

## Modeling Count Data

A far-reaching course in practical advanced statistics for biologists using R/Bioconductor, data exploration, and simulation.

Highway Safety Analytics and Modeling comprehensively covers the key elements needed to make effective transportation engineering and policy decisions based on highway safety data analysis in a single reference. The book includes all aspects of the decision-making process, from collecting and assembling data to developing models and evaluating analysis results. It discusses the challenges of working with crash and naturalistic data, identifies problems and proposes well-researched methods to solve them. Finally, the book examines the nuances associated with safety data analysis and shows how to best use the information to develop countermeasures, policies, and programs to reduce the frequency and severity of traffic crashes. Complements the Highway Safety Manual by the American Association of State Highway and Transportation Officials Provides examples and case studies for most models and methods Includes learning aids such as online data, examples and solutions to problems

A first approach for modeling time series of counts : the thinning-based INAR (1) model -- Further thinning-based models for count time series -- INGARCH models for count time series -- Further models for count time series -- Analyzing categorical time series -- Models for categorical time series -- Control charts for count processes -- Control charts for categorical processes

Methods of Statistical Model Estimation examines the most important and popular methods used to estimate parameters for statistical models and provide informative model summary statistics. Designed for R users, the book is also ideal for anyone wanting to better understand the algorithms used for statistical model fitting. The text presents algorithm

Growth models are among the core methods for analyzing how and when people change. Discussing both structural equation and multilevel modeling approaches, this book leads readers step by step through applying each model to longitudinal data to answer particular research questions. It demonstrates cutting-edge ways to describe linear and nonlinear change patterns, examine within-person and between-person differences in change, study change in latent variables, identify leading and lagging indicators of change, evaluate co-occurring patterns of change across multiple variables, and more. User-friendly features include real data examples, code (for Mplus or NLMIXED in SAS, and OpenMx or nlme in R), discussion of the output, and interpretation of each model's results. User-Friendly Features \*Real, worked-through longitudinal data examples serving as illustrations in each chapter. \*Script boxes that provide code for fitting the models to example data and facilitate application to the reader's own data. \*"Important Considerations" sections offering caveats, warnings, and recommendations for the use of specific models. \*Companion website supplying datasets and syntax for the book's examples, along with additional code in SAS/R for linear mixed-effects modeling.

Many texts are excellent sources of knowledge about individual statistical tools, but the art of data analysis is about choosing and using multiple tools. Instead of presenting isolated techniques, this text emphasizes problem solving strategies that address the many issues arising when developing multivariable models using real data and not standard textbook examples. It includes imputation methods for dealing with missing data effectively, methods for dealing with nonlinear relationships and for making the estimation of transformations a formal part of the modeling process, methods for dealing with "too many variables to analyze and not enough observations," and powerful model validation techniques based on the bootstrap. This text realistically deals with model uncertainty and its effects on inference to achieve "safe data

mining".

After reviewing the linear regression model and introducing maximum likelihood estimation, Long extends the binary logit and probit models, presents multinomial and conditioned logit models and describes models for sample selection bias.

This analysis provides a comprehensive account of models and methods to interpret frequency data.

The goal of this book is multidimensional: a) to help reviving Statistics education in many parts in the world where it is in crisis. For the first time authors from many developing countries have an opportunity to write together with the most prominent world authorities. The editor has spent several years searching for the most reputable statisticians all over the world. International contributors are either presidents of the local statistical societies, or head of the Statistics department at the main university, or the most distinguished statisticians in their countries. b) to enable any non-statistician to obtain quick and yet comprehensive and highly understandable view on certain statistical term, method or application c) to enable all the researchers, managers and practitioners to refresh their knowledge in Statistics, especially in certain controversial fields. d) to revive interest in statistics among students, since they will see its usefulness and relevance in almost all branches of Science.

The primary objective of this book is to provide an introduction to the econometric modeling of count data for graduate students and researchers. It should serve anyone whose interest lies either in developing the field further, or in applying existing methods to empirical questions. Much of the material included in this book is not specific to economics, or to quantitative social sciences more generally, but rather extends to disciplines such as biometrics and technometrics. Applications are as diverse as the number of congressional budget vetoes, the number of children in a household, and the number of mechanical defects in a production line. The unifying theme is a focus on regression models in which a dependent count variable is modeled as a function of independent variables which may or may not be counts as well. The modeling of count data has come of age. Inclusion of some of the fundamental models in basic textbooks, and implementation on standard computer software programs bear witness to that. Based on the standard Poisson regression model, numerous extensions and alternatives have been developed to address the common challenges faced in empirical modeling (unobserved heterogeneity, selectivity, endogeneity, measurement error, and dependent observations in the context of panel data or multivariate data, to name but a few) as well as the challenges that are specific to count data (e. g. , over dispersion and underdispersion).

