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**Pharmaceutical Statistics Using SAS A Practical Guide SAS Institute** Introduces a range of data analysis problems encountered in drug development and illustrates them using case studies from actual pre-clinical experiments and clinical studies. Includes a discussion of methodological issues, practical advice from subject matter experts, and review of relevant regulatory guidelines. **SAS Programming in the Pharmaceutical Industry, Second Edition SAS Institute** This comprehensive resource provides on-the-job training for statistical programmers who use SAS in the pharmaceutical industry This one-stop resource offers a complete review of what entry- to intermediate-level statistical programmers need to know in order to help with the analysis and reporting of clinical trial data in the pharmaceutical industry. SAS Programming in the Pharmaceutical Industry, Second Edition begins with an introduction to the pharmaceutical industry and the work environment of a statistical programmer. Then it gives a chronological explanation of what you need to know to do the job. It includes information on importing and massaging data into analysis data sets, producing clinical trial output, and exporting data. This edition has been updated for SAS 9.4, and it features new graphics as well as all new examples using CDISC SDTM or ADaM model data structures. Whether you're a novice seeking an introduction to SAS programming in the pharmaceutical industry or a junior-level programmer exploring new approaches to problem solving, this real-world reference guide offers a wealth of practical suggestions to help you sharpen your skills. This book is part of the SAS Press program. **SAS Macro Programming Made Easy Sas Inst** "The macro facility is a popular part of SAS. Macro programming is a required skill for many SAS programming jobs, and the SAS Advanced Programming Certification Exam tests macro processing concepts. Whether you're looking to become certified, land a job, or increase your skills, you'll benefit from SAS Macro Programming Made Easy, Third Edition. By following Michele Burlew's examples and step-by-step instructions, you'll be able to rapidly perform repetitive programming tasks, to pass information between programming steps more easily, and to make your programming easier to read. Updated for SAS 9.4, this book teaches you the elements of the macro facility (macro variables, macro programs, macro language), how to write a macro program, techniques for macro programming, tips on using the macro facility, how the macro facility fits into SAS, and about the interfaces between the macro facility and other components of SAS. Beginning macro programmers will learn to write SAS macro programs quickly and efficiently. More experienced programmers will find this book useful to refresh their conceptual knowledge and expand on their macro programming skills. Ultimately, any user interested in automating their programs including analysts, programmers, and report writers' will find Michele Burlew's book an excellent tutorial." -- **Data Preparation for Analytics Using SAS SAS Institute** Text addresses such tasks as: viewing analytic data preparation in the context of its business environment, identifying the specifics of predictive modeling for data mart creation, understanding the concepts and considerations of data preparation for time series analysis, and using SAS procedures for scoring. **Validating Clinical Trial Data Reporting with SAS SAS Institute** This indispensable guide focuses on validating programs written to support the clinical trial process from after the data collection stage to generating reports and submitting data and output to the Food and Drug Administration. **PROC SQL Beyond the Basics Using SAS, Third Edition SAS Institute** PROC SQL: Beyond the Basics Using SAS®, Third Edition, is a step-by-step, example-driven guide that helps readers master the language of PROC SQL. Packed with analysis and examples illustrating an assortment of PROC SQL options, statements, and clauses, this book not only covers all the basics, but it also offers extensive guidance on complex topics such as set operators and correlated subqueries. Programmers at all levels will appreciate Kirk Lafler's easy-to-follow examples, clear explanations, and handy tips to extend their knowledge of PROC SQL. This third edition explores new and powerful features in SAS® 9.4, including topics such as: IFC and IFN functions nearest neighbor processing the HAVING clause indexes It also features two completely new chapters on fuzzy matching and data-driven programming. Delving into the workings of PROC SQL with greater analysis and discussion, PROC SQL: Beyond the Basics Using SAS®, Third Edition, explores this powerful database language using discussion and numerous real-world examples. **SAS Macro Programming Made Easy, Third Edition SAS Institute** This book provides beginners with a thorough foundation in SAS macro programming. The macro facility is a popular part of SAS. Macro programming is a required skill for many SAS programming jobs, and the SAS Advanced Programming Certification Exam tests macro processing concepts. Whether you're looking to become certified, land a job, or increase your skills, you'll benefit from SAS Macro Programming Made Easy, Third Edition. By following Michele Burlew's examples and step-by-step instructions, you'll be able to rapidly perform repetitive programming tasks, to pass information between programming steps more easily, and to make your programming easier to read. Updated for SAS 9.4, this book teaches you the elements of the macro facility (macro variables, macro programs, macro language), how to write a macro program, techniques for macro programming, tips on using the macro facility, how the macro facility fits into SAS, and about the interfaces between the macro facility and other components of SAS. Beginning macro programmers will learn to write SAS macro programs quickly and efficiently. More experienced programmers will find this book useful to refresh their conceptual knowledge and expand on their