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Statistical Inference *Cengage Learning*

This book builds theoretical statistics from the first principles of probability theory. Starting from the basics of probability, the authors develop the theory of statistical inference using techniques, definitions, and concepts that are statistical and are natural extensions and consequences of previous concepts. Intended for first-year graduate students, this book can be used for students majoring in statistics who have a solid mathematics background. It can also be used in a way

that stresses the more practical uses of statistical theory, being more concerned with understanding basic statistical concepts and deriving reasonable statistical procedures for a variety of situations, and less concerned with formal optimality investigations. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Common Mistakes In English, 6/E
Pearson Education India

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.

Theoretical Statistics

Topics for a Core Course *Springer Science & Business Media*

Intended as the text for a sequence of advanced courses, this book covers major topics in theoretical statistics in a concise and rigorous fashion. The discussion assumes a background in advanced calculus, linear algebra, probability, and some analysis and topology. Measure theory is used, but the notation and basic results needed are presented in an initial chapter on probability, so prior knowledge of these topics is not essential. The presentation is designed to expose students to as

many of the central ideas and topics in the discipline as possible, balancing various approaches to inference as well as exact, numerical, and large sample methods. Moving beyond more standard material, the book includes chapters introducing bootstrap methods, nonparametric regression, equivariant estimation, empirical Bayes, and sequential design and analysis. The book has a rich collection of exercises. Several of them illustrate how the theory developed in the book may be used in various applications. Solutions to many of the exercises are included in an appendix.

Essential Statistical Inference

Theory and Methods *Springer Science*

& Business Media

This book is for students and researchers who have had a first year graduate level mathematical statistics course. It covers classical likelihood, Bayesian, and permutation inference; an introduction to basic asymptotic distribution theory; and modern topics like M-estimation, the jackknife, and the bootstrap. R code is woven throughout the text, and there are a large number of examples and problems. An important goal has been to make the topics accessible to a wide audience, with little overt reliance on measure theory. A typical semester course consists of Chapters 1-6 (likelihood-based estimation and testing, Bayesian inference, basic asymptotic results) plus selections from M-estimation and related testing and

resampling methodology. Dennis Boos and Len Stefanski are professors in the Department of Statistics at North Carolina State. Their research has been eclectic, often with a robustness angle, although Stefanski is also known for research concentrated on measurement error, including a co-authored book on non-linear measurement error models. In recent years the authors have jointly worked on variable selection methods.

Statistical Inference *Oxford University Press on Demand*

Statistical inference is the foundation on which much of statistical practice is built. This book covers the topic at a level suitable for students and professionals who need to understand these foundations.

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Statistical Design Springer Science & Business Media

Although statistical design is one of the oldest branches of statistics, its importance is ever increasing. This book

describes the principles that underpin good design, paying attention to both the theoretical background and the problems arising from real experimental situations.

Statistical Theory and Inference Springer

This text is for a one semester graduate course in statistical theory and covers minimal and complete sufficient statistics, maximum likelihood estimators, method of moments, bias and mean square error, uniform minimum variance estimators and the Cramer-Rao lower bound, an introduction to large sample theory, likelihood ratio tests and uniformly most powerful tests and the Neyman Pearson Lemma. A major goal of this text is to

make these topics much more accessible to students by using the theory of exponential families. Exponential families, indicator functions and the support of the distribution are used throughout the text to simplify the theory. More than 50 "brand name" distributions are used to illustrate the theory with many examples of exponential families, maximum likelihood estimators and uniformly minimum variance unbiased estimators. There are many homework problems with over 30 pages of solutions.

Theory of Point Estimation *Springer Science & Business Media*

This second, much enlarged edition by Lehmann and Casella of Lehmann's classic text on point estimation

maintains the outlook and general style of the first edition. All of the topics are updated, while an entirely new chapter on Bayesian and hierarchical Bayesian approaches is provided, and there is much new material on simultaneous estimation. Each chapter concludes with a Notes section which contains suggestions for further study. This is a companion volume to the second edition of Lehmann's "Testing Statistical Hypotheses".

