REVIEWS

THE NATURE OF SCIENTIFIC EVIDENCE: STATISTICAL, PHILOSOPHICAL, AND EMPIRICAL CONSIDERATIONS

Contents:
Foreword by C.R. Rao
1. A brief tour of statistical concepts, by N. Lewin-koh, M.L. Taper and S.R. Lele
2. Models of scientific inquiry and statistical practice: Implications for the structure of scientific knowledge, by B.A. Baurer
3. Experiments, observations, and other kinds of evidence, by S.M. Scheiner
PART II: Logics of Evidence. Overview, by V.P. Godambe
4. An error-statistical philosophy of evidence, by D.G. Mayo
5. The likelihood paradigm for statistical evidence, by R. Royall
6. Why likelihood?, by M. Forster and E. Sober
7. Evidence functions and the optimality of the law of likelihood, by S.R. Lele
PART III: Realities of Nature. Overview, by M.S. Boyce
8. Whole-ecosystem experiments: Replication and arguing from error, by J.A. Miller and T.M. Frost
9. Dynamical models as paths to evidence, by M.L. Taper and S.R. Lele
11. Statistics and the scientific method in ecology, by B. Dennis
12. Taking the prior seriously: Bayesian analysis without subjective probability, by D. Goodman
13. Elicit data, not prior: on using expert opinion in ecological studies, by S.R. Lele
14. Statistical distances as loss functions in assessing model adequacy, by B.G. Lindsay
15. Model identification from many candidates, by M.L. Taper
PART VI: Conclusion

Readership: ‘Any reader engaged in the quantification and evaluation of data.’ Students as well as established scientists

This book is a collection of papers, with the titles given in the contents, each followed by (typically) two commentaries and a rejoinder. The various authors are ecologists, statisticians and philosophers, but the editors hope that the volume will be of substantial interest to a much wider audience in the scientific community.

The book was preceded by two workshops and two symposia, and most of the contributors took part in these, so they will have had an opportunity to hear and digest others’ views before writing their contribution. This gives the book a useful coherence: it is less susceptible to the criticism of many collections, that they are disconnected. The book also includes introductory and concluding synthesis chapters, which further help to integrate the contents.

Although the book is centred around ecology, perhaps this is a good thing. Discussions of the philosophy of science which are not grounded in a practical application can often drift off into the realms of prescriptive fantasy, and certainly ecology is confronted by most if not all of the deep problems of inference.

This is a book which would amply repay detailed study. I have already learnt much from it, and I look forward to learning much more.

Imperial College of Science, Technology and Medicine
London, U.K.
D.J. Hand

R.L. MOORE, MATHEMATICIAN AND TEACHER
J. Parker.

Contents:
1. Roots and influences (1882-1897)
2. Of richest promise (1897-1902)
3. On to Chicago (1903)
4. A veritable hothouse (1903-1905)
5. Uneasy progress (1905-1908)
6. A settling experience (1908-1916)
7. Back to Texas (1916-1920)
8. A rewarding decade (1920-1930)
9. A change of direction (1930-1932)
This book is the first full biography of Niko Tinbergen, 1907-1988. Tinbergen and his friend Konrad Lorenz created a new branch of science-ethology: the study of animal behaviour. Tinbergen's early academic career was not outstanding; he scraped through at school and struggled to pass his PhD in 1932. But once he had found his metier, he made tremendous advances, winning numerous honours, including the Nobel Prize for Physiology or Medicine in 1973. Interestingly, his eldest brother Jan Tinbergen was awarded the Nobel Prize for Economics in 1969. (These two awards must have made it tough on their other siblings!)

Hans Kruuk, the author of this book was one of Tinbergen's students (along with such luminaries as Desmond Morris and Richard Dawkins) and became a good friend. In his preface, Kruuk thanks his friends and colleagues for supporting him while he wrote this book, since he had never attempted a biography before. Their confidence was well founded. This is a fascinating account of a fascinating man.

Imperial College of Science, Technology and Medicine
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D.J. Hand
cold, unfeeling intellect. As these great mathematicians reveal, it is also an art guided by a sense of beauty. This book makes fascinating reading for a wide audience and it definitely gets a strong endorsement.

Queen's University
Kingston, Canada
M.R. Murty

LUCK, LOGIC AND WHITE LIES - THE MATHEMATICS

PART I: Games of Chance

Contents:

1. Dice and probability
2. Waiting for a double 6
3. Tips on playing the lottery: More equal than equal?
4. A fair-and-odd game: But how?
5. The red and the black: The law of large numbers
6. Asymmetric dice: Are they worth anything?
7. Probability and geometry
8. Chance and mathematical certainty: Are they reconcilable?
9. In quest of the equiprobable
10. Winning the game: Probability and value
11. Which die is best?
12. A die is tested
13. The normal distribution: A race to the finish!
14. And not only at roulette: The Poisson distribution
15. When formulas become too complex: The Monte Carlo method
16. Markov chains and the game Monopoly
17. Blackjack: A Las Vegas fairy tale

PART II: Combinatorial Games

Contents:

18. Which move is best?
19. Chances of winning and symmetry
20. A game for three
21. Nim: The easy winner!
22. Lasker Nim: Winning along a secret path
23. Black-and-white Nim: To each his (or her) own
24. A game with dominos: Have we run out of space yet?
25. Go: A classical game with a modern theory
26. Misère games: Loser wins!
27. The computer as game partner
28. Can winning prospects always be determined?
29. Games and complexity: When calculations take too long
30. A good memory and luck: And nothing else?
31. Backgammon: To double or not to double?
32. Mastermind: Playing it safe

PART III: Strategic Games

Contents:

33. Rock-paper-scissors: The enemy's unknown plan
34. Minimax versus psychology: Even in poker?
35. Bluffing in poker: Can it be done without psychology?
36. Symmetric games: Disadvantages are avoidable, but how?
37. Minimax and linear optimization: As simple as can be
38. Play it again, Sam: Does experience make us wiser?
39. He/Her: Should I exchange?
40. Deciding at random: But how?
41. Optimal play: Planning efficiently
42. Baccarat: Draw from a five?
43. Three person poker: Is it a matter of trust?
44. QUAAK! Child's play?
45. Mastermind: Color codes and minimax

Readership: General readership, particularly game-players

This book is a translation of a book which was first published in German by Vieweg & Sohn Verlag in 2001. The author is (among other things) general manager of a game design company based in Limburg, Germany and the book is written to reach as broad a readership as possible.

The range is very wide and in broadly three categories. As the contents indicate, these are Games of Chance (‘Luck’), Combinatorial Games (‘Logic’), Strategic Games (‘White Lies’).

In the first of these categories, of course, there are features of the games (e.g. cards, dice, lotteries) which are not within the control of the player(s), even if probabilities of these features are known. In the second category are games (e.g. chess, checkers, nim, go) in which complete knowledge of the current state of play—and how it was arrived at—is known to the players, but where complexity comes from the vast numbers of moves and consequences that then need to be evaluated. Finally, in the third category are games (e.g. Rock-Paper-Scissors, Mastermind, poker) where knowledge is definitely incomplete and the goal is to ascertain and exploit the strategy of an opponent, while protecting one's own strategy. This book is certainly not a textbook. As the author admits, the mathematical detail given is too superficial and incomplete for experts, but there is a wealth of information and results to satisfy the most avid taste. The general readership should find it very fascinating and motivating to get to know more; these such readers who wish to follow up specifics, but also the experts, should find the multitude of references given throughout the text and in extensive chapter notes a mine of information. These references are also useful in putting aspects of the games in a historical perspective. The style of the book is engaging and attractive.

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F. H. Berkshire

FORECASTING PRODUCT LIABILITY CLAIMS:
Epidemiology and Modeling in the Manville Asbestos Case.

Contents:

1. Overview
2. Epidemiology of asbestos-related diseases
3. Forecasts based on direct estimates of exposure
4. Forecasts based on indirect estimates of exposure
5. Uncertainty in forecasts based on direct estimates of exposure
6. Updated forecasts based on indirect estimates of exposure
7. Uncertainty in updated forecasts
8. Forecasts based on a hybrid model
9. Uncertainty in forecasts based on a hybrid model
10. Conclusions and implications

Readership: General

Over 750,000 claimants have filed suit against some 8000 U.S. companies for illnesses and deaths related to exposure to asbestos, and at least 65 companies had been driven to bankruptcy; these numbers continue to grow. The largest producer was the Johns-Manville Corporation, whose name has been most prominently attached to the problems of asbestos (and this book). Claims may eventually reach $210 billion dollars (US). These authors were members of a six-person panel that advised the presiding judge about the probable future course of the numbers and sizes of new claims, as an aid to allocating the much smaller available funds fairly. This work led to substantial advances in the art of forecasting the number, timing, and nature of new claims. The authors present a lucid explanation of these advances and a description of how the matters in litigation have been settled. The presiding judge, Jack Weinstein, has contributed an informative preface and a plea for the broad changes needed to deal with
the medical-legal-entrepreneurial system that created such a mess.

