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Predictive Modeling with SAS Enterprise Miner CRC Press

The essential introduction to the theory and application of linear models—now in a valuable new edition Since most advanced statistical tools are generalizations of the linear model, it is necessary to first master the linear model in order to move forward to more advanced concepts. The linear model remains the main tool of the applied statistician and is central to the training of any statistician regardless of whether the focus is applied or theoretical. This completely revised and updated new edition successfully develops the basic theory of linear models for regression, analysis of variance, analysis of covariance, and linear mixed models. Recent advances in the methodology related to linear mixed models, generalized linear models, and the Bayesian linear model are also addressed. Linear Models in Statistics, Second Edition includes full coverage of advanced topics, such as mixed and generalized linear models, Bayesian linear models, two-way models with empty cells, geometry of least squares, vector-matrix calculus, simultaneous inference, and logistic and nonlinear regression. Algebraic, geometrical, frequentist, and Bayesian approaches to both the inference of linear models and the analysis of variance are also illustrated. Through the expansion of relevant material and the inclusion of the latest technological developments in the field, this book provides readers with the theoretical foundation to correctly interpret computer software output as well as effectively use, customize, and understand linear models. This modern Second Edition features: New chapters on Bayesian linear models as well as random and mixed linear models Expanded discussion of two-way models with empty cells Additional sections on the geometry of least squares Updated coverage of

simultaneous inference The book is complemented with easy-to-read proofs, real data sets, and an extensive bibliography. A thorough review of the requisite matrix algebra has been added for transitional purposes, and numerous theoretical and applied problems have been incorporated with selected answers provided at the end of the book. A related Web site includes additional data sets and SAS® code for all numerical examples. Linear Model in Statistics, Second Edition is a must-have book for courses in statistics, biostatistics, and mathematics at the upper-undergraduate and graduate levels. It is also an invaluable reference for researchers who need to gain a better understanding of regression and analysis of variance.

An Introduction to Categorical Data Analysis
Cambridge University Press

The fourth edition has an even stronger emphasis on concepts and applications, with greater attention to "real data" both in the examples and exercises. The mathematics is still downplayed, in particular probability, which is all too often a stumbling block for students. On the other hand, the text is not a cookbook. Reliance on an overly simplistic recipe-based approach to statistics is not the route to good statistical practice. Changes in the Fourth Edition: Since the first edition, the increase in computer power coupled with the continued improvement and accessibility of statistical software has had a major impact on the way social scientists analyze data. Because of this, this book does not cover the traditional shortcut hand-computational formulas and approximations. The presentation of computationally complex methods, such as regression, emphasizes interpretation of software output rather than the formulas for performing the analysis. The text contains numerous sample printouts, mainly in the style of SPSS and occasionally SAS, both in chapter

text and homework problems. This edition also has an appendix explaining how to apply SPSS and SAS to conduct the methods of each chapter and a website giving links to information about other software.

Analysis of Ordinal Categorical Data Lulu.com

Now in widespread use, generalized additive models (GAMs) have evolved into a standard statistical methodology of considerable flexibility. While Hastie and Tibshirani's outstanding 1990 research monograph on GAMs is largely responsible for this, there has been a long-standing need for an accessible introductory treatment of the subject that also emphasizes recent penalized regression spline approaches to GAMs and the mixed model extensions of these models. Generalized Additive Models: An Introduction with R imparts a thorough understanding of the theory and practical applications of GAMs and related advanced models, enabling informed use of these very flexible tools. The author bases his approach on a framework of penalized regression splines, and builds a well-grounded foundation through motivating chapters on linear and generalized linear models. While firmly focused on the practical aspects of GAMs, discussions include fairly full explanations of the theory underlying the methods. Use of the freely available R software helps explain the theory and illustrates the practicalities of linear, generalized linear, and generalized additive models, as well as their mixed effect extensions. The treatment is rich with practical examples, and it includes an entire chapter on the analysis of real data sets using R and the author's add-on package mgcv. Each chapter includes exercises, for which complete solutions are provided in an appendix. Concise, comprehensive, and essentially self-contained, Generalized Additive Models: An Introduction with R prepares readers with the practical skills and the theoretical background needed to use and understand GAMs and to move on to other GAM-related methods and models, such as SS-ANOVA, P-splines, backfitting and Bayesian approaches to smoothing and additive modelling.