Introduction to Probability *CRC Press*
Developed from celebrated Harvard statistics lectures, Introduction to Probability provides essential language and tools for understanding statistics, randomness, and uncertainty. The book explores a wide variety of applications

and examples, ranging from coincidences and paradoxes to Google PageRank and Markov chain Monte Carlo (MCMC). Additional

Introduction to Statistical Inference

Springer Science & Business Media

This book is based upon lecture notes developed by Jack Kiefer for a course in statistical inference he taught at Cornell University. The notes were distributed to the class in lieu of a textbook, and the problems were used for homework assignments. Relying only on modest prerequisites of probability theory and calculus, Kiefer's approach to a first course in statistics is to present the central ideas of the modern mathematical theory with a minimum of fuss and formality. He is able to do this

by using a rich mixture of examples, pictures, and mathematical derivations to complement a clear and logical discussion of the important ideas in plain English. The straightforwardness of Kiefer's presentation is remarkable in view of the sophistication and depth of his examination of the major theme: How should an intelligent person formulate a statistical problem and choose a statistical procedure to apply to it? Kiefer's view, in the same spirit as Neyman and Wald, is that one should try to assess the consequences of a statistical choice in some quantitative (frequentist) formulation and ought to choose a course of action that is verifiably optimal (or nearly so) without regard to the perceived "attractiveness" of certain dogmas and methods.

Probability and Statistical Inference

From Basic Principles to Advanced Models *CRC Press*

Probability and Statistical Inference: From Basic Principles to Advanced Models covers aspects of probability, distribution theory, and inference that are fundamental to a proper understanding of data analysis and statistical modelling. It presents these topics in an accessible manner without sacrificing mathematical rigour, bridging the gap between the many excellent introductory books and the more advanced, graduate-level texts. The book introduces and explores techniques that are relevant to modern practitioners, while being respectful to the history of statistical inference. It

seeks to provide a thorough grounding in both the theory and application of statistics, with even the more abstract parts placed in the context of a practical setting. Features:

- Complete introduction to mathematical probability, random variables, and distribution theory.
- Concise but broad account of statistical modelling, covering topics such as generalised linear models, survival analysis, time series, and random processes.
- Extensive discussion of the key concepts in classical statistics (point estimation, interval estimation, hypothesis testing) and the main techniques in likelihood-based inference.
- Detailed introduction to Bayesian statistics and associated topics.
- Practical illustration of some of the main computational methods used in

modern statistical inference (simulation, bootstrap, MCMC). This book is for students who have already completed a first course in probability and statistics, and now wish to deepen and broaden their understanding of the subject. It can serve as a foundation for advanced undergraduate or postgraduate courses. Our aim is to challenge and excite the more mathematically able students, while providing explanations of statistical concepts that are more detailed and approachable than those in advanced texts. This book is also useful for data scientists, researchers, and other applied practitioners who want to understand the theory behind the statistical methods used in their fields.

Models for Probability and

Statistical Inference

Theory and Applications *John Wiley & Sons*

This concise, yet thorough, book is enhanced with simulations and graphs to build the intuition of readers. Models for Probability and Statistical Inference was written over a five-year period and serves as a comprehensive treatment of the fundamentals of probability and statistical inference. With detailed theoretical coverage found throughout the book, readers acquire the fundamentals needed to advance to more specialized topics, such as sampling, linear models, design of experiments, statistical computing, survival analysis, and bootstrapping. Ideal as a textbook for a two-semester

sequence on probability and statistical inference, early chapters provide coverage on probability and include discussions of: discrete models and random variables; discrete distributions including binomial, hypergeometric, geometric, and Poisson; continuous, normal, gamma, and conditional distributions; and limit theory. Since limit theory is usually the most difficult topic for readers to master, the author thoroughly discusses modes of convergence of sequences of random variables, with special attention to convergence in distribution. The second half of the book addresses statistical inference, beginning with a discussion on point estimation and followed by coverage of consistency and confidence intervals. Further areas of exploration

