduces Bayesian data analysis, allowing users to obtain uncertainty measurements easily for any derived parameter of interest Written in a step-by-step approach that allows for eased understanding by non-statisticians Includes a companion website containing R-code to help users conduct Bayesian data analyses on their own data All example data as well as additional functions are provided in the R-package blmeco

The BUGS Book

A Practical Introduction to Bayesian Analysis

CRC Press Bayesian statistical methods have become widely used for data analysis and modelling in recent years, and the BUGS software has become the most popular software for Bayesian analysis worldwide. Authored by the team that originally developed this software, *The BUGS Book* provides a practical introduction to this program and its use. The text presents complete coverage of all the functionalities of BUGS, including prediction, missing data, model criticism, and prior sensitivity. It also features a large number of worked examples and a wide range of applications from various disciplines. The book introduces regression models, techniques for criticism and comparison, and a wide range of modelling issues before going into the vital area of hierarchical models, one of the most common applications of Bayesian methods. It deals with essentials of modelling without getting bogged down in complexity. The book emphasises model criticism, model comparison, sensitivity analysis to alternative priors, and thoughtful choice of prior distributions—all those aspects of the "art" of modelling that are easily overlooked in more theoretical expositions. More pragmatic than ideological, the authors systematically work through the large range of "tricks" that reveal the real power of the BUGS software, for example, dealing with missing data, censoring, grouped data, prediction, ranking, parameter constraints, and so on. Many of the examples are biostatistical, but they do not require domain knowledge and are generalisable to a wide range of other application areas. Full code and data for examples, exercises, and some solutions can be found on the book's website.

Bayesian Cognitive Modeling

A Practical Course

[Cambridge University Press](#) Bayesian inference has become a standard method of analysis in many fields of science. Students and researchers in experimental psychology and cognitive science, however, have failed to take full advantage of the new and exciting possibilities that the Bayesian approach affords. Ideal for teaching and self study, this book demonstrates how to do Bayesian modeling. Short, to-the-point chapters offer examples, exercises, and computer code (using WinBUGS or JAGS, and supported by Matlab and R), with additional support available online. No advance knowledge of statistics is required and, from the very start, readers are encouraged to apply and adjust Bayesian analyses by themselves. The book contains a series of chapters on parameter estimation and model selection, followed by detailed case studies from cognitive science. After working through this book, readers should be able to build their own Bayesian models, apply the models to their own data, and draw their own conclusions.

Quantitative Genetics in the Wild

[Oxford University Press](#) Across these fields, there is increasing appreciation of the need to quantify the genetic - rather than just the phenotypic - basis and diversity of key traits, the genetic basis of the associations between traits, and the interaction between these genetic effects and the environment. This research activity has been fuelled by methodological advances in both molecular genetics and statistics, as well as by exciting results emerging from laboratory studies of evolutionary quantitative genetics, and the increasing availability of suitable long-term datasets collected in natural populations, especially in animals. Quantitative Genetics in the Wild is the first book to synthesize the current level of knowledge in this exciting and rapidly-expanding area.

Bayesian Models for Astrophysical Data

[Cambridge University Press](#) A hands-on guide to Bayesian models with R, JAGS, Python, and Stan code, for a wide range of astronomical data types.

Doing Bayesian Data Analysis

A Tutorial with R, JAGS, and Stan

[Academic Press](#) Provides an accessible approach to Bayesian data analysis, as material is explained clearly with concrete examples. The book begins with the basics, including essential concepts of probability and random sampling, and gradually progresses to advanced hierarchical modeling methods for realistic data.

Bayesian Methods for Statistical Analysis

[ANU Press](#) Bayesian Methods for Statistical Analysis is a book on statistical methods for analysing a wide variety of data. The book consists of 12 chapters, starting with basic concepts and covering numerous topics, including Bayesian estimation, decision theory, prediction, hypothesis testing, hierarchical models, Markov chain Monte Carlo methods, finite population inference, biased sampling and nonignorable nonresponse. The book contains many exercises, all with worked solutions, including complete computer code. It is suitable for self-study or a semester-long course, with three hours of lectures and one tutorial per week for 13 weeks.

