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MATHEMATICAL STATISTICS AND DATA ANALYSIS

Cengage Learning This is the first text in a generation to re-examine the purpose of the mathematical statistics course. The book's approach interweaves traditional topics with data analysis and reflects the use of the computer with close ties to the practice of statistics. The author stresses analysis of data, examines real problems with real data, and motivates the theory. The book's descriptive statistics, graphical displays, and realistic applications stand in strong contrast to traditional texts that are set in abstract settings. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

MATHEMATICAL STATISTICS

Springer Science & Business Media This graduate textbook covers topics in statistical theory essential for graduate students preparing for work on a Ph.D. degree in statistics. This new edition has been revised and updated and in this fourth printing, errors have been ironed out. The first chapter provides a quick overview of concepts and results in measure-theoretic probability theory that are useful in statistics. The second chapter introduces some fundamental concepts in statistical decision theory and inference. Subsequent chapters contain detailed studies on some important topics: unbiased estimation, parametric estimation, nonparametric estimation, hypothesis testing, and confidence sets. A large number of exercises in each chapter provide not only practice problems for students, but also many additional results.

INTRODUCTION TO STATISTICS AND DATA ANALYSIS

WITH EXERCISES, SOLUTIONS AND APPLICATIONS IN R

Springer This introductory statistics textbook conveys the essential concepts and tools needed to develop and nurture statistical thinking. It presents descriptive, inductive and explorative statistical methods and guides the reader through the process of quantitative data analysis. In the experimental sciences and interdisciplinary research, data analysis has become an integral part of any scientific study. Issues such as judging the credibility of data, analyzing the data, evaluating the reliability of the obtained results and finally drawing the correct and appropriate conclusions from the results are vital. The text is primarily intended for undergraduate students in disciplines like business administration, the social sciences, medicine, politics, macroeconomics, etc. It features a wealth of examples, exercises and solutions with computer code in the statistical programming language R as well as supplementary material that will enable the reader to quickly adapt all methods to their own applications.

FUNDAMENTALS OF MATHEMATICAL STATISTICS

Sultan Chand & Sons Knowledge updating is a never-ending process and so should be the revision of an effective textbook. The book originally written fifty years ago has, during the intervening period, been revised and reprinted several times. The authors have, however, been thinking, for the last few years that the book needed not only a thorough revision but rather a substantial rewriting. They now take great pleasure in presenting to the readers the twelfth, thoroughly revised and enlarged, Golden Jubilee edition of the book. The subject-matter in the entire book has been re-written in the light of numerous criticisms and suggestions received from the users of the earlier editions in India and abroad. The basis of this revision has been the emergence of new literature on the subject, the constructive feedback from students and teaching fraternity, as well as those changes that have been made in the syllabi and/or the pattern of examination papers of numerous universities. Knowledge updating is a never-ending process and so should be the revision of an effective textbook. The book originally written fifty years ago has, during the intervening period, been revised and reprinted several times. The authors have, however, been thinking, for the last few years that the book needed not only a thorough revision but rather a substantial rewriting. They now take great pleasure in presenting to the

readers the twelfth, thoroughly revised and enlarged, Golden Jubilee edition of the book. The subject-matter in the entire book has been re-written in the light of numerous criticisms and suggestions received from the users of the earlier editions in India and abroad. The basis of this revision has been the emergence of new literature on the subject, the constructive feedback from students and teaching fraternity, as well as those changes that have been made in the syllabi and/or the pattern of examination papers of numerous universities. Some prominent additions are given below: 1. Variance of Degenerate Random Variable 2. Approximate Expression for Expectation and Variance 3. Lyapounov's Inequality 4. Holder's Inequality 5. Minkowski's Inequality 6. Double Expectation Rule or Double-E Rule and many others

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.

ALL OF STATISTICS

A CONCISE COURSE IN STATISTICAL INFERENCE

Springer Science & Business Media Taken literally, the title "All of Statistics" is an exaggeration. But in spirit, the title is apt, as the book does cover a much broader range of topics than a typical introductory book on mathematical statistics. This book is for people who want to learn probability and statistics quickly. It is suitable for graduate or advanced undergraduate students in computer science, mathematics, statistics, and related disciplines. The book includes modern topics like non-parametric curve estimation, bootstrapping, and classification, topics that are usually relegated to follow-up courses. The reader is presumed to know calculus and a little linear algebra. No previous knowledge of probability and statistics is required. Statistics, data mining, and machine learning are all concerned with collecting and analysing data.