include: distributions defined in terms of the multivariate normal, chi-square, t, and F (central and non-central); the one- and two-sample Wilcoxon test, together with methods of estimation based on both; linear models with a linear space-projection approach; and logistic regression. Each section contains a set of problems ranging in difficulty from simple to more complex, and selected answers as well as proofs to almost all statements are provided. An abundant amount of figures in addition to helpful simulations and graphs produced by the statistical package S-Plus(r) are included to help build the intuition of readers.

Essentials of Statistical Inference

Cambridge University Press

Concise account of main approaches;

first textbook to synthesize modern computation with basic theory.

Computer Age Statistical Inference

Algorithms, Evidence, and Data Science *Cambridge University Press*

The twenty-first century has seen a breathtaking expansion of statistical methodology, both in scope and in influence. 'Big data', 'data science', and 'machine learning' have become familiar terms in the news, as statistical methods are brought to bear upon the enormous data sets of modern science and commerce. How did we get here? And where are we going? This book takes us on an exhilarating journey through the revolution in data analysis following the introduction of electronic computation in

the 1950s. Beginning with classical inferential theories - Bayesian, frequentist, Fisherian - individual chapters take up a series of influential topics: survival analysis, logistic regression, empirical Bayes, the jackknife and bootstrap, random forests, neural networks, Markov chain Monte Carlo, inference after model selection, and dozens more. The distinctly modern approach integrates methodology and algorithms with statistical inference. The book ends with speculation on the future direction of statistics and data science.

Monte Carlo Statistical Methods *Springer Science & Business Media*

We have sold 4300 copies worldwide of the first edition (1999). This new edition contains five completely new chapters

covering new developments.

Theory of Statistics *Springer Science & Business Media*

The aim of this graduate textbook is to provide a comprehensive advanced course in the theory of statistics covering those topics in estimation, testing, and large sample theory which a graduate student might typically need to learn as preparation for work on a Ph.D. An important strength of this book is that it provides a mathematically rigorous and even-handed account of both Classical and Bayesian inference in order to give readers a broad perspective. For example, the "uniformly most powerful" approach to testing is contrasted with available decision-theoretic approaches.

Advanced Linear Algebra *Springer Science & Business Media*

This book covers an especially broad range of topics, including some topics not generally found in linear algebra books. The first part details the basics of linear algebra. Coverage then proceeds to a discussion of modules, emphasizing a comparison with vector spaces. A thorough discussion of inner product spaces, eigenvalues, eigenvectors, and finite dimensional spectral theory follows, culminating in the finite dimensional spectral theorem for normal operators.

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.

Principles of Statistical Inference*Cambridge University Press*

In this definitive book, D. R. Cox gives a comprehensive and balanced appraisal of statistical inference. He develops the key concepts, describing and comparing the main ideas and controversies over foundational issues that have been keenly argued for more than two-hundred years. Continuing a sixty-year career of major contributions to statistical thought, no one is better placed to give this much-needed account of the field. An appendix gives a more personal assessment of the merits of different ideas. The content ranges from the traditional to the contemporary. While specific applications are not treated, the book is strongly motivated by applications across the sciences and

associated technologies. The mathematics is kept as elementary as feasible, though previous knowledge of statistics is assumed. The book will be valued by every user or student of statistics who is serious about understanding the uncertainty inherent in conclusions from statistical analyses.