University of Chicago
Chicago, U.S.A. J.C. Bailar

MEASUREMENT THEORY AND PRACTICE: THE WORLD THROUGH QUANTIFICATION.
D.J. Hand.

Contents:
1. Introduction
2. The nature of measurement
3. The process of measurement
4. Accuracy of measurement
5. Measurement in psychology
6. Measurement in medicine
7. Measurement in the physical sciences
8. Measurement in economics and the social sciences
9. Measurement in other areas

Readership: Users and teachers of quantitative research methods, statisticians

From the preface: "... in translating our observations about the world into numerical form, we are mapping from the real world to an artificial one and, in particular, one in which we can apply mathematical tools. This book is about such mappings, describing how they are carried out, the properties they must have ...". Measurement is at the root of all statistical analysis, and Hand provides an elegant, authoritative overview of both fundamental ideas (Chs. 1-4) and the design and use of specific models and instruments in major applied fields (Chs. 5-8). This is a serious work in which the author's humour shines through, and the many examples and quotations make it easily accessible to statisticians and non-statisticians alike. The book is clearly the culmination of many years' work, and it deserves to be very widely read.

University of Warwick
Coventry, U.K. D. Firth

GRAPHIC DISCOVERY. A Trout in the Milk and Other Visual Adventures.
H. Wainer.

Contents:
PART I:
1. Why Playfair?
2. Who was Playfair?
3. William Playfair: A daring and worthless fellow
4. Scaling the heights (and widths)
5. A Priestly view of international currency exchanges
6. Tom's veggies and the American way
7. The graphical inventions of Duboug and Ferguson: Two precursors to William Playfair

PART II:
8. Winds across Europe: Francis Galton and the graphical discovery of weather patterns
9. A graphical investigation of the scourges of Vietnam
10. Two mind-bending statistical paradoxes
11. Order in the court
12. No order in the court
13. Like a trout in the milk
14. Scaling the market
15. Sex, smoking and life insurance: A graphical view
16. There they go again!
17. Sex and sport: How quickly are women gaining?
18. Clear thinking made visible: Redesigning score reports for students

PART III:
20. Graphical tools for the twenty-first century: Spinning and slicing
21. Graphical tools for the twenty-first century: Nearness and smoothing engines
22. Epilogue: A selection of selections anomalies

Readership: Non-academic general interest

The author takes a personalized, and mildly quirky, tour through a series of topics all related to graphical displays in statistics. Starting in Part I, we learn about the pioneers of the use of graphical methods, in particular on William Playfair's contributions. Part II is a series of short essays on topics where graphical methods are shown to be powerful in discovering patterns in data. Part III concentrates on the influence of Tukey on interactive computer graphics such as spanning, brushing and smoothing.

The tour that the reader is taken on is rather idiosyncratic, arriving at some unusual places and bypassing other areas where a more thorough treatment would certainly stop. For example, a student, interested in learning about graphical methods, who flips through the index would be surprised to find 'Henry VIII' but not 'histogram', 'bourgeois' but not 'box plot'.

University of Waterloo
Waterloo, Canada P. Marriott

EXPLORATORY DATA ANALYSIS WITH MATLAB.
W. Martinez and A.R. Martinez.

Contents:
1. Introduction to exploratory data analysis
2. Dimensionality reduction – linear methods
3. Dimensionality reduction – nonlinear methods
4. Data tours
5. Finding clusters
6. Model-based clustering
7. Smoothing scatter plots
8. Visualizing clusters
9. Distribution shapes
10. Multivariate visualization

APPENDIX A : Proximity Measures
APPENDIX B: Software Resources for EDA
APPENDIX C: Description of Data Sets
APPENDIX D: Introduction to MATLAB
APPENDIX E: MATLAB Functions

Readership: Scientists, statisticians, data miners, engineers, computer scientists, biostatisticians, social scientists and any discipline that deals with the analysis of raw data

This book, as the title implies, is centred on the use of MATLAB® to illustrate the computational aspects of Exploratory Data Analysis (EDA). MATLAB® and the MATLAB® Statistics Toolbox are used extensively to demonstrate the practical applications of EDA. The theory of EDA is alluded to but this is not the main thrust of the text. Pseudo code is also present so that users of other software packages can implement the algorithms. The main goal of the book is to show the key concepts and methods of computational statistics and how they can be implemented in MATLAB®.

This book presumes that the reader has an understanding of basic linear algebra and has completed an introductory course in probability and statistics. In particular the reader should know about random variables, probability distributions, density functions, regression and
basic descriptive measures on the statistics front, and also about array multiplication, matrix inverse, determinants and array transfers on the algebra side.

MATLAB code in the form of EDA Toolbox is provided with the text. This includes the functions, GUIs and sets of data that are described in the book. This is available for download at http://lib.stat.cmu.edu and http://www.infinitassociates.com.

The author recommends you review the 'readme' file for installation instructions and information on any changes. M-files that contain the MATLAB commands for the exercises are also available for download. I would recommend that these be downloaded for use when required.

Each chapter has exercises for the reader to complete, however, there are no answers are supplied. A brief summary and further reading is included with each chapter. The text also contains a wealth of references for the reader to pursue on related issues.

This is a book for those who have a good grounding in linear algebra and statistics who wish to use MATLAB® for statistical investigations.

London South Bank University
London, U.K. S. Starkings

STATISTICAL ANALYSIS AND DATA DISPLAY: AN INTERMEDIATE COURSE WITH EXAMPLES IN S-PLUS, R AND SAS.
R.M. Heiberger and B. Holland.

Contents:
1. Introduction and motivation
2. Data and statistics
3. Statistics concepts
4. Graphs
5. Introductory inference
6. One-way analysis of variance, ANOVA
7. Multiple comparisons
8. Linear regression by least squares
9. Multiple regression - more than one predictor
10. Multiple regression - variables and contrasts
11. Multiple regression - regression diagnostics
12. Two-way analysis of variance
13. Design of experiments - factorial designs
14. Design of experiments – complex designs
15. Bivariate statistics - discrete data
16. Nonparametrics
17. Logistic regression
18. Time series analysis

Readership: Statistics majors at the master’s level, other quantitatively oriented disciplines at the Ph.D. level

As indicated by the subtitle, this is an intermediate-level text covering the use of three popular examples of statistical software applied to the display and statistical analysis of data. The range of statistical techniques is broad but not as comprehensive as, say, Modern Applied Statistics with S (4th edition) by Venables and Ripley (2nd edition, Short Book Reviews, Vol. 15, p. 7). This book does cover the use of SAS which "MASS" does not. I think the authors are accurate in targeting the master's level student with this book as opposed to the Ph.D. student for whom MASS may be more appropriate. Considering that the book emphasizes data display and interpretation, the quality of the graphics is sometimes disappointing.

University of Wisconsin
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LINEAR MODELS WITH R.
J.J. Faraway.

Contents:
1. Introduction
2. Estimation
3. Inference
4. Diagnostics
5. Problems with predictions
6. Problems with error
7. Transformations
8. Variable selection
9. Shrinkage methods
10. Statistical strategy and model uncertainty
11. Insurance redlining – A complete example
12. Missing data
13. Analysis of variance
14. One-way analysis of variance
15. Factorial designs
16. Block designs

APPENDIX A: R Installation, Functions and Data
APPENDIX B: Quick Introduction to R

Readership: Researchers, teachers and students who have a background in statistics

There are many books on regression and analysis of variance on the market, but this one is unique and has a novel approach to these statistical methods. The author uses R throughout the text to teach data analysis. The user will have to have R installed on their machine to be able to do the exercises which are provided at the end of the chapters. The emphasis is on the practice of regression and analysis of variance with considerably less emphasis on the mathematical techniques.

