Modern Mathematical Statistics with Applications

Many mathematical statistics texts are heavily oriented toward a rigorous mathematical development of probability and statistics, without much attention paid to how statistics is actually used. In contrast, Modern Mathematical Statistics with Applications, Second Edition strikes a balance between mathematical foundations and statistical practice. In keeping with the recommendation that every math student should study statistics and probability with an emphasis on data analysis, accomplished authors Jay Devore and Kenneth Berk make statistical concepts and methods clear and relevant through careful explanations and a broad range of applications involving real data. The main focus of the book is on presenting and illustrating methods of inferential statistics that are useful in research. It begins with a chapter on descriptive statistics that immediately exposes the reader to real data. The next six chapters develop the probability material that bridges the gap between descriptive and inferential statistics. Point estimation, inferences based on statistical intervals, and hypothesis testing are then introduced in the next three chapters. The remainder of the book explores the use of this methodology in a variety of more complex settings.

Features

- An extensive range of applications that will appeal to a wide audience, including mathematics and statistics majors, prospective engineers and scientists, and business, economics, and quantitative social science students
- Nearly 1,500 exercises to help students master the material and better understand sophisticated concepts and arguments
- An emphasis on the importance of statistical software, including output from the statistical software packages Minitab, R, and SAS.

Fields of interest
Statistics, general; Statistical Theory and Methods

Target groups
Upper undergraduate

Discount group
P

Synthetic Datasets for Statistical Disclosure Control
Theory and Implementation

The aim of this book is to give the reader a detailed introduction to the different approaches to generating multiply imputed synthetic datasets. It describes all approaches that have been developed so far, provides a brief history of synthetic datasets, and gives useful hints on how to deal with real data problems like nonresponse, skip patterns, or logical constraints. Each chapter is dedicated to one approach, first describing the general concept followed by a detailed application to a real dataset providing useful guidelines on how to implement the theory in practice. The discussed multiple imputation approaches include imputation for nonresponse, generating fully synthetic datasets, generating partially synthetic datasets, generating synthetic datasets when the original data is subject to nonresponse, and a two-stage imputation approach that helps to better address the omnipresent trade-off between analytical validity and the risk of disclosure.

Features

- Is the first book that fully covers all different approaches to generating multiply imputed synthetic datasets
- Combination of theory and practical implementation issues makes it appealing to the researcher and the practitioner alike
- Obtaining access to real datasets which is already burdensome for researchers will become more and more complicated in the future, due to rising confidentiality concerns

Fields of interest
Statistics for Social Science, Behavioral Science, Education, Public Policy, and Law; Statistics for Business/Economics/Mathematical Finance/Insurance; Statistics for Life Sciences, Medicine, Health Sciences

Target groups
Professional/practitioner

Discount group
P

Handbook of Computational Statistics
Concepts and Methods

The Handbook of Computational Statistics - Concepts and Methods (second edition) is a revision of the first edition published in 2004, and contains additional comments and updated information on the existing chapters, as well as three new chapters addressing recent work in the field of computational statistics. This new edition is divided into 4 parts in the same way as the first ed. It begins with “How Computational Statistics became the backbone of modern data science” (Ch.1): an overview of the field of Computational Statistics, how it emerged as a separate discipline, and how its own development mirrored that of hardware and software, including a discussion of current active research. The second part (Chs. 2 - 15) presents several topics in the supporting field of statistical computing. Emphasis is placed on the need for fast and accurate numerical algorithms, and some of the basic methodologies for transformation, database handling, high-dimensional data and graphics treatment are discussed. The third part (Chs. 16 - 33) focuses on statistical methodology. Special attention is given to smoothing, iterative procedures, simulation and visualization of multivariate data. Lastly, a set of selected applications (Chs. 34 - 38) like Bioinformatics, Medical Imaging, Finance, Econometrics and Network Intrusion Detection highlight the usefulness of computational statistics in real-world applications.

Features

- Up-to-date coverage of the topic
- First-rate authors contribute to the volume
- The editors have been involved in this research area from the beginning and have all given substantial input to its development

Fields of interest
Statistics and Computing/Statistics Programs; Statistics, general; Statistical Theory and Methods

Target groups
Research

Discount group
P
Living Standards Analytics
Development through the Lens of Household Survey Data

The purpose of this book is to introduce, discuss, illustrate, and evaluate the colorful palette of analytical techniques that can be applied to the analysis of household survey data, with an emphasis on the innovations of the past decade or so. Most of the chapters begin by introducing a methodological or policy problem, to motivate the subsequent discussion of relevant methods. They then summarize the relevant techniques, and draw on examples – many of them from the authors’ own work – and aim to convey a sense of the potential, but also the strengths and weaknesses, of those techniques. This book is meant for graduate students in statistics, economics, policy analysis, and social sciences, especially, but certainly not exclusively, those interested in the challenges of economic development in the Third World. Additionally, the book will be useful to academics and practitioners who work closely with survey data. This is a book that can serve as a reference work, to be taken down from the shelf and perused from time to time.