INTRODUCTION TO MATHEMATICAL STATISTICS

MATHEMATICAL STATISTICS WITH APPLICATIONS IN R

Elsevier *Mathematical Statistics with Applications in R, Second Edition*, offers a modern calculus-based theoretical introduction to mathematical statistics and applications. The book covers many modern statistical computational and simulation concepts that are not covered in other texts, such as the Jackknife, bootstrap methods, the EM algorithms, and Markov chain Monte Carlo (MCMC) methods such as the Metropolis algorithm, Metropolis-Hastings algorithm and the Gibbs sampler. By combining the discussion on the theory of statistics with a wealth of real-world applications, the book helps students to approach statistical problem solving in a logical manner. This book provides a step-by-step procedure to solve real problems, making the topic more accessible. It includes goodness of fit methods to identify the probability distribution that characterizes the probabilistic behavior or a given set of data. Exercises as well as practical, real-world chapter projects are included, and each chapter has an optional section on using Minitab, SPSS and SAS commands. The text also boasts a wide array of coverage of ANOVA, nonparametric, MCMC, Bayesian and empirical methods; solutions to selected problems; data sets; and an image bank for students. Advanced undergraduate and graduate students taking a one or two semester mathematical statistics course will find this book extremely useful in their studies. Step-by-step procedure to solve real problems, making the topic more accessible Exercises blend theory and modern applications Practical, real-world chapter projects Provides an optional section in each chapter on using Minitab, SPSS and SAS commands Wide array of coverage of ANOVA, Nonparametric, MCMC, Bayesian and empirical methods

STAT LABS

MATHEMATICAL STATISTICS THROUGH APPLICATIONS

Springer Science & Business Media Integrating the theory and practice of statistics through a series of case studies, each lab introduces a problem, provides some scientific background, suggests investigations for the data, and provides a summary of the theory used in each case. Aimed at upper-division students.

STATISTICS AND DATA ANALYSIS FOR FINANCIAL ENGINEERING

WITH R EXAMPLES

Springer The new edition of this influential textbook, geared towards graduate or advanced undergraduate students, teaches the statistics necessary for financial engineering. In doing so, it illustrates concepts using financial markets and economic data, R Labs with real-data exercises, and graphical and analytic methods for modeling and diagnosing modeling errors. These methods are critical

because financial engineers now have access to enormous quantities of data. To make use of this data, the powerful methods in this book for working with quantitative information, particularly about volatility and risks, are essential. Strengths of this fully-revised edition include major additions to the R code and the advanced topics covered. Individual chapters cover, among other topics, multivariate distributions, copulas, Bayesian computations, risk management, and cointegration. Suggested prerequisites are basic knowledge of statistics and probability, matrices and linear algebra, and calculus. There is an appendix on probability, statistics and linear algebra. Practicing financial engineers will also find this book of interest.

MATHEMATICS FOR MACHINE LEARNING

Cambridge University Press Distills key concepts from linear algebra, geometry, matrices, calculus, optimization, probability and statistics that are used in machine learning.

MODERN STATISTICS WITH R

FROM WRANGLING AND EXPLORING DATA TO INFERENCE AND PREDICTIVE MODELLING

BoD - Books on Demand The past decades have transformed the world of statistical data analysis, with new methods, new types of data, and new computational tools. The aim of *Modern Statistics with R* is to introduce you to key parts of the modern statistical toolkit. It teaches you: - Data wrangling - importing, formatting, reshaping, merging, and filtering data in R. - Exploratory data analysis - using visualisation and multivariate techniques to explore datasets. - Statistical inference - modern methods for testing hypotheses and computing confidence intervals. - Predictive modelling - regression models and machine learning methods for prediction, classification, and forecasting. - Simulation - using simulation techniques for sample size computations and evaluations of statistical methods. - Ethics in statistics - ethical issues and good statistical practice. - R programming - writing code that is fast, readable, and free from bugs. Starting from the very basics, *Modern Statistics with R* helps you learn R by working with R. Topics covered range from plotting data and writing simple R code to using cross-validation for evaluating complex predictive models and using simulation for sample size determination. The book includes more than 200 exercises with fully worked solutions. Some familiarity with basic statistical concepts, such as linear regression, is assumed. No previous programming experience is needed.