macro programming skills. Ultimately, any user interested in automating their programs—including analysts, programmers, and report writers—will find Michele Burlew's book an excellent tutorial. This book is part of the SAS Press program. **SAS for Forecasting Time Series John Wiley & Sons** Easy-to-read and comprehensive, this book shows how the SAS System performs multivariate time series analysis and features the advanced SAS procedures STATSPACE, ARIMA, and SPECTRA. The interrelationship of SAS/ETS procedures is demonstrated with an accompanying discussion of how the choice of a procedure depends on the data to be analysed and the results desired. Other topics covered include detecting sinusoidal components in time series models and performing bivariate corr-spectral analysis and comparing the results with the standard transfer function methodology. The authors' unique approach to integrating students in a variety of disciplines and industries. Emphasis is on correct interpretation of output to draw meaningful conclusions. The volume, co-published by SAS and JWS, features both theory and practicality, and accompanies a soon-to-be extensive library of SAS hands-on manuals in a multitude of statistical areas. The book can be used with a number of hardware-specific computing machines including CMS, Mac, MVS, Opem VMS Alpha, Opmen VMS VAX, OS/390, OS/2, UNIX, and Windows. **PROC SQL Beyond the Basics Using SAS Sas Inst** Kirk Lafler's PROC SQL: Beyond the Basics Using SAS, Second Edition, offers a step-by-step example-driven guide that helps readers master the language of PROC SQL. Packed with analysis and examples illustrating an assortment of PROC SQL options, statements, and clauses, this book can be approached in a number of ways. Users can read it cover-to-cover or selectively by chapter; they can use the extensive index to find content of interest or refer to the helpful "Summary" that precede each chapter to look for help on a specific topic. The second edition explores new and powerful features in SAS 9.3, and includes such topics as adding data to a table with a SET clause; bulk loading data from Microsoft Excel; distinguishing between DATA step merges and PROC SQL joins; rules for designing indexes; cardinality and index selectivity; and demystifying join algorithms. It also features an expanded discussion of CASE expressions, and new sections on complex query applications, and grouping and performance. Delving into the workings of PROC SQL with greater analysis and discussion, PROC SQL: Beyond the Basic Using SAS, Second Edition, examines a broad range of topics and provides greater detail about this powerful database language using discussion and numerous real-world examples. **SAS Products and Releases: Base SAS: 9.4, 9.3\_M2, 9.3\_M1, 9.3, 9.21\_M3, 9.21\_M2, 9.21\_M1, 9.21, 9.2, 9.1.3, 9.1.2, 9.1, 9.0, 8.2, 8.01, 8.00, 8.0, 7.01, 6.12, 6.11, 6.10, 6.09, 6.08, 6.07, 6.06, 6.04, 6.03, 6.02, 6.01, 5.18 Operating Systems: All Design and Analysis of Experiments with R CRC Press** Design and Analysis of Experiments with R presents a unified treatment of experimental designs and design concepts commonly used in practice. It connects the objectives of research to the type of experimental design required, describes the process of creating the design and collecting the data, shows how to perform the proper analysis of the data, **SAS(R) Macro Programming Made Easy, Third Edition** This book provides beginners with a thorough foundation in SAS macro programming. The macro facility is a popular part of SAS. Macro programming is a required skill for many SAS programming jobs, and the SAS Advanced Programming Certification Exam tests macro processing concepts. Whether you're looking to become certified, land a job, or increase your skills, you'll benefit from SAS Macro Programming Made Easy, Third Edition. By following Michele Burlew's examples and step-by-step instructions, you'll be able to rapidly perform repetitive programming tasks, to pass information between programming steps more easily, and to make your programming easier to read. Updated for SAS 9.4, this book teaches you the elements of the macro facility (macro variables, macro programs, macro language), how to write a macro program, techniques for macro programming, tips on using the macro facility, how the macro facility fits into SAS, and about the interfaces between the macro facility and other components of SAS. Beginning macro programmers will learn to write SAS macro programs quickly and efficiently. More experienced programmers will find this book useful to refresh their conceptual knowledge and expand on their macro programming skills. Ultimately, any user interested in automating their programs—including analysts, programmers, and report writers—will find Michele Burlew's book an excellent tutorial. This book is part of the SAS Press program. **Nonparametric Methods in Statistics with SAS Applications CRC Press** Designed for a graduate course in applied statistics, Nonparametric Methods in Statistics with SAS Applications teaches students how to apply nonparametric techniques to statistical data. It starts with the tests of hypotheses and moves on to regression modeling, time-to-event analysis, density estimation, and resampling methods. The text begins with classical nonparametric hypotheses testing, including the sign, Wilcoxon sign-rank and rank-sum, Ansari-Bradley, Kolmogorov-Smirnov, Friedman rank, Kruskal-Wallis H, Spearman rank correlation coefficient, and Fisher exact tests. It then discusses smoothing techniques (loess and thin-plate splines) for classical nonparametric regression as well as binary logistic and Poisson models. The author also describes time-to-event nonparametric estimation methods, such as the Kaplan-Meier survival curve and Cox proportional hazards model, and presents histogram and kernel density estimation methods. The book concludes with the basics of jackknife and bootstrap interval estimation. Drawing on data sets from the author's many consulting projects, this classroom-tested book includes various examples from psychology, education, clinical trials, and other