Models For Ecological Data An Introduction

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Model selection and the cult of AIC Investigating species ' distributions with ecological niche models and GIS Ecosystem modelling ***Ecological Models \u0026 Data - BMSC Summer Field Course The Model Thinker: Making Data Work for You w/ @Scott_E_Page (Episode 75) #DataTalk*** ~~A quick intro to niche modeling~~ **Intro to the Ecological Model Models For Ecological Data An**

Facing ecological data sets of unprecedented size and complexity, environmental scientists are struggling to understand and exploit powerful new statistical tools for making sense of ecological processes. In Models for Ecological Data, James Clark introduces ecologists to these modern methods in modeling and computation.

Models for Ecological Data: An Introduction: Amazon.co.uk ...

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Models for Ecological Data: An Introduction ¦ NHBS ...

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Models for Ecological Data ¦ Princeton University Press
(PDF) Models for ecological data: An introduction by James S. Clark ¦ Tom Purucker - Academia.edu Academia.edu is a platform for academics to share research papers.

(PDF) Models for ecological data: An introduction by James ...
Ecological Applications 19:387-397. Uses density-dependent stage-structured model to assess potential impact of management strategies on an invasive plant, using demographic data collected at the invasion front. Wooten, M.B., Wikle, C.K, Dorazio, R.M. and Royle, J.A. 2007. Hierarchical spatiotemporal matrix models for characterizing invasions.

Models for Ecological Data - Texas A&M University
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Models for Ecological Data: An Introduction Lab Manual ...
Adaptation of model data to retrieve realistic values for initial population size and start date of the logistic model in R is explored. The advantages and limitations of the “ simple ” exponential and logistic growth models, and other available methods to analyse time series, are discussed.

Ecological Models ¦ SpringerLink
ecological modeling. A small data set on seed removal illustrates the three most common frameworks for statistical modeling in ecology: frequentist, likelihood-based, and Bayesian. The chapter also reviews what you should know to get the most out of the book, discusses the R language, and spells

Ecological Models and Data in R - McMaster University
Abstract. Ecological data often exhibit spatial pattern, which can be modeled as autocorrelation. Conditional autoregressive (CAR) and simultaneous autoregressive (SAR) models are network‐based models (also known as graphical models) specifically designed to model spatially autocorrelated data based on neighborhood relationships.

Spatial autoregressive models for statistical inference ...
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(PDF) Spatial Autoregressive Models for Statistical ...
Ecological models can be used for survey, to reveal system properties, establish research priorities, and to test scientific hypotheses. Hence, we consider them useful as experimental tools. A basic grouping shows that ecological models in general belong to three areas: biodemographic, bioenergetic, and biogeochemical.

Ecological Modeling - an overview ¦ ScienceDirect Topics
Ecological Models and Data in R is the first truly practical introduction to modern statistical methods for ecology. In step-by-step detail, Ecological Models and Data in R teaches ecology

graduate students and researchers everything they need to know in order to use maximum likelihood, information-theoretic, and Bayesian techniques to analyze their own data using the programming language R. Drawing on extensive experience teaching these techniques to graduate students in ecology, Benjamin ...

Ecological Models and Data in R ¦ NHBS Academic ...

A small data set on seed removal illustrates the three most common frameworks for statistical modeling in ecology: frequentist, likelihood-based, and Bayesian. The chapter also reviews what you should know to get the most out of the book, discusses the R language, and spells out a step-by-step process for building models of ecological systems.

Ecological Models and Data in R on JSTOR

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Models for Ecological Data: An Introduction by James S. Clark

In summary, Models for Ecological Data is an important text for those interested in ecological problems, which require computationally intensive methods. The level of the text is such that the reader should have a strong quantitative background (masters degree or higher in a quantitative discipline).

Models for Ecological Data : An Introduction by James S ...

Ecological Models and Data in R is the first truly practical introduction to modern statistical methods for ecology. In step-by-step detail, the book teaches ecology graduate students and researchers everything they need to know in order to use maximum likelihood, information-theoretic, and Bayesian techniques to analyze their own data using the programming language R. Drawing on extensive experience teaching these techniques to graduate students in ecology, Benjamin Bolker shows how to ...