FOUNDATIONS OF STATISTICS FOR DATA SCIENTISTS

WITH R AND PYTHON

CRC Press *Foundations of Statistics for Data Scientists: With R and Python* is designed as a textbook for a one- or two-term introduction to mathematical statistics for students training to become data scientists. It is an in-depth presentation of the topics in statistical science with which any data scientist should be familiar, including probability distributions, descriptive and inferential statistical methods, and linear modeling. The book assumes knowledge of basic calculus, so the presentation can focus on "why it works" as well as "how to do it." Compared to traditional "mathematical statistics" textbooks, however, the book has less emphasis on probability theory and more emphasis on using software to implement statistical methods and to conduct simulations to illustrate key concepts. All statistical analyses in the book use R software, with an appendix showing the same analyses with Python. The book also introduces modern topics that do not normally appear in mathematical statistics texts but are highly relevant for data scientists, such as Bayesian inference, generalized linear models for non-normal responses (e.g., logistic regression and Poisson loglinear models), and regularized model fitting. The nearly 500 exercises are grouped into "Data Analysis and Applications" and "Methods and Concepts." Appendices introduce R and Python and contain solutions for odd-numbered exercises. The book's website has expanded R, Python, and Matlab appendices and all data sets from the examples and exercises.

USING R FOR INTRODUCTORY STATISTICS

CRC Press The second edition of a bestselling textbook, *Using R for Introductory Statistics* guides students through the basics of R, helping them overcome the sometimes steep learning curve. The author does this by breaking the material down into small, task-oriented steps. The second edition maintains the features that made the first edition so popular, while updating data, examples, and changes to R in line with the current version. See *What's New in the Second Edition*: Increased emphasis on more idiomatic R provides a grounding in the functionality of base R. Discussions of the use of RStudio helps new R users avoid as many pitfalls as possible. Use of knitr package makes code easier to read and therefore easier to reason about. Additional information on computer-intensive approaches motivates the traditional approach. Updated examples and data make the information current and topical. The book has an accompanying package, *UsingR*, available from CRAN, R's repository of user-contributed packages. The package contains the data sets mentioned in the text (`data(package="UsingR")`), answers to selected problems (`answers()`), a few demonstrations (`demo()`), the errata (`errata()`), and sample code from the text. The topics of this text line up closely with traditional teaching progression; however, the book also highlights computer-intensive approaches to motivate the more traditional approach. The authors emphasize realistic data and examples and rely on visualization techniques to gather insight. They introduce statistics and R seamlessly, giving students the tools they need to use R and the information they need to navigate the sometimes complex world of statistical computing.

STATISTICS FOR DATA SCIENTISTS

AN INTRODUCTION TO PROBABILITY, STATISTICS, AND DATA ANALYSIS

Springer This book provides an undergraduate introduction to analysing data for data science, computer science, and quantitative social science students. It uniquely combines a hands-on approach to data analysis - supported by numerous real data examples and reusable [R] code - with a rigorous treatment of probability and statistical principles. Where contemporary undergraduate textbooks in probability theory or statistics often miss applications and an introductory treatment of modern methods (bootstrapping, Bayes, etc.), and where applied data analysis books often miss a rigorous theoretical treatment, this book provides an accessible but thorough

introduction into data analysis, using statistical methods combining the two viewpoints. The book further focuses on methods for dealing with large data-sets and streaming-data and hence provides a single-course introduction of statistical methods for data science.

AN INTRODUCTION TO MATHEMATICAL STATISTICS AND ITS APPLICATIONS

Pearson College Division Noted for its integration of real-world data and case studies, this text offers sound coverage of the theoretical aspects of mathematical statistics. The authors demonstrate how and when to use statistical methods, while reinforcing the calculus that students have mastered in previous courses. Throughout the Fifth Edition, the authors have added and updated examples and case studies, while also refining existing features that show a clear path from theory to practice.

STATISTICS FOR MATHEMATICIANS

A RIGOROUS FIRST COURSE

Birkhäuser This textbook provides a coherent introduction to the main concepts and methods of one-parameter statistical inference. Intended for students of Mathematics taking their first course in Statistics, the focus is on Statistics for Mathematicians rather than on Mathematical Statistics. The goal is not to focus on the mathematical/theoretical aspects of the subject, but rather to provide an introduction to the subject tailored to the mindset and tastes of Mathematics students, who are sometimes turned off by the informal nature of Statistics courses. This book can be used as the basis for an elementary semester-long first course on Statistics with a firm sense of direction that does not sacrifice rigor. The deeper goal of the text is to attract the attention of promising Mathematics students.