Data Analysis Springer Science & Business Media

A valuable new edition of a standard

reference The use of statistical methods for categorical data has increased dramatically, particularly for applications in the biomedical and social sciences. An Introduction to Categorical Data Analysis, Third Edition summarizes these methods and shows readers how to use them using software. Readers will find a unified generalized linear models approach that connects logistic regression and loglinear models for discrete data with normal regression for continuous data. Adding to the value in the new edition is:

- Illustrations of the use of R software to perform all the analyses in the book
- A new chapter on alternative methods for categorical data, including smoothing and regularization methods (such as the lasso), classification methods such as linear discriminant analysis and classification trees, and cluster analysis
- New sections in many chapters introducing the Bayesian approach for the methods of that chapter
- More than 70 analyses of data sets to illustrate application of the methods, and about 200 exercises, many containing other data sets
- An appendix showing how to use SAS, Stata, and SPSS, and an appendix with short solutions to most odd-numbered exercises

Written in an applied, nontechnical style, this book illustrates the methods using a wide variety of real data, including medical clinical trials, environmental questions, drug use by teenagers, horseshoe crab mating, basketball shooting, correlates of happiness, and much more. An Introduction to Categorical Data Analysis, Third Edition is an invaluable tool for statisticians and biostatisticians as well as methodologists in the social and behavioral sciences, medicine and public health, marketing,

education, and the biological and agricultural sciences.

Compositional Data Analysis John Wiley & Sons

This is a textbook for an undergraduate course in probability and statistics. The approximate prerequisites are two or three semesters of calculus and some linear algebra. Students attending the class include mathematics, engineering, and computer science majors.

Generalized Additive Models SAS Institute

Introduces the key concepts in the analysis of categorical data with illustrative examples and accompanying R code This book is aimed at all those who wish to discover how to analyze categorical data without getting immersed in complicated mathematics and without needing to wade through a large amount of prose. It is aimed at researchers with their own data ready to be analyzed and at students who would like an approachable alternative view of the subject. Each new topic in categorical data analysis is illustrated with an example that readers can apply to their own sets of data. In many cases, R code is given and excerpts from the resulting output are presented. In the context of log-linear models for cross-tabulations, two specialties of the house have been included: the use of cobweb diagrams to get visual information concerning significant interactions, and a procedure for detecting outlier category combinations. The R code used for these is available and may be freely adapted. In addition, this book: Uses an example to illustrate each new topic in categorical data Provides a clear explanation of an important subject Is understandable to most readers with minimal statistical and mathematical backgrounds Contains examples that are accompanied by R code and resulting output Includes starred sections that provide more background details for interested readers Categorical Data Analysis by Example is a reference for students in statistics and researchers in other disciplines, especially the social sciences, who use categorical data. This book is also a reference for practitioners in market research, medicine, and other fields.

Student Solutions Manual for Statistical Methods for the Social Sciences John Wiley & Sons

An up-to-date, comprehensive treatment of a classic text on missing data in statistics The topic of missing data has gained considerable attention in recent decades. This new edition by two acknowledged experts on the subject offers an up-to-date account of practical methodology for handling missing data problems. Blending theory and application, authors Roderick Little and Donald Rubin review historical approaches to the subject and describe simple methods for multivariate analysis with missing values. They then provide a coherent theory for analysis of problems based on likelihoods derived from statistical models for the data and the missing data mechanism,

and then they apply the theory to a wide range of important missing data problems. Statistical Analysis with Missing Data, Third Edition starts by introducing readers to the subject and approaches toward solving it. It looks at the patterns and mechanisms that create the missing data, as well as a taxonomy of missing data. It then goes on to examine missing data in experiments, before discussing complete-case and available-case analysis, including weighting methods. The new edition expands its coverage to include recent work on topics such as nonresponse in sample surveys, causal inference, diagnostic methods, and sensitivity analysis, among a host of other topics. An updated "classic" written by renowned authorities on the subject Features over 150 exercises (including many new ones) Covers recent work on important methods like multiple imputation, robust alternatives to weighting, and Bayesian methods Revises previous topics based on past student feedback and class experience Contains an updated and expanded bibliography The authors were awarded The Karl Pearson Prize in 2017 by the International Statistical Institute, for a research contribution that has had profound influence on statistical theory, methodology or applications. Their work "has been no less than defining and transforming." (ISI) Statistical Analysis with Missing Data, Third Edition is an ideal textbook for upper undergraduate and/or beginning graduate level students of the subject. It is also an excellent source of information for applied statisticians and practitioners in government and industry.

