The Annals of Mathematical Statistics
1968, Vol. 39, No. 6, 2163–2167

BOOK REVIEWS

Correspondence concerning reviews should be addressed to the Book Review Editor, Professor James F. Hannan, Department of Statistics, Michigan State University, East Lansing, Michigan 48823

THOMAS S. FERGUSON, *Mathematical Statistics, A Decision Theoretic Approach.* Academic Press, New York, 1967. xi + 396 pp. $14.50.

Review by ROBERT A. WIJSMAN

Columbia University and University of Illinois

This is an excellent textbook that contains a large chunk of modern mathematical statistics in spite of its moderate size. It is intended for first-year graduate students, but will undoubtedly benefit a much wider audience. In fact, I think almost everybody can learn something new from it. For graduate students, mastering the material in the book and working all the exercises will probably go a long way toward preparation for the Ph.D. preliminary examination.

The author states in the Preface that as a rule he has included only topics that could be justified from a decision-theoretic viewpoint (the only exception being confidence sets). This certainly leaves out large chunks of specialized topics such as nonparametric, large sample, multivariate and analysis of variance (some basics of linear hypothesis is included, though). Some special tools, such as the Cramér-Rao inequality in estimation, are not included either. But the amount of material that is covered is impressive enough, including a whole chapter on testing hypotheses. Here is a list of chapter titles: Chapter 1: Game theory and decision theory; Chapter 2: The main theorems of decision theory; Chapter 3: Distributions and sufficient statistics; Chapter 4: Invariant statistical decision problems; Chapter 5: Testing hypotheses; Chapter 6: Multiple decision problems; Chapter 7: Sequential decision problems. No special chapter on estimation is included since many of the applications concern estimation. I think it is fair to say that what is covered in the book forms the basic core of statistical inference, and is the conceptually most difficult part of it.

For a text at the graduate level this book presents one unusual feature: it does not strive for complete mathematical rigor. The student is not expected to know measure theory and Lebesgue integration, and thus in certain theorems precise conditions and rigorous proofs are out of the question. This has both advantages and disadvantages. An advantage is that the essential features are not obscured by bothersome measure-theoretic difficulties. A drawback is that the student is left with many gaps to be filled in later. However, the author supplies a generous amount of references, giving the student ample opportunity to supplement the material in the book. Another slight drawback is that sometimes the precise