PYTHON FOR DATA ANALYSIS

DATA WRANGLING WITH PANDAS, NUMPY, AND IPYTHON

O'Reilly Media, Inc. Get complete instructions for manipulating, processing, cleaning, and crunching datasets in Python. Updated for Python 3.6, the second edition of this hands-on guide is packed with practical case studies that show you how to solve a broad set of data analysis problems effectively. You'll learn the latest versions of pandas, NumPy, IPython, and Jupyter in the process. Written by Wes McKinney, the creator of the Python pandas project, this book is a practical, modern introduction to data science tools in Python. It's ideal for analysts new to Python and for Python programmers new to data science and scientific computing. Data files and related material are available on GitHub. Use the IPython shell and Jupyter notebook for exploratory computing Learn basic and advanced features in NumPy (Numerical Python) Get started with data analysis tools in the pandas library Use flexible tools to load, clean, transform, merge, and reshape data Create informative visualizations with matplotlib Apply the pandas groupby facility to slice, dice, and summarize datasets Analyze and manipulate regular and irregular time series data Learn how to solve real-world data analysis problems with thorough, detailed examples

PRACTICAL STATISTICS FOR DATA SCIENTISTS

50 ESSENTIAL CONCEPTS

O'Reilly Media, Inc. Statistical methods are a key part of data science, yet very few data scientists have any formal statistics training. Courses and books on basic statistics rarely cover the topic from a data science perspective. This practical guide explains how to apply various statistical methods to data science, tells you how to avoid their misuse, and gives you advice on what's important and what's not. Many data science resources incorporate statistical methods but lack a deeper statistical perspective. If you're familiar with the R programming language, and have some exposure to statistics, this quick reference bridges the gap in an accessible, readable format. With this book, you'll learn: Why exploratory data analysis is a key preliminary step in data science How random sampling can reduce bias and yield a higher quality dataset, even with big data How the principles of experimental design yield definitive answers to questions How to use regression to estimate outcomes and detect anomalies Key classification techniques for predicting which categories a record belongs to Statistical machine learning methods that "learn" from data Unsupervised learning methods for extracting meaning from unlabeled data

INTRODUCTION TO PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS

John Wiley & Sons Incorporated Elements of probability; Random variables and expectation; Special; random variables; Sampling; Parameter estimation; Hypothesis testing; Regression; Analysis of variance; Goodness of fit and nonparametric testing; Life testing; Quality control; Simulation.

CORE STATISTICS

Cambridge University Press Core Statistics is a compact starter course on the theory, models, and computational tools needed to make informed use of powerful statistical methods.

MODERN MATHEMATICAL STATISTICS WITH APPLICATIONS

Springer Nature This 3rd edition of Modern Mathematical Statistics with Applications tries to strike a balance between mathematical foundations and statistical practice. The book provides a clear and current exposition of statistical concepts and methodology, including many examples and exercises based on real data gleaned from publicly available sources. Here is a small but representative selection of scenarios for our examples and exercises based on information in recent articles: Use of the "Big Mac index" by the publication The Economist as a humorous way to compare product costs across nations Visualizing how the concentration of lead

levels in cartridges varies for each of five brands of e-cigarettes Describing the distribution of grip size among surgeons and how it impacts their ability to use a particular brand of surgical stapler Estimating the true average odometer reading of used Porsche Boxsters listed for sale on www.cars.com Comparing head acceleration after impact when wearing a football helmet with acceleration without a helmet Investigating the relationship between body mass index and foot load while running The main focus of the book is on presenting and illustrating methods of inferential statistics used by investigators in a wide variety of disciplines, from actuarial science all the way to zoology. It begins with a chapter on descriptive statistics that immediately exposes the reader to the analysis of real data. The next six chapters develop the probability material that facilitates the transition from simply describing data to drawing formal conclusions based on inferential methodology. Point estimation, the use of statistical intervals, and hypothesis testing are the topics of the first three inferential chapters. The remainder of the book explores the use of these methods in a variety of more complex settings. This edition includes many new examples and exercises as well as an introduction to the simulation of events and probability distributions. There are more than 1300 exercises in the book, ranging from very straightforward to reasonably challenging. Many sections have been rewritten with the goal of streamlining and providing a more accessible exposition. Output from the most common statistical software packages is included wherever appropriate (a feature absent from virtually all other mathematical statistics textbooks). The authors hope that their enthusiasm for the theory and applicability of statistics to real world problems will encourage students to pursue more training in the discipline.

MATHEMATICAL FOUNDATIONS FOR DATA ANALYSIS

Springer Nature This textbook, suitable for an early undergraduate up to a graduate course, provides an overview of many basic principles and techniques needed for modern data analysis. In particular, this book was designed and written as preparation for students planning to take rigorous Machine Learning and Data Mining courses. It introduces key conceptual tools necessary for data analysis, including concentration of measure and PAC bounds, cross validation, gradient descent, and principal component analysis. It also surveys basic techniques in supervised (regression and classification) and unsupervised learning (dimensionality reduction and clustering) through an accessible, simplified presentation. Students are recommended to have some background in calculus, probability, and linear algebra. Some familiarity with programming and algorithms is useful to understand advanced topics on computational techniques.