Children, Adolescents and Families with Severe Mental Illness: Towards a Comprehensive Early Identification of Risk

[Frontiers Media SA](#)

Systematic Reviews in Health Research

Meta-Analysis in Context

[John Wiley & Sons](#) Systematic Reviews in Health Research Explore the cutting-edge of systematic reviews in healthcare In this Third Edition of the classic Systematic Reviews textbook, now titled Systematic Reviews in Health Research, a team of distinguished researchers deliver a comprehensive and authoritative guide to the rapidly evolving area of systematic reviews and meta-analysis. The book demonstrates why systematic reviews—when conducted properly—provide the highest quality evidence on clinical and public health interventions and shows how they contribute to inference in many other contexts. The new edition reflects the broad role of systematic reviews, including: Twelve new chapters, covering additional study designs, methods and software, for example, on genetic association studies, prediction models, prevalence studies, network and dose-response meta-analysis Thorough update of 15 chapters focusing on systematic reviews of interventions Access to a companion website offering supplementary materials and practical exercises (www.systematic-reviews3.org) A key text for health researchers, Systematic Reviews in Health Research is also an indispensable resource for practitioners, students, and instructors in the health sciences needing to understand research synthesis.

Learning Statistics with R

[Lulu.com](#)

Learning Analytics

From Research to Practice

[Springer](#) In education today, technology alone doesn't always lead to immediate success for students or institutions. In order to gauge the efficacy of educational technology, we need ways to measure the efficacy of educational practices in their own right. Through a better understanding of how learning takes place, we may work toward establishing best practices for students, educators, and institutions. These goals can be accomplished with learning analytics. Learning Analytics: From Research to Practice updates this emerging field with the latest in theories, findings, strategies, and tools from across education and technological disciplines. Guiding readers through preparation, design, and examples of implementation, this pioneering reference clarifies LA methods as not mere data collection but sophisticated, systems-based analysis with practical applicability inside the classroom and in the larger world. Case studies illustrate applications of LA throughout academic settings (e.g., intervention, advisement, technology design), and their resulting impact on pedagogy and learning. The goal is to bring greater efficiency and deeper engagement to individual students, learning communities, and educators, as chapters show diverse uses of learning analytics to: Enhance student and faculty performance. Improve student understanding of course material. Assess and attend to the needs of struggling learners. Improve accuracy in grading. Allow instructors to assess and develop their own strengths. Encourage more efficient use of resources at the institutional level. Researchers and practitioners in educational technology, IT, and the learning sciences will hail the information in Learning Analytics: From Research to Practice as a springboard to new levels of student, instructor, and institutional success.

Advances in Parapsychological Research 9

[McFarland](#) The essays in this volume 9 of a series inform readers of the present status of leading issues in parapsychology (or psi research). The authors are experts in their fields and have written in a reader-friendly way that captures the complexity and importance of their topics. Each essay comprehensively reviews a controversial topic from a critical stance, and updates its status based on the latest theoretical and empirical considerations. For readers who need to keep pace with the evolution of thinking in psi research, this volume is authoritative. The series as a whole has traced the development of psi research over decades, providing a longterm definitive resource.

Modern Statistical Methods for Astronomy

With R Applications

[Cambridge University Press](#) Modern astronomical research is beset with a vast range of statistical challenges, ranging from reducing data from megadatasets to characterizing an amazing variety of variable celestial objects or testing astrophysical theory. Linking astronomy to the world of modern statistics, this volume is a unique resource, introducing astronomers to advanced statistics through ready-to-use code in the public domain R statistical software environment. The book presents fundamental results of probability theory and statistical inference, before exploring several fields of applied statistics, such as data smoothing, regression, multivariate analysis and classification, treatment of nondetections, time series analysis, and spatial point processes. It applies the methods discussed to contemporary astronomical research datasets using the R statistical software,

making it invaluable for graduate students and researchers facing complex data analysis tasks. A link to the author's website for this book can be found at www.cambridge.org/msma. Material available on their website includes datasets, R code and errata.