Categorical Statistics for Communication Research Springer Science & Business Media

A valuable new edition of a standard reference The use of statistical methods for categorical data has increased dramatically, particularly for applications in the biomedical and social sciences. An Introduction to Categorical Data Analysis, Third Edition summarizes these methods and shows readers how to use them using software. Readers will find a unified generalized linear models approach that connects logistic regression and loglinear models for discrete data with normal regression for continuous data. Adding to the value in the new edition is:

- Illustrations of the use of R software to perform all the analyses in the book
- A new chapter on alternative methods for categorical data, including smoothing and regularization methods (such as the lasso), classification methods such as linear discriminant analysis and classification trees, and cluster analysis
- New sections in many chapters introducing the Bayesian approach for the methods of that chapter
- More than 70 analyses of data sets to illustrate application of the methods, and about 200 exercises, many containing other data sets
- An appendix showing how to use SAS, Stata, and SPSS, and an appendix with short solutions to most odd-numbered exercises

Written in an applied, nontechnical style, this

book illustrates the methods using a wide variety of real data, including medical clinical trials, environmental questions, drug use by teenagers, horseshoe crab mating, basketball shooting, correlates of happiness, and much more. An Introduction to Categorical Data Analysis, Third Edition is an invaluable tool for statisticians and biostatisticians as well as methodologists in the social and behavioral sciences, medicine and public health, marketing, education, and the biological and agricultural sciences.

Analysis of Categorical Data with R CRC Press

Highly recommended by the Journal of Official Statistics, The American Statistician, and other journals, Applied Survey Data Analysis, Second Edition provides an up-to-date overview of state-of-the-art approaches to the analysis of complex sample survey data. Building on the wealth of material on practical approaches to descriptive analysis and regression modeling from the first edition, this second edition expands the topics covered and presents more step-by-step examples of modern approaches to the analysis of survey data using the newest statistical software. Designed for readers working in a wide array of disciplines who use survey data in their work, this book continues to provide a useful framework for integrating more in-depth studies of the theory and methods of survey data analysis. An example-driven guide to the applied statistical analysis and interpretation of survey data, the second edition contains many new examples and practical exercises based on recent versions of real-world survey data sets. Although the authors continue to use Stata for most examples in the text, they also continue to offer SAS, SPSS, SUDAAN, R, WesVar, IVEware, and Mplus software code for replicating the examples on the book's updated website.

Ordinal Data Modeling CRC Press

Categorical data arise often in many fields, including biometrics, economics, management, manufacturing, marketing, psychology, and sociology. This book provides an introduction to the analysis of such data. The coverage is broad, using the loglinear Poisson regression model and logistic binomial regression models as the primary engines for methodology. Topics covered include count regression models, such as Poisson, negative binomial, zero-inflated, and zero-truncated models; loglinear models for two-dimensional and multidimensional contingency tables, including for square tables and tables with ordered categories; and regression models for two-category (binary) and multiple-category target variables, such as logistic and proportional odds models. All methods are illustrated with analyses of real data examples, many from recent subject area journal articles. These analyses are highlighted in the text, and are more detailed than is typical, providing discussion of the context and background of