Features
- Together, the authors have over fifty years of experience working with household datasets, and have written over 200 papers, articles, and reports
- Includes chapters on sampling, causality, Bayesian methods, bootstrapping, impact evaluation, duration models, and modeling spatial effects
- Promotes harnessing of data, particularly from household surveys, to improve policy recommendations

Fields of interest
Statistics for Social Science, Behavioral Science, Education, Public Policy, and Law

Target groups
Research

Discount group
P

Due September 2011

$79.95

W. Jank, University of Maryland, College Park, MD, USA

Business Analytics for Managers

The practice of business is changing. More and more companies are amassing larger and larger amounts of data, and storing them in bigger and bigger data bases. Consequently, successful applications of data-driven decision making are plentiful and increasing on a daily basis. This book will motivate the need for data and data-driven solutions, using real data from real business scenarios. It will allow managers to better interact with personnel specializing in analytics by exposing managers and decision makers to the key ideas and concepts of data-driven decision making. Business Analytics for Managers conveys ideas and concepts from both statistics and data mining with the goal of extracting knowledge from real business data and actionable insight for managers. Throughout, emphasis placed on conveying data-driven thinking. While the ideas discussed in this book can be implemented using many different software solutions from many different vendors, it also provides a quick-start to one of the most powerful software solutions available. The main goals of this book are as follows: to excite managers and decision makers about the potential that resides in data and the value that data analytics can add to business processes and provide managers with a basic understanding of the main concepts of data analytics and a common language to convey data-driven decision problems so they can better communicate with personnel specializing in data mining or statistics.

Features
- Informs managers and decision makers about the potential that resides in data and the value that data analytics can add to business processes
- Provides managers with a basic understanding of the main concepts of data analytics and a common language to convey data-driven decision problems so they can better communicate with personnel specializing in data mining or statistics
- Hands on and practice-oriented, with real world examples to explain every concept

Fields of interest
Statistics for Business/Economics/Mathematical Finance/Insurance

Target groups
Research

Discount group
P

Due September 2011
2011. X, 206 p. 101 illus., 24 in color. (Use R) Softcover

approx $59.95
ISBN 978-1-4614-0405-7

R. A. Muenchen, University of Tennessee, Knoxville, TN, USA

R for SAS and SPSS Users

R is a powerful and free software system for data analysis and graphics, with over 1,200 add-on packages available. This book introduces R using SAS and SPSS terms with which you are already familiar. It demonstrates which of the add-on packages are most like SAS and SPSS and compares them to R’s built-in functions. It steps through over 30 programs written in all three packages, comparing and contrasting the packages’ differing approaches. The programs and practice datasets are available for download. The glossary defines over 50 R terms using SAS/SPSS jargon and again using R jargon. The table of contents and the index allow you to find equivalent R functions by looking up both SAS statements and SPSS commands. When finished, you will be able to import data, manage and transform it, create publication quality graphics, and perform basic statistical analyses. This new edition has updated programming, an expanded index, and even more statistical methods covered in over 25 new sections.

Features
- Uses clear, step-by-step demonstrations of every concept
- Uses SAS/SPSS terminology in narrative, Table of Contents, Index and Glossary
- Demonstrates which of over 1,200 add-on packages give the most SAS/SPSS-like output

Contents

Fields of interest
Statistics and Computing/Statistics Programs; Probability and Statistics in Computer Science; Data Mining and Knowledge Discovery

Target groups
Professional/practitioner

Discount group
P

Due August 2011
2nd ed. 2011. XXVIII, 686 p. 117 illus., 35 in color. (Statistics and Computing) Hardcover

approx $99.00
ISBN 978-1-4614-0684-6
B. Vidakovic, Georgia Institute of Technology, Atlanta, GA, USA

Statistics for Bioengineering Sciences
With MATLAB and WinBUGS Support

Through its scope and depth of coverage, this book addresses the needs of the vibrant and rapidly growing engineering fields, bioengineering and biomedical engineering, while implementing software that engineers are familiar with. The author integrates introductory statistics for engineers and introductory biostatistics as a single textbook heavily oriented to computation and hands on approaches. For example, topics ranging from the aspects of disease and device testing, Sensitivity, Specificity and ROC curves, Epidemiological Risk Theory, Survival Analysis, or Logistic and Poisson Regressions are covered. In addition to the synergy of engineering and biostatistical approaches, the novelty of this book is in the substantial coverage of Bayesian approaches to statistical inference. Many examples in this text are solved using both the traditional and Bayesian methods, and the results are compared and commented.

Features
- The text addresses the needs of the vibrant and rapidly growing engineering fields, bioengineering and biomedical engineering
- Implements software with which engineers are familiar
- Incorporates substantial coverage of Bayesian approaches to statistical inference

From the contents

Field of interest
Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences

Target groups
Upper undergraduate

Discount group
P

A. Ziegler, University of Lübeck, Germany

Generalized Estimating Equations

Generalized estimating equations have become increasingly popular in biometrical, econometrical, and psychometrical applications because they overcome the classical assumptions of statistics, i.e. independence and normality, which are too restrictive for many problems. Therefore, the main goal of this book is to give a systematic presentation of the original generalized estimating equations (GEE) and some of its further developments. Subsequently, the emphasis is put on the unification of various GEE approaches. This is done by the use of two different estimation techniques, the pseudo maximum likelihood (PML) method and the generalized method of moments (GMM). The author details the statistical foundation of the GEE approach using more general estimation techniques. The book could therefore be used as basis for a course to graduate students in statistics, biostatistics, or econometrics, and will be useful to practitioners in the same fields.

Features
- Generalized estimating equations have become increasingly popular in biometrical, econometrical, and psychometrical applications
- In this book, they are derived in a unified way using pseudo maximum likelihood estimation and the generalized method of moments
- References to the relevant literature discussing technical details are provided for the interested reader

From the contents

Field of interest
Statistical Theory and Methods

Target groups
Research

Discount group
P