

Short Book Reviews



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Editor Dr. A.M. Herzberg

REVIEWS

SAUNDERS MAC LANE. A MATHEMATICAL AUTOBIOGRAPHY.

S. Mac Lane.

Wellesley, Massachusetts: A.K. Peters, 2005, pp. xvi + 358, US\$39.00.

Contents:

PART One: Early Years

PART Two: First Teaching

PART Three: Collaborative Research

PART Four: The War Years

PART Five: Eilenberg and Mac Lane

PART Six: Harvard Years

PART Seven: Chicago in the Fifties

PART Eight: Mathematical Developments

PART Nine: National Academy of Science

PART Ten: The Sixties and Beyond

PART Eleven: National Science Policy

PART Twelve: Travels

PART Thirteen: Advising

PART Fourteen: Later Developments

PART Fifteen: Contemplating

Readership: Mathematicians

Saunders Mac Lane is one of the pioneers of 20th century mathematics. His seminal contributions to the theory of cohomology of groups and homological algebra led to the creation of "category theory", a fundamental formalism that encapsulates theorems from diverse areas of mathematics into visual images consisting of objects and morphisms. In this captivating autobiography, Mac Lane takes us back to the early years of his mathematical youth. For example, in Chapter 12 he describes how the quaternions inspired the construction of crossed product algebras and the discovery of group extensions. From then on, the subject develops naturally connecting itself to algebraic topology, number theory and ultimately, algebraic geometry. The book is interspersed with amusing anecdotes along with a description of his famous collaborative work with Eilenberg. I would recommend this biography to any serious mathematics student. Modern algebra often appears dry, but the reading of this book will do much to show it is a fertile creation of marvellous minds.

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M.R. Murty

THE GRAMMAR OF GRAPHICS, 2nd edition.

L. Wilkinson.

New York: Springer-Verlag, 2005, pp. xviii + 690, US\$79.95.

[Original, 1999; Short Book Reviews, Vol. 20, p. 3]

Contents:

1. Introduction

2. How to make a pie
3. Data
4. Variables
5. Algebra
6. Scales
7. Statistics
8. Geometry
9. Coordinates
10. Aesthetics
11. Facets
12. Guides
13. Space
14. Time
15. Uncertainty
16. Analysis
17. Control
18. Automation
19. Reader
20. Coda

Readership: Statisticians, computer scientists and others interested in visualizing data

To most people who work with data the production of graphical displays, through a favourite computer package, has become something that is completely taken for granted. If one thinks of the process at all it is only when one is frustrated when one cannot get the package to do exactly what one wants. This fascinating book deconstructs the process of producing graphics and in doing so raises many fascinating questions on the nature and representation of information. The book is split into two parts; *syntax*, where the author discusses an abstract framework for manipulating data into graphics, and *semantics* in which he discusses the meaning, or lack of it, underlying displays. The approach is multi-disciplinary and illustrates the power of how good, well thought-out abstraction can illuminate and give insight to general problems. This second edition is almost twice the size of the original, with six new chapters and substantial revisions.

University of Waterloo
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P. Marriott

INFÉRENCE ET PRÉVISION EN GRANDES DIMENSIONS.

D. Bosq.

Paris: Economica, 2005, pp. 194.

Première partie: Prévision

1. Prévision statistique

2. Prévision asymptotique

Deuxième partie: Inférence par Projection

3. Estimation par projection adaptative

4. Estimation par projection adaptative dans les processus

5. Tests fonctionnels

6. Prédiction non paramétrique
- Troisième partie: Processus Linéaires en Grandes Dimensions
7. Processus linéaires fonctionnels
 8. Estimation et prévision des processus linéaires fonctionnels

Lecture: Probabilistes et statisticiens

Dans cet ouvrage l'auteur nous offre une étude bien détaillée sur l'inférence et la prévision dans le cas où les données et/ou le paramètre sont en grande dimension (éventuellement infinie). L'accent est sur des méthodes non paramétriques. Plus précisément la projection adaptative est utilisée pour estimer par exemple une densité, une fonction de régression, une densité spectrale, etc. On considère aussi des tests d'ajustement. Des résultats nouveaux apparaissent sur les processus linéaires en dimension infinie. Le traitement est basé sur la théorie de la mesure et l'inférence statistique mathématique.

Hasselt University
Diepenbeek, Belgium N.D.C. Veraverbeke

A MODERN INTRODUCTION TO PROBABILITY AND STATISTICS. UNDERSTANDING WHY AND HOW.

F.M. Dekking, C. Kraaikamp, H.P. Lopuhaä and L.E. Meester.

London: Springer-Verlag, 2005,
pp. xv + 486, US\$49.95.

Contents:

1. Why probability and statistics?
2. Outcomes, events, and probability
3. Conditional probability and independence
4. Discrete random variables
5. Continuous random variables
6. Simulation
7. Expectation and variance
8. Computations with random variables
9. Joint distributions and independence
10. Covariance and correlation
11. More computations with more random variables
12. The Poisson process
13. The law of large numbers
14. The central limit theorem
15. Exploratory data analysis: Graphical summaries
16. Exploratory data analysis: Numerical summaries
17. Basic statistical models
18. The bootstrap
19. Unbiased estimators
20. Efficiency and mean squared error
21. Maximum likelihood
22. The method of least squares
23. Confidence intervals for the mean
24. More on confidence intervals
25. Testing hypotheses: Essentials
26. Testing hypotheses: Elaboration
27. The t -test
28. Comparing two samples

APPENDIX A: Summary of Distributions

APPENDIX B: Table of the Normal and t -distributions

APPENDIX C: Answers to Selected Exercises

APPENDIX D: Full Solutions to Selected Exercises

Readership: Undergraduate students in mathematics, engineering, econometrics

This textbook provides a well-written first course in probability and statistics. The text is self-contained with fourteen chapters on probability (from probability rules to the central limit theorem) and fourteen chapters on

statistics (from exploratory data analysis to the two sample t -test). There are of course many introductory books on the market, but the present one can show a number of pluses. The focus is on understanding the methods intuitively (by using interesting examples) and to deal with them at an acceptable mathematical level. Another plus is the wealth of more than three hundred and fifty exercises, going from easy to more challenging. Many of them have shorter or longer solutions in the Appendix. It is a book that has been written based on the long teaching experience of the authors and I would certainly recommend it for university coursework.

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PROBABILITY: A GRADUATE COURSE.

A. Gut.

New York: Springer-Verlag, 2005,
pp. xxiii + 603, US\$79.95.

Contents:

1. Introductory measure theory
2. Random variables
3. Inequalities
4. Characteristic functions
5. Convergence
6. The law of large numbers
7. The central limit theorem
8. The law of the iterated logarithm
9. Limit theorems: Extensions and generalizations
10. Martingales

APPENDIX A: Some Useful Mathematics

Readership: Those who need a sound knowledge of undergraduate real analysis and mathematical statistics

This is more substantial than the usual graduate course in probability; it contains many useful and interesting details that previously were scattered around the literature and gives clear evidence that the writer has a great deal of experience in the area. It is a thorough treatment and the author has been careful to ensure transparency in proofs. Indeed he remarks that the literature of the subject is replete with highly abbreviated proofs containing large gaps in logic which are dismissed with comments such as "it is clear that ...". He has done an excellent job in ensuring such gaps are very few in number; it is easy to dip into a chapter, readily pick up the argument and follow it through. The author writes in a clear-headed straight-forward style and provides plenty of exercises at the end of each chapter. The material covered goes beyond most graduate texts on probability; for example the extensive discussion of rates of convergence in the Central Limit Theorem, the chapter on the Law of the Iterated Logarithm, the detailed treatment of the Strong Law of Large Numbers, etc. These give the book some of the flavour of Feller Volume 2. It would be an excellent text for those who wish to develop a research interest in probability theory or a related area. The author recommends virtually all of it (except Chapter 9) as forming a graduate course. However, unhappily there would be very few universities in Australia now that would be able to run a viable graduate course covering the contents of this book. The decline in the level of mathematical knowledge of undergraduates coupled with the need to retain student numbers has led to a purging, or at least a dilution, of mathematics from many statistics programs. This of course is not unique to Australia; it seems to be happening everywhere.