A First Course in Statistical Inference *Springer*

This book offers a modern and accessible introduction to Statistical Inference, the science of inferring key information from data. Aimed at beginning undergraduate students in mathematics, it presents the concepts underpinning frequentist statistical theory. Written in a conversational and informal style, this concise text

concentrates on ideas and concepts, with key theorems stated and proved. Detailed worked examples are included and each chapter ends with a set of exercises, with full solutions given at the back of the book. Examples using R are provided throughout the book, with a brief guide to the software included. Topics covered in the book include: sampling distributions, properties of estimators, confidence intervals, hypothesis testing, ANOVA, and fitting a straight line to paired data. Based on the author's extensive teaching experience, the material of the book has been honed by student feedback for over a decade. Assuming only some familiarity with elementary probability, this textbook has been devised for a one semester first course in statistics.

Think Stats *"O'Reilly Media, Inc."*

If you know how to program, you have the skills to turn data into knowledge using the tools of probability and statistics. This concise introduction shows you how to perform statistical analysis computationally, rather than mathematically, with programs written in Python. You'll work with a case study throughout the book to help you learn the entire data analysis process—from collecting data and generating statistics to identifying patterns and testing hypotheses. Along the way, you'll become familiar with distributions, the rules of probability, visualization, and many other tools and concepts. Develop your understanding of probability and statistics by writing and testing code. Run experiments to test statistical behavior,

such as generating samples from several distributions Use simulations to understand concepts that are hard to grasp mathematically Learn topics not usually covered in an introductory course, such as Bayesian estimation Import data from almost any source using Python, rather than be limited to data that has been cleaned and formatted for statistics tools Use statistical inference to answer questions about real-world data

STATISTICAL INFERENCE : THEORY OF ESTIMATION *PHI Learning Pvt. Ltd.*

This book is sequel to a book Statistical Inference: Testing of Hypotheses (published by PHI Learning). Intended for the postgraduate students of statistics, it introduces the problem of estimation in

the light of foundations laid down by Sir R.A. Fisher (1922) and follows both classical and Bayesian approaches to solve these problems. The book starts with discussing the growing levels of data summarization to reach maximal summarization and connects it with sufficient and minimal sufficient statistics. The book gives a complete account of theorems and results on uniformly minimum variance unbiased estimators (UMVUE)—including famous Rao and Blackwell theorem to suggest an improved estimator based on a sufficient statistic and Lehmann-Scheffe theorem to give an UMVUE. It discusses Cramer-Rao and Bhattacharyya variance lower bounds for regular models, by introducing Fishers information and Chapman, Robbins and Kiefer variance

lower bounds for Pitman models. Besides, the book introduces different methods of estimation including famous method of maximum likelihood and discusses large sample properties such as consistency, consistent asymptotic normality (CAN) and best asymptotic normality (BAN) of different estimators. Separate chapters are devoted for finding Pitman estimator, among equivariant estimators, for location and scale models, by exploiting symmetry structure, present in the model, and Bayes, Empirical Bayes, Hierarchical Bayes estimators in different statistical models. Systematic exposition of the theory and results in different statistical situations and models, is one of the several attractions of the presentation. Each chapter is concluded with several

solved examples, in a number of statistical models, augmented with exposition of theorems and results. **KEY FEATURES** • Provides clarifications for a number of steps in the proof of theorems and related results., • Includes numerous solved examples to improve analytical insight on the subject by illustrating the application of theorems and results. • Incorporates Chapter-end exercises to review student's comprehension of the subject. • Discusses detailed theory on data summarization, unbiased estimation with large sample properties, Bayes and Minimax estimation, separately, in different chapters.

The Blood Tree

'The Blood Tree is a high-throttle journey

through the realms of light and dark. It gives readers a glimpse into the angels that both safeguard and exploit humanity.'

Statistical Design *Springer Science & Business Media*

Statistical design is one of the fundamentals of our subject, being at the core of the growth of statistics during the previous century. In this book the basic theoretical underpinnings are covered. It describes the principles that drive good designs and good statistics. Design played a key role in agricultural statistics and set down principles of good practice, principles that still apply today. Statistical design is all about understanding where the variance comes from, and making sure that is

where the replication is. Indeed, it is probably correct to say that these principles are even more important today.