the problem, model checking, and scientific implications. More than 200 exercises are provided, many also based on recent subject area literature. Data sets and computer code are available at a web site devoted to the text. Adopters of this book may request a solutions manual from: textbook@springer-ny.com. From the reviews: "Jeff Simonoff's book is at the top of the heap of categorical data analysis textbooks...The examples are superb. Student reactions in a class I taught from this text were uniformly positive, particularly because of the examples and exercises. Additional materials related to the book, particularly code for S-Plus, SAS, and R, useful for analysis of examples, can be found at the author's Web site at New York University. I liked this book for this reason, and recommend it to you for pedagogical purposes." (Stanley Wasserman, The American Statistician, August 2006, Vol. 60, No. 3) "The book has various noteworthy features. The examples used are from a variety of topics, including medicine, economics, sports, mining, weather, as well as social aspects like needle-exchange programs. The examples motivate the theory and also illustrate nuances of data analytical procedures. The book also incorporates several newer methods for analyzing categorical data, including zero-inflated Poisson models, robust analysis of binomial and poisson models, sandwich estimators, multinomial smoothing, ordinal agreement tables...this is definitely a good reference book for any researcher working with categorical data." Technometrics, May 2004 "This guide provides a practical approach to the appropriate analysis of categorical data and would be a suitable purchase for individuals with varying levels of statistical understanding." Paediatric and Perinatal Epidemiology, 2004, 18 "This book gives a fresh approach to the topic of categorical data analysis. The presentation of the statistical methods exploits the connection to regression modeling with a focus on practical features rather than formal theory...There is much to learn from this book. Aside from the ordinary materials such as association diagrams, Mantel-Haenszel estimators, or overdispersion, the reader will also find some less-often presented but interesting and stimulating topics...[T]his is an excellent book, giving an up-to-date introduction to the wide field of analyzing categorical data." Biometrics, September 2004 "...It is of great help to data analysts, practitioners and researchers who deal with categorical data and need to get a necessary insight into the methods of analysis as well as practical guidelines for solving problems." International Journal of General Systems, August 2004 "The author has succeeded in writing a useful and readable textbook combining most of general theory and practice of count data." Kwantitatieve Methoden "The book especially stresses how to analyze and interpret data...In fact, the highly detailed multi-page descriptions of analysis and interpretation make the book stand

out." Mathematical Geology, February 2005 "Overall, this is a competent and detailed text that I would recommend to anyone dealing with the analysis of categorical data." Journal of the Royal Statistical Society "This important work allows for clear analogies between the well-known linear models for Gaussian data and categorical data problems. ... Jeffrey Simonoff's Analyzing Categorical Data provides an introduction to many of the important ideas and methods for understanding counted data and tables of counts. ... Some readers will find Simonoff's style very much to their liking due to reliance on extended real data examples to illuminate ideas. ... I think the extensive examples will appeal to most students." (Sanford Weisberg, SIAM Review, Vol. 47 (4), 2005) "It is clear that the focus of Simonoff's book is different from other books on categorical data analysis. ... As an introductory textbook, the book is comprehensive enough since all basic topics in categorical data analysis are discussed. ... I think Simonoff's book is a valuable addition to the literature because it discusses important models for counts" (Jeroen K. Vermunt, Statistics in Medicine, Vol. 24, 2005) "The author based this book on his notes for a class with a very diverse pool of students. The material is presented in such a way that a very heterogeneous group of students could grasp it. All methods are illustrated with analyses of real data examples. The author provides a detailed discussion of the context and background of the problem. ... The book is very interesting and can be warmly recommended to people working with categorical data." (EMS - European Mathematical Society Newsletter, December, 2004) "Categorical data arise often in many fields This book provides an introduction to the analysis of such data. ... All methods are illustrated with analyses of real data examples, many from recent subject-area journal articles. These analyses are highlighted in the text and are more detailed than is typical More than 200 exercises are provided, including many based on recent subject-area literature. Data sets and computer code are available at a Web site devoted to this text." (T. Postelnicu, Zentralblatt MATH, Vol. 1028, 2003) "This book grew out of notes prepared by the author for classes in categorical data analysis. The presentation is fresh and compelling to read. Regression ideas are used to motivate the modelling presented. The book focuses on applying methods to real problems; many of these will be novel to readers of statistics texts All chapters end with a section providing references to books or articles for the inquiring reader." (C.M. O'Brien, Short Book Reviews, Vol. 23 (3), 2003)

A Course on Statistics for Finance Macmillan Higher Education Praise for the Second Edition "A must-have book for anyone expecting to do research and/or applications in categorical data analysis." —Statistics in Medicine "It is a total delight reading this book." —Pharmaceutical