The linear regression model is the most commonly used statistical method in the social sciences. This book considers regression models that are appropriate when the dependent variable is censored, truncated, binary, ordinal, nominal, or count. I refer to these variables as categorical and limited dependent variables (hereafter CLDVs). Until recently, the greatest obstacle in using models for CLDVs was the lack of software that was flexible, stable, and easy to use. This limitation no longer applies since these models can be estimated routinely with standard software. Now, the greatest

impediment is the complexity of the models and the difficulty in interpreting the results. The difficulties arise because most models for CLDVs are nonlinear.

Practical Guide to Logistic Regression covers the key points of the basic logistic regression model and illustrates how to use it properly to model a binary response variable. This powerful methodology can be used to analyze data from various fields, including medical and health outcomes research, business analytics and data science, ecology, fisheries, astronomy, transportation, insurance, economics, recreation, and sports. By harnessing the capabilities of the logistic model, analysts can better understand their data, make appropriate predictions and classifications, and determine the odds of one value of a predictor compared to another. Drawing on his many years of teaching logistic regression, using logistic-based models in research, and writing about the subject, Professor Hilbe focuses on the most important features of the logistic model. Serving as a guide between the author and readers, the book explains how to construct a logistic model, interpret coefficients and odds ratios, predict probabilities and their standard errors based on the model, and evaluate the model as to its fit. Using a variety of real data examples, mostly from health outcomes, the author offers a basic step-by-step guide to developing and interpreting observation and grouped logistic models as well as penalized and exact logistic regression. He also gives a step-by-step guide to modeling Bayesian logistic regression. R statistical software is used throughout the book to display the statistical models while SAS and Stata codes for all examples are included at the end of each chapter. The example code can be adapted to readers' own analyses. All the code is available on the author's website.

Panel Data Econometrics: Theory introduces econometric modelling. Written by experts from diverse disciplines, the volume uses longitudinal datasets to illuminate applications for a variety of fields, such as banking, financial markets, tourism and transportation, auctions, and experimental economics. Contributors emphasize techniques and applications, and they accompany their explanations with case studies, empirical exercises and supplementary code in R. They also address panel data analysis in the context of productivity and efficiency analysis, where some of the most interesting applications and advancements have recently been made. Provides a vast array of empirical applications useful to practitioners from different application environments Accompanied by extensive case studies and empirical exercises Includes empirical chapters accompanied by supplementary code in R, helping researchers replicate findings Represents an accessible resource for diverse industries, including health, transportation, tourism, economic growth, and banking, where researchers are not always econometrics experts

This entry-level text offers clear and concise guidelines on how to select, construct, interpret, and evaluate count data. Written for researchers with little or no background in advanced statistics, the book presents treatments of all major

models using numerous tables, insets, and detailed modeling suggestions. It begins by demonstrating the fundamentals of modeling count data, including a thorough presentation of the Poisson model. It then works up to an analysis of the problem of overdispersion and of the negative binomial model, and finally to the many variations that can be made to the base count models. Examples in Stata, R, and SAS code enable readers to adapt models for their own purposes, making the text an ideal resource for researchers working in health, ecology, econometrics, transportation, and other fields. A hands-on introduction to the principles of Bayesian modeling using WinBUGS Bayesian Modeling Using WinBUGS provides an easily accessible introduction to the use of WinBUGS programming techniques in a variety of Bayesian modeling settings. The author provides an accessible treatment of the topic, offering readers a smooth introduction to the principles of Bayesian modeling with detailed guidance on the practical implementation of key principles. The book begins with a basic introduction to Bayesian inference and the WinBUGS software and goes on to cover key topics, including: Markov Chain Monte Carlo algorithms in Bayesian inference Generalized linear models Bayesian hierarchical models Predictive distribution and model checking Bayesian model and variable evaluation Computational notes and screen captures illustrate the use of both WinBUGS as well as R software to apply the discussed techniques. Exercises at the end of each chapter allow readers to test their understanding of the presented concepts and all data sets and code are available on the book's related Web site. Requiring only a working knowledge of probability theory and statistics, Bayesian Modeling Using WinBUGS serves as an excellent book for courses on Bayesian statistics at the upper-undergraduate and graduate levels. It is also a valuable reference for researchers and practitioners in the fields of statistics, actuarial science, medicine, and the social sciences who use WinBUGS in their everyday work.

