Evolutionary Statistical Procedures

This proposed text appears to be a good introduction to evolutionary computation for use in applied statistics research. The authors draw from a vast base of knowledge about the current literature in both the design of evolutionary algorithms and statistical techniques. Modern statistical research is on the threshold of solving increasingly complex problems in high dimensions, and the generalization of its methodology to parameters whose estimators do not follow mathematically simple distributions is underway. Many of these challenges involve optimizing functions for which analytic solutions are infeasible. Evolutionary algorithms represent a powerful and easily understood means of approximating the optimum value in a variety of settings. The proposed text seeks to guide readers through the crucial issues of optimization problems in statistical settings and the implementation of tailored methods (including both stand-alone evolutionary algorithms and hybrid crosses of these procedures with standard statistical algorithms like Metropolis-Hastings) in a variety of applications. This book would serve as an excellent reference work for statistical researchers at an advanced graduate level or beyond, particularly those with a strong background in computer science.

Features

► A reference for statistical researchers at an advanced graduate level or beyond
► Deals with topics like time series data analysis, cluster analysis, design of experiments, outliers etc. that have practical aspects and should be appealing to readers
► For each application area benefits from using evolutionary methods are outlined
► There are no other books that deal with applications of EC in statistics

Fields of interest

Statistics and Computing/Statistics Programs; Computer Imaging, Vision, Pattern Recognition and Graphics; Algorithms

Target groups

Research

Type of publication

Monograph

Due December 2010

D. Borcard, Université de Montréal, QC, Canada; F. Gillet, Université de Franche-Comté, Besançon, France; P. Legendre, Université de Montréal, QC, Canada

Numerical Ecology with R

Numerical Ecology with R provides a long-awaited bridge between a textbook in Numerical Ecology and the implementation of this discipline in the language. After short theoretical overviews, the authors accompany the users through the exploration of the methods by means of applied and extensively commented examples. Users are invited to use this book as a teaching companion at the computer. The travel starts with exploratory approaches, proceeds with the construction of association matrices, then addresses three families of methods: clustering, unconstrained and canonical ordination, and spatial analysis. All the necessary data files, the scripts used in the chapters, as well as the extra functions and packages written by the authors, can be downloaded from a web page accessible through the Springer web site (http://www.springer.com/978-1-4419-7975-9).

Features

► Practical guide to Numerical Ecology by leaders of the field
► All examples are extensively commented
► Complete data sets, functions and scripts are provided

Contents

Introduction.- Exploratory data analysis.- Association measures and matrices.- Cluster analysis.- Unconstrained ordination.- Canonical ordination.- Spatial analysis of ecological data.

Fields of interest

Statistics for Life Sciences, Medicine, Health Sciences; Monitoring/Environmental Analysis; Biostatistics

Target groups

Research

Type of publication

Monograph

Due March 2011

G. T. Duncan, Carnegie Mellon University, Pittsburgh, PA, USA; M. Elliot, University of Manchester, UK

Statistical Confidentiality

Principles and Practice

Co author: J. Salazar-González, Universidad de La Laguna

Because statistical confidentiality embraces the responsibility for both protecting data and ensuring its beneficial use for statistical purposes, those working with personal and proprietary data can benefit from the principles and practices this book presents. Researchers can understand why an agency holding statistical data does not respond well to the demand. Just give me the data; only going to do good things with it. Statisticians can incorporate the requirements of statistical confidentiality into their methodologies for data collection and analysis. Data stewards, caught between those eager for data and those who worry about confidentiality, can use the tools of statistical confidentiality toward satisfying both groups. The eight chapters lay out the dilemma of data stewardship organizations (such as statistical agencies) in resolving the tension between protecting data from snoopers while providing data to legitimate users, explain disclosure risk and explore the types of attack that a data snooper might mount.

Features

► Introduces the field of statistical confidentiality, emphasizing motivation and modern practices
► Provides an overview of a complex topic which impacts many areas of the information society
► Introduces basic concepts and techniques to protect private information in databases before being released

Contents


Fields of interest

Statistics for Social Science, Behavioral Science, Education, Public Policy, and Law

Target groups

Professional/practitioner

Type of publication

Monograph

Due December 2010

R. Baragona, F. Battaglia, Universita La Sapienza, Rome, Italy; L. Poli, Universita’ Ca’ Foscari, Venice, Italy
Statistics of Financial Markets
An Introduction

Statistics of Financial Markets offers a vivid yet concise introduction to the growing field of statistical application in finance. The reader will learn the basic methods of evaluating option contracts, analysing financial time series, selecting portfolios and managing risks making realistic assumptions of the market behaviour. The focus is both on the fundamentals of mathematical finance and financial time series analysis and on applications to given problems of financial markets, thus making the book the ideal basis for lecturers, seminars and crash courses on the topic. For the third edition the book has been updated and extensively revised. Several new aspects have been included: new chapters on long memory models, copulae and CDO valuation. Practical exercises have been added, the solutions of which are provided in the book by S. Borak, W. Härdle and B. Lopez Cabrera (2010) ISBN 978-3-642-11133-4. Both R and Matlab Code, together with the data, can be downloaded at www.springer.com/978-3-642-16520-7

