All Faculty Scholarship   Faculty Scholarship

6-1-2005

Review of: Combinatorics of Permutations by Miklós Bóna

Robert A. Beezer
University of Puget Sound, beezer@pugetsound.edu

Follow this and additional works at: http://soundideas.pugetsound.edu/faculty_pubs

Combinatorics of Permutations by Miklós Bóna
Review by: Robert A. Beezer
SIAM Review, Vol. 47, No. 2 (Jun., 2005), pp. 372-373
Published by: Society for Industrial and Applied Mathematics

David Ruppert's *Statistics and Finance* is also for an undergraduate audience and discusses computation in SAS and MATLAB. The first half addresses statistical problems that are not the topic of the other books reviewed here, but the second half overlaps those books in covering option pricing with binomial trees and Brownian motion and interest-rate models. The later chapters cover advanced subjects like value-at-risk, GARCH models, and behavioral finance.

After a not-too-gentle introductory chapter, the book is very well written and clear. The 60-page review of probability and statistics is a model of expository compactness, and the choice of applications, centered on statistical and computational aspects, is good. In parts, the author is (by his own admission) just summarizing what he has learned from other books and research papers. While this is extremely readable and valuable as introduction, it is arguable that the shorter chapters (8–10 and 14, for example) could have been omitted to create a more focused book. Nonetheless, the clear writing and illustrative examples and pictures strongly recommend the book as a basis for finance-motivated statistics classes at the undergraduate level.

REFERENCES

[1] M. BAXTER AND A. RENNIE, *Financial Calculus: An Introduction to Derivative Pricing*, Cambridge University Press, Cambridge, UK, 1996.

[2] J. CVITANIC AND F. ZAPATERO, *Introduction to the Economics and Mathematics of Financial Markets*, MIT Press, Cambridge, MA, 2004.

[3] V. GOODMAN AND J. STAMPFLI, *The Mathematics of Finance: Modeling and Hedging*, Brooks/Cole, Monterey, CA, 2000.

[4] J. HARRISON AND S. PLISKA, *Martingales and stochastic integrals in the theory of continuous trading*, Stochastic Process. Appl., 11 (1981), pp. 215–260.

[5] P. HUNT AND J. KENNEDY, *Financial Derivatives in Theory and Practice*, Wiley, New York, 2004.

[6] M. JOSHI, *The Concepts and Practice of Mathematical Finance*, Cambridge University Press, Cambridge, UK, 2003.

[7] I. KARATZAS AND S. SHREVE, *Methods of Mathematical Finance*, Springer-Verlag, New York, 1998.

[8] D. LAMBERTON AND B. LAPEYRE, *Introduction to Stochastic Calculus Applied to Finance*, Chapman & Hall, London, 1996.

[9] T. MIKOSCH, *Elementary Stochastic Calculus with Finance in View*, World Scientific, Riveredge, NJ, 1999.

[10] M. MUSIELA AND M. RUTKOWSKI, *Martingale Methods in Financial Modelling*, Springer-Verlag, New York, 1997.

[11] S. NEFTCI, *Introduction to the Mathematics of Financial Derivatives*, Academic Press, New York, 2000.

[12] P. WILMOTT, S. HOWISON, AND J. DEWYNNE, *Option Pricing*, Oxford Financial Press, Oxford, UK, 1993.

RONNIE SIRCAR
Princeton University

Combinatorics of Permutations. By Miklós Bóna. Chapman & Hall/CRC, Boca Raton, FL, 2004. $89.95. xiv+383 pp., hardcover. ISBN 1-58488-434-7.

Permutations are a central topic in combinatorics and have applications in many fields, such as sorting algorithms in computer science and permutation groups in group theory. Many monographs study permutations, each with its own emphasis and perspective. And many important results in this area are spread across the research literature of many different fields. This book aims to round up any topic related to the combinatorial nature of permutations and

present it between one set of covers. For topics that are presented carefully in other texts, the coverage is more of an overview, exposing the reader to the main ideas and then pointing the way to where one can learn more. For topics that are new, obscure, or neglected by more specialized works, the author is more comprehensive. Throughout the book, there are frequent references to the excellent bibliography of more than two hundred research articles and books.

It is clear that the author finds his topic to be full of "serious fun." This enthusiasm is conveyed in the conversational and engaging style of the writing. The titles of the eight chapters provide an indication of this style and of the topics covered: "In One Line and Close. Permutations as Linear Orders. Runs"; "In One Line and Anywhere. Permutations as Linear Orders. Inversions"; "In Many Circles. Permutations as Products of Cycles"; "In Any Way But This. Pattern Avoidance. The Basics"; "In This Way, But Nicely. Pattern Avoidance. Followup"; "Mean and Insensitive. Random Permutations"; "Permutations vs. Everything Else: Algebraic Combinatorics of Permutations"; "Get Them All. Algorithms and Permutations."

Each chapter concludes with a set of about thirty or forty problems of a theoretical nature (as opposed to being computational), with solutions and notes for each odd-numbered problem appearing in a section at the end of the book. These problems are then followed by a "Problems Plus" section containing about ten or fifteen more difficult theoretical problems. These extra problems are followed immediately by a short discussion of each. These discussions usually lead with a reference to a research article or monograph, which provides an indication of the difficulty level.

Unfortunately, it would appear that not much care was taken in proofreading this text. In the limited amount of close reading performed by this reviewer, there was an index reference that was two pages away from its target ("log–concave"), a figure that was inaccurate (Figure 7.3), a proof where a key explanation had the expression a_i replaced by simply i (Theorem 2.3), a definition whose lead-in text directly contradicts the subsequent definition (Defini-

tion 2.1), and a theorem whose conclusion contains a typographical error that is obvious simply from the form of the statement (Theorem 1.4). Searching on the Internet did not locate any listings of errata.

This book was written to be used in a graduate-level topics course. For that purpose it is ideally suited. It would also be an excellent choice for a graduate student to use independently before initiating a research program in this area, though such a student should be alerted to the possibility of frequent errors. Experienced researchers in combinatorics will find the book useful as a guide to the literature on permutations. For graduate students with advanced interests in any field of combinatorics, the faculty who work with these students, or the libraries that support them, this book is an excellent choice.

ROBERT A. BEEZER
University of Puget Sound

Most Honourable Remembrance: The Life and Work of Thomas Bayes. By Andrew Dale. Springer-Verlag, New York, 2003. $99.00. xxiv+668 pp., hardcover. ISBN 0-387-00499-8.

Professor Dale poses the question of "Why one would want to study the life and works of Thomas Bayes, this strangely neglected topic," in the preface. Bayes's theorem, a seemingly simple result, seems to play such a pivotal role in the history of mathematics (to such an extent that a major branch of statistics carries his name), yet little is known about Thomas Bayes the man. This book takes the reader back to Bayes's time and place, to understand and appreciate the contribution Thomas Bayes made to mathematics and theology within the political, religious, and intellectual ferment occurring at the time. The few primary sources that relate directly to Bayes are supplemented with extensive sources relating to that time and place.

The book's early chapters cover Bayes's family background. After the restoration of Charles II, the British Parliament passed the Act of Uniformity which intended to regulate all public worship in England and