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J.R. Leslie

EPIDEMIOLOGY: Study Design and Data Analysis,
2nd edition.
M. Woodward.
Boca Raton, Florida: Chapman and Hall/
CRC Press, 2005, pp. xxii + 849,
US\$79.95/£39.99.

Contents:

1. Fundamental issues
2. Basic analytical procedures
3. Assessing risk factors
4. Confounding and interaction
5. Cohort studies
6. Case-control studies
7. Intervention studies
8. Sample size determination
9. Modelling quantitative outcome variables
10. Modelling binary outcome data
11. Modelling follow-up data
12. Meta-analysis

Readership: Researchers wanting to understand statistical methods applied in epidemiology and statisticians wanting to examine applications in epidemiology

This second edition [first edition, 2000; *Short Book Reviews*, Vol. 20, p. 2] has added about 150 pages with a new chapter on meta analysis accounting for about fifty pages and a companion web site.

Discussions of various epidemiological research designs, and of concepts such as confounding and interaction are very well presented. The chapter on sample size describes fairly basic methods, but common extensions such as to correlations or studies involving more than two conditions are not included. In the modeling chapters, for the most part, explanations are clear (for example, of the need for special models for binary data) for those with knowledge of logarithms, the exponential function and probability distributions. However, in an attempt to cover many different situations, cursory details are given; for example, the Poisson regression is presented with almost no discussion of the Poisson distribution, its properties and uses. Models for (matched) case-control studies receive very little attention. As well, estimates and tests for generalized linear models, survival models, etc. appear in the text through SAS computer outputs without discussion of their origin. This book provides very good coverage of major issues in the design of epidemiological studies, and a decent, but very quick, tour of commonly used statistical models for such studies.

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K.S. Brown

ANALYZING ENVIRONMENTAL DATA.

W.W. Piegorsch and A.J. Bailer.
Chichester, U.K.: Wiley, 2005,
pp. xv + 496, £45.00.

Contents:

1. Linear regression
2. Nonlinear regression
3. Generalized linear models
4. Quantitative risk assessment with stimulus-response data
5. Temporal data and autoregressive modelling
6. Spatially correlated data
7. Combining environmental information
8. Fundamentals of environmental sampling

APPENDIX A: Review of Probability and Statistical Inference

APPENDIX B: Tables

Readership: Students and researchers in environmental statistics

This is a substantial and thorough book which covers a large variety of the statistical techniques which are of use in environmental statistics. Most of the techniques are demonstrated by application to real data, either directly in the text (with frequent reference to sample SAS programs) or embedded in the many exercises—the larger sets of data having been made available at the publishers' website. Anyone who mastered the contents of this book would be well equipped as an applied statistician in a more general sense, not just restricted to the analysis of environmental data. Indeed, the neat summaries of topics, as varied as overdispersion, Weibull growth curves, bootstrap confidence intervals and semivariograms, etc., might make this a handy reference book for any statistician's bookshelf.

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P.J. Laycock

WEIGHT-OF-EVIDENCE FOR FORENSIC DNA PROFILES.

D.J. Balding.
Chichester, U.K.: Wiley,
2005, pp. x + 184, £45.00.

Contents:

1. Introduction
2. Crime on an Island
3. Assessing evidence *via* likelihood ratios
4. Typing technologies
5. Some popular genetics for DNA evidence
6. Identification
7. Relatedness
8. Other approaches to weight of evidence
9. Issues for the courtroom
10. Solutions to exercises

Readership: Forensic scientists, expert witnesses

As the author states, "the analysis of forensic DNA profiles is a complex topic"; but this book should provide a good starting point for any reader with a reasonably developed background in both statistics and genetics. There are set exercises to assist such a reader in developing his or her understanding. Possibly the most important formula in genetics is stated to be $F=1/(1+4N\mu)$, which is shown to yield the curious implication that the effective size of the human population (i.e. N) for displaying all observed genetic variation is about 10,000 people! The author proposes that "evidential weight can be measured by likelihood ratios and combined to assess the totality of the evidence using the appropriate version of Bayes Theorem." That this can be highly controversial in a legal context is acknowledged and carefully analyzed by commentary on several of the important cases, including the well-known case of *Regina versus D.J. Adams* which went to the Appeal Court twice.

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P.J. Laycock

STATISTICS FOR EXPERIMENTERS: DESIGN, INNOVATION AND DISCOVERY, 2nd edition.

G.E.P. Box, J.S. Hunter and W.G. Hunter.
Hoboken, New Jersey: Wiley, 2005, pp. xvii + 633,
£54.50.

Contents:

1. Catalyzing the generation of knowledge
2. Basics (probability, parameters, and statistics)
3. Comparing two entities: Reference distributions, tests, and confidence intervals
4. Comparing a number of entities, randomized blocks and Latin squares

5. Factorial designs at two levels
6. Fractional factorial designs
7. Additional fractionals and analysis
8. Factorial designs and data transformation
9. Multiple sources of variation
10. Least squares and why we need designed experiments
11. Modeling, geometry, and experimental design
12. Some applications of response surface methods
13. Designing robust products and processes: An introduction
14. Process control, forecasting, and time series: An introduction
15. Evolutionary process operation

Readership: Experimenters in science and engineering, statisticians

This is a welcome second edition of a much-loved book. The new subsidiary title reflects how the statistical design and analysis of experiments have become key elements of scientific advance and training since the book first appeared in 1978.

Much of the material from the first edition has been rewritten and updated, as have the valuable references, further reading, exercises and problems at the end of the chapters. Many new topics have been included, such as Bayesian methods for identifying active factors from small experiments, and for selecting follow-on runs for an experiment to guide the choice between competing models. The treatment of other topics has been expanded, for example, split-plot designs and components of variance. A particularly useful addition is an extensive discussion of the "hands on" design of a paper helicopter. This is an excellent means of conveying understanding of basic principles and techniques of experimentation to people as diverse as industrial engineers and mathematical undergraduates.

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S.M. Lewis

STATISTICAL DESIGN OF EXPERIMENTS WITH ENGINEERING APPLICATIONS.

K. Rekab and M. Shaikh.

Boca Raton, Florida: Chapman and Hall/CRC Press, 2005, pp. x + 252, US\$89.95/£49.99.