Research "If you do any analysis of categorical data, this is an essential desktop reference." —Technometrics The use of statistical methods for analyzing categorical data has increased dramatically, particularly in the biomedical, social sciences, and financial industries. Responding to new developments, this book offers a comprehensive treatment of the most important methods for categorical data analysis. *Categorical Data Analysis, Third Edition* summarizes the latest methods for univariate and correlated multivariate categorical responses. Readers will find a unified generalized linear models approach that connects logistic regression and Poisson and negative binomial loglinear models for discrete data with normal regression for continuous data. This edition also features: An emphasis on logistic and probit regression methods for binary, ordinal, and nominal responses for independent observations and for clustered data with marginal models and random effects models Two new chapters on alternative methods for binary response data, including smoothing and regularization methods, classification methods such as linear discriminant analysis and classification trees, and cluster analysis New sections introducing the Bayesian approach for methods in that chapter More than 100 analyses of data sets and over 600 exercises Notes at the end of each chapter that provide references to recent research and topics not covered in the text, linked to a bibliography of more than 1,200 sources A supplementary website showing how to use R and SAS; for all examples in the text, with information also about SPSS and Stata and with exercise solutions *Categorical Data Analysis, Third Edition* is an invaluable tool for statisticians and methodologists, such as biostatisticians and researchers in the social and behavioral sciences, medicine and public health, marketing, education, finance, biological and agricultural sciences, and industrial quality control.

Mathematics for Machine Learning Emerald Group Publishing A valuable overview of the most important ideas and results in statistical modeling Written by a highly-experienced author, *Foundations of Linear and Generalized Linear Models* is a clear and comprehensive guide to the key concepts and results of linear statistical models. The book presents a broad, in-depth overview of the most commonly used statistical models by discussing the theory underlying the models, R software applications, and examples with crafted models to elucidate key ideas and promote practical model building. The book begins by illustrating the fundamentals of linear models, such as how the model-fitting projects the data onto a model vector subspace and how orthogonal decompositions of the data yield information about the effects of explanatory variables. Subsequently, the book covers the most popular generalized linear models, which include binomial and multinomial logistic regression for categorical data, and Poisson and negative binomial loglinear models for count data. Focusing on the theoretical underpinnings of these models, *Foundations of Linear and Generalized Linear Models* also features: An introduction to quasi-

likelihood methods that require weaker distributional assumptions, such as generalized estimating equation methods An overview of linear mixed models and generalized linear mixed models with random effects for clustered correlated data, Bayesian modeling, and extensions to handle problematic cases such as high dimensional problems Numerous examples that use R software for all text data analyses More than 400 exercises for readers to practice and extend the theory, methods, and data analysis A supplementary website with datasets for the examples and exercises An invaluable textbook for upper-undergraduate and graduate-level students in statistics and biostatistics courses, *Foundations of Linear and Generalized Linear Models* is also an excellent reference for practicing statisticians and biostatisticians, as well as anyone who is interested in learning about the most important statistical models for analyzing data.

Statistical Methods for the Social Sciences John Wiley & Sons This book provides a comprehensive introduction to methods and models for categorical data analysis and their applications in social science research. Companion website also available, at <https://webspace.utexas.edu/dpowers/www/>

The Statistical Sleuth John Wiley & Sons Prepare for exams and succeed in your statistics course with this comprehensive solutions manual! Featuring worked out-solutions to the problems in *THE STATISTICAL SLEUTH: A COURSE IN METHODS OF DATA ANALYSIS, 2nd Edition*, this manual shows you how to approach and solve problems using the same step-by-step explanations found in your textbook examples.

Analyzing Categorical Data Wadsworth Publishing Company *The Analysis of Biological Data* provides students with a practical foundation of statistics for biology students. Every chapter has several biological or medical examples of key concepts, and each example is prefaced by a substantial description of the biological setting. The emphasis on real and interesting examples carries into the problem sets where students have dozens of practice problems based on real data. The third edition features over 200 new examples and problems. These include new calculation practice problems, which guide the student step by step through the methods, and a greater number of examples and topics come from medical and human health research. Every chapter has been carefully edited for even greater clarity and ease of use. All the data sets, R scripts for all worked examples in the book, as well as many other teaching resources, are available to qualified instructors (see below).