Features
► Offers an introduction to the growing field of statistical applications in finance ► Its main topics include option pricing, analysis of financial time series, portfolio selection and risk management ► Interactive approach using statistical software "learning by doing" by directly applying the methods using statistical software

Contents
Option Pricing - Statistical Models of Financial Time Series - Selected Financial Applications - Technical Appendix - Appendix - Frequently Used Notations - Index

Fields of interest
Statistics for Business/Economics/Mathematical Finance/Insurance; Quantitative Finance; Finance/Banking

Target groups
Graduate

Type of publication
Graduate/Advanced undergraduate textbook

Due November 2010

3rd Ed. 2011. XXII, 599 p. (Universitext) Softcover
► € 74.95 | £67.99
► appr. * € (D) 80.20 | € (A) 82.45 | sFr 107,50
ISBN 978-3-642-16520-7

Handbook of Statistical Bioinformatics

Numerous fascinating breakthroughs in biotechnology have generated large volumes and diverse types of high throughput data that demand the development of efficient and appropriate tools in computational statistics integrated with biological knowledge and computational algorithms. This volume collects contributed chapters from leading researchers to survey the many active research topics and promote the visibility of this research area. This volume is intended to provide an introductory and reference book for students and researchers who are interested in the recent developments of computational statistics in computational biology.

Features
► Introduces the state-of-arts techniques for statistical bioinformatics ► Focus on the interface between computational statistics and computational biology ► Covers key topics in modeling and analysis of massive data sets generated from high throughput biotechnology

Contents
Overview - Sequence Analysis - Expression Data Analysis - Systems Biology

Fields of interest
Statistics, general; Biomedicine general; Computer Imaging, Vision, Pattern Recognition and Graphics

Target groups
Professional/practitioner

Type of publication
Handbook

Due December 2010

► appr. * € 249.00 | £224.50
► appr. * € (D) 266,43 | € (A) 273,90 | sFr 357,00
ISBN 978-3-642-16344-4

Forest Analytics with R
An Introduction

Forest Analytics with R combines practical, down-to-earth forestry data analysis and solutions to real forest management challenges with state-of-the-art statistical and data-handling functionality. The authors adopt a problem-driven approach, in which statistical and mathematical tools are introduced in the context of the forestry problem that they can help to resolve. All the tools are introduced in the context of real forestry datasets, which provide compelling examples of practical applications. The modeling challenges covered within the book include imputation and interpolation for spatial data, fitting probability density functions to tree measurement data using maximum likelihood, fitting allometric functions using both linear and non-linear least-squares regression, and fitting growth models using both linear and non-linear mixed-effects modeling

Features
► Use of real datasets provides detailed and realistic examples of forestry data handling and analysis ► Guided by forestry problems, not by statistical tools, so all material is driven by context instead of convenience ► Combines practical, down-to-earth forestry data analysis solutions with state-of-the-art statistical functionality

Contents
Introduction - Forest data management - Data analysis for common inventory methods - Imputation and Interpolation - Fitting dimensional distributions - Linear and non-linear models - Fitting linear hierarchical models - Simulations - Forest estate planning and optimization

Fields of interest
Statistics for Life Sciences, Medicine, Health Sciences; Forestry; Forestry Management

Target groups
Graduate

Type of publication
Graduate/Advanced undergraduate textbook

Due January 2011

2011. XIV, 354 p. (Use R) Softcover
► appr. * € 49.95 | £44.99
► appr. * € (D) 53,45 | € (A) 54,95 | sFr 72,00
ISBN 978-1-4419-7761-8
Statistics and Data Analysis for Financial Engineering

Financial engineers have access to enormous quantities of data but need powerful methods for extracting quantitative information, particularly about volatility and risks. Key features of this textbook are: illustration of concepts with financial markets and economic data, R Labs with real-data exercises, and integration of graphical and analytic methods for modeling and diagnosing modeling errors. Despite some overlap with the author’s undergraduate textbook Statistics and Finance: An Introduction this book differs from that earlier volume in several important aspects: it is graduate-level; computations and graphics are done in R; and many advanced topics are covered, for example, multivariate distributions, copulas, Bayesian computations, VaR and expected shortfall, and cointegration. The prerequisites are basic statistics and probability, matrices and linear algebra, and calculus. Some exposure to finance is helpful.

Features
- Examples using financial markets and economic data illustrate important concepts
- R Labs with real-data exercises give students practice in data analysis
- Integration of graphical and analytic methods for model selection and model checking quantify and help mitigate risks due to modeling errors and uncertainty

From the contents

Fields of interest
Statistics for Business/Economics/Mathematical Finance/Insurance

Target groups
Graduate

Type of publication
Graduate/Advanced undergraduate textbook

Due January 2011