Introduction to Probability Theory and Statistical Inference

Probability Theory and Statistical Inference *Cambridge University Press*

This empirical research methods course enables informed implementation of statistical procedures, giving rise to trustworthy evidence.

Large-Scale Inference

Empirical Bayes Methods for Estimation, Testing, and Prediction *Cambridge University Press*

We live in a new age for statistical inference, where modern scientific technology such as microarrays and fMRI machines routinely produce thousands and sometimes millions of parallel data sets, each with its own estimation or testing problem. Doing thousands of problems at once is more than repeated application of classical methods. Taking an empirical Bayes approach, Bradley Efron, inventor of the bootstrap, shows how information accrues across problems in a way that combines Bayesian and frequentist ideas. Estimation, testing and prediction blend in this framework, producing opportunities for new methodologies of increased power. New difficulties also arise, easily leading to flawed inferences. This book takes a careful

look at both the promise and pitfalls of large-scale statistical inference, with particular attention to false discovery rates, the most successful of the new statistical techniques. Emphasis is on the inferential ideas underlying technical developments, illustrated using a large number of real examples.

Probability

Theory and Examples *Cambridge University Press*

This classic introduction to probability theory for beginning graduate students covers laws of large numbers, central limit theorems, random walks, martingales, Markov chains, ergodic theorems, and Brownian motion. It is a comprehensive treatment concentrating

on the results that are the most useful for applications. Its philosophy is that the best way to learn probability is to see it in action, so there are 200 examples and 450 problems. The fourth edition begins with a short chapter on measure theory to orient readers new to the subject.

The Likelihood Principle *IMS*

A Graduate Course on Statistical Inference *Springer*

This textbook offers an accessible and comprehensive overview of statistical estimation and inference that reflects current trends in statistical research. It draws from three main themes throughout: the finite-sample theory, the asymptotic theory, and Bayesian statistics. The authors have included a

chapter on estimating equations as a means to unify a range of useful methodologies, including generalized linear models, generalized estimation equations, quasi-likelihood estimation, and conditional inference. They also utilize a standardized set of assumptions and tools throughout, imposing regular conditions and resulting in a more coherent and cohesive volume. Written for the graduate-level audience, this text can be used in a one-semester or two-semester course.

Solutions Manual for Statistical Inference

Statistical Inference as Severe Testing

How to Get Beyond the Statistics Wars *Cambridge University Press*

Mounting failures of replication in social and biological sciences give a new urgency to critically appraising proposed reforms. This book pulls back the cover on disagreements between experts charged with restoring integrity to science. It denies two pervasive views of the role of probability in inference: to assign degrees of belief, and to control error rates in a long run. If statistical consumers are unaware of assumptions behind rival evidence reforms, they can't scrutinize the consequences that affect them (in personalized medicine, psychology, etc.). The book sets sail with a simple tool: if little has been done to rule out flaws in inferring a claim, then it has not passed a severe test. Many

methods advocated by data experts do not stand up to severe scrutiny and are in tension with successful strategies for blocking or accounting for cherry picking and selective reporting. Through a series of excursions and exhibits, the philosophy and history of inductive inference come alive. Philosophical tools are put to work to solve problems about science and pseudoscience, induction and falsification.

Sampling: Design and Analysis

Design and Analysis *CRC Press*

What is the unemployment rate? How many adults have high blood pressure? What is the total area of land planted with soybeans? Sampling: Design and Analysis tells you how to design and

analyze surveys to answer these and other questions. This authoritative text, used as a standard reference by numerous survey organizations, teaches sampling using real data sets from social sciences, public opinion research, medicine, public health, economics, agriculture, ecology, and other fields. The book is accessible to students from a wide range of statistical backgrounds. By appropriate choice of sections, it can be used for a graduate class for statistics students or for a class with students from business, sociology, psychology, or biology. Readers should be familiar with concepts from an introductory statistics class including linear regression; optional sections contain the statistical theory, for readers who have studied mathematical statistics. Distinctive