Contents:

1. Introduction
2. Designing and conducting the experiment
3. Optimization of the location parameter
4. Minimization of the dispersion
5. Taguchi's approach to the design of experiments
6. Statistical optimization of the location parameter
7. Statistical minimization of the dispersion parameter
8. Validity of the prediction equation
9. Three-level factorial designs
10. Second order analysis

APPENDIX 1: Two-Level Fractional Factorial Designs

APPENDIX 2: Plackett-Burman Designs

APPENDIX 3: Taguchi Designs

APPENDIX 4: Standardized Normal Distribution

APPENDIX 5: Percentiles of the t Distribution

APPENDIX 6: Percentiles of the F Distribution

APPENDIX 7: Some Useful Box-Behnken Designs

APPENDIX 8: Matrix Algebra

Readership: Experimenters who want a beginning text in response surface methodology

This volume offers a pared-down tour of response surfaces that "avoids frustrating and unnecessary time spent on theory". Although it has the feel of a series of lists, it provides a useful introduction to readers who are happy

with such an approach. Some of the references to books are dated and refer to earlier editions, and Figure 9.6 is incomplete. The "problems" (exercises) at the ends of the chapters are mostly uninspiring, 29 out of 39 asking for a repetition of book material. Of the ten problems with data, one refers to an example in the text, six form parts of only two distinct problems. Of the remaining three, the single Chapter 3 problem is a version of the Box and J.S. Hunter example in *Technometrics*, 1961, pp. 334-337. The example also appears in the Box, Hunter and Hunter book *Statistics for Experimenters*, first edition, pp. 424-429, and in the 2005 second edition, pp. 252-257.

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N.R. Draper

EXPERIMENTAL DESIGN FOR FORMULATION.

W.F. Smith.

Philadelphia: Society for Industrial and Applied Mathematics/Alexandria, Virginia: American Statistical Association, 2005, pp. xix + 367, US\$105.00.

Contents:

1. Introduction
2. Mixture space
3. Models for a mixture setting
4. Designs for simplex-shaped regions
5. Designs for non-simplex shaped regions
6. Design evaluation
7. Blocking mixture experiments
8. Building models in a mixture setting
9. Model evaluation
10. Model revision
11. Effects
12. Optimization
13. Including process variables
14. Collinearity

Readership: Scientists interested in experiments with mixtures

The author gained his experience in this area working for Eastman Kodak and with the help of John Cornell of mixture fame, whom he characterizes as his mentor. Both can be proud of this volume which offers a "step-by-step guide to the design and analysis of experiments involving formulations" (namely mixtures). Recommended.

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N.R. Draper

TESTING STATISTICAL HYPOTHESES, 3rd edition.

E.L. Lehmann and J.P. Romano.

New York: Springer-Verlag, 2005, pp. xvi + 789, US\$89.95.

Contents:

PART I: Small Sample Theory

1. The general decision problem
2. The probability background
3. Uniformly most powerful tests
4. Unbiasedness: Theory and first applications
5. Unbiasedness: Applications to normal distributions
6. Invariance
7. Linear hypotheses
8. The minimax principle
9. Multiple testing and simultaneous inference
10. Conditional inference

PART II: Large-Sample Theory

11. Basic large-sample theory
12. Quadratic mean differentiable families
13. Large-sample optimality
14. Testing goodness of fit

15. General large-sample methods

APPENDIX A: Auxiliary Results

Readership: Graduate students and senior undergraduate students in statistics and related fields

The third edition of this book differs principally from the second in that the treatment of asymptotic optimality is greatly enhanced in Part II. There is also a more extensive discussion of goodness-of-fit as well as multiple testing and an introduction to the bootstrap and related techniques. This new edition of the classic and fundamental text on the theory of testing hypotheses is an essential addition to the bookshelf of mathematical statisticians.

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D.L. McLeish

MATHEMATICAL STATISTICS WITH APPLICATIONS.

A.S. Kapadia, W. Chan and L. Moyé.
Boca Raton, Florida: Chapman and Hall/
CRC Press, 2005, pp. xxiii + 617,
US\$89.95/£49.99.

Contents:

- Introduction
- 1. Review of mathematics
- 2. Probability theory
- 3. Random variables
- 4. Discrete distributions
- 5. Continuous random variables
- 6. Distributions of order statistics
- 7. Asymptotic distribution theory
- 8. Point estimation
- 9. Hypothesis testing
- 10. Interval estimation
- 11. Introduction to computational methods

Readership: Scientists who need mathematical statistics for their applications

The book starts with an introductory chapter, Chapter 1, of forty-five pages on mathematical concepts and tools. Personally I would prefer to see this review in the appendix of the book since it is not very inviting for the rest of the book. The remaining ten chapters are a rather classical introduction to probability and statistics using a lot of calculus. Each chapter has a number of exercises, in total about two hundred and fifty. No solutions or hints are provided. Although the topics are the ones you can find in numerous other books, it is worth mentioning that the authors also deal with some Bayesian inference, some non-parametric tests and some modern computational techniques such as EM, Gibbs sampler and MCMC.

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CONSTRUCTING MEASURES: AN ITEM RESPONSE MODELING APPROACH.

M. Wilson.
Mahwah, New Jersey: Lawrence
Erlbaum, 2005, pp. xix + 228, US\$59.95.

Contents:

- PART I: A Constructive Approach to Measurement
 - 1. Construct modeling: The "four building blocks" approach
- PART II: The Four Building Blocks
 - 2. Construct maps
 - 3. The item designs
 - 4. The outcome space
 - 5. The measurement model

PART III: Quality Control Methods

- 6. Choosing and evaluating a measurement model
 - 7. Reliability
 - 8. Validity
- PART IV: A Beginning Rather Than A Conclusion
- 9. New steps in measuring

APPENDIX 1: The Cases Archive (on CD)

APPENDIX 2: Grade Map (on CD)

Readership: Advanced students of item test, or instrument development, measurement, item response theory, or Rasch analysis in a variety of departments including education and psychology, and those developing instruments in industrial, organizational, educational and other contexts

This book describes the process of constructing scales for measuring phenomena in the behavioural and social sciences. It proceeds through four stages. The *construct map* presents 'a coherent and substantive definition for the content' in the form of a uni-dimensional continuum. The *items design* describes how to capture observations which bear on the underlying concept being measured. The *outcome space* describes how responses to items are coded. And the *measurement model* relates the items and their outcome codes back to the underlying concept, so enabling observations on the former to shed light on the value of the latter. This last section essentially gives a very informal introduction to item response models. Part III of the book introduces issues of reliability and validity in the context of evaluating such measurement procedures. From a statistical perspective, the book is elementary. From the perspective of someone new to measurement issues, and coming from an educational or psychological background, I think it would provide an excellent initial introduction to the ideas and methods.

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D.J. Hand

CORRESPONDENCE ANALYSIS AND DATA CODING WITH JAVA AND R.

F. Murtagh.
Boca Raton, Florida: Chapman and Hall/CRC Press,
2005, pp. 230, US\$79.95/£44.99.

Contents:

- 1. Introduction
- 2. Theory of correspondence analysis
- 3. Input data coding
- 4. Examples and case studies
- 5. Content analysis of text
- 6. Concluding remarks

Readership: Statisticians, computer scientists, researchers in many disciplines

The structure and relationships in multivariate data is often not revealed by simple summary statistics and correlations, or chi-squared tests. This book shows how correspondence analysis can display these hidden structures. A complete guide to the implementation of this technique is offered. Detailed examples of its application to data are drawn from an astonishingly wide variety of fields; astronomy, financial modeling and forecasting, comparisons of prehistoric and modern groups of dogs, ancient goblets and measurements on ancient Egyptian skulls.

An entire chapter is devoted to the analysis of textual data by correspondence analysis; an approach which is quite different from the current conventional methods. Based on the frequencies of "tool" words such as "to", "and" and "the", this method is relatively easy to automate. It can distinguish between different forms of

writing, such as novels, fairy tales and technical reports; between authors and between works by the same author.