STATISTICAL DATA ANALYSIS

Oxford University Press This book is a guide to the practical application of statistics in data analysis as typically encountered in the physical sciences. It is primarily addressed at students and professionals who need to draw quantitative conclusions from experimental data. Although most of the examples are taken from particle physics, the material is presented in a sufficiently general way as to be useful to people from most branches of the physical sciences. The first part of the book describes the basic tools of data analysis: concepts of probability and random variables, Monte Carlo techniques, statistical tests, and methods of parameter estimation. The last three chapters are somewhat more specialized than those preceding, covering interval estimation, characteristic functions, and the problem of correcting distributions for the effects of measurement errors (unfolding).

FOUNDATIONS OF STATISTICS FOR DATA SCIENTISTS

WITH R AND PYTHON

CRC Press Designed as a textbook for a one or two-term introduction to mathematical statistics for students training to become data scientists, *Foundations of Statistics for Data Scientists: With R and Python* is an in-depth presentation of the topics in statistical science with which any data scientist should be familiar, including probability distributions, descriptive and inferential statistical methods, and linear modelling. The book assumes knowledge of basic calculus, so the presentation can focus on 'why it works' as well as 'how to do it.' Compared to traditional "mathematical statistics" textbooks, however, the book has less emphasis on probability theory and more emphasis on using software to implement statistical methods and to conduct simulations to illustrate key concepts. All statistical analyses in the book use R software, with an appendix showing the same analyses with Python. The book also introduces modern topics that do not normally appear in mathematical statistics texts but are highly relevant for data scientists, such as Bayesian inference, generalized linear models for non-normal responses (e.g., logistic regression and Poisson loglinear models), and regularized model fitting. The nearly 500 exercises are grouped into "Data Analysis and Applications" and "Methods and Concepts." Appendices introduce R and Python and contain solutions for odd-numbered exercises. The book's website has expanded R, Python, and Matlab appendices and all data sets from the examples and exercises. Alan Agresti, Distinguished Professor Emeritus at the University of Florida, is the author of seven books, including *Categorical Data Analysis* (Wiley) and *Statistics: The Art and Science of Learning from Data* (Pearson), and has presented short courses in 35 countries. His awards include an honorary doctorate from De Montfort University (UK) and the Statistician of the Year from the American Statistical Association (Chicago chapter). Maria Kateri, Professor of Statistics and Data Science at the RWTH Aachen University, authored the monograph *Contingency Table Analysis: Methods and Implementation Using R* (Birkhäuser/Springer) and a textbook on mathematics for economists (in German). She has a long-term experience in teaching statistics courses to students of Data Science, Mathematics, Statistics, Computer Science, and Business Administration and Engineering. "The main goal of this textbook is to present foundational statistical methods and theory that are relevant in the field of data science. The authors depart from the typical approaches taken by many conventional mathematical statistics textbooks by placing more emphasis on providing the students with intuitive and practical interpretations of those methods with the aid of R programming codes...I find its particular strength to be its intuitive presentation of statistical theory and methods without getting bogged down in mathematical details that are perhaps less useful to the practitioners" (Mintaek Lee, Boise State University) "The aspects of this manuscript that I find appealing: 1. The use of real data. 2. The use of R but with the option to use Python. 3. A good mix of theory and practice. 4. The text is well-written with good exercises. 5. The coverage of topics (e.g. Bayesian methods and clustering) that are not usually part of a course in statistics at the level of this book." (Jason M. Graham,

University of Scranton)