R is a language and environment for data analysis and graphics. It may be considered an implementation of S, an award-winning language initially developed at Bell Laboratories since the late 1970s. The R project was initiated by Robert Gentleman and Ross Ihaka at the University of Auckland, New Zealand, in the early 1990s, and has been developed by an international team since mid-1997. Historically, econometricians have favored other computing environments, some of which have fallen by the wayside, and also a variety of packages with canned routines. We believe that R has great potential in econometrics, both for research and for teaching. There are at least three reasons for this: (1) R is mostly platform independent and runs on Microsoft Windows, the Mac family of operating systems, and various flavors of Unix/Linux, and also on some more exotic platforms. (2) R is free software that can be downloaded and installed at no cost from a family of mirror sites around the globe, the Comprehensive R Archive Network (CRAN); hence students can easily install it on their own machines. (3) R is open-source software, so that the full source code is available and can be inspected to understand what it really does, learn from it, and modify and extend it. We also like to think that platform

independence and the open-source philosophy make R an ideal environment for reproducible econometric research. Probability and Bayesian Modeling is an introduction to probability and Bayesian thinking for undergraduate students with a calculus background. The first part of the book provides a broad view of probability including foundations, conditional probability, discrete and continuous distributions, and joint distributions. Statistical inference is presented completely from a Bayesian perspective. The text introduces inference and prediction for a single proportion and a single mean from Normal sampling. After fundamentals of Markov Chain Monte Carlo algorithms are introduced, Bayesian inference is described for hierarchical and regression models including logistic regression. The book presents several case studies motivated by some historical Bayesian studies and the authors' research. This text reflects modern Bayesian statistical practice. Simulation is introduced in all the probability chapters and extensively used in the Bayesian material to simulate from the posterior and predictive distributions. One chapter describes the basic tenets of Metropolis and Gibbs sampling algorithms; however several chapters introduce the fundamentals of Bayesian inference for conjugate priors to deepen understanding. Strategies for constructing prior distributions are described in situations when one has substantial prior information and for cases where one has weak prior knowledge. One chapter introduces hierarchical Bayesian modeling as a practical way of combining data from different groups. There is an extensive discussion of Bayesian regression models including the construction of informative priors, inference about functions of the parameters of interest, prediction, and model selection. The text uses JAGS (Just Another Gibbs Sampler) as a general-purpose computational method for simulating from posterior distributions for a variety of Bayesian models. An R package ProbBayes is available containing all of the book datasets and special functions for illustrating concepts from the book.

Functional Form and Heterogeneity in Models for Count Data surveys practical extensions of the Poisson and negative binomial (NB) models that practitioners can employ to refine the specifications or broaden their reach into new situations. The author resolves some inconsistencies of the panel data models with other more familiar results for the linear regression model. Functional Form and Heterogeneity in Models for Count Data is focused on two large issues: the accommodation of overdispersion and heterogeneity in the basic count framework and the functional form of the conditional mean and the extension of models of heterogeneity to models for panel data and sources of correlation across outcomes. The first is more straightforward since, in principle, these are elements of the conditional variance of the distribution of counts that can be analyzed apart from the conditional mean. Robust inference methods for basic models can be relied upon to preserve the validity of estimation and inference procedures. The second feature motivates the development of more intricate models such as the two part, panel and bivariate models presented in the text.