However, this book goes beyond applications. A terse presentation of the mathematical basis of correspondence analysis is included and full listings of programs written in R to implement the examples are given. These can be downloaded from the web and are suitable for use with Windows, Mackintosh or Unix systems. Similar programs are also available in Java.

Often data has to be categorized before doing a correspondence analysis. The recommendations given on how this should be done to avoid distortion and minimize the inevitable loss of information, could be usefully applied in many other situations.

All in all this book can be recommended as a succinct reference on all aspects of correspondence analysis, theoretical, computational and practical.

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J.M. Juritz

CLUSTERING FOR DATA MINING: A DATA RECOVERY APPROACH.

B. Mirkin.

Boca Raton, Florida: Chapman and Hall/
CRC Press, 2005, pp. xxiii + 266,
US\$79.95/£44.99.

Contents:

1. What is clustering?
 2. What is data?
 3. K-means clustering
 4. Ward hierarchical clustering
 5. Data recovery models
 6. Different clustering approaches
 7. General issues
- Conclusions: Data recovery approach in clustering

Readership: Readers new to cluster analysis, and researchers in cluster analysis methods

Cluster analysis is characterized by its wide range of techniques and its ad hoc nature. Recent years have seen various attempts to formulate a sounder theoretical base, often in the form of model-based approaches. This book also attempts to establish a stronger foundation, though from a rather different perspective. This perspective is indicated by the word 'recovery' in the book's title, indicating that the clusters should be regarded as summaries of the data in the sense that good approximations to the data could be generated ('recovered') if one knew the cluster structure. This yields a decomposition of the data into that part which is explained by the cluster structure, and that part which is not—in a way similar to the decomposition of many other standard statistical tools into explained and unexplained variation. The particular decomposition studied in this book is the decomposition of the total sum of squares matrix into between and within cluster components, and the book develops this decomposition, and its associated diagnostics, further than I have seen them developed for cluster analysis before. Overall, the book presents an unusual, perhaps even rather idiosyncratic approach to cluster analysis, from the perspective of someone who is clearly an enthusiast for the insights these tools can bring to understanding data.

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D.J. Hand

MINING IMPERFECT DATA: DEALING WITH CONTAMINATION AND INCOMPLETE RECORDS.

R.K. Pearson.

Philadelphia: Society for Industrial and Applied
Mathematics, 2005, pp. x + 305, US\$70.00.

Contents:

1. Introduction
2. Imperfect datasets: Character, consequences, and causes
3. Univariate outlier detection
4. Data pretreatment
5. What is a "good" data characterization?
6. GSA
7. Sampling schemes for a fixed dataset
8. Concluding remarks and open questions

Readership: Anyone concerned with data mining who has to confront imperfect data

Modern statistics is such a large subject that it is difficult to know which parts to cover when teaching, and which to omit, but the training of every statistician should include an introduction to issues of imperfect data. After all, outside the confines of the text book all data are likely to be imperfect: poor quality data is a ubiquitous problem, and all real data should be approached with suspicion. For this reason, I am pleased to see this book. Although the title refers to data mining, it seems to me to cover material which one might find in a statistics text on the problem: it is concerned with model building in the face of imperfect data, rather than anomaly detection for its own sake.

The author tackles the detection and resolution of data quality problems in data mining in two phases. The first is *data pretreatment*, concerned with detecting and handling outliers, missing data, noninformative variables, misalignments, and other anomalies. The second is *analytical validation*, concerned with assessing structures once they have been found to decide if they could be merely a consequence of poor quality data. This second aspect is tackled *via* the notion of *generalized sensitivity analysis*, the GSA of the contents list, an informal graphical approach to exploring the sensitivity of an analysis to changes in a set of data, and the particulars of which appear to be the author's own development.

One of the difficulties with attempts at general treatments of quality of data is that many of the issues are context dependent. I think that this inevitably means that such treatments run the risk of some idiosyncrasy, and this book is no exception. Nevertheless, the tools described here will find frequent use when mining perfect data.

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D.J. Hand

APPLIED LINEAR REGRESSION, 3rd edition.

S. Weisberg.

Hoboken, New Jersey: Wiley, 2005,
pp. xvi + 310, £48.95.

Contents:

1. Scatterplots and regression
2. Simple linear regression
3. Multiple regression
4. Drawing conclusions
5. Weights, lack of fit, and more
6. Polynomials and factors
7. Transformations

8. Regression diagnostics: Residuals
9. Outliers and influence
10. Variable selection
11. Nonlinear regression
12. Logistic regression

Readership: Statisticians, scientists and engineers using regression models

This is an up-dated third edition [1980, 1st edition; Short Book Reviews, Vol. 1, p. 2] of a well-presented text on the theory and practice of regression analysis, illustrated by many examples and supported by a wealth of sets of data available for downloading from a dedicated website. The book begins with a new Chapter 1 introducing the ideas of graphing the data in various ways and using smoothers to assist with the identification of any relationships which might be present. This is followed by two chapters on the theory of least squares in simple and multiple regression, each with a set of practical examples and exercises. Chapter 4 on Drawing Conclusions focuses on understanding the interpretation of the model parameter estimates, the effects of dropping terms, the meaning of R^2 and dealing with missing data. A short section on computationally intensive methods such as the bootstrap concludes this chapter. There follow chapters on weighted regression, assessing lack-of-fit, the use of polynomials and factors, and on the use of transformations of the response variable and/or the predictor variables. Later chapters emphasize the importance of diagnostic tools to examine the models and to investigate for outliers and influential points. Much changed from earlier editions is the chapter on variable selection, collinearity and the use of predicted residuals. The last two chapters provide an introduction to nonlinear regression and logistic regression respectively. The material is well explained and clearly illustrated, with numerous examples and end-of-chapter exercises using the sets of data available. The theory uses matrix notation but little calculus, with the emphasis on understanding the methods employed. This is an excellent book which could easily be used as a course text.

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P. Prescott

FUNCTIONAL DATA ANALYSIS, 2nd edition.

J.O. Ramsey and B.W. Silverman.

New York: Springer-Verlag, 2005,
pp. xxix + 426,

[Original 1997, Short Book Reviews, Vol. 18, p. 11]

Contents:

1. Introduction
2. Tools for exploring functional data
3. From functional data to smooth functions
4. Smoothing functional data by least squares
5. Smoothing functional data with a smoothness penalty
6. Constrained functions
7. The registration and display of functional data
8. Principal components analysis for functional data
9. Regularized principal components analysis
10. Principal components analysis for mixed data
11. Canonical correlation and discriminant analysis
12. Functional linear models
13. Modelling functional responses with multivariate covariates
14. Functional responses, functional covariates and the current model
15. Functional linear models for scalar responses
16. Functional linear models for functional responses
17. Derivatives and functional linear models
18. Differential equations and operators
19. Principal differential analysis
20. Green's functions and reproducing kernels
21. More general roughness penalties
22. Some perspectives on FDA

Readership: Researchers and statisticians working with repeated measures

The first edition presented a large, coherent collection of techniques for the analysis of data of repeated measures of smooth functions. Growth curves are an example. This second edition, more than a third longer, presents a significant expansion. New analytic and graphical tools have been added. Approximate confidence intervals are included. The topics are introduced with more discussion and the examples are described in greater detail. This edition is useful to a broader audience.