Analysis of Ordinal Categorical Data 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. 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.

Modern Statistics with R John Wiley & Sons A comprehensive source on mixed data analysis, *Analysis of Mixed Data: Methods & Applications* summarizes the fundamental developments in the field. Case studies are used extensively throughout the book to illustrate interesting applications from economics, medicine and health, marketing, and genetics. Carefully edited for smooth readability and *Categorical Data Analysis* CRC Press

It is difficult to imagine that the statistical analysis of compositional data has been a major issue of concern for more than 100 years. It is even more difficult to realize that so many statisticians and users of statistics are unaware of the particular problems affecting compositional data, as well as their solutions. The issue of "spurious correlation", as the situation was phrased by Karl Pearson back in 1897, affects all data that measures parts of some whole, such as percentages, proportions, ppm and ppb. Such measurements are present in all fields of science, ranging from geology, biology, environmental sciences, forensic sciences, medicine and hydrology. This book presents the history and development of compositional data analysis along with Aitchison's log-ratio approach. *Compositional Data Analysis* describes the state of the art both in theoretical fields as well as applications in the different fields of science. Key

Features: Reflects the state-of-the-art in compositional data analysis. Gives an overview of the historical development of compositional data analysis, as well as basic concepts and procedures. Looks at advances in algebra and calculus on the simplex. Presents applications in different fields of science, including, genomics, ecology, biology, geochemistry, planetology, chemistry and economics. Explores connections to correspondence analysis and the Dirichlet distribution. Presents a summary of three available software packages for compositional data analysis. Supported by an accompanying website featuring R code. Applied scientists working on compositional data analysis in any field of science, both in academia and professionals will benefit from this book, along with graduate students in any field of science working with compositional data.

Statistical Analysis with Missing Data BoD - Books on Demand
Despite the recent rapid growth in machine learning and predictive analytics, many of the statistical questions that are faced by researchers and practitioners still involve explaining why something is happening. Regression analysis is the best 'swiss army knife' we have for answering these kinds of questions. This book is a learning resource on inferential statistics and regression analysis. It teaches how to do a wide range of statistical analyses in both R and in Python, ranging from simple hypothesis testing to advanced multivariate modelling. Although it is primarily focused on examples related to the analysis of people and talent, the methods easily transfer to any discipline. The book hits a 'sweet spot' where there is just enough mathematical theory to support a strong understanding of the methods, but with a step-by-step guide and easily reproducible examples and code, so that the methods can be put into practice immediately. This makes the book accessible to a wide readership, from public and private sector analysts and practitioners to students and researchers. Key Features:

- 16 accompanying datasets across a wide range of contexts (e.g. academic, corporate, sports, marketing)
- Clear step-by-step instructions on executing the analyses.
- Clear guidance on how to interpret results.
- Primary instruction in R but added sections for Python coders.
- Discussion exercises and data exercises for each of the main chapters.
- Final chapter of practice material and datasets ideal for class homework or project work.

[Introduction to Probability and Statistics Using R](#) CRC Press

Now in its third edition, this classic book is widely considered the leading text on Bayesian methods, lauded for its accessible, practical approach to analyzing data and solving research problems. Bayesian Data Analysis,

Third Edition continues to take an applied approach to analysis using up-to-date Bayesian methods. The authors—all leaders in the statistics community—introduce basic concepts from a data-analytic perspective before presenting advanced methods. Throughout the text, numerous worked examples drawn from real applications and research emphasize the use of Bayesian inference in practice. New to the Third Edition Four new chapters on nonparametric modeling Coverage of weakly informative priors and boundary-avoiding priors Updated discussion of cross-validation and predictive information criteria Improved convergence monitoring and effective sample size calculations for iterative simulation Presentations of Hamiltonian Monte Carlo, variational Bayes, and expectation propagation New and revised software code The book can be used in three different ways. For undergraduate students, it introduces Bayesian inference starting from first principles. For graduate students, the text presents effective current approaches to Bayesian modeling and computation in statistics and related fields. For researchers, it provides an assortment of Bayesian methods in applied statistics. Additional materials, including data sets used in the examples, solutions to selected exercises, and software instructions, are available on the book's web page.