This book is not an introductory text. It presumes some knowledge of basic statistical theory and practice. Readers are expected to know the essentials of statistical inference such as estimation, hypothesis testing and confidence intervals. Also a basic knowledge of data analysis is presumed and some linear algebra and calculus is required. A brief introduction to R is presented in the appendix, and all the sets of data used are available from the website www.stat.lsa.umich.edu/~faraway/LMR.

One will need to follow the explanation given to be able to download and use the data. Free introductory guides to R can be obtained from www.r-project.org which is extremely useful to new users of R.

The text also contains a wealth of references for the reader to pursue on related issues. This book is recommended for all who wish to use R for statistical investigations.

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MONTE CARLO STATISTICAL METHODS, 2nd edition.
C.P. Robert and G. Casella.

Contents:
1. Introduction
2. Random variable generation
3. Monte Carlo integration
4. Controlling Monte Carlo variance
5. Monte Carlo optimization
6. Markov chains
7. The Metropolis-Hastings algorithm
8. The slice sampler
9. The two-stage Gibbs sampler
10. The multi-stage Gibbs sampler
11. Variable dimension models and reversible jump algorithms
12. Diagnosing convergence
13. Perfect sampling
14. Iterated and sequential importance sampling

Readership: Graduate students and scientists seeking to understand or apply Monte Carlo methods

This revision of the influential 1999 text [Short Book Reviews, Vol. 20, p. 12] includes changes to the presentation in the early chapters and much new material related to MCMC and Gibbs sampling. The result is a useful introduction to Monte Carlo methods and a convenient reference for much of current methodology. The theoretical bases of the methods are presented in useful detail. For example the chapter introducing the Metropolis-Hastings algorithm runs for fifty-four pages. The numerous problems include many with analytical components. The result is a very useful resource for anyone wanting to understand Monte Carlo procedures.

This excellent text is highly recommended, with one caution. The many examples that illustrate applications are conveniently simple. However, some readers may miss the fact that many examples are appropriately handled with more basic methods.

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D.F. Andrews

PLANNING, CONSTRUCTION AND STATISTICAL ANALYSIS OF COMPARATIVE EXPERIMENTS
F.G. Giesbrecht and M.L. Gumpertz.

Contents:
1. Introduction
2. Completely randomised designs
3. Linear models for designed experiments
4. Testing hypotheses and determining sample sizes
5. Methods of reducing unexplained variation
6. Latin squares
7. Split-plot and related designs
8. Incomplete block designs
9. Repeated experiments designs
10. Factorial experiments: The 2^k system
11. Factorial experiments: The 3^k system
12. Analysis of experiments without designed error terms
13. Confounding effects with blocks
14. Fractional factorial experiments
15. Response surface designs
16. Plackett-Burman Hadamard plans
17. General p^k and nonstandard factorials
18. Plans for which run order is important
19. Sequences of fractions of factorials
20. Factorial experiments with quantitative factors: Blocking and fractions
21. Supersaturated plans
22. Multistage experiments
23. Orthogonal arrays and related structures
24. Factorial plans derived via orthogonal arrays
25. Experiments on the computer

Readership: Experimental scientists, statistics undergraduate/MSc students

This book covers a wide range of topics. The approach is broadly a traditional one based on the normal theory linear model and analyses of all the standard experimental designs are presented, including for example analysis of covariance in split-plot experiments. The level of detail is higher than in most other books on similar topics and therefore makes this one a useful reference tool. There are lots of numerical examples and exercises with calculations based on SAS®. This is definitely a book aimed at experimentalists; the mathematical level is not high. However, there are good accounts of confounding and fractional replication, topics which many find conceptually difficult.

We find general advice about planning experiments including a section on ethical issues and a section on Taguchi methods. Little mention is made of optimality criteria but this does not detract from the value of the book.

Imperial College of Science, Technology and Medicine
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L.V. White

ANALYSIS OF VARIANCE FOR RANDOM MODELS,
Volume II: Unbalanced Data. Theory, Methods, Applications and Data Analysis.
H. Sahai and M.M. Ojeda.

Contents:
9. Matrix preliminaries and general linear model
10. Some general methods for making inferences about variance components
11. One-way classification
12. Two-way classification without interaction
13. Two-way classification with interaction
14. Three-way and higher-order crossed classification
15. Two-way nested classification
16. Three-way nested classification
17. General r-way nested classification

Readership: Theoretical research statisticians, applied statisticians using random effects models, graduate students

This is the second of a two-volume comprehensive review of the analysis of variance for random effects models. Volume I [Short Book Reviews, Vol. 24, p. 46] was devoted to various models using balanced data, whereas this volume is concerned with unbalanced data. The book provides an extensive coverage of the methods and techniques of point estimation, interval estimation and tests of hypotheses for random effects models. A variety of experimental designs are considered involving one, two, three and multi-factor experiments with crossed and nested factors. Throughout the text, the procedures are illustrated using numerical examples analyzed with several software systems (although in my copy and at least one other copy Figures 15.1, 16.1, 16.2 and 16.3 which should have contained computer output were blank).

This volume begins with Chapter 9, a short chapter on matrix algebra and the linear model. This is followed by a substantial chapter in which several methods of estimating the variance components in the random effects model are discussed. These include Henderson’s adaptations of ANOVA, restricted maximum likelihood (REML), minimum-norm quadratic unbiased estimation (MINQUE) and Pukelshiem’s convex programming approach using the existence of non-negative quadratic unbiased estimators. The authors include an examination of the merits of the different methods described, remarking on the relative simplicity of some and the computational complexity of others. The chapter closes with a set of twenty-four exercises and fifteen pages of references.

Chapter 11 on the one-way classification model sets the structure for the remaining chapters of the book. The various estimation methods described earlier are applied to this simple model in considerable detail. Sampling variances and confidence intervals for the estimators of the variance components are developed and the methods are illustrated using a numerical example analyzed with SAS, SPSS and BMDP. Subsequent
chapters, which cover increasingly more complicated models with more factors, with and without interaction terms and with the factors crossed or nested, have a similar structure, each covering the detailed theory, a numerical example, a set of exercises and a list of references.

The book will be particularly useful as a reference source to the literature of random effects models with each chapter having its own bibliography and with the main extensive reference section containing more than six hundred papers.

University of Southampton
Southampton, U.K.  P. Prescott

DESIGN AND ANALYSIS OF ACCELERATED TESTS FOR MISSION CRITICAL RELIABILITY.
M.J. LuValle, B.G. Lefevre and S. Kannan.

Contents:
1. Background
2. Demarcation mapping: Initial design of accelerated tests
3. Interface for building kinetic models
4. Evansen process mapping
5. Data analysis for failure time data
6. Data analysis for degradation data

APPENDIX: Installing the Software

Readership: Reliability engineers, physical scientists, statisticians

It is widely recognized that advances in the analysis and improvement of reliability ultimately rely on an understanding of the physical processes that lead to failures in equipment, materials or systems. This is especially true in the area of accelerated testing, where reliability testing under severe conditions aims to provide insight into reliability under normal conditions. This book attempts to link physical models for degradation and failure to accelerated testing and reliability analysis. The scope is fairly narrow: the book focuses on first-order chemical kinetic models and introduces a limited range of statistical methods. Nevertheless, it is a useful and welcome start in an important area. The inclusion of a software system that aids specification and visualization of kinetic models is also welcome. One hopes that this book will spur further research in this area.

University of Waterloo
Waterloo, Canada  J.F. Lawless

ANALYSIS AND MODELLING OF SPATIAL ENVIRONMENTAL DATA.
M. Kanevski and M. Maignan.

Contents:
1. Introduction to environmental data analysis and modelling
2. Exploratory spatial data analysis. Analysis of monitoring networks, declustering
3. Spatial data analysis: Deterministic interpolations
4. Introduction to geostatistics. Variography
5. Geostatistical spatial predictions
6. Estimation of local probability density functions
7. Conditional stochastic simulations
8. Artificial neural networks and spatial data analysis
9. Support vector machines for environmental spatial data
10. Geographical information systems and spatial data analysis
11. Conclusions

Readership: Graduate students and those working in the field

This book was a pleasure to review. Most of the emphasis is on insight and intuition with relatively little on traditional multivariate techniques. I also found some of the explanations delightful. When was the last time you encountered the Cauchy-Riemann equations in a statistics text? The authors state that "Our purpose in writing this book is to describe hierarchical Bayesian methods for one class of applications for which they can pay substantial dividends: spatial (and spatiotem-
poral) statistics." And, while they did not quite convert me to Bayesianism, made me reconsider some of my assumptions. They later state "Our book is intended as a research monograph, presenting the state of the art" and my impression is that they have succeeded.