This is a book for data analysts. It begins "Figure 1.1 provides ... data". The book is a valuable source of techniques. The author's software is available. Exploratory graphical methods are uniquely useful in learning from data. While not all will agree with the interpretations of the results (see page 121), the discussion illustrates the great potential of what might be discovered.

University of Toronto
Toronto, Canada

D.F. Andrews

IMAGE PROCESSING AND JUMP REGRESSION

ANALYSIS.

P. Qiu.

Hoboken, New Jersey: Wiley,
2005, pp. ix + 301, US\$94.95.

Contents:

1. Introduction
2. Basic statistical concepts and conventional smoothing techniques
3. Estimation of jump regression curves
4. Estimation of jump location curves of regression surfaces
5. Jump-preserving surface estimation by local smoothing
6. Edge detection in image processing
7. Edge-preserving image restoration

Readership: Image analysts and statisticians

The human eye is extremely good at image analysis in particular at detecting edges and non-smooth features in complex images. Such a task is non-trivial for many conventional statistical regression-based methods that are based on local smoothness. Jump regression analysis attempts to bridge this gap. This book would be suitable for a graduate level course on statistically based image analysis with the emphasis on smoothing and edge detection. Such a course would only require a basic knowledge of statistical methodology. It takes a fairly practical approach to topics with application emphasized over proof.

University of Waterloo
Waterloo, Canada

P. Marriott

STATISTICS FOR FISSION TRACK ANALYSIS.

R.F. Galbraith.

Boca Raton, Florida: Chapman and Hall/
CRC Press, pp. xiv + 219, US\$79.95/£44.99.

Contents:

1. Introduction
2. The Poisson line segment model
3. Track counts and densities: Fission track dating
4. The population method
5. Discrete mixture of ages
6. Continuous mixture of ages
7. Probability distributions of lengths and angles
8. Observational features of track measurements
9. Further developments

Readership: Experimental scientists and statisticians

The book is a good survey for scientists who have worked in the field. The book deals mainly with length measurements as deduced from fission tracks. The book does not mention all the recent advances in stereology, image analysis and stochastic geometry which deal with most of the problems addressed in this text.

This would be an excellent introductory text for those wishing to enter this field, especially if they were also aware of the new statistical tools available. It would be an asset to have data sets at the end of chapters to give readers the chance to practice the theory cited and to perhaps try some new theories on the same data.

University of Calgary
Calgary, Canada

E. Enns

THE TEN MOST WANTED SOLUTIONS IN PROTEIN BIOINFORMATICS.

A. Tramontano.

Boca Raton, Florida: Chapman and Hall/CRC Press, 2005, pp. xx + 186, US\$69.95/£39.99.

Contents:

Introduction

- Problem 1. Protein sequence alignment
- Problem 2. Predicting protein features from the sequence
- Problem 3. Function prediction
- Problem 4. Protein structure prediction
- Problem 5. Membrane proteins
- Problem 6. Functional site identification
- Problem 7. Protein-protein interaction
- Problem 8. Protein-small molecule interaction
- Problem 9. Protein design
- Problem 10. Protein engineering

Conclusions

Readership: Students and newcomers to biostatistics either from biology or from computational mathematics and statistics

Bioinformatics is a fuzzy mixture of biology, mathematics and engineering. To introduce newcomers to this area is not an easy task and this book is a serious attempt to help many of them. The author is balancing somewhere between a popular science book and a medium level textbook. The book would be more attractive if it were not overloaded with high tech terminology (biological and in computational mathematics/statistics).

GlaxoSmithKline
Collegeville, U.S.A.

V.V. Fedorov

BEYOND BETA. Other Continuous Families of Distributions with Bounded Support and Applications.

S. Kotz and J.R. van Dorp.

Hackensack, New Jersey: World Scientific, 2004, pp. xvi + 289.

Contents:

- 1. The triangular distribution
 - 2. Some early extensions of the triangular distribution
 - 3. The standard two-sided power distribution
 - 4. The two-sided power distribution
 - 5. The generalized trapezoidal distribution
 - 6. Uneven two-sided power distributions
 - 7. The reflected generalized Topp and Leone distribution
 - 8. A generalized framework for two-sided distributions
- Epilogue

APPENDIX A: Graphical Overview of Continuous Univariate Families of Distributions Possessing a Bounded Domain

APPENDIX B: The Johnson S_B Distribution

Readership: Probabilists and statisticians

The most used family of density functions on a bounded interval is that of the beta distribution (including the uniform as a special case). This book explores alternative families of densities with bounded support. The simplest is the triangular distribution, which has various extensions: the Topp and Leone distribution, the trapezoidal distribution, the distribution of convex linear combinations of uniform random variables. Further families are the two-sided power distributions and many other generalizations, providing for example 'peaked' alternatives for the beta densities. For each of the families, properties and examples are given as well as methods for estimating the parameters. Together with the historical notes, this monograph is an interesting piece of work.

Hasselt University
Diepenbeek, Belgium

N.D.C. Veraverbeke

STATISTICAL AND INDUCTIVE INFERENCE BY MINIMUM MESSAGE LENGTH.

C.S. Wallace.

New York: Springer-Verlag, 2005, pp. xv + 429, US\$79.95.

Contents:

- 1. Inductive inference
- 2. Information
- 3. Strict minimum message length (SMML)
- 4. Approximations to SMML
- 5. MML: Quadratic approximations to SMML
- 6. MML details in some interesting cases
- 7. Structural models
- 8. The feathers on the arrow of time
- 9. MML as a descriptive theory
- 10. Related work

Readership: Graduate students and researchers in machine learning and data mining, scientists and analysts in various disciplines wishing to make use of computer techniques for hypothesis discovery, statisticians and econometricians interested in the philosophy of science

I am really pleased to see this book in print at last; it has been in preparation for a long time. I recall many years ago discussing with Chris Wallace the need to have his seminal thoughts on inference, and in particular on his minimum message length approach, recorded in an accessible form. His insights and deep understanding of inferential issues deserve a wider audience, and especially deserve the attention of statisticians. The minimum message length approach to inference is based on formalizing the Occam's razor principle, that the 'best' explanation for a body of data is the shortest. The approach is not without its technical complexities, and it is possible that this has held back its wider acceptance. With luck, the appearance of this book will relax that constraint. Any statistician interested in the foundations of the discipline, or of the deeper philosophical issues of inference, will find this volume a rewarding read.

Chris Wallace died in August 2004, with the book partly finished. D.W. Albrecht and I. Zuckerman, two of his colleagues, made minor corrections and amendments to bring the volume to publication.

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

D.J. Hand

STRUCTURAL ASPECTS IN THE THEORY OF
PROBABILITY. A PRIMER IN PROBABILITIES
ON ALGEBRAIC-TOPOLOGICAL STRUCTURES.

H. Heyer.

River Edge, New Jersey: World Scientific,
2004, pp. x + 388, US\$78.00.

Contents:

1. Probability measures on metric spaces
2. The Fourier transform in a Banach space
3. The structure of infinitely divisible probability measures
4. Harmonic analysis of convolution semigroups
5. Negative definite functions and convolution semigroups
6. Probabilistic properties of convolution semigroups

APPENDIX A: Topological Groups

APPENDIX B: Topological Vector Spaces

APPENDIX C: Commutative Banach Algebras

Readership: Graduate students and researchers

This is an attractive book. The author leads the reader through a second course of probability theory and leaves her at the point of current research. The text assumes a first course in probability using measures as in the standard books, e.g. Billingsley, Breiman, Chung or Durrett. The theme of this book is to use functional analysis as the backbone on which to develop a structural theory of probability. In this respect the author assumes basic knowledge of Banach spaces. In the appendices, background material is provided without proof. In the second half of the book, the author develops the basic theory of harmonic analysis on locally compact Abelian groups. This is used in turn as a base for Markov processes on Abelian groups. The table of contents gives a good description of the material covered. There are no exercises.