areas. It also presents a set of exercises at the end of each chapter. All examples and exercises require the use of SAS 9.3 software. Complete SAS codes for all examples are given in the text. Large data sets for the exercises are available on the author's website. **Statistical Data Analysis Using SAS Intermediate Statistical Methods Springer** The aim of this textbook (previously titled SAS for Data Analytics) is to teach the use of SAS for statistical analysis of data for advanced undergraduate and graduate students in statistics, data science, and disciplines involving analyzing data. The book begins with an introduction beyond the basics of SAS, illustrated with non-trivial, real-world, worked examples. It proceeds to SAS programming and applications, SAS graphics, statistical analysis of regression models, analysis of variance models, analysis of variance with random and mixed effects models, and then takes the discussion beyond regression and analysis of variance to conclude. Pedagogically, the authors introduce theory and methodological basis topic by topic, present a problem as an application, followed by a SAS analysis of the data provided and a discussion of results. The text focuses on applied statistical problems and methods. Key features include: end of chapter exercises, downloadable SAS code and data sets, and advanced material suitable for a second course in applied statistics with every method explained using SAS analysis to illustrate a real-world problem. New to this edition: • Covers SAS v9.2 and incorporates new commands • Uses SAS ODS (output delivery system) for reproduction of tables and graphics output • Presents new commands needed to produce ODS output • All chapters rewritten for clarity • New and updated examples throughout • All SAS outputs are new and updated, including graphics • More exercises and problems • Completely new chapter on analysis of nonlinear and generalized linear models • Completely new appendix Mervyn G. Marasinghe, PhD, is Associate Professor Emeritus of Statistics at Iowa State University, where he has taught courses in statistical methods and statistical computing. Kenneth J. Koehler, PhD, is University Professor of Statistics at Iowa State University, where he teaches courses in statistical methodology at both graduate and undergraduate levels and primarily uses SAS to supplement his teaching. **Linear Models with R CRC Press** A Hands-On Way to Learning Data Analysis Part of the core of statistics, linear models are used to make predictions and explain the relationship between the response and the predictors. Understanding linear models is crucial to a broader competence in the practice of statistics. Linear Models with R, Second Edition explains how to use linear models **Analysis of Categorical Data with R CRC Press** Learn How to Properly Analyze Categorical Data Analysis of Categorical Data with R presents a modern account of categorical data analysis using the popular R software. It covers recent techniques of model building and assessment for binary, multcategory, and count response variables and discusses fundamentals, such as odds ratio and probability estimation. The authors give detailed advice and guidelines on which procedures to use and why to use them. The Use of R as Both a Data Analysis Method and a Learning Tool Requiring no prior experience with R, the text offers an introduction to the essential features and functions of R. It incorporates numerous examples from medicine, psychology, sports, ecology, and other areas, along with extensive R code and output. The authors use data simulation in R to help readers understand the underlying assumptions of a procedure and then to evaluate the procedure's performance. They also present many graphical demonstrations of the features and properties of various analysis methods. Web Resource The data sets and R programs from each

example are available at [www.chrisbilder.com/categorical](http://www.chrisbilder.com/categorical). The programs include code used to create every plot and piece of output. Many of these programs contain code to demonstrate additional features or to perform more detailed analyses than what is in the text. Designed to be used in tandem with the book, the website also uniquely provides videos of the authors teaching a course on the subject. These videos include live, in-class recordings, which instructors may find useful in a blended or flipped classroom setting. The videos are also suitable as a substitute for a short course. **SAS System for Regression John Wiley & Sons** This book describes how to use the SAS System to perform a wide variety of different regression analyses, such as using various models as well as diagnosing data problems. Topics include performing linear regression analyses using PROC REG; diagnosing and providing remedies for data problems including outliers and multicollinearity; using regression to fit a variety of different models, including nonlinear models; using SAS/INSIGHT software for performing regression analysis. Examples feature many SAS procedures including REG, PLOT, GPLOT, NLIN, RSREG, AUTOREG, PRINCOMP, and others. **SAS Hash Object Programming Made Easy (Hardcover Edition) Hash objects, an efficient look-up tool in the SAS DATA step, are object-oriented programming structures that function differently from traditional SAS language statements. Michele Burlew's SAS Hash Object Programming Made Easy shows readers how to use these powerful features, which they can program to quickly look up and manage data and to conserve computing resources. SAS provides various look-up techniques, and hash objects are among the newest, so therefore many users may not have yet used them. Because the examples presented vary in complexity, SAS Hash Object Programming Made Easy is useful to SAS users of all experience levels, from novice programmer to advanced programmer. Novice programmers can adapt some of the simpler hash programming techniques as they develop their SAS programming skills. This book helps more experienced programmers learn how to take advantage of hash object programming by comparing traditional processing techniques to those that use hash objects. Additionally, users from diverse fields with different requirements can adapt the examples in SAS Hash Object Programming Made Easy to fit their unique situations.