Beyond Multiple Linear Regression: Applied Generalized Linear Models and Multilevel Models in R is designed for undergraduate

students who have successfully completed a multiple linear regression course, helping them develop an expanded modeling toolkit that includes non-normal responses and correlated structure. Even though there is no mathematical prerequisite, the authors still introduce fairly sophisticated topics such as likelihood theory, zero-inflated Poisson, and parametric bootstrapping in an intuitive and applied manner. The case studies and exercises feature real data and real research questions; thus, most of the data in the textbook comes from collaborative research conducted by the authors and their students, or from student projects. Every chapter features a variety of conceptual exercises, guided exercises, and open-ended exercises using real data. After working through this material, students will develop an expanded toolkit and a greater appreciation for the wider world of data and statistical modeling. A solutions manual for all exercises is available to qualified instructors at the book's website at [www.routledge.com](http://www.routledge.com), and data sets and Rmd files for all case studies and exercises are available at the authors' GitHub repo (<https://github.com/proback/BeyondMLR>)

An accessible introduction to the use of regression analysis in the social sciences *Regression with Social Data: Modeling Continuous and Limited Response Variables* represents the most complete and fully integrated coverage of regression modeling currently available for graduate-level behavioral science students and practitioners. Covering techniques that span the full spectrum of levels of measurement for both continuous and limited response variables, and using examples taken from such disciplines as sociology, psychology, political science, and public health, the author succeeds in demystifying an academically rigorous subject and making it accessible to a wider audience. Content includes coverage of: Logit, probit, scobit, truncated, and censored regressions Multiple regression with ANOVA and ANCOVA models Binary and multinomial response models Poisson, negative binomial, and other regression models for event-count data Survival analysis using multistate, multiepisode, and interval-censored survival models Concepts are reinforced throughout with numerous chapter problems, exercises, and real data sets. Step-by-step solutions plus an appendix of mathematical tutorials make even complex problems accessible to readers with only moderate math skills. The book's logical flow, wide applicability, and uniquely comprehensive coverage make it both an ideal text for a variety of graduate course settings and a useful reference for practicing researchers in the field.

Modeling Count Data Cambridge University Press

This comprehensive guide to Bayesian methods in astronomy enables hands-on work by supplying complete R, JAGS, Python, and Stan code, to use directly or to adapt. It begins by examining the normal model from both frequentist and Bayesian perspectives and then progresses to a full range of Bayesian generalized linear and mixed or hierarchical models, as well as additional types of models such as ABC and INLA. The book provides code that is largely unavailable elsewhere and includes details on interpreting and evaluating Bayesian models. Initial discussions offer models in synthetic form so that readers can easily adapt them to their own data; later the models are applied to real astronomical data. The consistent focus is on hands-on modeling, analysis of data, and interpretations that address scientific questions. A must-have for astronomers, its concrete approach will also be attractive to researchers in the sciences more generally.

Logistic Regression Models presents an overview of the full range of logistic models, including binary, proportional, ordered, partially ordered, and unordered categorical response regression procedures. Other topics discussed include panel, survey, skewed, penalized, and exact logistic models. The text illustrates how to apply the various models to health, environmental, physical, and social science data. Examples illustrate successful modeling. The text first provides basic terminology and concepts, before explaining the foremost methods of estimation (maximum likelihood and IRLS) appropriate for logistic models. It then presents an in-depth discussion of related terminology and examines logistic regression model development and interpretation of the results. After focusing on the construction and interpretation of various interactions, the author evaluates assumptions and goodness-of-fit tests that can be used for model assessment. He also covers binomial logistic regression, varieties of overdispersion, and a number of extensions to the basic binary and binomial logistic model. Both real and simulated data are used to explain and test the concepts involved. The appendices give an overview of marginal effects and discrete change as well as a 30-page tutorial on using Stata commands related to the examples used in the text. Stata is used for most examples while R is provided at the end of the chapters to replicate examples in the text. Apply the models to your own data. Data files for examples and questions used in the text as well as code for user-authored commands are provided on the book's website, formatted in Stata, R, Excel, SAS, SPSS, and Limdep. See Professor Hilbe discuss the book.

An Applied Treatment of Modern Graphical Methods for Analyzing Categorical Data  
Discrete Data Analysis with R: Visualization and Modeling Techniques for Categorical and Count Data presents an applied treatment of modern methods for the analysis of categorical data, both discrete response data and frequency data. It explains how to use graphical meth