Queen's University
Kingston, Canada

J.A. Mingo

FLOWGRAPH MODELS FOR MULTISTATE
TIME-TO-EVENT DATA.

A.K. Huzurbazar.

Hoboken, New Jersey: Wiley,
2005, pp. xii + 270, £54.50.

Contents:

1. Multistate models and flowgraph models
2. Flowgraph models
3. Inversion of flowgraph moment generating functions
4. Censored data histograms
5. Bayesian prediction for flowgraph models
6. Computational implementation of flowgraph models
7. Semi-Markov processes
8. Incomplete data
9. Flowgraph models for queueing systems

Readership: Stochastic modelers especially in biological and engineering sciences, analysts of multi-state survival data

A valuable and original synthesis is given of the following ideas: discrete multistate systems in continuous time; their representation by flowgraphs; a calculus of moment generating functions (Laplace transforms) attached to such systems; the inversion of moment generating functions into density or distribution functions by saddle-point methods; provision of computer algorithms for such inversion where analytical inversion is not available; some corresponding statistical issues. The emphasis is mostly on the calculation of the distribution taken in these models, typically semi-Markov processes, to reach a specified

terminal state. The account is lucid, largely self-contained and is illustrated with interesting examples from a number of fields. The book is particularly welcome in the light of an increasing tendency to tackle such problems solely by computer simulation.

Nuffield College
Oxford, U.K.

D.R. Cox

RELIABILITY AND RISK MODELS: SETTING
RELIABILITY REQUIREMENTS.

M.T. Todinov.

Chichester, U.K.: Wiley, 2005,
pp. xviii + 322, £65.00.

Contents:

1. Some basic reliability concepts
2. Common reliability and risk models and their applications
3. Reliability and risk models based on mixture distributions
4. Building reliability and risk models
5. Load-strength (demand-capacity) models
6. Solving reliability and risk models using a Monte Carlo simulation
7. Analysis of the properties of inhomogeneous media using Monte Carlo simulations
8. Mechanisms of failure
9. Overstress reliability integral and damage factorisation law
10. Determining the probability of failure for components containing flaws
11. Uncertainty associated with the location of the ductile-to-brittle transition region of multi-run welds
12. Modelling the kinetics of deterioration of protective coatings due to corrosion
13. Minimising the probability of failure of automotive suspension springs by delaying the fatigue failure model
14. Reliability governed by the relative locations of random variables in a finite domain
15. Reliability dependent on the existence of minimum critical distances between the locations of random variables in a finite interval
16. Reliability analysis and setting reliability requirements based on the cost of failure

Readership: Industry (manufacturing, maintenance, engineering); academic (researchers and postgraduate students in engineering)

The treatment is firmly embedded in practical engineering. The situations are tackled intelligently, sometimes departing from the conventional wisdom and even challenging the time-honoured approaches. My overall impression is of a book written by an engineer deeply immersed in certain practical problems but able to apply sound statistical methods innovatively. This strikes me as unusual. Some technical engineering knowledge seems to be assumed, e.g. 'MPa' is used without explanation on page 53. On the other hand, no statistical knowledge is assumed, Chapters 1 to 6 covering elementary aspects of probability and statistics. The later chapters tend to focus on particular aspects, presumably reflecting the author's own interests and publications; see the list of references. These applications are dominated by the specialist field of crack propagation and metal fatigue. However, the statistical methods presented can be useful in other fields of engineering. Good features include the large number of diagrams used to illustrate the text, and the provision of pseudo-code for many of the methods.

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

M.J. Crowder

FINANCIAL DERIVATIVES, 2nd edition.

R.W. Kolb.
Malden, Massachusetts: Blackwell,
2000, pp. ix + 261, £25.99. [Original, 1996]

Contents:

1. Introduction
2. Futures
3. Options
4. The swaps market
5. Synthesizing and transforming securities
6. Risk management and financial engineering

Readership: Students interested in an overview of financial derivatives that avoids the use of mathematics

The book succeeds in providing supplemental material for an introductory course that treats futures, options and swaps. The material is well-presented and the index is good. New concepts are highlighted in bold. A sixth chapter is added to this second edition promoting derivatives as instruments for managing risk. The deficiencies of this new edition show up in precisely this context—the tables are not updated from 1996, the case studies (e.g., Barings, Orange County, P&G) are not completed and, perhaps most importantly, there is no mention of the rapidly growing interest in managing credit risk through CDO's, CDS's, etc.

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

C. Albanese

INTRODUCTION TO MODERN PORTFOLIO OPTIMIZATION WITH NuOPTtm, S-PLUS[®] AND S⁺Bayestm.

B. Scherer and R.D. Martin.
New York: Springer-Verlag, 2005,
pp. xxi + 405, US\$79.95.

Contents:

1. Linear and quadratic programming
2. General optimization with SIMPLE
3. Advanced issues in mean-variance optimization
4. Resampling and portfolio choice
5. Scenario optimization: Addressing non-normality
6. Robust statistical methods for portfolio construction
7. Bayes methods

Readership: Practitioners in quantitative finance, students and scientists in financial engineering, operations research or statistics

The construction of optimal investment strategies is a basic and hot topic of financial engineering in both practice and academia. In this book variants and generalizations of the classical one-period Markowitz mean-variance portfolio optimization approach are considered. Topics addressed range from introductions to linear and quadratic programming, robust statistics, and Bayesian estimation to risk measures, such as conditional value-at-risk or mean absolute deviation that constitute alternatives to the portfolio return variance. These introductions are accompanied by practical advice on how to use statistical packages such as NuOPTtm, S-PLUS[®] and S⁺Bayestm to solve the corresponding static portfolio problems. With regard to static portfolio optimization, the book gives a good survey on the development from the basic Markowitz approach to state of the art models and is in particular valuable for direct use in practice or for lectures combined with practical exercises. However, it does not contain any significant part on modern multi-period or continuous time portfolio optimization at all.

University of Kaiserslautern
Kaiserslautern, Germany

R. Korn

ROBUST LIBOR MODELLING AND PRICING OF DERIVATIVE PRODUCTS.

J. Schoenmakers.
Boca Raton, Florida: Chapman and Hall/
CRC Press, 2005, pp. xvi + 202, US\$89.95/£99.95.

Contents:

1. Arbitrage-free modelling of effective interest rates
2. Parametrisation of the Libor market model
3. Implied calibration of a Libor market model to caps and swaptions
4. Pricing of exotic European style products
5. Pricing of Bermudan style Libor derivatives
6. Pricing long dated products via Libor approximations

Readership: Practitioners, financial engineers, students with an interest in (Libor Market Model) interest-rate modelling

This book provides an introduction to the Libor market model, one of the current tools for modelling interest rates and interest rate derivatives. The author begins with the necessary financial mathematics, discusses parametrizations of the Libor model that are economically feasible, and calibration of the Libor Market Model to market data. The latter exercise is made more challenging by the fact that typically the model has a parameter of higher dimension than the cardinality of the market quotes that are being matched. The impact of various calibration methods on the pricing of various interest-rate derivatives, Libor trigger swaps, Ratchet caps, sticky Caps, and Auto-flex caps, as well as Bermudan style Libor derivatives is discussed. Finally, lognormal approximations are used to price long-dated interest-rate derivatives and these approximations assessed by simulation.