Generalized Linear Models for Categorical and Continuous Limited Dependent Variables

[CRC Press](#) **Generalized Linear Models for Categorical and Continuous Limited Dependent Variables** is designed for graduate students and researchers in the behavioral, social, health, and medical sciences. It incorporates examples of truncated counts, censored continuous variables, and doubly bounded continuous variables, such as percentages. The book provides br

Introduction to WinBUGS for Ecologists

Bayesian Approach to Regression, ANOVA, Mixed Models and Related Analyses

[Academic Press](#) **Introduction to WinBUGS for Ecologists** introduces applied Bayesian modeling to ecologists using the highly acclaimed, free WinBUGS software. It offers an understanding of statistical models as abstract representations of the various processes that give rise to a data set. Such an understanding is basic to the development of inference models tailored to specific sampling and ecological scenarios. The book begins by presenting the advantages of a Bayesian approach to statistics and introducing the WinBUGS software. It reviews the four most common statistical distributions: the normal, the uniform, the binomial, and the Poisson. It describes the two different kinds of analysis of variance (ANOVA): one-way and two- or multiway. It looks at the general linear model, or ANCOVA, in R and WinBUGS. It introduces generalized linear model (GLM), i.e., the extension of the normal linear model to allow error distributions other than the normal. The GLM is then extended contain additional sources of random variation to become a generalized linear mixed model (GLMM) for a Poisson example and for a binomial example. The final two chapters showcase two fairly novel and nonstandard versions of a GLMM. The first is the site-occupancy model for species distributions; the second is the binomial (or N-) mixture model for estimation and modeling of abundance. Introduction to the essential theories of key models used by ecologists Complete juxtaposition of classical analyses in R and Bayesian analysis of the same models in WinBUGS Provides every detail of R and WinBUGS code required to conduct all analyses Companion Web Appendix that contains all code contained in the book and additional material (including more code and solutions to exercises)

Avoiding Questionable Research Practices in Applied Psychology

[Springer Nature](#) This authoritative volume presents a detailed analysis of the replication crisis and the use of questionable research practices (QRPs) in psychology, as well as recommended practices for combatting these problems. Ultimately, the book aims to provide a comprehensive, current, and accessible account of the adverse effects of QRPs. The replication crisis in psychology and allied fields has exposed critical flaws in the standard views of research methods, which allow for extensive flexibility in data analysis by investigators and permit the widespread use of QRPs. Chapters examine the intentional use of QRPs such as data fabrication and falsification, along with subtler, unintentional practices such as p-hacking and HARKING (hypothesizing after results are known). Drawing on the growing awareness of these problems, contributors also highlight potential strategies to detect QRPs and minimize their negative impact through open data practices, preregistration of hypotheses and analyses, and adversarial collaborations, in which investigators holding opposing positions on a scientific issue agree to work together on a study in an effort to counteract their respective biases. Among the topics covered: History of controversies in statistics and replication Embracing intellectual humility while designing research Confirmatory vs. exploratory analyses Publication bias and negative results Promoting honest and transparent report writing Avoiding Questionable Research Practices in Applied Psychology provides a deeper understanding of how QRPs impede the reliability and trustworthiness of findings in psychology and the social sciences. It will be a practical, useful resource for students and instructors in graduate and advanced undergraduate level research methods classes, along with psychological researchers interested in improving their own research.

Case Studies in Bayesian Statistical Modelling and Analysis

[John Wiley & Sons](#) Provides an accessible foundation to Bayesian analysis using real world models This book aims to present an introduction to Bayesian modelling and computation, by considering real case studies drawn from diverse fields spanning ecology, health, genetics and finance. Each chapter comprises a description of the problem, the corresponding model, the computational method, results and inferences as well as the issues that arise in the implementation of these approaches. Case Studies in Bayesian Statistical Modelling and Analysis: Illustrates how to do Bayesian analysis in a clear and concise manner using real-world problems. Each chapter focuses on a real-world problem and describes the way in which the problem may be analysed using Bayesian methods. Features approaches that can be used in a wide area of application, such as, health, the environment, genetics, information science, medicine, biology, industry and remote sensing. Case Studies in Bayesian Statistical Modelling and Analysis is aimed at statisticians, researchers and practitioners who have some expertise in statistical modelling and analysis, and some understanding of the basics of Bayesian statistics, but little experience in its application. Graduate students of statistics and biostatistics will also find this book beneficial.