Ecological Models and Data in R ¦ Princeton University Press

I Basic Blocks of Bayesian Modeling: Bayesian Hierarchical Models in Statistical Ecology. The Beta-Binomial Model. The Basic Normal Model. Working with More Than One Beta-Binomial Element. Combining Various Sources of Information. The Normal Linear Model. Nonlinear Models for Stock-Recruitment Analysis. Getting beyond Regression Models.

Introduction to Hierarchical Bayesian Modeling for ...

Facing ecological data sets of unprecedented size and complexity, environmental scientists are struggling to understand and exploit powerful new statistical tools for making sense of ecological processes. In Models for Ecological Data, James Clark introduces ecologists to these modern methods in modeling and computation.

Models for ecological data : an introduction (Book, 2007 ...

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The environmental sciences are undergoing a revolution in the use of models and data. Facing ecological data sets of unprecedented size and complexity, environmental scientists are struggling to understand and exploit powerful new statistical tools for making sense of ecological processes. In Models for Ecological Data, James Clark introduces ecologists to these modern methods in modeling and computation. Assuming only basic courses in calculus and statistics, the text introduces readers to basic maximum likelihood and then works up to more advanced topics in Bayesian modeling and computation. Clark covers both classical statistical approaches and powerful new computational tools and describes how complexity can motivate a shift from classical to Bayesian methods. Through an available lab manual, the book introduces readers to the practical work of data modeling and computation in the language R. Based on a successful course at Duke University and National Science Foundation-funded institutes on hierarchical modeling, Models for Ecological Data will enable ecologists and other environmental scientists to develop useful models that make sense of ecological data. Consistent treatment from classical to modern Bayes Underlying distribution theory to algorithm development Many examples and applications Does not assume statistical background Extensive supporting appendixes Lab manual in R is available separately

Introduction and background; Exploratory data analysis and graphics; Deterministic functions for ecological modeling; Probability and stochastic distributions for ecological modeling; Stochatsic simulation and power analysis; Likelihood and all that; Optimization and all that; Likelihood examples; Standar statistics revisited; Modeling variance; Dynamic models.

Laboratory manual for: Models for ecological data.

Making statistical modeling and inference more accessible to ecologists and related scientists, Introduction to Hierarchical Bayesian Modeling for Ecological Data gives readers a flexible and effective framework to learn about complex ecological processes from various sources of data. It also helps readers get started on building their own statistical models. The text begins with simple models that progressively become more complex and realistic through explanatory covariates and intermediate hidden states variables. When fitting the models to data, the authors gradually present the concepts and techniques of the Bayesian paradigm from a practical point of view using real case studies. They emphasize how hierarchical Bayesian modeling supports multidimensional models involving complex interactions between parameters and latent variables. Data sets, exercises, and R and WinBUGS codes are available on the authors ' website. This book shows how Bayesian statistical modeling provides an intuitive way to organize data, test ideas, investigate competing hypotheses, and assess degrees of confidence of predictions. It also illustrates how conditional reasoning can dismantle a complex reality into more understandable pieces. As conditional reasoning is intimately linked with Bayesian thinking, considering hierarchical models within the Bayesian setting offers a unified and coherent framework for modeling, estimation, and prediction.

A guide to data collection, modeling and inference strategies for biological survey data using Bayesian and classical statistical methods. This book describes a general and flexible framework for modeling and inference in ecological systems based on hierarchical models, with a strict focus on the use of probability models and parametric inference. Hierarchical

models represent a paradigm shift in the application of statistics to ecological inference problems because they combine explicit models of ecological system structure or dynamics with models of how ecological systems are observed. The principles of hierarchical modeling are developed and applied to problems in population, metapopulation, community, and metacommunity systems. The book provides the first synthetic treatment of many recent methodological advances in ecological modeling and unifies disparate methods and procedures. The authors apply principles of hierarchical modeling to ecological problems, including * occurrence or occupancy models for estimating species distribution * abundance models based on many sampling protocols, including distance sampling * capture-recapture models with individual effects * spatial capture-recapture models based on camera trapping and related methods * population and metapopulation dynamic models * models of biodiversity, community structure and dynamics * Wide variety of examples involving many taxa (birds, amphibians, mammals, insects, plants) * Development of classical, likelihood-based procedures for inference, as well as Bayesian methods of analysis * Detailed explanations describing the implementation of hierarchical models using freely available software such as R and WinBUGS * Computing support in technical appendices in an online companion web site