The text is intentionally less mathematically demanding than N.A.C. Cressie [1993, Short Book Reviews, Vol. 12, p. 45] but at the same time it is not trivial. In many sections the formulae are augmented by showing R or S code, making it easy to actually apply the mathematics.

In summary, this is a nice book.

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Kingston, Canada  
D.J. Thomson

ADVANCED DISTANCE SAMPLING.

Contents:
1. Introduction to advanced distance sampling
2. General formulation for distance sampling
3. Covariate models for the detection function
4. Spatial distance sampling models
5. Temporal inferences from distance sampling surveys
6. Methods for incomplete detection at distance zero
7. Design of distance sampling surveys and Geographic Information Systems
8. Adaptive distance sampling surveys
9. Passive approaches to detection in distance sampling
10. Assessment of distance sampling estimators
11. Further topics in distance sampling

Readership: Professionals in government and environmental agencies, statisticians, biologists, wildlife managers, conservation biologists and ecologists, as well as graduate students of the density and abundance of biological populations

This is a follow up to the same team's Introduction to Distance Sampling [2002, Short Book Reviews, Vol. 22, p. 23] this time concentrating on more advanced and recent methods. Those methods used prior to 2000 are deemed historical by the editorial team. The chapter headings reveal a wide range of application of modern statistical techniques. The contributors were assigned specific topics rather than their own research, with their chapters editorially treated so that it reads like a unified applied statistics textbook. It may also be read as a thorough review of current best practice in distance sampling. A computer package that implemented the methods of the previous volume is being extended to cover those of this book.

Imperial College of Science,  
Technology and Medicine  
London, U.K.  
D.J. Hand


Contents:
1. Introduction and concepts
2. Observed score equating using the random groups design
3. Random groups - smoothing in equipercentile equating
4. Nonequivalent groups - linear methods
5. Nonequivalent groups - equipercentile methods
6. Item response theory methods
7. Standard methods of equating
8. Practical issues in equating
9. Score scales
10. Linking
11. Current and future challenges

Readership: Advanced graduate psychometric students, entry-level professionals, or others approaching equating, scaling, or linking for the first time, or professionals using the book as a reference work

Equating is a statistical tool which adjusts for differences between tests which are intended to be similar in difficulty and content. This book describes such tools. The authors say 'the principal goals of this book are for the reader to understand the principles of equating, scaling,
and linking; to be able to conduct equating, scaling, and linking, and to interpret the results in reasonable ways.' This second edition, published nine years after the (award-winning) first edition, has new chapters on test scaling and on test linking.

Given the perennial debates about academic standards and grade inflation, it is my view that tools such as those described in this book should be adopted much more widely by the academic community than they are at present. This book provides an excellent overview, and I strongly recommend it.

Imperial College of Science, Technology and Medicine
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D.J. Hand

MULTIVARIATE STATISTICAL METHODS, 4th edition.
D.F. Morrison.
Belmont, California, Brooks/Cole
Thomson Learning, 2005, pp. vii + 469.

Contents:
1. Samples from the multivariate normal population
2. Tests of hypotheses on means
3. The multivariate analysis of variance
4. Classification by discriminant functions
5. Inferences from covariance matrices
6. The structure of multivariate observations: I. Principal components
7. The structure of multivariate observations: II. Factor analysis

Readership: Students and practitioners of statistics, and researchers in other fields who analyze multidimensional response data

This is the fourth edition of a classic introductory text on multivariate statistics that was first published in 1967. This edition differs from prior editions in that two introductory chapters on elementary statistics and matrix algebra, respectively, have been removed, since such basic information is readily available elsewhere. Citations have also been updated, and a number of real sets of data for exercises have been added.

Coverage is quite traditional, and, though elementary, readers do need some prior statistical maturity and facility with matrix algebra before tackling the book. The book is a good standard reference for any statistician who works with multivariate data.

Brookfield, U.S.A.

C.A. Fung

W. Enders.

Contents:
1. Difference equations
2. Stationary time-series models
3. Modeling volatility
4. Models with trend
5. Multi-equation time-series models
6. Co-integration and error-correction models
7. Nonlinear time-series models

Readership: Undergraduate students of statistics, macroeconomics, agricultural economics and international finance

This book is the second edition of a previously well-read text used by both students of statistics and economics. In revising the text, the author has addressed a number of issues raised by readers of the first edition and incorporated guidance on how to compare the forecasts of alternative time-series models. The largest change has been in the addition of an entire chapter on nonlinear time-series models.

The text emphasizes the difference equation as the foundation of time-series modelling and the author takes seriously the term applied in the title of the book. Simple examples are used and built upon to develop ever more general and complicated models. The author recognizes the need for the techniques to be explicitly programmed and reference is given to a number of software packages.

The statistical prerequisites for using this book are modest: a knowledge of multiple regression analysis and ordinary least squares. The reader is assumed to be familiar with the concepts correlation and covariance, together with the meaning of terms such as mean square error, significance level and unbiased estimate. A knowledge of matrix algebra is assumed as a prerequisite to solving systems of equations.

CEFAS Lowestoft Laboratory
Lowestoft, U.K.

C.M. O'Brien

SKEW-ELLiptICAL DISTRIBUTIONS AND THEIR APPLICATIONS. A Journey Beyond Normality.
M.G. Genton (Ed.).

Contents:
PART I: Theory and Inference
1. The skew-normal distribution, by A.D. Valle
2. The closed skew-normal distribution, by G. González-Farías, J.A. Domínguez-Molina and A. Gupta
4. Generalized skew-normal distributions, by N.M.R. Loperfido
5. Skew-symmetric and generalized skew-elliptical distributions, by M.G. Genton
6. Elliptical models subject to hidden truncation or selective sampling, by B.C. Arnold and R.J. Beaver
7. From symmetric to asymmetric distributions: A unified approach, by R.B. Arellano-Valle and G.E. del Pino
8. Skewed link models for categorical response data, by M.-H. Chen
9. Skew-elliptical distributions in Bayesian inference, by B. Liseo

PART II: Applications and Case Studies
10. Bayesian multivariate skewed regression modeling with an application to firm size, by J.T.A.S. Ferreira and M.F.J. Steel
11. Capital asset pricing for UK stocks under the multivariate skew-normal distribution, by C. Adcock
12. A skew-in-mean GARCH model, by G. De Luca and N.M.R. Loperfido
15. Time series analysis with a skewed Kalman filter, by P. Naveau, M.G. Genton and C. Ammann
17. Shape representation with flexible skew-symmetric distributions, by S.H. Baloch, H. Krim and M.G. Genton
18. An astronomical distance determination method using regression with skew-normal errors,
   by L. Eyer and M.G. Genton
19. On a Bayesian multivariate survival model with a skewed frailty,
   by S.K. Sahu and D.K. Dey
20. Linear mixed effects models with flexible generalized skew-elliptical random effects,
   by Y.Y. Ma, M.G. Genton and M. Davidian

Readership: Researchers and graduate students in statistics, scientists

Suppose \( f(x) \) is a density function with \( f(x) = f(-x) \) for all \( x \). Let \( 0 \leq \gamma(x) \leq 1 \) be a skewing function with the defining property that \( \gamma(-x) = 1 - \gamma(x) \). Then for \( \alpha > 0 \), the product \( f(x;\alpha) = 2 f(x) \gamma(\alpha x) \) is easily seen to be a density function, with its skewness determined by the value of \( \alpha \).

For example, the symmetric case is \( \alpha = 0 \). When \( f(x) \) is a standard normal density function and \( \gamma(x) \) is the standard normal distribution function, the resulting density is said to be skewed normal. Extensions to multivariate skewed normal distributions are not hard to construct, and have interesting theoretical properties and applications.

This book brings together theoretical and applied work on skewed multivariate distributions. There is an impressive list of topics and authors. The book does a good job of advertising these skewed distributions as flexible families of error distributions for data where symmetry is not appropriate. As Nicola Loperfido says in Chapter 4, these skewed distributions are "a reasonable compromise between mathematical tractability and shape flexibility." I agree, provided that the emphasis is put on mathematical tractability. Flexible families are not hard to construct. So the mathematically tractable choices are to be recommended the most.