APPLIED MATHEMATICS FOR THE ANALYSIS OF BIOMEDICAL DATA

MODELS, METHODS, AND MATLAB

John Wiley & Sons Features a practical approach to the analysis of biomedical data via mathematical methods and provides a MATLAB® toolbox for the collection, visualization, and evaluation of experimental and real-life data. *Applied Mathematics for the Analysis of Biomedical Data: Models, Methods, and MATLAB®* presents a practical approach to the task that biological scientists face when analyzing data. The primary focus is on the application of mathematical models and scientific computing methods to provide insight into the behavior of biological systems. The author draws upon his experience in academia, industry, and government-sponsored research as well as his expertise in MATLAB to produce a suite of computer programs with applications in epidemiology, machine learning, and biostatistics. These models are derived from real-world data and concerns. Among the topics included are the spread of infectious disease (HIV/AIDS) through a population, statistical pattern recognition methods to determine the presence of disease in a diagnostic sample, and the fundamentals of hypothesis testing. In addition, the author uses his professional experiences to present unique case studies whose analyses provide detailed insights into biological systems and the problems inherent in their examination. The book contains a well-developed and tested set of MATLAB functions that act as a general toolbox for practitioners of quantitative biology and biostatistics. This combination of MATLAB functions and practical tips amplifies the book's technical merit and value to industry professionals. Through numerous examples and sample code blocks, the book provides readers with illustrations of MATLAB programming. Moreover, the associated toolbox permits readers to engage in the process of data analysis without needing to delve deeply into the mathematical theory. This gives an accessible view of the material for readers with varied backgrounds. As a result, the book provides a streamlined framework for the development of mathematical models, algorithms, and the corresponding computer code. In addition, the book features: Real-world computational procedures that can be readily applied to similar problems without the need for keen mathematical acumen Clear delineation of topics to accelerate access to data analysis Access to a book companion website containing the MATLAB toolbox created for this book, as well as a Solutions Manual with solutions to selected exercises *Applied Mathematics for the Analysis of Biomedical Data: Models, Methods, and MATLAB®* is an excellent textbook for students in mathematics, biostatistics, the life and social sciences, and quantitative, computational, and mathematical biology. This book is also an ideal reference for industrial scientists, biostatisticians, product development scientists, and practitioners who use mathematical models of biological systems in biomedical research, medical device development, and pharmaceutical submissions.

STATISTICS AND PROBABILITY FOR ENGINEERING APPLICATIONS

Elsevier *Statistics and Probability for Engineering Applications* provides a complete discussion of all the major topics typically covered in a college engineering statistics course. This textbook minimizes the derivations and mathematical theory, focusing instead on the information and techniques most needed and used in engineering applications. It is filled with practical techniques directly applicable on the job. Written by an experienced industry engineer and statistics professor, this book makes learning statistical methods easier for today's student. This book can be read sequentially like a normal textbook, but it is designed to be used as a handbook, pointing the reader to the topics and sections pertinent to a particular type of statistical problem. Each new concept is clearly and briefly described, whenever possible by relating it to previous topics. Then the student is given carefully chosen examples to deepen understanding of the basic ideas and how they are applied in engineering. The examples and case studies are taken from real-world engineering problems and use real data. A number of practice problems are provided for each section, with answers in the back for selected problems. This book will appeal to engineers in the entire engineering spectrum (electronics/electrical, mechanical, chemical, and civil engineering); engineering students and students taking computer science/computer engineering graduate courses; scientists needing to use applied statistical methods; and engineering technicians and technologists. * Filled with practical techniques directly applicable on the job * Contains hundreds of solved problems and case studies, using real data sets * Avoids unnecessary theory

MATHEMATICAL FOUNDATIONS OF BIG DATA ANALYTICS

Springer Nature In this textbook, basic mathematical models used in Big Data Analytics are presented and application-oriented references to relevant practical issues are made. Necessary mathematical tools are examined and applied to current problems of data analysis, such as brand loyalty, portfolio selection, credit investigation, quality control, product clustering, asset pricing etc. – mainly in an economic context. In addition, we discuss interdisciplinary applications to biology, linguistics, sociology, electrical engineering, computer science and artificial intelligence. For the models, we make use of a wide range of mathematics – from basic disciplines of numerical linear algebra, statistics and optimization to more specialized game, graph and even complexity theories. By doing so, we cover all relevant techniques commonly used in Big Data Analytics. Each chapter starts with a concrete practical problem whose primary aim is to motivate the study of a particular Big Data Analytics technique. Next, mathematical results follow – including important definitions, auxiliary statements and conclusions arising. Case-studies help to deepen the acquired knowledge by applying it in an interdisciplinary context. Exercises serve to improve understanding of the underlying theory. Complete solutions for exercises can be consulted by the interested reader at the end of the textbook; for some which have to be solved numerically, we provide descriptions of algorithms in Python code as supplementary material. This textbook has been recommended and developed for university courses in Germany, Austria and Switzerland.

DATA ANALYSIS

STATISTICAL AND COMPUTATIONAL METHODS FOR SCIENTISTS AND ENGINEERS

Springer Science & Business Media The fourth edition of this successful textbook presents a comprehensive introduction to statistical

and numerical methods for the evaluation of empirical and experimental data. Equal weight is given to statistical theory and practical problems. The concise mathematical treatment of the subject matter is illustrated by many examples and for the present edition a library of Java programs has been developed. It comprises methods of numerical data analysis and graphical representation as well as many example programs and solutions to programming problems. The book is conceived both as an introduction and as a work of reference. In particular it addresses itself to students, scientists and practitioners in science and engineering as a help in the analysis of their data in laboratory courses, in working for bachelor or master degrees, in thesis work, and in research and professional work.