ICT Innovations 2019. Big Data Processing and Mining

11th International Conference, ICT Innovations 2019, Ohrid, North Macedonia, October 17–19, 2019, Proceedings

[Springer Nature](#) This book constitutes the refereed proceedings of the 11th International ICT Innovations Conference, ICT Innovations 2019, held in Ohrid, Macedonia, in October 2019. The 18 full papers presented were carefully reviewed and selected from 75 submissions. They cover the following topics: sensor applications and deployments, embedded and cyber-physical systems, robotics, network architectures, cloud computing, software infrastructure, software creation and management, models of computation, computational complexity and cryptography, design and analysis of algorithms, mathematical optimization, probability and statistics, data management systems, data mining, human computer interaction (HCI), artificial intelligence, machine learning, life and medical sciences, health care information systems, bioinformatics.

Applied Logistic Regression

[John Wiley & Sons](#) A new edition of the definitive guide to logistic regression modeling for health science and other applications This thoroughly expanded Third Edition provides an easily accessible introduction to the logistic regression (LR) model and highlights the power of this model by examining the relationship between a dichotomous outcome and a set of covariables. Applied Logistic Regression, Third Edition emphasizes applications in the health sciences and handpicks topics that best suit the use of modern statistical software. The book provides readers with state-of-the-art techniques for building, interpreting, and assessing the performance of LR models. New and updated features include: A chapter on the analysis of correlated outcome data A wealth of additional material for topics ranging from Bayesian methods to assessing model fit Rich data sets from real-world studies that demonstrate each method under discussion Detailed examples and interpretation of the presented results as well as exercises throughout Applied Logistic Regression, Third Edition is a must-have guide for professionals and researchers who need to model nominal or ordinal scaled outcome variables in public health, medicine, and the social sciences as well as a wide range of other fields and disciplines.

Modern Statistical Methods for HCI

[Springer](#) This book critically reflects on current statistical methods used in Human-Computer Interaction (HCI) and introduces a number of novel methods to the reader. Covering many techniques and approaches for exploratory data analysis including effect and power calculations, experimental design, event history analysis, non-parametric testing and Bayesian inference; the research contained in this book discusses how to communicate statistical results fairly, as well as presenting a general set of recommendations for authors and reviewers to improve the quality of statistical analysis in HCI. Each chapter presents [R] code for running analyses on HCI examples and explains how the results can be interpreted. Modern Statistical Methods for HCI is aimed at researchers and graduate students who have some knowledge of "traditional" null hypothesis significance testing, but who wish to improve their practice by using techniques which have recently emerged from statistics and related fields. This book critically evaluates current practices within the field and supports a less rigid, procedural view of statistics in favour of fair statistical communication.

R for Data Science

Import, Tidy, Transform, Visualize, and Model Data

["O'Reilly Media, Inc."](#) Learn how to use R to turn raw data into insight, knowledge, and understanding. This book introduces you to R, RStudio, and the tidyverse, a collection of R packages designed to work together to make data science fast, fluent, and fun. Suitable for readers with no previous programming experience, R for Data Science is designed to get you doing data science as quickly as possible. Authors Hadley Wickham and Garrett Grolemund guide you through the steps of importing, wrangling, exploring, and modeling your data and communicating the results. You'll get a complete, big-picture understanding of the data science cycle, along with basic tools you need to manage the details. Each section of the book is paired with exercises to help you practice what you've learned along the way. You'll learn how to: **Wrangle**—transform your datasets into a form convenient for analysis **Program**—learn powerful R tools for solving data problems with greater clarity and ease **Explore**—examine your data, generate hypotheses, and quickly test them **Model**—provide a low-dimensional summary that captures true "signals" in your dataset **Communicate**—learn R Markdown for integrating prose, code, and results

Principles and Challenges of Fundamental Methods in Veterinary Epidemiology and Economics

[Frontiers Media SA](#)

Tracking Environmental Change Using Lake Sediments

Data Handling and Numerical Techniques

[Springer Science & Business Media](#) Numerical and statistical methods have rapidly become part of a palaeolimnologist's tool-kit. They are used to explore and summarise complex data, reconstruct past environmental variables from fossil assemblages, and test competing hypotheses about the causes of observed changes in lake biota through history. This book brings together a wide array of numerical and statistical techniques currently available for use in palaeolimnology and other branches of palaeoecology. Visit <http://extras.springer.com> the Springer's Extras website to view data-sets, figures, software, and R scripts used or mentioned in this book.