University of Waterloo
Waterloo, Canada

C.G. Small

WEIBULL MODELS
D.N. Prabhakar Murthy, M. Xie and R. Jiang.

Contents:
PART A: Overview
1. Overview
2. Taxonomy for Weibull models
PART B: Basic Weibull Model
3. Model analysis
4. Parameter estimation
5. Model selection and validation
PART C: Types I and II Models
6. Type I Weibull models
7. Type II Weibull models
PART D: Type III Models
8. Type III(a) Weibull models
9. Type III(b) Weibull models
10. Type III(c) Weibull models
11. Type III(d) Weibull models
PART E: Types IV to VII Models
12. Type IV Weibull models
13. Type V Weibull models
14. Type VI Weibull models (multivariate models)
15. Type VII Weibull models
PART F: Weibull modeling of data
16. Weibull modeling of data
PART G: Applications in reliability
17. Modeling product failures
18. Product reliability and Weibull failure models

Readership: "Everyone from reliability engineers to applied statisticians involved with reliability and survival analysis"

The main expressed aim is to develop a taxonomy for the various forms that this widely applied probability model can take through transformations and generalization, and to integrate the literature. Sixty pages of standard theory are followed by one hundred and eighty in which the model is split into seven types and over forty sub-types. Each chapter has exercises asking for analyses to be repeated on sample sets of data. There is a large reference section.

Model selection is driven by the Weibull probability plot of \( y = \ln(-\ln(R(t))) \) on \( x = \ln t \), where \( R(t) \) is the survivor function. There is no attempt at comparison outside the Weibull stable.

The index is hopeless. "Weibull probability plot" gives pages 95 and 99; "WPP" gives 53, 55, ..., "Plot, Weibull" gives 87. The plot is actually described on page 12. Under "Well" we have "well mixed" and "well separated", both on 169 and 177, referring to Models III(a)-1 and III(a)-2. "Distribution function" directs us to Type III(c)-1 in Chapter 10.

A search for "profile likelihood", used in estimation, yields nothing. "Likelihood" gives only "likelihood function" and "likelihood ratio test", the latter in respect of its use with Model VII(a)-3. The references include D.R. Cox's paper "Partial likelihood", but there is no author index to enable me to trace it.

Peads might also question "Baye's (sic) estimate" (index and 269) and "percentile (also referred to as fractile or quantile)" and "0.50 percentile is called the median".

Imperial College of Science, Technology and Medicine
London, U.K.
R. Coleman

COMPUTATIONAL METHODS IN STATISTICS AND ECONOMETRICS
H. Tanizaki.

Contents:
1. Elements of Statistics
2. Random number generation I
3. Random number generation II
PART II: Selected Applications of Monte Carlo Methods
4. Bayesian estimation
5. Bias correction of QLSE in AR models
6. State space modeling
PART III: Nonparametric Statistical Methods
7. Difference between two-sample means
8. Independence between samples

Readership: Researchers and mature students of statistics and econometrics who seek computational tools to support the evaluation and application of statistical methodologies that could otherwise be intractable

Monte Carlo concepts have long been a respectable approach to difficult integration problems, and have helped to overcome early criticisms of Bayesian methods as impractical. In the first half of this interesting book, the author develops sub-routines in Fortran and C to generate random samples from a large variety of discrete and continuous distributions, and then in the second half of the book he applies these sub-routines to illustrate Bayesian estimation, to compare the power of various estimators, and to obtain small sample properties of a number of non-parametric methods.

Chapter 1 is a summary of a first graduate course in mathematical statistics, which should be enough to arm the reader to tackle the rest of the book.

All of the sub-routines are given in the book to...
Brookfield, U.S.A.

C.A. Fung

STATISTICS FOR MICROARRAYS.

S. Wil and J. McClure.

Contents:

1. Preliminaries

2. Set-up of a microarray experiment

3. Statistical design of microarrays

4. Normalisation

5. Quality assessment

6. Microarray myths: Data

PART I: Getting Good Data

7. Microarray discoveries

8. Differential expression

9. Predicting outcomes with gene expression profiles

10. Microarray myths: Inference

READERSHIP: Statisticians, biostatisticians,
bioinformaticians, numerate biologists
and clinicians

This book addresses the range of questions and
problems that biostatisticians and bioinformaticians face
when analyzing genomic data generated by recently de-
veloped microarray(biochip)-based technologies. It focuses
specifically on microarray experiments that generate
measurements of expression levels of thousands of genes
under various experimental conditions.

This clear and synthetic text is aimed deliberately
at an applied minded audience and the numerous exam-
plars help understanding of the techniques. In contrast to
recent edited books on the subject that present often a
somewhat disjointed collection of topics and authors, this
book adopts a structured and pedagogical approach with a
focus on conveying the benefits of a systematic statistical
approach in this domain. Thus, it gives an up-to-date and
personal account of methods of analysis, and notably offers
advice on best use and potential misuse. Particularly noteworthy
are the chapters on differential expression and prediction.

The accompanying set of R routines which makes the book
self-contained is valuable. This book is an excellent refer-
text for any researcher interested in the analysis of
transcriptomic data.

Imperial College of Science,
Technology and Medicine

London, U.K.

S. Richardson

ANALYZING MICROARRAY GENE EXPRESSION DATA.


Contents:

1. Microarrays in gene expression studies

2. Cleaning and normalization

3. Some cluster analysis methods

4. Clustering of tissue samples

5. Screening and clustering of genes

6. Discriminant analysis

7. Supervised classification of tissue samples

8. Linking microarray data with survival analysis

READERSHIP: "biologists who will undertake the statistical
analyses of their own experimental

microarray data and biostatisticians
entering the field of microarray gene
expression data analysis." (Preface)

Data analysis methods for the field of microarray
gene expression are the primary focus of this book. It be-
gins with two background chapters that will be particularly
useful to statisticians new to microarray data. In addition to
providing a reasonably comprehensive overview of the
range of statistical and computational techniques at use in
the field, the authors make a good case for the advantages
of some approaches over others, particularly emphasizing
mixture models, a principal component-based approach
known as gene shaving, and support vector machines.

They also discuss methods to address the biases
introduced by multiple testing and overfitting with many
genes. Inherent in the presentation are useful ways to
combine techniques to address the biological questions of
interest and some good ideas concerning strategies for the
analysis of these complex data. Throughout, the methods
are applied and compared in a number of well-known sets
of data from the literature, all concerned with clinically ori-
ented investigations of human cancer. The references are
an excellent source of current statistical work in what is a
rapidly evolving field. A helpful web page associated with
points to the authors' software and the sets of data analyzed.

Although biologists analyzing their own data
would learn a great deal from this book about appropriate
use of various methods, these are advanced multivariate
methods usually taught at the graduate level in statistics
and biostatistics programs. The book would serve as a
very good resource for a graduate topics seminar in ad-
vanced applied statistics.

University of Toronto

Toronto, Canada

S.B. Bull

DESIGN AND ANALYSIS OF DNA MICROARRAY

INVESTIGATIONS.

R.M. Simon, E.L. Korn, L.M. McShave,
M.D. Radmacker, G.W. Wright and Y. Zhao.

New York: Springer-Verlag, 2004,
pp. x + 199, US$59.95.

Contents:

1. Introduction

2. DNA microarray technology

3. Design of DNA microarray experiments

4. Image analysis

5. Quality control

6. Array normalization

7. Class comparison

8. Class prediction

9. Class discovery

APPENDIX A: Basic Biology of Gene Expression
APPENDIX B: Description of Gene Expression Datasets
APPENDIX C: BRB Array Tools

READERSHIP: Biomedical researchers using statistical tools

The design and analysis of microarray experi-
ments presents a difficult and important endeavour for
modern statistics. Over the past five to ten years, some old
tools have been adapted to this area, and some newer
tools have been developed. The toolbox has finally begun
to gel. This book presents a concise overview of many
useful statistical approaches to microarray data, running
the gamut from design of experiments, image analysis of
the raw data, data normalization and analysis. This broad
range of topics makes the book unique and useful. The
authors are all experienced researchers and practitioners in
this area.

At last less than two hundred pages, however, the
depth of the book is (understandably) lacking in places. For
example, there is discussion of diagonal linear discriminant analysis and there is no mention of nearest centroids (an equivalent method) or nearest shrunken centroids, a useful generalization with automatic feature selection. And support vector machines, which are widely used (deservedly or not) are given less than half a page.

These quals aside, this book is a valuable resource for microarray experimenters. I enjoyed it and recommend it for anyone working in this area.