** **Statistical Inference An Integrated Approach, Second Edition CRC Press** A Balanced Treatment of Bayesian and Frequentist Inference- Statistical Inference: An Integrated Approach, Second Edition presents an account of the Bayesian and frequentist approaches to statistical inference. Now with an additional author, this second edition places a more balanced emphasis on both perspectives than the first edition. New to the Second Edition: New material on empirical Bayes and penalized likelihoods and their impact on regression models Expanded material on hypothesis testing, method of moments, bias correction, and hierarchical models More examples and exercises More comparison between the approaches, including their similarities and differences Designed for advanced undergraduate and graduate courses, the text thoroughly covers statistical inference without delving too deep into technical details. It compares the Bayesian and frequentist schools of thought and explores procedures that lie on the border between the two. Many examples illustrate the methods and models, and exercises are included at the end of each chapter. **Statistical Rethinking A Bayesian Course with Examples in R and Stan CRC Press** Statistical Rethinking: A Bayesian Course with Examples in R and Stan builds readers' knowledge of and confidence in statistical modeling. Reflecting the need for even minor programming in today's model-based statistics, the book pushes readers to perform step-by-step calculations that are usually automated. This unique computational approach ensures that readers understand enough of the details to make reasonable choices and interpretations in their own modeling work. The text presents generalized linear multilevel models from a Bayesian perspective, relying on a simple logical interpretation of Bayesian probability and maximum entropy. It covers from the basics of regression to multilevel models. The author also discusses measurement error, missing data, and Gaussian process models for spatial and network autocorrelation. By using complete R code examples throughout, this book provides a practical foundation for performing statistical inference. Designed for both PhD students and seasoned professionals in the natural and social sciences, it prepares them for more advanced or specialized statistical modeling. Web Resource The book is accompanied by an R package (rethinking) that is available on the author's website and GitHub. The two core functions (map and map2stan) of this package allow a variety of statistical models to be constructed from standard model formulas. **Output Delivery System The Basics Sas Inst** Output Delivery System: The Basics is an example-driven book that is geared toward beginner and intermediate ODS users and that demonstrates the many wonders of ODS. Beginning with basic syntax and progressing to more complex techniques and custom styles, you will learn to take basic SAS output and transform it into a beautiful integrated Web page, a word-processor-friendly RTF file, high-resolution printed output, and a bookmarked PDF file. You can also create a data set from the results of most procedures, allowing you to build your own custom reports. Each of the wide array of ODS techniques is presented in an easy-to-use, two-page layout with the text and code on one page and the resulting output on the facing page. **Advanced SQL with SAS SAS Institute** This book introduces advanced techniques for using PROC SQL in SAS. If you are a SAS programmer, analyst, or student who has mastered the basics of working with SQL, Advanced SQL with SAS® will help take your skills to the next level. Filled with practical examples with detailed explanations, this book demonstrates how to improve performance and speed for large data sets. Although the book addresses advanced topics, it is designed to progress from the simple and manageable to the complex and sophisticated. In addition to numerous tuning techniques, this book also touches on implicit and explicit pass-throughs, presents alternative SAS grid- and cloud-based processing environments, and compares SAS programming languages and approaches including FedSQL, CAS, DS2, and hash programming. Other topics include: Missing values and data quality with audit trails "Blind spots" like how missing values can affect even the simplest calculations and table joins SAS macro language and SAS macro programs SAS functions Integrity constraints SAS Dictionaries SAS Compute Server **SAS Hash Object Programming Made Easy Sas Inst** Hash objects, an efficient look-up tool in the SAS DATA step, are object-oriented programming structures that function differently from traditional SAS language statements. Michele Burlew's SAS Hash Object Programming Made Easy shows readers how to use these powerful features, which they can program to quickly look up and manage data and to conserve computing resources. SAS provides various look-up techniques, and hash objects are among the newest, so therefore many users may not have yet used them. Because the examples presented vary in complexity, SAS Hash Object Programming Made Easy is useful to SAS users of all experience levels, from novice programmer to advanced programmer. Novice programmers can adapt some of the simpler hash programming techniques as they develop their SAS programming skills. This book helps more experienced programmers learn how to take advantage of hash object programming by comparing traditional processing techniques to those that use hash objects. Additionally, users from diverse fields with different requirements can adapt the examples in SAS Hash Object Programming Made Easy to fit their unique situations. **SAS Products and Releases: Base SAS: 9.3\_M2, 9.3\_M1, 9.3, 9.21\_M3, 9.21\_M2, 9.21\_M1, 9.21, 9.2, 9.1.3, 9.1.2, 9.1, 9.0** **Multivariate Survival Analysis and Competing Risks CRC Press** Multivariate Survival Analysis and Competing Risks introduces