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Data and Methods in Corpus Linguistics

[Cambridge University Press](#) By contrasting different approaches and datasets, this book highlights critical developments in latest corpus-linguistic research.

Intuitive Biostatistics

A Nonmathematical Guide to Statistical Thinking

[Oxford University Press, USA](#) With an engaging and conversational tone, this unique book provides a clear introduction to statistics for undergraduate and graduate students in a wide range of fields and also serves as a statistics refresher for working scientists. Designed for consumers of statistical data, IntuitiveBiostatistics is a non-mathematical guide to statistical thinking using minimal equations and including a detailed review of assumptions and common mistakes.

Foundations and Applications of Statistics

[American Mathematical Soc.](#) Foundations and Applications of Statistics simultaneously emphasizes both the foundational and the computational aspects of modern statistics. Engaging and accessible, this book is useful to undergraduate students with a wide range of backgrounds and career goals. The exposition immediately begins with statistics, presenting concepts and results from probability along the way. Hypothesis testing is introduced very early, and the motivation for several probability distributions comes from p-value computations. Pruiim develops the students' practical statistical reasoning through explicit examples and through numerical and graphical summaries of data that allow intuitive inferences before introducing the formal machinery. The topics have been selected to reflect the current practice in statistics, where computation is an indispensable tool. In this vein, the statistical computing environment R is used throughout the text and is integral to the exposition. Attention is paid to developing students' mathematical and computational skills as well as their statistical reasoning. Linear models, such as regression and ANOVA, are treated with explicit reference to the underlying linear algebra, which is motivated geometrically. Foundations and Applications of Statistics discusses both the mathematical theory underlying statistics and practical applications that make it a powerful tool across disciplines. The book contains ample material for a two-semester course in undergraduate probability and statistics. A one-semester course based on the book will cover hypothesis testing and confidence intervals for the most common situations. In the second edition, the R code has been updated throughout to take advantage of new R packages and to illustrate better coding style. New sections have been added covering bootstrap methods, multinomial and multivariate normal distributions, the delta method, numerical methods for Bayesian inference, and nonlinear least squares. Also, the use of matrix algebra has been expanded, but remains optional, providing instructors with more options regarding the amount of linear algebra required.

Modeling Demographic Processes in Marked Populations

[Springer Science & Business Media](#) Here, biologists and statisticians come together in an interdisciplinary synthesis with the aim of developing new methods to overcome the most significant challenges and constraints faced by quantitative biologists seeking to model demographic rates.

The Book of R

A First Course in Programming and Statistics

[No Starch Press](#) The Book of R is a comprehensive, beginner-friendly guide to R, the world's most popular programming language for statistical analysis. Even if you have no programming experience and little more than a grounding in the basics of mathematics, you'll find everything you need to begin using R effectively for statistical analysis. You'll start with the basics, like how to handle data and write simple programs, before moving on to more advanced topics, like producing statistical summaries of your data and performing statistical tests and modeling. You'll even learn how to create impressive data visualizations with R's basic graphics tools and contributed packages, like ggplot2 and ggvis, as well as interactive 3D visualizations using the rgl package. Dozens of hands-on exercises (with downloadable solutions) take you from theory to practice, as you learn: -The fundamentals of programming in R, including how to write data frames, create functions, and use variables, statements, and loops -Statistical concepts like exploratory data analysis, probabilities, hypothesis tests, and regression modeling, and how to execute them in R -How to access R's thousands of functions, libraries, and data sets -How to draw valid and useful conclusions from your data -How to create publication-quality graphics of your results Combining detailed explanations with real-world examples and exercises, this book will provide you with a solid understanding of both statistics and the depth of R's functionality. Make The Book of R your doorway into the growing world of data analysis.