Like its bestselling predecessor, *Multilevel Modeling Using R, Second Edition* provides the reader with a helpful guide to conducting multilevel data modeling using the R software environment. After reviewing standard linear models, the authors present the basics of multilevel models and explain how to fit these models using R. They then show how to employ multilevel modeling with longitudinal data and demonstrate the valuable graphical options in R. The book also describes models for categorical dependent variables in both single level and multilevel data. New in the Second Edition: Features the use of `lmer` (instead of `lme`) and including the most up to date approaches for obtaining confidence intervals for the model parameters. Discusses measures of  $R^2$  (the squared multiple correlation coefficient) and overall model fit. Adds a chapter on nonparametric and robust approaches to estimating multilevel models, including rank based, heavy tailed distributions, and the multilevel lasso. Includes a new chapter on multivariate multilevel models. Presents new sections on micro-macro models and multilevel generalized additive models. This thoroughly updated revision gives the reader state-of-the-art tools to launch their own investigations in multilevel modeling and gain insight into their research. About the Authors: W. Holmes Finch is the George and Frances Ball Distinguished Professor of Educational Psychology at Ball State University. Jocelyn E. Bolin is a Professor in the Department of Educational Psychology at Ball State University. Ken Kelley is the Edward F. Sorin Society Professor of IT, Analytics and Operations and the Associate Dean for Faculty and Research for the Mendoza College of Business at the University of Notre Dame.

"This entry-level text offers clear and concise guidelines on how to select, construct, interpret, and evaluate count data. Written for researchers with little or no background in advanced statistics, the book presents treatments of all major models using numerous tables, insets, and detailed modeling suggestions. It begins by demonstrating the fundamentals of linear regression and works up to an analysis of the Poisson and negative binomial models, and to the problem of overdispersion. Examples in Stata, R, and SAS code enable readers to adapt models for their own purposes, making the text an ideal resource for researchers working in public health, ecology, econometrics, transportation, and other related fields"--

I teach management at the university level, and one of the most important topics covered in the curriculum is human behavior in organizations. As an instructor, I have always been fascinated by the behavior of university students. After all, the university is an organization, and students are the largest group in it. One particular behavior that interested me was student withdrawal from courses throughout the semester. This case illustrates how I used count models to study group differences in course withdrawal. As the total number of courses from which a student withdraws during his or her time in university must be a whole number, the analysis was performed using count models. The case study will explain why such models were used and how the analysis was performed.

**ALERT:** Before you purchase, check with your instructor or review your course syllabus to ensure that you select the correct ISBN. Several versions of Pearson's MyLab & Mastering products exist for each title, including customized versions for individual schools, and registrations are not transferable. In addition, you may need a CourseID, provided by your instructor, to register for and use Pearson's MyLab & Mastering products. Packages Access codes for Pearson's MyLab & Mastering products may not be included when purchasing or renting from companies other than Pearson; check with the seller before completing your purchase. Used or rental books If you rent or purchase a used book with an access code, the access code may have been redeemed previously and you may have to purchase a new access code. Access codes Access codes that are purchased from sellers other than Pearson carry a higher risk of being either the wrong ISBN or a previously redeemed code. Check with the seller prior to purchase. -- Data Analysis with SPSS is designed to teach students how to explore data in a systematic manner using the most popular professional social statistics program on the market today. Written in ten manageable chapters, this book first introduces students to the approach researchers use to frame research questions and the logic of establishing causal relations. Students are then oriented to the SPSS program and how to examine data sets. Subsequent chapters guide them through univariate analysis, bivariate analysis, graphic analysis, and multivariate analysis. Students conclude their course by learning how to write a research report and by engaging in their own research project. Each book is packaged with a disk containing the GSS (General Social Survey) file and the States data files. The GSS file contains 100 variables generated from interviews with 2,900 people, concerning their behaviors and attitudes on a wide variety of issues such as abortion, religion, prejudice, sexuality, and

politics. The States data allows comparison of all 50 states with 400 variables indicating issues such as unemployment, environment, criminality, population, and education. Students will ultimately use these data to conduct their own independent research project with SPSS. Note: MySearchLab does not come automatically packaged with this text. To purchase MySearchLab, please visit: [www.mysearchlab.com](http://www.mysearchlab.com) or you can purchase a ValuePack of the text + MySearchLab with Pearson eText (at no additional cost). ValuePack ISBN-10: 0205863728 / ValuePack ISBN-13: 9780205863723

This book provides the most comprehensive and up-to-date account of regression methods to explain the frequency of events.

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.