univariate survival analysis and extends it to the multivariate case. It covers competing risks and counting processes and provides many real-world examples, exercises, and R code. The text discusses survival data, survival distributions, frailty models, parametric methods, multivariate data and distributions, copulas, continuous failure, parametric likelihood inference, and non- and semi-parametric methods. There are many books covering survival analysis, but very few that cover the multivariate case in any depth. Written for a graduate-level audience in statistics/biostatistics, this book includes practical exercises and R code for the examples. The author is renowned for his clear writing style, and this book continues that trend. It is an excellent reference for graduate students and researchers looking for grounding in this burgeoning field of research. **PROC TABULATE by Example, Second Edition (Hardcover Edition) An abundance of real-world examples highlights Lauren Haworth Lake's and Julie McKnight's PROC TABULATE by Example, Second Edition. Beginning and intermediate SAS users will find this step-by-step guide to producing tables and reports using the TABULATE procedure both convenient and inviting. Topics are presented in order of increasing complexity, making this an excellent training manual or self-tutorial. The concise format also makes this a quick reference guide for specific applications for more advanced users. A very handy section on common problems and their solutions is also included. With this book, you will quickly learn how to generate tables using macros, handle percentages and missing data, modify row and column headings, and produce one-, two-, and three-dimensional tables using PROC TABULATE. Also provided are more advanced tips on complex formatting with the Output Delivery System (ODS) and exporting PROC TABULATE output to other applications.** **Graphics for Statistics and Data Analysis with R CRC Press** Graphics for Statistics and Data Analysis with R presents the basic principles of sound graphical design and applies these principles to engaging examples using the graphical functions available in R. It offers a wide array of graphical displays for the presentation of data, including modern tools for data visualization and representation. The book considers graphical displays of a single discrete variable, a single continuous variable, and then two or more of each of these. It includes displays and the R code for producing the displays for the dot chart, bar chart, pictographs, stemplot, boxplot, and variations on the quantile-quantile plot. The author discusses nonparametric and parametric density estimation, diagnostic plots for the simple linear regression model, polynomial regression, and locally weighted polynomial regression for producing a smooth curve through data on a scatterplot. The last chapter illustrates visualizing multivariate data with examples using Trellis graphics. Showing how to use graphics to display or summarize data, this text provides best practice guidelines for producing and choosing among graphical displays. It also covers the most effective graphing functions in R. R code is available for download on the book's website. **Practical Multivariate Analysis, Fifth Edition CRC Press** This new version of the bestselling Computer-Aided Multivariate Analysis has been appropriately renamed to better characterize the nature of the book. Taking into account novel multivariate analyses as well as new options for many standard methods, Practical Multivariate Analysis, Fifth Edition shows readers how to perform multivariate statistical analyses and understand the results. For each of the techniques presented in this edition, the authors use the most recent software versions available and discuss the most modern ways of performing the analysis. New to the Fifth Edition Chapter on regression of correlated outcomes resulting from clustered or longitudinal samples Reorganization of the chapter on data analysis preparation to reflect current software packages Use of R statistical software Updated and reorganized references and summary tables Additional end-of-chapter problems and data sets The first part of the book provides examples of studies requiring multivariate analysis techniques; discusses characterizing data for analysis, computer programs, data entry, data management, data clean-up, missing values, and transformations; and presents a rough guide to assist in choosing the appropriate multivariate analysis. The second part examines outliers and diagnostics in simple linear regression and looks at how multiple linear regression is employed in practice and as a foundation for understanding a variety of concepts. The final part deals with the core of multivariate analysis, covering canonical correlation, discriminant, logistic regression, survival, principal components, factor, cluster, and log-linear analyses. While the text focuses on the use of R, S-PLUS, SAS, SPSS, Stata, and STATISTICA, other software packages can also be used since the output of most standard statistical programs is explained. Data sets and code are available for download from the book's web page and CRC Press Online. **The BUGS Book A Practical Introduction to Bayesian Analysis CRC Press** Bayesian statistical methods have become widely used for data analysis and modelling in recent years, and the BUGS software has become the most popular software for Bayesian analysis worldwide. Authored by the team that originally developed this software, The BUGS Book provides a practical introduction to this program and its use. The text presents complete coverage of all the functionalities of BUGS, including prediction, missing data, model criticism, and prior sensitivity. It also features a large number of worked examples and a wide range of applications from various disciplines. The book introduces regression models, techniques for criticism and comparison, and a wide range of modelling issues before going into the vital area of hierarchical models, one of the most common applications of Bayesian methods. It deals with essentials of modelling without