Bayesian Data Analysis, Third Edition

[CRC Press](#) Now in its third edition, this classic book is widely considered the leading text on Bayesian methods, lauded for its accessible, practical approach to analyzing data and solving research problems. Bayesian Data Analysis, Third Edition continues to take an applied approach to analysis using up-to-date Bayesian methods. The authors—all leaders in the statistics community—introduce basic concepts from a data-analytic perspective before presenting advanced methods. Throughout the text, numerous worked examples drawn from real applications and research emphasize the use of Bayesian inference in practice. New to the Third Edition Four new chapters on nonparametric modeling Coverage of weakly informative priors and boundary-avoiding priors Updated discussion of cross-validation and predictive information criteria Improved convergence monitoring and effective sample size calculations for iterative simulation Presentations of Hamiltonian Monte Carlo, variational Bayes, and expectation propagation New and revised software code The book can be used in three different ways. For undergraduate students, it introduces Bayesian inference starting from first principles. For graduate students, the text presents effective current

approaches to Bayesian modeling and computation in statistics and related fields. For researchers, it provides an assortment of Bayesian methods in applied statistics. Additional materials, including data sets used in the examples, solutions to selected exercises, and software instructions, are available on the book's web page.

Statistical Applications for Chemistry, Manufacturing and Controls (CMC) in the Pharmaceutical Industry

Springer This book examines statistical techniques that are critically important to Chemistry, Manufacturing, and Control (CMC) activities. Statistical methods are presented with a focus on applications unique to the CMC in the pharmaceutical industry. The target audience consists of statisticians and other scientists who are responsible for performing statistical analyses within a CMC environment. Basic statistical concepts are addressed in Chapter 2 followed by applications to specific topics related to development and manufacturing. The mathematical level assumes an elementary understanding of statistical methods. The ability to use Excel or statistical packages such as Minitab, JMP, SAS, or R will provide more value to the reader. The motivation for this book came from an American Association of Pharmaceutical Scientists (AAPS) short course on statistical methods applied to CMC applications presented by four of the authors. One of the course participants asked us for a good reference book, and the only book recommended was written over 20 years ago by Chow and Liu (1995). We agreed that a more recent book would serve a need in our industry. Since we began this project, an edited book has been published on the same topic by Zhang (2016). The chapters in Zhang discuss statistical methods for CMC as well as drug discovery and nonclinical development. We believe our book complements Zhang by providing more detailed statistical analyses and examples.

Advanced R

CRC Press An Essential Reference for Intermediate and Advanced R Programmers Advanced R presents useful tools and techniques for attacking many types of R programming problems, helping you avoid mistakes and dead ends. With more than ten years of experience programming in R, the author illustrates the elegance, beauty, and flexibility at the heart of R. The book develops the necessary skills to produce quality code that can be used in a variety of circumstances. You will learn: The fundamentals of R, including standard data types and functions Functional programming as a useful framework for solving wide classes of problems The positives and negatives of metaprogramming How to write fast, memory-efficient code This book not only helps current R users become R programmers but also shows existing programmers what's special about R. Intermediate R programmers can dive deeper into R and learn new strategies for solving diverse problems while programmers from other languages can learn the details of R and understand why R works the way it does.

Forest-Water Interactions

Springer Nature The United Nations has declared 2018-2028 as the International Decade for Action on Water for Sustainable Development. This is a timely designation. In an increasingly thirsty world, the subject of forest-water interactions is of critical importance to the achievement of sustainability goals. The central underlying tenet of this book is that the hydrologic community can conduct better science and make a more meaningful impact to the world's water crisis if scientists are: (1) better equipped to utilize new methods and harness big data from either or both high-frequency sensors and long-term research watersheds; and (2) aware of new developments in our process-based understanding of the hydrological cycle in both natural and urban settings. Accordingly, this forward-looking book delves into forest-water interactions from multiple methodological, statistical, and process-based perspectives (with some chapters featuring data sets and open-source R code), concluding with a chapter on future forest hydrology under global change. Thus, this book describes the opportunities of convergence in high-frequency sensing, big data, and open source software to catalyze more comprehensive understanding of forest-water interactions. The book will be of interest to researchers, graduate students, and advanced undergraduates in an array of disciplines, including hydrology, forestry, ecology, botany, and environmental engineering.