University of Waterloo
Waterloo, Canada

D.L. McLeish

FINANCIAL DERIVATIVES: PRICING, APPLICATIONS AND MATHEMATICS.

J. Baz and G. Chacko.
Cambridge University Press, 2004, pp. xi + 338, £35.00.

Contents:

1. Preliminary mathematics (17pp)
 2. Principles of financial valuation (56pp)
 3. Interest rate models (106pp)
 4. Mathematics of asset pricing (85pp)
- Bibliography (57pp)

Readership: MBA and MSc students in finance, Quant analysts in the finance industry

There is now a huge number of books on this subject. This one is at an intermediate level: no measure theory but much more mathematical and practical detail than elementary texts. The emphasis can be gleaned from the page count of the chapters. Chapter 2 covers the Black-Scholes theory, but with more emphasis than usual on principles of risk, utility and equilibrium. The lengthy interest rate chapter includes valuable detail on convexity corrections etc. and covers some standard models, but does not cover important modern developments such as the Libor Market Model. The final chapter covers standard material in stochastic calculus at a generally informal level. Occasionally the authors slip up—for example, their proof that Brownian motion is continuous also shows that the Poisson process is continuous (which it is, in probability). There is a colossal bibliography.

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

M.H.A. Davis

(WILEY AD)

NOTES

THE HISTORY OF MATHEMATICS:A BRIEF COURSE, 2nd edition.

R. Cooke.

Hoboken, New Jersey: Wiley,
2005, pp. xvii + 607, £54.50.

From the back cover: "In the first edition [*The History of Mathematics*], each chapter was devoted to a single culture. This *Second Edition* is organized by subject matter: a general survey of mathematics in many cultures, arithmetic, geometry, algebra, analysis, and mathematical inference. This new organization enables students to focus on one complete topic and, at the same time, compare how different cultures approached each topic. Many new photographs and diagrams have been added to this edition to enhance the presentation."

GÖDEL'S THEOREM. An Incomplete Guide to Its Use and Abuse.

T. Franzén.

Wellesley, Massachusetts: A.K. Peters,
2005, pp. x + 172, US\$24.95.

From a review of the book: "This unique exposition of Kurt Gödel's stunning incompleteness theorems for a general audience manages to do what none other has accomplished: explain clearly and thoroughly just what the theorems really say and imply and correct their diverse misapplications to philosophy, psychology, physics, theology, post-modernist criticism and what have you."

S. Feferman, Stanford University.

LOGICAL DILEMMAS. The Life and Work of Kurt Gödel.

J.W. Dawson, Jr.

Wellesley, Massachusetts: A.K. Peters,
1997, pp. xiv + 361, US\$34.00.

From the back cover: "This definitive biography of the logician and philosopher Kurt Gödel is the first in-depth account to integrate details of his personal life with his work and is based on the author's intensive study of Gödel's papers and surviving correspondence. Dawson, a logician and historian of science, examines the life of this driven man whose work on the foundations of mathematics has fundamentally changed our thoughts on this subject and has stimulated much of the research conducted in the twentieth century. He further explores the relationship between Gödel's personality and his scientific achievements and describes the impact that Gödel's results have had on our modern world view."

CATASTROPHE: RISK AND RESPONSE.

R.A. Posner.

Oxford University Press, 2004,
pp. x + 322, £16.99/US\$28.00.

From the book jacket: "Catastrophes, whether natural or man-made, that could destroy the human race are often dismissed as alarmist or fanciful, the stuff of science fiction. In fact, the risk of such disasters is real, and growing. ...

"How should the nation and the world respond to disaster possibilities that, for a variety of psychological and cultural reasons, people find hard to wrap their minds around? Richard Posner shows that what is needed is a fresh, thoroughly interdisciplinary perspective that will meld the insights of lawyers, economists, psychologists, and other social scientists with those of researchers in the physical sciences. Responsibility for averting catastrophe cannot be left either to scientists or to politicians and other policymakers ignorant of science.

"As in many of his previous books, Posner brings law and the social sciences to bear on a contemporary

problem—in this case one of particular urgency. Weighing the risk and the possible responses in each case, Posner shows us what to worry about and what to dismiss, and discusses concrete ways of minimizing the most dangerous risks. Must we yield a degree of national sovereignty in order to deal effectively with global warming? Are limitations on our civil liberties a necessary and proper response to the danger of bioterror attacks? Would investing more heavily in detection and interception systems for menacing asteroids be money well spent? How far can we press cost-benefit analysis in the design of responses to world-threatening events? Should the institutional framework of science policy be altered? Do we need educational reform? Is the interface of law and science awry? These are but a few of the issues canvassed in this fascinating, disturbing, and necessary book."

THE MORALS OF MEASUREMENT: ACCURACY, IRONY AND TRUST IN VICTORIAN ELECTRICAL PRACTICE.

G.J.N. Gooday.

Cambridge University Press, 2004, pp. xxv + 285,
£55.00/US\$85.00.

From the book jacket: "*The Morals of Measurement* is a contribution to the social histories of quantification and of electrical technology in nineteenth-century Britain, Germany, and France. It shows how the advent of commercial electrical lighting stimulated the industrialisation of electrical measurement from a skilled labour-intensive activity mechanised practice relying on radically new kinds of instruments. Challenging traditional accounts that focus on metrological standards, this book shows instead the centrality of trust when measurement was undertaken in an increasingly complex division of labour with manufactured hardware. Case studies demonstrate how difficult late Victorians found it to agree upon which electrical practitioners, instruments, and metals were most trustworthy and what they could hope to measure with any accuracy. Subtle ambiguities arose too over what constituted 'measurement' or 'accuracy' and thus over the respective responsibilities of humans and technologies in electrical practice. Running alongside these concerns, the themes of body, gender, and authorship feature importantly in controversies over the changing identity of the measurer. In examining how new groups of electrical experts and consumers construed the fairness of metering for domestic lighting, this work charts the early moral debates over what is now a ubiquitous technology for quantifying electricity. Accordingly readers will gain fresh insights, tinged with irony, on a period in which measurement was treated as the definitive means of gaining knowledge of the world."

RATIONAL CHOICE AND JUDGEMENT: DECISION ANALYSIS FOR THE DECIDER.

R. Brown.

Hoboken, New Jersey: Wiley,
2005, pp. xxvii + 245, £43.50.

From the back cover: "This book takes an innovative approach to decision analysis that moves away from cumbersome, quantitative methods to give students and professionals decision-making tools that can be applied immediately. The author, who has forty years of experience in top-level decision consulting, explains how deciders actually think about their choices from the beginning and provides methods to solve problems by addressing a given choice several different ways. Simple decision-making models are integrated into the thinking process to add logical rigor. Careful account is taken of the user, the user, and the organization, as well as all available data and subjective knowledge. Next, readers are given the chance to apply their new skills to resolve real-life problems."

CRYPTOGRAPHY, INFORMATION THEORY, AND ERROR-CORRECTION. A HANDBOOK FOR THE 21ST CENTURY.

A.A. Bruen and M.A. Forcinito.
Hoboken, New Jersey: Wiley, 2005, pp. xxiii + 468,
£54.00.