getting bogged down in complexity. The book emphasises model criticism, model comparison, sensitivity analysis to alternative priors, and thoughtful choice of prior distributions—all those aspects of the "art" of modelling that are easily overlooked in more theoretical expositions. More pragmatic than ideological, the authors systematically work through the large range of "tricks" that reveal the real power of the BUGS software, for example, dealing with missing data, censoring, grouped data, prediction, ranking, parameter constraints, and so on. Many of the examples are biostatistical, but they do not require domain knowledge and are generalisable to a wide range of other application areas. Full code and data for examples, exercises, and some solutions can be found on the book's website. **Ordinary Differential Equations: Basics and Beyond Springer** This book develops the theory of ordinary differential equations (ODEs), starting from an introductory level (with no prior experience in ODEs assumed) through to a graduate-level treatment of the qualitative theory, including bifurcation theory (but not chaos). While proofs are rigorous, the exposition is reader-friendly, aiming for the informality of face-to-face interactions. A unique feature of this book is the integration of rigorous theory with numerous applications of scientific interest. Besides providing motivation, this synthesis clarifies the theory and enhances scientific literacy. Other features include: (i) a wealth of exercises at various levels, along with commentary that explains why they matter; (ii) figures with consistent color conventions to identify nullclines, periodic orbits, stable and unstable manifolds; and (iii) a dedicated website with software templates, problem solutions, and other resources supporting the text ([www.math.duke.edu/ode-book](http://www.math.duke.edu/ode-book)). Given its many applications, the book may be used comfortably in science and engineering courses as well as in mathematics courses. Its level is accessible to upper-level undergraduates but still appropriate for graduate students. The thoughtful presentation, which anticipates many confusions of beginning students, makes the book suitable for a teaching environment that emphasizes self-directed, active learning (including the so-called inverted classroom). **Applied Categorical and Count Data Analysis CRC Press** Developed from the authors' graduate-level biostatistics course, Applied Categorical and Count Data Analysis explains how to perform the statistical analysis of discrete data, including categorical and count outcomes. The authors describe the basic ideas underlying each concept, model, and approach to give readers a good grasp of the fundamentals of the methodology without using rigorous mathematical arguments. The text covers classic concepts and popular topics, such as contingency tables, logistic models, and Poisson regression models, along with modern areas that include models for zero-modified count outcomes, parametric and semiparametric longitudinal data analysis, reliability analysis, and methods for dealing with missing values. R, SAS, SPSS, and Stata programming codes are provided for all the examples, enabling readers to immediately experiment with the data in the examples and even adapt or extend the codes to fit data from their own studies. Designed for a one-semester course for graduate and senior undergraduate students in biostatistics, this self-contained text is also suitable as a self-learning guide for biomedical and psychosocial researchers. It will help readers analyze data with discrete variables

in a wide range of biomedical and psychosocial research fields. **Time Series Modeling, Computation, and Inference CRC Press** Focusing on Bayesian approaches and computations using simulation-based methods for inference, *Time Series: Modeling, Computation, and Inference* integrates mainstream approaches for time series modeling with significant recent developments in methodology and applications of time series analysis. It encompasses a graduate-level account of Bayesian time series modeling and analysis, a broad range of references to state-of-the-art approaches to univariate and multivariate time series analysis, and emerging topics at research frontiers. The book presents overviews of several classes of models and related methodology for inference, statistical computation for model fitting and assessment, and forecasting. The authors also explore the connections between time- and frequency-domain approaches and develop various models and analyses using Bayesian tools, such as Markov chain Monte Carlo (MCMC) and sequential Monte Carlo (SMC) methods. They illustrate the models and methods with examples and case studies from a variety of fields, including signal processing, biomedicine, and finance. Data sets, R and MATLAB® code, and other material are available on the authors' websites. Along with core models and methods, this text offers sophisticated tools for analyzing challenging time series problems. It also demonstrates the growth of time series analysis into new application areas. **Bayesian Ideas and Data Analysis An Introduction for Scientists and Statisticians CRC Press** Emphasizing the use of WinBUGS and R to analyze real data, *Bayesian Ideas and Data Analysis: An Introduction for Scientists and Statisticians* presents statistical tools to address scientific questions. It highlights foundational issues in statistics, the importance of making accurate predictions, and the need for scientists and statisticians to collaborate in analyzing data. The WinBUGS code provided offers a convenient platform to model and analyze a wide range of data. The first five chapters of the book contain core material that spans basic Bayesian ideas, calculations, and inference, including modeling one and two sample data from traditional sampling models. The text then covers Monte Carlo methods, such as Markov chain Monte Carlo (MCMC) simulation. After discussing linear structures in regression, it presents binomial regression, normal regression, analysis of variance, and Poisson regression, before