Bayesian Data Analysis in Ecology Using Linear Models with R, BUGS, and STAN examines the Bayesian and frequentist methods of conducting data analyses. The book provides the theoretical background in an easy-to-understand approach, encouraging readers to examine the processes that generated their data. Including discussions of model selection, model checking, and multi-model inference, the book also uses effect plots that allow a natural interpretation of data. Bayesian Data Analysis in Ecology Using Linear Models with R, BUGS, and STAN introduces Bayesian software, using R for the simple modes, and flexible Bayesian software (BUGS and Stan) for the more complicated ones. Guiding the ready from easy toward more complex (real) data analyses ina step-by-step manner, the book presents problems and solutions—including all R codes—that are most often applicable to other data and questions, making it an invaluable resource for analyzing a variety of data types. Introduces Bayesian data analysis, allowing users to obtain uncertainty measurements easily for any derived parameter of interest Written in a step-by-step approach that allows for eased understanding by non-statisticians Includes a companion website containing R-code to help users conduct Bayesian data analyses on their own data All example data as well as additional functions are provided in the R-package blmeco

Mathematical modelling is an essential tool in present-day ecological research. Yet for many ecologists it is still problematic to apply modelling in their research. In our experience, the major problem is at the conceptual level: proper understanding of what a model is, how ecological relations can be translated consistently into mathematical equations, how models are solved, steady states calculated and interpreted. Many textbooks jump over these conceptual hurdles to dive into detailed formulations or the mathematics of solution. This book attempts to fill that gap. It introduces essential concepts for mathematical modelling, explains the mathematics behind the methods, and helps readers to implement models and obtain hands-on experience. Throughout the book, emphasis is laid on how to translate ecological questions into interpretable models in a practical way. The book aims to be an introductory textbook at the undergraduate-graduate level, but will also be useful to seduce experienced ecologists into the world of modelling. The range of ecological models treated is wide, from Lotka-Volterra type of principle-seeking models to environmental or ecosystem models, and including matrix models, lattice models and sequential decision models. All chapters contain a concise introduction into the theory, worked-out examples and exercises.

All examples are implemented in the open-source package R, thus taking away problems of software availability for use of the book. All code used in the book is available on a dedicated website.

This book discusses advanced statistical methods that can be used to analyse ecological data. Most environmental collected data are measured repeatedly over time, or space and this requires the use of GLMM or GAMM methods. The book starts by revising regression, additive modelling, GAM and GLM, and then discusses dealing with spatial or temporal dependencies and nested data.

This book provides a practical introduction to analyzing ecological data using real data sets. The first part gives a largely non-mathematical introduction to data exploration, univariate methods (including GAM and mixed modeling techniques), multivariate analysis, time series analysis, and spatial statistics. The second part provides 17 case studies. The case studies include topics ranging from terrestrial ecology to marine biology and can be used as a template for a reader ' s own data analysis. Data from all case studies are available from www.highstat.com. Guidance on software is provided in the book.

An authoritative and accessible introduction to the concepts and tools needed to make ecology a more predictive science Ecologists are being asked to respond to unprecedented environmental challenges. How can they provide the best available scientific information about what will happen in the future? Ecological Forecasting is the first book to bring together the concepts and tools needed to make ecology a more predictive science. Ecological Forecasting presents a new way of doing ecology. A closer connection between data and models can help us to project our current understanding of ecological processes into new places and times. This accessible and comprehensive book covers a wealth of topics, including Bayesian calibration and the complexities of real-world data; uncertainty quantification, partitioning, propagation, and analysis; feedbacks from models to measurements; state-space models and data fusion; iterative forecasting and the forecast cycle; and decision support. Features case studies that highlight the advances and opportunities in forecasting across a range of ecological subdisciplines, such as epidemiology, fisheries, endangered species, biodiversity, and the carbon cycle Presents a probabilistic approach to prediction and iteratively updating forecasts based on new data Describes statistical and informatics tools for bringing models and data together, with emphasis on: Quantifying and partitioning uncertainties Dealing with the complexities of real-world data Feedbacks to identifying data needs, improving models, and decision support Numerous hands-on activities in R available online