FOUNDATIONS OF DATA SCIENCE

Cambridge University Press Covers mathematical and algorithmic foundations of data science: machine learning, high-dimensional geometry, and analysis of large networks.

INTRODUCTION TO STATISTICS AND DATA ANALYSIS

Cengage Learning Roxy Peck, Chris Olsen, and Jay Devore's new edition uses real data and attention-grabbing examples to introduce students to the study of statistics and data analysis. Traditional in structure yet modern in approach, this text guides students through an intuition-based learning process that stresses interpretation and communication of statistical information. Simple notation--including frequent substitution of words for symbols--helps students grasp concepts and cement their comprehension. Hands-on activities and interactive applets allow students to practice statistics firsthand. INTRODUCTION TO STATISTICS AND DATA ANALYSIS includes updated coverage of most major technologies, as well as expanded coverage of probability. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

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.

MATHEMATICAL STATISTICS WITH RESAMPLING AND R

John Wiley & Sons This thoroughly updated second edition combines the latest software applications with the benefits of modern resampling techniques. Resampling helps students understand the meaning of sampling distributions, sampling variability, P-values, hypothesis tests, and confidence intervals. The second edition of *Mathematical Statistics with Resampling and R* combines modern resampling techniques and mathematical statistics. This book has been classroom-tested to ensure an accessible presentation, uses the powerful and flexible computer language R for data analysis and explores the benefits of modern resampling techniques. This book offers an introduction to permutation tests and bootstrap methods that can serve to motivate classical inference methods. The book strikes a balance between theory, computing, and applications, and the new edition explores additional topics including consulting, paired t test, ANOVA and Google Interview Questions. Throughout the book, new and updated case studies are included representing a diverse range of subjects such as flight delays, birth weights of babies, and telephone company repair times. These illustrate the relevance of the real-world applications of the material. This new edition: • Puts the focus on statistical consulting that emphasizes giving a client an understanding of data and goes beyond typical expectations • Presents new material on topics such as the paired t test, Fisher's Exact Test and the EM algorithm • Offers a new section on "Google Interview Questions" that illustrates statistical thinking • Provides a new chapter on ANOVA • Contains more exercises and updated case studies, data sets, and R code Written for undergraduate students in a mathematical statistics course as well as practitioners and researchers, the second edition of *Mathematical Statistics with Resampling and R* presents a revised and updated guide for applying the most current resampling techniques to mathematical statistics.

INTRODUCTION TO STATISTICS AND DATA ANALYSIS

Brooks/Cole Roxy Peck, Chris Olsen and Jay Devore's new edition uses real data and attention-grabbing examples to introduce students to the study of statistical output and methods of data analysis. Based on the best-selling *STATISTICS: THE EXPLORATION AND ANALYSIS OF DATA*, Fifth Edition, this new *INTRODUCTION TO STATISTICS AND DATA ANALYSIS*, Second Edition integrates coverage of the graphing calculator and includes expanded coverage of probability. Traditional in structure yet modern in approach, this text guides students through an intuition-based learning process that stresses interpretation and communication of statistical information. Conceptual comprehension is cemented by the simplicity of notation--frequently substituting words for symbols. Simple notation helps students grasp concepts. Hands-on activities and Seeing Statistics applets in each chapter allow students to practice statistics firsthand.

EXAMPLES AND PROBLEMS IN MATHEMATICAL STATISTICS

John Wiley & Sons Provides the necessary skills to solve problems in mathematical statistics through theory, concrete examples, and exercises. With a clear and detailed approach to the fundamentals of statistical theory, *Examples and Problems in Mathematical Statistics* uniquely bridges the gap between theory and application and presents numerous problem-solving examples that illustrate the related notations and proven results. Written by an established authority in probability and mathematical statistics, each chapter begins with a theoretical presentation to introduce both the topic and the important results in an effort to aid in overall comprehension. Examples are then provided, followed by problems, and finally, solutions to some of the earlier problems. In addition, *Examples and Problems in Mathematical Statistics* features: Over 160 practical and interesting real-world examples from a variety of fields including engineering, mathematics, and statistics to help readers become proficient in theoretical problem solving. More than 430 unique exercises with select solutions. Key statistical inference topics, such as probability theory, statistical distributions, sufficient statistics, information in samples, testing statistical hypotheses, statistical estimation, confidence and tolerance intervals, large sample theory, and Bayesian analysis. Recommended for graduate-level courses in probability and statistical inference, *Examples and Problems in Mathematical Statistics* is also an ideal reference for applied statisticians and researchers.