Students in both social and natural sciences often seek regression methods to explain the frequency of events, such as visits to a doctor, auto accidents, or new patents awarded. This book provides the most comprehensive and up-to-date account of models and methods to interpret such data. The authors have conducted research in the field for more than twenty-five years. In this book, they combine theory and practice to make sophisticated methods of analysis accessible to researchers and practitioners working with widely different types of data and software in areas such as applied statistics,

econometrics, marketing, operations research, actuarial studies, demography, biostatistics, and quantitative social sciences. The book may be used as a reference work on count models or by students seeking an authoritative overview. Complementary material in the form of data sets, template programs, and bibliographic resources can be accessed on the Internet through the authors' homepages. This second edition is an expanded and updated version of the first, with new empirical examples and more than one hundred new references added. The new material includes new theoretical topics, an updated and expanded treatment of cross-section models, coverage of bootstrap-based and simulation-based inference, expanded treatment of time series, multivariate and panel data, expanded treatment of endogenous regressors, coverage of quantile count regression, and a new chapter on Bayesian methods.

This book presents the most current trends in the field of finance and accounting from an international perspective. Featuring contributions presented at the 17th Annual Conference on Finance and Accounting at the University of Economics in Prague, this title provides a mix of research methods used to uncover the hidden consequences of accounting convergence in the private (IFRS) and public sectors (IPSAS). Topics covered include international taxation (from both the micro- and macroeconomic level), international investment, monetary economics, risk management, management accounting, auditing, investment capital, corporate finance and banking, among others. The global business environment shapes the international financial flows of finance and the demand for international harmonization of accounting. As such, the field of global finance and accounting has encountered some new challenges. For example, policy-makers and regulators are forced to restructure their tools to tackle with new features of trading at global capital markets and international investment. This book complements this global view of development with country-specific studies, focusing on emerging and transitioning economies, which are affected indirectly and in unforeseen ways. The combination of global perspective and local specifics makes this volume attractive and useful to academics, researchers, regulators and policy-makers in the field of finance and accounting.

For advanced students of network data science, this compact account covers both well-established methodology and the theory of models recently introduced in the graphical model literature. It focuses on the discrete case where all variables involved are categorical and, in this context, it achieves a unified presentation of classical and recent results.

This second edition of Hilbe's Negative Binomial Regression is a substantial enhancement to the popular first edition. The only text devoted entirely to the negative binomial model and its many variations, nearly every model discussed in the literature is addressed. The theoretical and distributional background of each model is discussed, together with examples of their construction, application, interpretation and evaluation. Complete Stata and R codes are provided throughout the text, with additional code (plus SAS), derivations and data provided on the book's website. Written for the

practising researcher, the text begins with an examination of risk and rate ratios, and of the estimating algorithms used to model count data. The book then gives an in-depth analysis of Poisson regression and an evaluation of the meaning and nature of overdispersion, followed by a comprehensive analysis of the negative binomial distribution and of its parameterizations into various models for evaluating count data.

Deftly balancing theory and application, this book stands out in its coverage of the derivation of the GLM families and their foremost links. This edition has new sections on discrete response models, including zero-truncated, zero-inflated, censored, and hurdle count models, as well as heterogeneous negative binomial, and more.

"This book provides a concise point of reference for the most commonly used regression methods. It begins with linear and nonlinear regression for normally distributed data, logistic regression for binomially distributed data, and Poisson regression and negative-binomial regression for count data. It then progresses to these regression models that work with longitudinal and multi-level data structures. The volume is designed to guide the transition from classical to more advanced regression modeling, as well as to contribute to the rapid development of statistics and data science. With data and computing programs available to facilitate readers' learning experience, *Statistical Regression Modeling* promotes the applications of R in linear, nonlinear, longitudinal and multi-level regression. All included datasets, as well as the associated R program in packages *nlme* and *lme4* for multi-level regression, are detailed in Appendix A. This book will be valuable in graduate courses on applied regression, as well as for practitioners and researchers in the fields of data science, statistical analytics, public health, and related fields."--Page 4 of cover.

In a conversational tone, *Regression & Linear Modeling* provides conceptual, user-friendly coverage of the generalized linear model (GLM). Readers will become familiar with applications of ordinary least squares (OLS) regression, binary and multinomial logistic regression, ordinal regression, Poisson regression, and loglinear models. The author returns to certain themes throughout the text, such as testing assumptions, examining data quality, and, where appropriate, nonlinear and non-additive effects modeled within different types of linear models. Available with Perusall—an eBook that makes it easier to prepare for class Perusall is an award-winning eBook platform featuring social annotation tools that allow students and instructors to collaboratively mark up and discuss their SAGE textbook. Backed by research and supported by technological innovations developed at Harvard University, this process of learning through collaborative annotation keeps your students engaged and makes teaching easier and more effective. Learn more.