Stanford University
Stanford, U.S.A. R. Tibshirani

BAYESIAN NONPARAMETRICS VIA NEURAL NETWORKS.
H.K.H. Lee.

Contents:
1. Introduction
2. Nonparametric models
3. Priors for neural networks
4. Building a model
5. Conclusions

Readership: Students and practitioners of statistics and computational sciences

This book presents neural-network models in a statistical framework in order to expel their myth that they are at worst magical black boxes and at best machine learning algorithms. As the author discusses, there is a definite probability model behind neural networks and begins by showing that neural networks are nothing more than a statistical model for nonparametric regression and classification.

The text has been developed from the author's 1998 Ph.D. thesis and whilst not providing an all-inclusive introduction to the field, does present material in a self-contained manner with references provided for further details of the many issues not directly addressed.

Two examples, one on ozone pollution and the other on loan applications, are used throughout the text. The author does not assume that the reader has any previous knowledge of neural networks but introduces topics in a self-contained way. However, the reader is assumed to have a basic understanding of the Bayesian approach, mathematical statistics and linear regression that might limit its initial readership.

CEFAS Lowestoft Laboratory
 Lowestoft, U.K. C.M. O'Brien

INTRODUCTION TO RANDOM TIMES AND QUANTUM RANDOMNESS. New edition.
K.L. Chung and J.-C. Zambrini.

Contents:
PART 1: Introduction to Random Time
1. Prologue
2. Stopping time
3. Martingale stopped
4. Random past and future
5. Other times
6. From first to last
7. Gapless time
8. Markov chain in continuum time
9. The trouble with the infinite

PART 2: Introduction to Quantum Randomness
1. Classical prologue
2. Standard quantum mechanics
3. Probabilities in standard quantum mechanics
4. Feynman's approach to quantum probabilities
5. Schrödinger's Euclidean quantum mechanics
6. Beyond Feynman's approach
7. Time for a dialogue

Readership: Advanced students in stochastics or quantum physics; mathematical researchers in those areas

This is a quite unusual and highly stimulating book, written by two masters of their fields. While directed primarily towards talented, broadminded and ambitious younger students of stochastics or mathematical physics, many more senior researchers will find points of considerable interest in the expositions. The level of exposition is relatively elementary in both parts, but the style is far from that of a textbook, being rather colloquial, with many historical insights and some anecdotal material, the latter particularly in Part 1. That part, written by Professor Kai Lai Chung, is in the classical probabilistic (Kolmogorovian) framework and centres around stopping times for discrete time Markov processes. Part 2, by Professor Jean-Claude Zambrini, addresses a basic difficulty of the theory of quantum physics, as recognized from earliest days on by the founders of the theory, namely the fact that time (and random time) is not a quantum observable. Zambrini offers a detailed and lucid discussion of this problem, based on a succinct introduction to the mathematics of quantum physics, and outlines a possible research programme that aims at constructing a sort of middle way between classical probability, in the sense of Kolmogorov, and quantum probability, in the sense of von Neumann and Schrödinger, and drawing heavily on Feynman's path integral approach. The hope is that such a middle way, while presumably not fully satisfactory for either of the two probabilistic universes, will throw new light on the foundations of quantum mechanics, and in particular on the puzzle of time, as well as opening up completely new avenues for research in classical probability.

I would recommend any reader of the book to start with the two forewords and the final section of Part 2.

University of Aarhus
Aarhus, Denmark O.E. Barndorff-Nielsen

DISTRIBUTION THEORY OF RUNS AND PATTERNS AND ITS APPLICATIONS. A FINITE MARKOV CHAIN IMBEDDING APPROACH.
J.C. Fu and W.Y.W. Lou.

Contents:
1. Introduction
2. Finite Markov chain imbedding
3. Runs and patterns in a sequence of two-state trials
4. Runs and patterns in multi-state trials
5. Waiting-time distributions
6. Random permutations
7. Applications

Readership: Researchers in applied statistics, quality control and engineering systems

Traditionally, the distributions of runs and patterns were studied using combinatorial analysis but finding the appropriate combinatorial identities to derive the appropriate probability distributions can be difficult, if not impossible. The author's approach to the problem is to make use of finite Markov chain imbedding techniques for studying the distributions of runs and patterns. A great advantage of this approach is that it can be applied not only to independent and identically distributed cases but also to Markov-dependent multi-state trials.
Applications date back to the early 1980s for the purpose of evaluating the reliabilities of various engineering systems, to hypothesis testing and DNA sequence matching in the late 1990s, and to health care in 2000. The text is neither a review book for the theory of runs and patterns, nor is it intended as a course textbook. It is mainly aimed at researchers and the contents are largely based upon recent developments in the area.

CEFAS Lowestoft Laboratory
Lowestoft, U.K. C.M. O'Brien

ELEMENTS OF THE RANDOM WALK: AN INTRODUCTION FOR ADVANCED STUDENTS AND RESEARCHERS.
J. Rudnick and G. Gaspari.

Contents:
1. Introduction to techniques
2. Generating functions I
3. Generating functions II: Recurrence, sites visited, and the role of dimensionality
4. Boundary conditions, steady state, and the electrostatic analogy
5. Variations on the random walk
6. The shape of a random walk
7. Path integrals and self-avoidance
8. Properties of the random walk: Introduction to scaling
9. Scaling of walks and critical phenomena
10. Walks and the O(n) model: Mean field theory and spin waves
11. Scaling, fractals, and renormalization
12. More on the renormalization group

Readership: Graduate students and researchers of statistics, mathematics and engineering

The random walk is a useful model across a range of scientific disciplines and has played a role in the analysis of stock prices and quantum field theory, to name but two novel applications. This book is self-contained in the basic topics of the random walk and provides an excellent introduction to emerging topics such as fractals, scaling and path integrals.

Central to the mathematical treatment is the generating function but mathematical background is provided in supplements at the end of each chapter, whenever appropriate. Exercises are included in a number of the chapters. The text is well-written and would provide an excellent course companion for both an intermediate course and an advanced course in probability.

CEFAS Lowestoft Laboratory
Lowestoft, U.K. C.M. O'Brien

WHY STOCK MARKETS CRASH. Critical Events in Complex Financial Systems.
D. Sornette.

Contents:
1. Financial crashes: What, how, why, and when?
2. Fundamentals of financial markets
3. Financial crashes are "outliers"
4. Positive feedbacks
5. Modeling financial bubbles and market crashes
6. Hierarchies, complex fractal dimensions, and log-periodicity
7. Autopsy of major crashes: Universal exponents and log-periodicity
8. Bubbles, crises, and crashes in emerging markets
9. Prediction of bubbles, crashes, and antibubbles
10. 2050: The end of the growth era?

Readership: Anyone interested in the functioning of financial markets

No doubt, the author has thought carefully about how to present a wealth of potential material to an audience not particularly expert in the behaviour of complex systems. Starting from such systems, the author explains how certain periodicities may come naturally in financial markets. The book is more on data-driven observations than on mathematical theory. For most of the models presented, theory however does exist. I find the book lively, well written with lots of common sense insight on the functioning of our financial system. Is this the new "unifying" theory for understanding financial markets? Surely not; I did find however interesting information scattered throughout the text which students and researchers working on other approaches to the same questions might find interesting for their own research.

ETH-Zürich
Zürich, Switzerland P.A.L. Embrechts

THE CONCEPTS AND PRACTICE OF MATHEMATICAL FINANCE.
M.S. Joshi.

Contents:
1. Risk
2. Pricing methodologies and arbitrage
3. Trees and option pricing
4. Practicalities
5. The Itô calculus
6. Risk neutrality and martingale measures
7. The practical pricing of a European option
8. Continuous barrier options
9. Multi-look exotic options
10. Multiple sources of risk
11. Options with early exercise features
12. Interest rate derivatives
13. The pricing of exotic interest rate derivatives
14. Incomplete markets and jump-diffusion processes
15. Variance gamma models
16. Smile dynamics and the pricing of exotic options

APPENDIX A: Financial and mathematical jargon
APPENDIX B: Computer projects
APPENDIX C: Elements of probability theory
APPENDIX D: Hints and answers to exercises

Readership: Students or practitioners new to mathematical finance

In view of the fact that there are now many books on mathematical finance, several of which have been reviewed in these pages, the obvious question is what is different about this one? The author's aims are to impart a conceptual understanding of the basic ideas in mathematical finance, and to show how these are translated into practicalities. I think he succeeds in both of these objectives. The book starts at a satisfactory introductory level, introducing basic motivations and the concept of arbitrage. It examines things from several different perspectives, thus presenting an attractive overview of the subject, and certainly equipping readers with a broader understanding than would some of the technically deeper but narrower and more partisan books. The book has been very nicely produced by Cambridge University Press. I would certainly recommend that anyone teaching an introductory or intermediate course on this topic seriously consider this book as a potential course text.
The Evaluation of Surrogate Endpoints

T. Burzykowski, G. Molenberghs, Limburgs Universitair Centrum, Diepenbeek, Belgium; M. Buyse, International Drug Development Institute, Brussels, Belgium (Eds.)