features include: More than 450 exercises. In each chapter, Introductory Exercises develop skills, Working with Data Exercises give practice with data from surveys, Working with Theory Exercises allow students to investigate statistical properties of estimators, and Projects and Activities Exercises integrate concepts. A solutions manual is available. An emphasis on survey design. Coverage of simple random, stratified, and cluster sampling; ratio estimation; constructing survey weights; jackknife and bootstrap; nonresponse; chi-squared tests and regression analysis. Graphing data from surveys. Computer code using SAS® software. Online supplements containing data sets, computer programs, and additional material. Sharon Lohr, the author of

Measuring Crime: Behind the Statistics, has published widely about survey sampling and statistical methods for education, public policy, law, and crime. She has been recognized as Fellow of the American Statistical Association, elected member of the International Statistical Institute, and recipient of the Gertrude M. Cox Statistics Award and the Deming Lecturer Award. Formerly Dean's Distinguished Professor of Statistics at Arizona State University and a Vice President at Westat, she is now a freelance statistical consultant and writer. Visit her website at www.sharonlohr.com. This edition is a reprint of the second edition published by Cengage Learning, Inc. Reprinted with permission.

Current Issues in Statistical Inference

Essays in Honor of D. Basu *IMS*

Introduction to Real Analysis *Prentice Hall*

Using an extremely clear and informal approach, this book introduces readers to a rigorous understanding of mathematical analysis and presents challenging math concepts as clearly as possible. The real number system. Differential calculus of functions of one variable. Riemann integral functions of one variable. Integral calculus of real-valued functions. Metric Spaces. For those who want to gain an understanding of mathematical analysis and challenging mathematical concepts.

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.

Theory of Statistical Inference *CRC Press*

Theory of Statistical Inference is designed as a reference on statistical inference for researchers and students at the graduate or advanced undergraduate level. It presents a unified treatment of the foundational ideas of modern statistical inference, and would be suitable for a core course in a graduate program in statistics or biostatistics. The emphasis is on the application of mathematical theory to the problem of inference, leading to an optimization theory allowing the choice

of those statistical methods yielding the most efficient use of data. The book shows how a small number of key concepts, such as sufficiency, invariance, stochastic ordering, decision theory and vector space algebra play a recurring and unifying role. The volume can be divided into four sections. Part I provides a review of the required distribution theory. Part II introduces the problem of statistical inference. This includes the definitions of the exponential family, invariant and Bayesian models. Basic concepts of estimation, confidence intervals and hypothesis testing are introduced here. Part III constitutes the core of the volume, presenting a formal theory of statistical inference. Beginning with decision theory, this section then covers uniformly minimum variance

unbiased (UMVU) estimation, minimum risk equivariant (MRE) estimation and the Neyman-Pearson test. Finally, Part IV introduces large sample theory. This section begins with stochastic limit theorems, the δ -method, the Bahadur representation theorem for sample quantiles, large sample U-estimation, the Cramér-Rao lower bound and asymptotic efficiency. A separate chapter is then devoted to estimating equation methods. The volume ends with a detailed development of large sample hypothesis testing, based on the likelihood ratio test (LRT), Rao score test and the Wald test. Features This volume includes treatment of linear and nonlinear regression models, ANOVA models, generalized linear models (GLM) and generalized estimating equations

(GEE). An introduction to decision theory (including risk, admissibility, classification, Bayes and minimax decision rules) is presented. The importance of this sometimes overlooked topic to statistical methodology is emphasized. The volume emphasizes throughout the important role that can be played by group theory and invariance in statistical inference. Nonparametric (rank-based) methods are derived by the same principles used

for parametric models and are therefore presented as solutions to well-defined mathematical problems, rather than as robust heuristic alternatives to parametric methods. Each chapter ends with a set of theoretical and applied exercises integrated with the main text. Problems involving R programming are included. Appendices summarize the necessary background in analysis, matrix algebra and group theory.