

1. Record Nr.	UNINA9910144720403321
Autore	Stauffer Howard B. <1941->
Titolo	Contemporary Bayesian and frequentist statistical research methods for natural resource scientists [[electronic resource] /] / Howard B. Stauffer
Pubbl/distr/stampa	Hoboken, N.J., : Wiley-Interscience, c2008
ISBN	1-281-13476-7 9786611134761 0-470-18509-0 0-470-18507-4
Descrizione fisica	1 online resource (418 p.)
Disciplina	519.5/42 519.542
Soggetti	Bayesian statistical decision theory Mathematical statistics Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 383-387) and index.
Nota di contenuto	CONTEMPORARY BAYESIAN AND FREQUENTIST STATISTICAL RESEARCH METHODS FOR NATURAL RESOURCE SCIENTISTS; CONTENTS; Preface; 1 Introduction; 1.1 Introduction; 1.2 Three Case Studies; 1.2.1 Case Study 1: Maintenance of a Population Parameter above a Critical Threshold Level; 1.2.2 Case Study 2: Estimation of the Abundance of a Discrete Population; 1.2.3 Case Study 3: Habitat Selection Modeling of a Wildlife Population; 1.2.4 Case Studies Summary; 1.3 Overview of Some Solution Strategies; 1.3.1 Sample Surveys and Parameter Estimation; 1.3.2 Experiments and Hypothesis Testing 1.3.3 Multiple Linear Regression, Generalized Linear Modeling, and Model Selection 1.3.4 A Preview of Bayesian Statistical Inference; 1.3.5 A Preview of Model Selection Strategies and Information-Theoretic Criteria for Model Selection; 1.3.6 A Preview of Mixed-Effects Modeling; 1.4 Review: Principles of Project Management; 1.5 Applications; 1.6 S-Plus® and R Orientation I: Introduction; 1.6.1 Orientation I; 1.6.2 Simple Manipulations; 1.6.3 Data Structures; 1.6.4 Random Numbers; 1.6.5 Graphs; 1.6.6 Importing and Exporting Files; 1.6.7 Saving and

Restoring Objects; 1.6.8 Directory Structures
1.6.9 Functions and Control Structures
1.6.10 Linear Regression Analysis in S-Plus and R; 1.7 S-Plus and R Orientation II: Distributions; 1.7.1 Uniform Distribution; 1.7.2 Normal Distribution; 1.7.3 Poisson Distribution; 1.7.4 Binomial Distributions; 1.7.5 Simple Random Sampling; 1.8 S-Plus and R Orientation III: Estimation of Mean and Proportion, Sampling Error, and Confidence Intervals; 1.8.1 Estimation of Mean; 1.8.2 Estimation of Proportion; 1.9 S-Plus and R Orientation IV: Linear Regression; 1.10 Summary; Problems; 2 Bayesian Statistical Analysis I: Introduction; 2.1 Introduction
2.1.1 Historical Background
2.1.2 Limitations to the Use of Frequentist Statistical Inference for Natural Resource Applications: An Example; 2.2 Three Methods for Fitting Models to Datasets; 2.2.1 Least-Squares (LS) Fit-Minimizing a Goodness-of-Fit Profile; 2.2.2 Maximum-Likelihood (ML) Fit-Maximizing the Likelihood Profile; 2.2.3 Bayesian Fit-Bayesian Statistical Analysis and Inference; 2.2.4 Examples; 2.3 The Bayesian Paradigm for Statistical Inference: Bayes Theorem; 2.4 Conjugate Priors; 2.4.1 Continuous Data with the Normal Model; 2.4.2 Count Data with the Poisson Model
2.4.3 Binary Data with the Binomial Model
2.4.4 Conjugate Priors for Other Datasets; 2.5 Other Priors; 2.5.1 Noninformative, Uniform, and Proper or Improper Priors; 2.5.2 Jeffreys Priors; 2.5.3 Reference Priors, Vague Priors, and Elicited Priors; 2.5.4 Empirical Bayes Methods; 2.5.5 Sensitivity Analysis: An Example; 2.6 Summary; Problems; 3 Bayesian Statistical Inference II: Bayesian Hypothesis Testing and Decision Theory; 3.1 Bayesian Hypothesis Testing: Bayes Factors; 3.1.1 Proportion Estimation of Nesting Northern Spotted Owl Pairs; 3.1.2 Medical Diagnostics; 3.2 Bayesian Decision Theory
3.3 Preview: More Advanced Methods of Bayesian Statistical Analysis-Markov Chain Monte Carlo (MCMC) Algorithms and WinBUGS Software

Sommario/riassunto

The first all-inclusive introduction to modern statistical research methods in the natural resource sciences. The use of Bayesian statistical analysis has become increasingly important to natural resource scientists as a practical tool for solving various research problems. However, many important contemporary methods of applied statistics, such as generalized linear modeling, mixed-effects modeling, and Bayesian statistical analysis and inference, remain relatively unknown among researchers and practitioners in this field. Through its inclusive, hands-on treatment of real-world examples,