Portfolio Optimization with R/Rmetrics

Rmetrics

Bayesian Modeling Using WinBUGS

John Wiley & Sons A hands-on introduction to the principles of Bayesian modeling using WinBUGS Bayesian Modeling Using WinBUGS provides an easily accessible introduction to the use of WinBUGS programming techniques in a variety of Bayesian modeling settings. The author provides an accessible treatment of the topic, offering readers a smooth introduction to the principles of Bayesian modeling with detailed guidance on the practical implementation of key principles. The book begins with a basic introduction to Bayesian inference and the WinBUGS software and goes on to cover key topics, including: Markov Chain Monte Carlo algorithms in Bayesian inference Generalized linear models Bayesian hierarchical models Predictive distribution and model checking Bayesian model and variable evaluation Computational notes and screen captures illustrate the use of both WinBUGS as well as R software to apply the discussed techniques. Exercises at the end of each chapter allow readers to test their understanding of the presented concepts and all data sets and code are available on the book's related Web site. Requiring only a working knowledge of probability theory and statistics, Bayesian Modeling Using WinBUGS serves as an excellent book for courses on Bayesian statistics at the upper-undergraduate and graduate levels. It is also a valuable reference for researchers and practitioners in the fields of statistics, actuarial science, medicine, and the social sciences who use WinBUGS in their everyday work.

Complex Surveys

A Guide to Analysis Using R

John Wiley & Sons A complete guide to carrying out complex survey analysis using R As survey analysis continues to serve as a core component of sociological research, researchers are increasingly relying upon data gathered from complex surveys to carry out traditional analyses. Complex Surveys is a practical guide to the analysis of this kind of data using R, the freely available and downloadable statistical programming language. As creator of this specific survey package for R, the author provides the ultimate presentation of how to successfully use the software for analyzing data from complex surveys while also utilizing the most current data from health and social sciences studies to demonstrate the application of survey research methods in these fields. The book begins with coverage of basic tools and topics within survey analysis such as simple and stratified sampling, cluster sampling, linear regression, and categorical data regression. Subsequent chapters delve into more technical aspects of complex survey analysis, including post-stratification, two-phase sampling, missing data, and causal inference. Throughout the book, an emphasis is placed on graphics, regression modeling, and two-phase designs. In addition, the author supplies a unique discussion of epidemiological two-phase designs as well as probability-weighting for causal inference. All of the book's examples and figures are regenerated using R, and a related Web site provides the R code that allows readers to reproduce the presented content. Each chapter concludes with exercises that vary in level of complexity, and detailed appendices outline additional mathematical and computational descriptions to assist readers with comparing results from various software systems. Complex Surveys is an excellent book for courses on sampling and complex surveys at the upper-undergraduate and graduate levels. It is also a practical reference guide for applied statisticians and practitioners in the social and health sciences who use statistics in their everyday work.

Doing Meta-Analysis with R

A Hands-On Guide

CRC Press Doing Meta-Analysis with R: A Hands-On Guide serves as an accessible introduction on how meta-analyses can be conducted in R. Essential steps for meta-analysis are covered, including calculation and pooling of outcome measures, forest plots, heterogeneity diagnostics, subgroup analyses, meta-regression, methods to control for publication bias, risk of bias assessments and plotting tools. Advanced but highly relevant topics such as network meta-analysis, multi-three-level meta-analyses, Bayesian meta-analysis approaches and SEM meta-analysis are also covered. A companion R package, dmetar, is introduced at the beginning of the guide. It contains data sets and several helper functions for the meta and metafor package used in the guide. The programming and statistical background covered in the book are kept at a non-expert level, making the book widely accessible. Features • Contains two introductory chapters on how to set up an R environment and do basic imports/manipulations of meta-analysis data, including exercises • Describes statistical concepts clearly and concisely before applying them in R • Includes step-by-step guidance through the coding required to perform meta-analyses, and a companion R package for the book