extending these methods to handle correlated data. The authors also examine survival analysis and binary diagnostic testing. A complementary chapter on diagnostic testing for continuous outcomes is available on the book's website. The last chapter on nonparametric inference explores density estimation and flexible regression modeling of mean functions. The appropriate statistical analysis of data involves a collaborative effort between scientists and statisticians. Exemplifying this approach, *Bayesian Ideas and Data Analysis* focuses on the necessary tools and concepts for modeling and analyzing scientific data. Data sets and codes are provided on a supplemental website. **Introduction to Statistical Limit Theory CRC Press** Helping students develop a good understanding of asymptotic theory, *Introduction to Statistical Limit Theory* provides a thorough yet accessible treatment of common modes of convergence and their related tools used in statistics. It also discusses how the results can be applied to several common areas in the field. The author explains as much of the **Introduction to General and Generalized Linear Models CRC Press** Bridging the gap between theory and practice for modern statistical model building, *Introduction to General and Generalized Linear Models* presents likelihood-based techniques for statistical modelling using various types of data. Implementations using R are provided throughout the text, although other software packages are also discussed. Numerous examples show how the problems are solved with R. After describing the necessary likelihood theory, the book covers both general and generalized linear models using the same likelihood-based methods. It presents the corresponding/parallel results for the general linear models first, since they are easier to understand and often more well known. The authors then explore random effects and mixed effects in a Gaussian context. They also introduce non-Gaussian hierarchical models that are members of the exponential family of distributions. Each chapter contains examples and guidelines for solving the problems via R. Providing a flexible framework for data analysis and model building, this text focuses on the statistical methods and models that can help predict the expected value of an outcome, dependent, or response variable. It offers a sound introduction to general and generalized linear models using the popular and powerful likelihood techniques. Ancillary materials are available at [www.imm.dtu.dk/~hm/GLM](http://www.imm.dtu.dk/~hm/GLM) **Exercises and Solutions in Biostatistical Theory CRC Press** Drawn from nearly four decades of Lawrence L. Kupper's teaching experiences as a distinguished professor in the Department of Biostatistics at the University of North Carolina, *Exercises and Solutions in Biostatistical Theory* presents theoretical statistical concepts, numerous exercises, and detailed solutions that span topics from basic probability **Principles of Uncertainty CRC Press** An intuitive and mathematical introduction to subjective probability and Bayesian statistics. An accessible, comprehensive guide to the theory of Bayesian statistics, *Principles of Uncertainty* presents the subjective Bayesian approach, which has played a pivotal role in game theory, economics, and the recent boom in Markov Chain Monte Carlo methods. Both rigorous and friendly, the book contains: Introductory chapters examining each new concept or assumption Just-in-time mathematics - the presentation of ideas just before they are applied Summary and exercises at the end of each chapter Discussion of maximization of expected utility The basics of Markov Chain Monte Carlo computing techniques Problems involving more than one decision-maker Written in an appealing, inviting style, and packed with interesting examples, *Principles of Uncertainty* introduces the most compelling parts of mathematics, computing, and philosophy as they bear on statistics. Although many books present the computation of a variety of statistics and algorithms while barely skimming the philosophical ramifications of subjective probability, this book takes a different tack. By addressing how to think about uncertainty, this book gives readers the intuition and understanding required to choose a particular method for a particular purpose. **Introduction to the Theory of Statistical Inference CRC Press** Based on the authors' lecture notes, *Introduction to the Theory of Statistical Inference* presents concise yet complete coverage of statistical inference theory, focusing on the fundamental classical principles. Suitable for a second-semester undergraduate course on statistical inference, the book offers proofs to support the mathematics. It illustrates core concepts using cartoons and provides solutions to all examples and problems. Highlights Basic notations and ideas of statistical inference are explained in a mathematically rigorous, but understandable, form Classroom-tested and designed for students of mathematical statistics Examples, applications of the general theory to special cases, exercises, and figures provide a deeper insight into the material Solutions provided for problems formulated at the end of each chapter Combines the theoretical basis of statistical inference with a useful applied toolbox that includes linear models Theoretical, difficult, or frequently misunderstood problems are marked The book is aimed at advanced undergraduate students, graduate students in mathematics and statistics, and theoretically-interested students from other disciplines. Results are presented as theorems and corollaries. All theorems are proven and important statements are formulated as guidelines in prose. With its multipronged and student-tested approach, this book is an excellent introduction to the theory of statistical inference. **Understanding Advanced Statistical Methods CRC Press** Providing a much-needed bridge between elementary statistics courses and advanced research methods courses, *Understanding Advanced Statistical Methods* helps students grasp the fundamental assumptions and machinery behind sophisticated statistical