PROBABILITY AND MATHEMATICAL STATISTICS: THEORY, APPLICATIONS, AND PRACTICE IN R

SIAM This book develops the theory of probability and mathematical statistics with the goal of analyzing real-world data. Throughout the text, the R package is used to compute probabilities, check analytically computed answers, simulate probability distributions, illustrate answers with appropriate graphics, and help students develop intuition surrounding probability and statistics. Examples, demonstrations, and exercises in the R programming language serve to reinforce ideas and facilitate understanding and confidence. The book's Chapter Highlights provide a summary of key concepts, while the examples utilizing R within the chapters are instructive and practical. Exercises that focus on real-world applications without sacrificing mathematical rigor are included, along with more than 200 figures that help clarify both concepts and applications. In addition, the book features two helpful appendices: annotated solutions to 700 exercises and a Review of Useful Math. Written for use in applied masters classes, *Probability and Mathematical Statistics: Theory, Applications, and Practice in R* is also suitable for advanced undergraduates and for self-study by applied mathematicians and statisticians and qualitatively inclined engineers and scientists.

AN INTRODUCTION TO STATISTICAL METHODS AND DATA ANALYSIS

Cengage Learning Ott and Longnecker's *AN INTRODUCTION TO STATISTICAL METHODS AND DATA ANALYSIS*, 6th Edition, International Edition provides a broad overview of statistical methods for advanced undergraduate and graduate students from a variety of disciplines who have little or no prior course work in statistics. The authors teach students to solve problems encountered in research projects, to make decisions based on data in general settings both within and beyond the university setting, and to become critical readers of statistical analyses in research papers and in news reports. The first eleven chapters present material typically covered in an introductory statistics course, as well as case studies and examples that are often encountered in undergraduate capstone courses. The remaining chapters cover regression modeling and design of experiments.

THE BEHAVIORAL AND SOCIAL SCIENCES

ACHIEVEMENTS AND OPPORTUNITIES

National Academies Press This volume explores the scientific frontiers and leading edges of research across the fields of anthropology, economics, political science, psychology, sociology, history, business, education, geography, law, and psychiatry, as well as the newer, more specialized areas of artificial intelligence, child development, cognitive science, communications, demography, linguistics, and management and decision science. It includes recommendations concerning new resources, facilities, and programs that may be needed over the next several years to ensure rapid progress and provide a high level of returns to basic research.

MATHEMATICAL STATISTICS

AN INTRODUCTION TO LIKELIHOOD BASED INFERENCE

John Wiley & Sons Presents a unified approach to parametric estimation, confidence intervals, hypothesis testing, and statistical modeling, which are uniquely based on the likelihood function. This book addresses mathematical statistics for upper-undergraduates and first year graduate students, tying chapters on estimation, confidence intervals, hypothesis testing, and statistical models together to present a unifying focus on the likelihood function. It also emphasizes the important ideas in statistical modeling, such as sufficiency, exponential family distributions, and large sample properties. *Mathematical Statistics: An Introduction to Likelihood Based Inference* makes advanced topics accessible and understandable and covers many topics in more depth than typical mathematical statistics textbooks. It includes numerous examples, case studies, a large number of exercises ranging from drill and skill to extremely difficult problems, and many of the important theorems of mathematical statistics along with their proofs. In addition to the connected chapters mentioned above, *Mathematical Statistics* covers likelihood-based estimation, with emphasis on multidimensional parameter spaces and range dependent support. It also includes a chapter on confidence intervals, which contains examples of exact confidence intervals along with the standard large sample confidence intervals based on the MLE's and bootstrap confidence intervals. There's also a chapter on parametric statistical models featuring sections on non-iid observations, linear regression, logistic regression, Poisson regression, and linear models. Prepares students with the tools needed to be successful in their future work in statistics data science. Includes practical case studies including real-life data collected from Yellowstone National Park, the Donner party, and the Titanic voyage. Emphasizes the important ideas to statistical modeling, such as sufficiency, exponential family distributions, and large sample properties. Includes sections on Bayesian estimation and credible intervals. Features examples, problems, and solutions. *Mathematical Statistics: An Introduction to Likelihood Based Inference* is an ideal textbook for upper-undergraduate and graduate

courses in probability, mathematical statistics, and/or statistical inference.

INTRODUCTION TO PROBABILITY AND STATISTICS USING R

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