Both humanitarian and commercial considerations have spurred intensive search for methods to reduce the time and cost required to develop new therapies. The identification and use of surrogate endpoints, i.e., measures that can replace or supplement other endpoints in evaluations of experimental treatments or other interventions, is a general strategy that has stimulated both enthusiasm and skepticism. Surrogate endpoints are useful when they can be measured with the requisite tools. In addition, an introduction to the theory of resampling methods such as the bootstrap is developed. The sections on multiple testing and goodness of fit testing are expanded. The text is suitable for Ph.D. students in statistics and includes over 300 new problems out of a total of more than 760.


Testing Statistical Hypotheses

E.L. Lehmann, University of California, Berkeley, CA; J. P. Romano, Stanford University, Stanford, CA

The third edition of Testing Statistical Hypotheses updates and expands upon the classic graduate text, emphasizing optimality theory for hypothesis testing and confidence sets. The principal additions include a rigorous treatment of large sample optimality, together with the requisite tools. In addition, an introduction to the theory of resampling methods such as the bootstrap is developed. The sections on multiple testing and goodness of fit testing are expanded. The text is suitable for Ph.D. students in statistics and includes over 300 new problems out of a total of more than 760.


Statistical Methods in Molecular Evolution

R. Nielsen, Cornell University, Ithaca, NY (Ed.)

Most studies in molecular evolution rely heavily on statistical procedures based on stochastic process modelling and advanced computational methods including high-dimensional numerical optimization and Markov Chain Monte Carlo. This book provides an overview of the statistical theory and methods used in studies of molecular evolution. It includes an introductory section suitable for readers that are new to the field, a section discussing practical methods for data analysis, and more specialized sections discussing specific models and addressing statistical issues relating to estimation and model choice. The chapters are written by the leaders of field and they will take the reader from basic introductory material to the state-of-the-art statistical methods.


Computational Genome Analysis: An Introduction

R. C. Deonier, S. Tavaré, M. S. Waterman, University of Southern California, Los Angeles, CA

This textbook focuses on computational and statistical principles applied to genomes, and is not concerned with proving theorems and discussing the subtleties of the mathematics and statistics except where they are crucial for understanding the methods. In addition to describing the basic mathematics and statistics underlying computational genomics, the book indicates how to implement the concepts in computational biology by simulations and examples using the R statistics package (available for free download). Although some biology students may find these examples challenging, the authors believe that understanding requires the ability to visualize problems from a computational standpoint. The goal is to provide a mathematical and statistical foundation for intelligent application of the available computational tools.

HANDBOOK OF COMPUTATIONAL AND NUMERICAL METHODS IN FINANCE.
S.T. Rachev (Ed.).

Contents:
1. Skewness and kurtosis trades
2. Valuation of a credit spread put option: The stable Paretian model with copulas
3. GARCH-type processes in modeling energy prices
4. Malliavin calculus in finance
5. Bootstrap unit root tests for heavy-tailed time series
6. Optimal portfolio selection and risk management: A comparison between the stable Paretian approach and the Gaussian one
7. Optimal quantization methods and applications to numerical problems in finance
8. Numerical methods for stable modeling in financial risk management
9. Modern heuristics for finance problems: A survey of selected methods and applications
10. On relation between expected regret and conditional value-at-risk
11. Estimation, adjustment and applications of transition matrices in credit risk models

Readership: Postgraduate students and researchers in quantitative finance

DYNAMICS OF MARKETS, ECONOPHYSICS AND FINANCE.
J.L. McCauley.
Cambridge University Press, 2004, pp. xvi + 209, £45.00/US$65.00.

Contents:
1. The moving target
2. Neo-classical economic theory
3. Probability and stochastic processes
4. Scaling the ivory tower of finance
5. Standard betting procedures in portfolio selection theory
6. Dynamics of financial markets, volatility and option pricing
7. Thermodynamic analogies vs instability of markets
8. Scaling, correlations and cascades in finance and turbulence
9. What is complexity?

Readership: Science graduate students, finance specialists

METHODS IN FINANCE.
S. Boyd and L. Vandenberghe. 

Contents:
1. Introduction
PART I: Theory
2. Convex sets
3. Convex functions
4. Convex optimization problems
5. Duality
PART II: Applications
6. Approximation and fitting
7. Statistical estimation

CONVEX OPTIMIZATION.
S. Boyd and L. Vandenberghe.

Contents:
1. Introduction
PART I: Theory
2. Convex sets
3. Convex functions
4. Convex optimization problems
5. Duality
PART II: Applications
6. Approximation and fitting
7. Statistical estimation

The title of this book may be somewhat misleading—as an edited volume, it contains several papers on some issues in quantitative finance. Most contributions have a computational/numerical slant. It is no surprise that several papers concentrate on heavy-tailed models, in particular Pareto-type models figure prominently. For me, the highlight is the paper by Kohatsu-Higa and Montero on "Malliavan Calculus in Finance". This seventy plus page paper gives a very readable introduction to this important field of current research. A further enjoyable paper is "Modern Heuristics for Finance Problems: A Survey of Selected Methods and Applications" by Schlottmann and Seese.
This text is an introduction to logistics through mathematical modelling with all the consequential simplifications and idealizations. It assumes that the reader is familiar with statistics and probability theory, and comfortable with mathematical programming models and algorithms. The models presented are deterministic; they assume that the data concerned with costs, demand, and distances are all known with certainty. The book is intended for an advanced graduate course, in logistics or operations management, to demonstrate the use of modelling in a logistics environment. It is unlikely to be of value to practitioners because of its mathematical demands and because of the inadequacy of the models to solve real life complex problems.

London School of Economics
London, U.K. S. Powell

R.Y. Rubinstein and D.P. Kroese.

Contents:
1. Preliminaries
2. A tutorial introduction to the cross-entropy method
3. Efficient simulation via cross-entropy
4. Combinatorial optimization via cross-entropy
5. Continuous optimization and modifications
6. Noisy optimization with CE
7. Application of CE to COPs
8. Application of CE to machine learning

Readership: Engineers, computer scientists, mathematicians and statisticians interested in numerical methods.

This book describes the cross-entropy method for a range of optimization problems. The cross-entropy (distance) itself is a very familiar object in statistics and information theory and is usually known as the Kullback-Leibler divergence (distance). The authors start with a rather short introduction to the probabilistic background, then describe a few simple examples to illustrate the main ideas; the rest of the book is a careful elaboration and generalization of these ideas.

It is a substantial contribution to stochastic optimization and more generally to the stochastic numerical methods theory.

GlaxoSmithKline
Collegeville, U.S.A. V.V. Fedorov

NOTES

A BASIC COURSE IN STATISTICS. 5th edition.
G.M. Clarke and D. Cooke.

From the preface: "The fourth edition contained two new chapters and much additional new material. We have not made any changes of that nature in this fifth edition. Instead we have substantially altered, and increased, the material on computing. Previously we included hints on how to carry out the computing exercises using MINITAB, though the computing exercises, to be found at the end of most chapters, are not tied to any particular statistical package. We have now added sections throughout giving detailed instructions on how to use MINITAB to carry out the statistical procedures introduced in the book. The hints have been completely revised. We have taken advantage of the substantially improved version of the package, MINITAB 14, introduced in December 2003, though users of other packages will still find better ways of handling some of the exercises."

METHODS AND MODELS IN STATISTICS.
In Honour of Professor John Nelder, FRS.
N. Adams, M. Crowder, D.J. Hand and D. Stephens (Eds.).

