

sampling theory is in effect given a complete chapter whereas what may be thought of as examples of similar importance in a modeling context, the Poisson process and Markov chains, are tacked on the end of Chapter 6 ("analytic methods for joint models"). Further, some probability models, notably the *t*-distributions, are mentioned only in the context of sampling distribution and not at all as models for actual data.

The book is intended for use as a course text and guidelines are given as to how, by selection of sections to be covered, courses of different "lengths, levels and areas of emphasis" may be covered. This book seems well suited for this intended use, or even for private study, having very many examples and exercises (139 in chapter 6 alone!); but it is not really suitable for use as a reference book.

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Ole HAGEN and Fred WENSTØP (eds.)

Progress in Utility and Risk Theory

Volume 42 in: Theory and Decision Library, Reidel, Dordrecht, 1984, xii + 279 pages. Dfl.115.00

This book is an interesting and informative volume for researchers and practitioners in decision and management sciences, as well as for some economists. It consists of a number of related papers on the theme of utility theory and decision making under uncertainty. It does not specifically cover risk theory in the insurance sense as might be implied from the title, but comprehensively reviews the state of the art in most aspects of utility theory as applied to risky decision making in general. Overall, the message is that there has been only a little theoretical progress in utility theory since the publication of von Neumann and Morgenstern's volume in 1947. However there has been a lot of progress (much of it in the past five years) both in understanding the shortcomings of the theory and in formulating the desired directions for improvement and generalization.

Major contributors to this volume were Maurice Allais, Georges Bernard, Ole Hagen, Roman

Krysztofowicz, Wilhelm Krelle, Denis Bouyssou, Graham Loomes and Robert Sugden, and Robin Pope. Allais' paper which comprises the first half of the book is concerned with the basic issues of probability and utility including interesting reviews of both theoretical contributions and some empirical studies. This contribution is likely to be of interest to researchers in decision analysis, as it highlights much of the basic research in forty years of utility theory development. The theoretical contributions of Machina, Camacho, Bernard, Kahneman and Tversky, and Pope are discussed and much attention is given to the issues of probabilism versus determinism and the existence of cardinal utility. There are however, no startling new theoretical developments reported in this paper (or elsewhere in the volume).

The second half of the book contains papers on decision models and on the translation of theory into practice and should be of greater interest to practitioners. Bouyssou's paper is an excellent survey of decision aids and of the role and validity of the utility axioms.

In aggregate, the contributions in this volume give the impression that theories of decision making are not in a 'stable science' state, but are very much in a state of flux. This is a thought-provoking book and should make interesting reading for those who wish to keep abreast of current thinking on some fundamental issues in utility theory.

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Multi-Objective Decision Making

Based on the proceedings of a conference on Multi-Objective Decision Making organised jointly by The Institute of Mathematics and its Applications and The Department of Decision Theory, University of Manchester and held at the University of Manchester, 20-22 April, 1982, Academic Press, London, 1983, xiv + 325 pages, £20.00

This book is an extended collection of papers presented at a conference on multi-objective deci-