*Flexible Bayesian Regression Modeling* is a step-by-step guide to the Bayesian revolution in regression modeling, for use in advanced econometric and statistical analysis where datasets are characterized by complexity, multiplicity, and large sample sizes, necessitating the need for considerable flexibility in modeling techniques. It reviews three forms of flexibility: methods which provide flexibility in their error distribution; methods which model non-central parts of the distribution (such as quantile regression);

and finally models that allow the mean function to be flexible (such as spline models). Each chapter discusses the key aspects of fitting a regression model. R programs accompany the methods. This book is particularly relevant to non-specialist practitioners with intermediate mathematical training seeking to apply Bayesian approaches in economics, biology, finance, engineering and medicine. Introduces powerful new nonparametric Bayesian regression techniques to classically trained practitioners Focuses on approaches offering both superior power and methodological flexibility Supplemented with instructive and relevant R programs within the text Covers linear regression, nonlinear regression and quantile regression techniques Provides diverse disciplinary case studies for correlation and optimization problems drawn from Bayesian analysis 'in the wild'

Learn Poisson and negative binomial regression techniques About This Video Work with single and multiple independent variables Learn about model visualization and probability prediction Get acquainted with the dataset and explore continuous and binary variables In Detail The course is divided into two parts. In the first part, you'll be introduced to the theory behind count models in an intuitive way while keeping the math at a minimum. The course starts with an overview of count tables, where you'll learn how to calculate the incidence rate ratio. You'll get to grips with Poisson regression and understand how to work with continuous, binary, and categorical variables. As you advance, you'll explore the concept of overdispersion and how to address this issue using negative binomial models. The course also covers other count models such as truncated models and zero-inflated models. In the second part of the course, you'll be able to apply what you have learned using Stata. You'll be taken through a large project where you'll fit the Poisson, negative binomial, and zero-inflated models. Additionally, you'll discover the tools used to compare these models.

This monograph deals with econometric models for the analysis of event counts. The interest of econometricians in this class of models has started in the mid-eighties. After more than one decade of intensive research, the literature has reached a level of maturity that calls for a systematic and accessible exposition of the main results and methods. Such an exposition is the aim of the book. Count data models have found their way into the curricula of micro-econometric classes and are available on standard computer software. The basic methods have been used in countless applications in fields such as labor economics, health economics, insurance economics, urban economics, and economic demography, to name but a few. Other, more recent, methods are poised to become standard tools soon. While the book is oriented towards the empirical economists and applied econometrician, it should be useful to statisticians and biometricians as well. A first edition of this book was published in 1994 under the title "Count Data Models - Econometric Theory and an Application to Labor Mobility" . While this edition keeps the character and broad organization of this first edition, and its emphasis on combining a summary of the existing literature with several new results and methods, it is substantially revised and enlarged. Many parts have been completely rewritten and several new sections have New sections include: count data models for dependent processes; been added.

Drawing on the authors' substantial expertise in modeling longitudinal and clustered data, Quasi-Least Squares Regression provides a thorough treatment of quasi-least squares (QLS) regression—a computational approach for the estimation of correlation

parameters within the framework of generalized estimating equations (GEEs). The authors present a detailed evaluation of QLS methodology, demonstrating the advantages of QLS in comparison with alternative methods. They describe how QLS can be used to extend the application of the traditional GEE approach to the analysis of unequally spaced longitudinal data, familial data, and data with multiple sources of correlation. In some settings, QLS also allows for improved analysis with an unstructured correlation matrix. Special focus is given to goodness-of-fit analysis as well as new strategies for selecting the appropriate working correlation structure for QLS and GEE. A chapter on longitudinal binary data tackles recent issues raised in the statistical literature regarding the appropriateness of semi-parametric methods, such as GEE and QLS, for the analysis of binary data; this chapter includes a comparison with the first-order Markov maximum-likelihood (MARK1ML) approach for binary data. Examples throughout the book demonstrate each topic of discussion. In particular, a fully worked out example leads readers from model building and interpretation to the planning stages for a future study (including sample size calculations). The code provided enables readers to replicate many of the examples in Stata, often with corresponding R, SAS, or MATLAB® code offered in the text or on the book's website.

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