The papers in this volume are those presented at a symposium in March 2004 in honour of Professor John Nelder's eightieth birthday. The papers reflect the wide range of Nelder's work in many areas and are accessible to non-specialists.
Encyclopedia of Statistics in Behavioural Science
BRIAN EVERITT, Institute of Psychiatry, London and David Howell
This comprehensive Encyclopedia encompasses the refined statistical concepts and techniques that are essential to the advancement in psychology and its ever-widening fields of application.
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From the back cover: "The Handbook of Computational Statistics - Concepts and Methods is divided into 4 parts. It begins with an overview of the field of Computational Statistics, how it emerged as a separate discipline, how it developed along with the development of hard- and software, including a discussion of current active research. "The second part presents several topics in the support field of statistical computing. Emphasis is placed on the need for fast and accurate numerical algorithms, and it discusses some of the basic methodologies for transformation, data base handling and graphics treatment. "The third part focuses on statistical methodology. Special attention is given to smoothing, iterative procedures, simulation and visualization of multivariate data. "Finally a set of selected applications like Bioinformatics, Medical Imaging, Finance and Network Intrusion Detection highlight the usefulness of computational statistics." 


From the back cover: "The Compact Handbook of Computational Biology contains detailed coverage of methods for pragmatic analysis of nucleic acid and protein sequences and structures ... definition and detection of motifs in nucleic acid and protein sequences ... protein structure prediction ... discrete modeling of biopolymers ... computer-assisted research on protein folding ... computer-assisted studies of DNA-protein interactions ... computer-assisted genomics, proteomics and comparative genomics ... and computer-assisted studies of genome evolution at the molecular (DNA) level. "Designed as a reliable, integrated reference for specialists, as well as an instructional manual for students and trainees in computational biology, bioinformatics, proteomics, molecular genetics (sometimes referred to as functional genomics), and related fields, the handbook can also serve as a practical resource for industrial executives in charge of bioinformatics, genomics, and proteomics, as well as for science administrators in universities and scientific foundations. Lawyers, journalists, historians of science, forensic scientists, and medical professionals can also find this text useful as a desk reference and as a guide to the literature."


A note by the author: "The Lesotho Atlas of Sustainable Development is an attempt to map the state of sustainable human development in the country. The quality of life and the level of human well-being, in terms of a range of indicators, have been cartographically portrayed across districts, geographical zones, rural and urban areas and across gender base. Each map is accompanied by an analytical text in sufficient detail. Maps are simple and meaningful. The Atlas conveys a strong message for sustainable development for Lesotho: things are getting worse, quickly. It acknowledges the need for fast and accurate numerical algorithms, and it discusses some of the basic methodologies for transformation, data base handling and graphics treatment. "The choice of indicators has been governed by the need to evaluate the sustainable development process in terms of its overall impact on the quality of life and the standard of living of people. Today, there is a broad-based consensus to view sustainable human development in terms of, at least, three critical dimensions of well-being. These are related to longevity, education, and command over resources. Efforts have been made to portray through maps these dimensions in terms of the specific indicators which are used to reflect the specific socio-cultural conditions that prevail at the levels of districts, geographical zones, rural and urban areas and at gender level at a specific period of time. From these indicators, a core of composite indices, namely the Human Development Index (HDI) and poverty deprivation indices have been portrayed at the levels of geographical zones of the country. These indices have been shown separately for rural-urban and at gender levels. "Lesotho's gender related development index (GDI) of 111 is 9 places higher than its HDI rank of 120. Lesotho's gender empowerment measure (GEM) of 50 is advantageous in relation to other developing countries. Males are less educated than females. In the age groups over 5 years of age who have never attended school, two-thirds are males, and only one-third are females. The greatest disparity is found in mountain areas where some 30 per cent more girls than boys attend school. "Poverty is greater in rural than in urban Lesotho. About 54 per cent of rural households are poor, compared with a Maseru average of 28 per cent. The poorest 20 per cent of the population spends nearly two-thirds of its resources just on food and a further nearly one-fourth on minimal other basic needs. Among those with farming as their main source of income, 74 per cent are poor and 43 per cent are ultra poor.

The compilation of indicators in the Atlas covers such aspects of social environment that influence individual and collective well-being. This includes the current primary school enrolment is nearly 70 per cent. As a result of the unabated spread of the HIV/AIDS epidemic, nearly one-half of children who lose their parents to HIV/AIDS drop out of school and teachers die, gains in literacy and enrolment ratios are being quickly eroded. The epidemic is putting a brake on economic growth by at least 1 to 2 percentage points a year, greatly jeopardizing efforts to reduce poverty through equitable growth. The Atlas includes the maps to indicate the effects of HIV/AIDS on crude death rate, infant mortality rate, life expectancy and on human development for the periods of 1996 and 2010 for Lesotho. The Atlas provides a telescopic view, through the medium of maps, of the socioeconomic impact of the HIV/AIDS epidemic and it argues that the unabated spread of the epidemic with deepening poverty will put a brake on reaching the Millennium Summit development goals in Lesotho as in much of Africa."
meat regularly, and using a host of household electrical appliances. Even in the midst of great inequality, these New Consumers have already gained purchasing power equal to that of the United States, and the cumulative impact on the environment is enormous.

"Myers and Kent have distilled the results of their remarkable research to reveal the patterns of increasing consumption in twenty developing and transition nations, with particular attention to China and India, whose surging economies and large populations account for much of the recent exceptional growth in humanity's ecological footprint. New consumers generally have been following a path established in long-developed nations of needlessly overusing limited natural resources. As the authors document, this course is clearly unsustainable on a world scale. When India's economy doubled, its air pollution rose eightfold. Were each person in China to consume as much grain-fed beef as today's average American, it would require more grain than the entire U.S. harvest.

"If the developed nations have set a dangerous precedent by over-consuming, innovative policies offer some reason for hope. China, for example, has now written sustainable consumption into law and begun promoting it through economic incentives and education programs. Drawing on such examples, Myers and Kent outline an alternative path. Through a combination of lifestyle changes, policy reforms, and technological innovation around the globe, a decent and enduring standard of living could be available to everyone. In this, the authors insist, we in the developed nations must set an example. As they put it, "the question is not 'can we afford to consume sustainably?' Rather it is 'how can we afford not to?'"

ONE WITH NINEVEH: Politics, Consumption and the Human Future.
P.R. Ehrlich and A.H. Ehrlich.

From the book jacket: "Through lucid explanations, telling anecdotes, and incisive analyses, the eminent scientists Paul Ehrlich and Anne Ehrlich here spotlight the three elephants in our global living room—rising consumption, increasing world population, and unchecked political and economic inequity—that together are increasingly shaping today's politics, undermining the planet's ability to sustain us, and determining humankind's future. The result is a book that brillianty puts today's policy debates in a larger context and makes a compelling case for the critical discussion that we should be having.

"One with Nineveh" takes its title from Rudyard Kipling's "Recessional" ("Lo, all our pomp of yesterday / Is one with Niniveh and Tyre!") his famous 1897 poem alluding to the pride and arrogance that went before the fall of ancient Mesopotamian civilizations. Their undoing, in addition to warfare, was deforestation and unsustainable irrigation, practices whose destructive effects were ignored by the elites at the time. In One with Nineveh, the Ehrlichs suggest that the hubris of our own civilization could be leading us to an end similar to Niniveh's—whose ruins lie near the Iraqi city of Mosul—if environmental trends such as loss of biodiversity and acceleration of climate change are not halted. Unlike the regional ecological collapse of Mesopotamia, this time the collapse could be global.

"Both a cautionary tale and a call to action, One with Nineveh is remarkable in its sweep and in the range of solutions it proposes, from local actions to reform of national government to international initiatives. Grounded in science, economics, and history, the Ehrlichs' forthright discussion of the underlying issues of our time gives cause for considerable concern yet reason to hope."

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"Sacrifice is the key concept that bridges citizenship and trust, according to Allen. She uncovers the ordinary, daily sacrifices citizens make to keep democracy working—and offers methods for recognizing and reciprocating those sacrifices. Trenchant, incisive, and ultimately hopeful, Talking to Strangers is nothing less than a manifesto for a revitalized democratic citizenry."

ECOLOGICAL ECONOMICS: Principles and Applications.
H.E. Daly and J. Farley.

From the publisher's description: "This introductory textbook describes the basics of traditional neoclassical economic thought and also examines the connections between economic growth, environmental degradation, and social inequity. The volume opens with a discussion of the role of the earth's biotic and abiotic resources in sustaining life. The rest of the text is organized around the main fields in traditional economics: microeconomics, macroeconomics, and international economics."
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