From the back cover: "With identity theft, cyber-crime, and digital file sharing proliferating in today's wired world, providing safe and accurate information transfers has become a paramount concern. The issues and problems raised in this endeavour are encompassed within three disciplines: cryptography, information theory, and error-correction. As technology continues to develop, these fields have converged at a practical level, increasing the need for a unified treatment of these three cornerstones of the information age.

"Stressing the interconnections of the disciplines, *Cryptography, Information Theory, and Error-Correction* offers a complete, yet accessible account of the technologies shaping the 21st century. This book contains the most up-to-date, detailed, and balanced treatment available on these subjects. The authors draw on their experience both in the classroom and in industry, giving the book's material and presentation a unique real-world orientation."

CODES. The Guide to Secrecy from Ancient to Modern Times.

R.A. Mollin.
Boca Raton, Florida: Chapman and Hall/CRC Press, 2005,
pp. xx + 679, US\$79.95/£44.99.

From the back cover: "From the Rosetta Stone to public-key cryptography, the art and science of cryptology has been used to unlock the vivid history of ancient cultures, to turn the tide of warfare, and to thwart potential hackers from attacking computer systems. *Codes: The Guide to Secrecy from Ancient to Modern Times* explores the depth and breadth of the field remaining accessible to the uninitiated while retaining enough rigor for the seasoned cryptologist.

"The book begins by tracing the development of cryptology from that of an arcane practice used, for example, to conceal alchemic recipes, to the modern scientific method that is studied and employed today. The remainder of the book explores the modern aspects and applications of cryptology, covering symmetric- and public-key cryptography, cryptographic protocols, key management, message authentication, e-mail and Internet security, and advanced applications such as wireless security, smart cards, biometrics, and quantum cryptography. The author also includes non-cryptographic security issues and a chapter devoted to information theory and coding. Nearly 200 diagrams, examples, figures, and tables along with abundant references and exercises complement the discussion."

INTRODUCTION TO CODING THEORY.

J. Bierbrauer.
Boca Raton, Florida: Chapman and Hall/
CRC Press, 2005, pp. xxiii + 390,
US\$79.95/£39.99.

From the back cover: "Although its roots lie in information theory, the applications of coding theory now extend to statistics, cryptography, and many areas of pure mathematics, as well as pervading large parts of theoretical computer science, from universal hashing to numerical integration.

"*Introduction to Coding Theory* introduces the theory of error-correcting codes in a thorough but gentle presentation. ... The author takes a unique, more natural approach to cyclic codes that is not couched in ring theory

but by virtue of its simplicity, leads to far-reaching generalizations. Throughout the book, his discussions are packed with applications that include, but reach well beyond data transmission, with each one introduced as soon as the codes are developed."

COMPUTATIONAL STATISTICS.

G.H. Givens and J.A. Hoeting.
Hoboken, New Jersey: Wiley,
2005, pp. xix + 418, £48.95.

From the back cover: "This comprehensive introduction enables readers to develop a multifaceted and thorough knowledge of modern statistical computing and computational statistics. Backed by many years of classroom experience, the authors help readers gain a practical understanding of how and why modern statistical methods work, enabling readers to apply these methods effectively. Detailed examples are drawn from diverse fields such as bioinformatics, ecology, medicine, computer vision, and stochastic finance.

"The text emphasizes areas that are central to understanding the evolving field of computational statistics including areas where routine application of software often fails to solve complex problems. Topics covered include ordinary and combinatorial optimization, algorithms for missing data, numerical and Monte Carlo integration, simulation, introductory and advanced Markov chain Monte Carlo, bootstrapping, density estimation, and smoothing.

"Knowledge of computer languages is not required, making examples and algorithms easier for readers to follow. Everything needed to quickly learn and apply the material is provided and is presented in a fluid, jargon-free style with fascinating real-world examples and problem sets that have been tested in the classroom for more than a decade."

THE PRACTICAL HANDBOOK OF INTERNET COMPUTING.

M.P. Singh (Ed.).
Boca Raton, Florida: Chapman and Hall/
CRC Press, 2005, pp. xxvii + 1073,
US\$139.95/£79.99.

From the back cover: "*The Practical Handbook of Internet Computing* analyzes a broad array of technologies and concerns related to the Internet, including corporate intranets. Fresh and insightful articles by recognized experts address the key challenges facing Internet users, designers, integrators and policymakers. In addition to discussing major applications, it also covers the architectures, enabling technologies, software utilities and engineering techniques that are necessary to conduct distributed computing and take advantage of Web-based services."

STATISTICAL METHODS IN COMPUTER SECURITY.

W.W.S. Chen (Ed.).
New York: Dekker, 2005,
pp. xiv + 352, US\$89.95; £49.99.

From the back cover: "Addressing challenges currently plaguing computer networks worldwide, *Statistical Methods in Computer Security* details the latest statistical methods in computer security, including a new model for probabilistic information retrieval on the web ... addresses crime and misconduct on the Internet and considers the development of infrastructures that may prevent breaches of security and law ... illustrates the vulnerability of networked computers to new virus attacks despite widespread deployment of antivirus software, firewalls, and other network security equipment ... describes a general framework for organizational Internet security policy ... and studies the function, utilization, and benefits of firewalls in industry."

(CAMBRIDGE AD)

TAGUCHI'S QUALITY ENGINEERING HANDBOOK.

G. Taguchi, S. Chowdhury and Y. Wu.
Hoboken, New Jersey: Wiley, 2005,
pp. xxxii + 1662, £65.00.

From the back cover: "In the last fifty years, one man stands out as the driving force behind the quality revolution—Genichi Taguchi. Now, for the first time in one volume, *Taguchi's Quality Engineering Handbook* presents all the methods and beliefs that have made Taguchi one of the most respected authorities on quality engineering and management in the world.

"No other single volume presents the full breadth of founding beliefs behind the successful engineering practices used by today's leading companies. Helpful to companies in both manufacturing and service industries, *Taguchi's Quality Engineering Handbook* provides accessible material on such topics as: Quality loss function, On-line quality engineering, Signal-to-noise ratio, Robust engineering, Design of experiments (known as the "*Taguchi method*"), Mahalanobis–Taguchi Systems (MTS). *Taguchi's Quality Engineering Handbook* is a landmark resource for everyone interested in quality and engineering, from engineers and managers to upper-level VPs and educators."

AXIOMATIC QUALITY: INTEGRATING AXIOMATIC DESIGN WITH SIX-SIGMA, RELIABILITY, AND QUALITY ENGINEERING.

B.S. El-Haik.
Hoboken, New Jersey: Wiley, 2005,
pp. xx + 285, £48.95.

From the back cover: "As the adoption of quality methods grows across various industries, its implementation is challenged by situations where statistical tools are inadequate, yet the earlier a proactive quality system is introduced into a given process, the greater the payback these methods will yield.

"*Axiomatic Quality* brings together two well-established theories, axiomatic design and robust design, to eliminate or reduce both conceptual and operational weaknesses. Providing a complete framework for immediate implementation, this book guides design teams in producing systems that operate at high-quality levels for each of their design requirements. And it shows the way towards achieving the Six-Sigma target—six times the standard deviation contained between the target and each side of the specification limits—for each requirement."

INFORMATICS IN PROTEOMICS.

A. Srivastava (Ed.).
Boca Raton, Florida: Taylor and Francis,
2005, pp. 436, US\$159.95; £92.00.

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