topics, such as logistic regression, maximum likelihood, bootstrapping, nonparametrics, and Bayesian methods. The book teaches students how to properly model, think critically, and design their own studies to avoid common errors. It leads them to think differently not only about math and statistics but also about general research and the scientific method. With a focus on statistical models as producers of data, the book enables students to more easily understand the machinery of advanced statistics. It also downplays the "population" interpretation of statistical models and presents Bayesian methods before frequentist ones. Requiring no prior calculus experience, the text employs a "just-in-time" approach that introduces mathematical topics, including calculus, where needed. Formulas throughout the text are used to explain why calculus and probability are essential in statistical modeling. The authors also intuitively explain the theory and logic behind real data analysis, incorporating a range of application examples from the social, economic, biological, medical, physical, and engineering sciences. Enabling your students to answer the why behind statistical methods, this text teaches them how to successfully draw conclusions when the premises are flawed. It empowers them to use advanced statistical methods with confidence and develop their own statistical recipes. Ancillary materials are available on the book's website. **Generalized Linear Mixed Models Modern Concepts, Methods and Applications CRC Press** *Generalized Linear Mixed Models: Modern Concepts, Methods and Applications* presents an introduction to linear modeling using the generalized linear mixed model (GLMM) as an overarching conceptual framework. For readers new to linear models, the book helps them see the big picture. It shows how linear models fit with the rest of the core statistics curriculum and points out the major issues that statistical modelers must consider. Along with describing common applications of GLMMs, the text introduces the essential theory and main methodology associated with linear models that accommodate random model effects and non-Gaussian data. Unlike traditional linear model textbooks that focus on normally distributed data, this one adopts a generalized mixed model approach throughout: data for linear modeling need not be normally distributed and effects may be fixed or random. With numerous examples using SAS® PROC GLIMMIX, this book is ideal for graduate students in statistics, statistics professionals seeking to update their knowledge, and researchers new to the generalized linear model thought process. It focuses on data-driven processes and provides context for extending traditional linear model thinking to generalized linear mixed modeling. See Professor Stroup discuss the book. **Exercises and Solutions in Statistical Theory CRC Press** *Exercises and Solutions in Statistical Theory* helps students and scientists obtain an in-depth understanding of statistical theory by working on and reviewing solutions to interesting and challenging exercises of practical importance. Unlike similar books, this text incorporates many exercises that apply to real-world settings and provides much more thorough solutions. The exercises and selected detailed solutions cover from basic probability theory through to the theory of statistical inference. Many of the exercises deal with important, real-life scenarios in areas such as medicine, epidemiology, actuarial science, social science, engineering, physics, chemistry, biology, environmental health, and sports. Several exercises illustrate the utility of study design strategies, sampling from finite populations, maximum likelihood, asymptotic theory, latent class analysis, conditional inference, regression analysis, generalized linear models, Bayesian analysis, and other statistical topics. The book also contains references to published books and articles that offer more information about the statistical concepts. Designed as a supplement for advanced undergraduate and graduate courses, this text is a valuable source of classroom examples, homework problems, and examination questions. It is also useful for scientists interested in enhancing or refreshing their theoretical statistical skills. The book improves readers' comprehension of the principles of statistical theory and helps them see how the principles can be used in practice. By mastering the theoretical statistical strategies necessary to solve the exercises, readers will be prepared to successfully study even higher-level statistical theory. **Stationary Stochastic Processes Theory and Applications CRC Press** Intended for a second course in stationary processes, *Stationary Stochastic Processes: Theory and Applications* presents the theory behind the field's widely scattered applications in engineering and science. In addition, it reviews sample function properties and spectral representations for stationary processes and fields, including a portion on stationary point processes. Features Presents and illustrates the fundamental correlation and spectral methods for stochastic processes and random fields Explains how the basic theory is used in special applications like detection theory and signal processing, spatial statistics, and reliability Motivates mathematical theory from a statistical model-building viewpoint Introduces a selection of special topics, including extreme value theory, filter theory, long-range dependence, and point processes Provides more than 100 exercises with hints to solutions and selected full solutions This book covers key topics such as ergodicity, crossing problems, and extremes, and opens the doors to a selection of special topics, like extreme value theory, filter theory, long-range dependence, and point processes, and includes many exercises and examples to illustrate the theory. Precise in mathematical details without being pedantic, *Stationary Stochastic Processes: Theory and Applications* is for the student with some experience with stochastic processes and a desire for deeper understanding without getting bogged down in abstract mathematics.