Review: [Untitled]

Reviewed Work(s):
    Empirical Processes with Applications to Statistics. by G. R. Shorack; J. A. Wellner

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Journal of the Royal Statistical Society. Series A (Statistics in Society), Vol. 151, No. 1. (1988), p. 239.

22. Empirical Processes with Applications to Statistics. By G. R. Shorack and J. A. Wellner. ISBN 0 471 86725 X. Wiley, 1986. xxxvii, 938p. £57.45 (Wiley Series in Probability and Mathematical Statistics.)

Despite the central importance of empirical processes to statistical theory, one approaches a work on the subject running to 938 pages with the mixed feelings of awe, panic and fatigue. However, any such thoughts are quickly dispelled as this is an excellent book. It comes close to giving an encyclopaedic coverage of the topic and in doing so it provides a very good introduction to many of the main areas of interest for research in probability and statistics over the last fifteen or twenty years. It will be of interest principally to researchers in the field but it is suitable for a graduate course (or courses) as the authors have managed to include much of the required background material, some of it in summarised form.

A comprehensive treatment is given of the extensive limit theory for empirical processes now in the literature with a full development of weak convergence results, laws of the iterated logarithm and their functional versions, large deviation results and strong limit theorems for the modulus of continuity. The main body of the book deals with the case of independent identically distributed real random variables but there are relatively short sections on the independent but non-identically distribution situation and on extensions to empirical measures and processes for general spaces. Among the applications discussed are goodness-of-fit tests, spacings, censored data, ranks, bootstrapping, reliability and econometrics.

The book is very cleary written throughout. Proofs and technical material contain sufficient detail to guide the reader through painlessly without at any stage being cluttered. There is a mass of interesting sidelights and further references to results which are not in the main development but which make the book a pleasure to dip into as bedside reading. As other reviewers have also pointed out, the only drawback to this is the lack of chapter and section numbers in the running head which in a book of this size makes it difficult to skip forward and backward. However, as this is likely to become a standard work of reference for many years to come, there is no doubt that this minor blemish may be rectified easily in future editions. All probabilists and mathematical statisticians will welcome this as an attractive addition to their libraries.

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23. Stochastic Geometry and its Applications. By D. Stoyan, W. S. Kendall and J. Mecke. ISBN 0 471 90519 4. Wiley, 1987. 345p. £23.50. (Wiley Series in Probability and Mathematical Statistics. A co-production with Akademie-Verlag, GDR.)

This book had its genesis in a short book in German (*Stochastiche Geometrie: Eine Einführung*, Akademie-Verlag, 1983, by Stoyan and Mecke) which has been expanded and reorganized. It still has much of the nature of an introduction and contains few proofs. I felt an opportunity had been missed to give more of the details of the distinctive East German approach to the subject, much of which is published in journals which are not widely disseminated. Nevertheless, what we have provides an unrivalled overview of "stochastic geometry". Of course such terms have a flexible meaning. The authors follow the spirit of Davidson and D. G. Kendall in the late 1960's of "non-uniform processes of geometrically arranged objects". Thus as well as material on point processes in n dimensions they study fibre processes (curves in space), surface processes, random tessellations and processes of triads.

There is some material on geometrical statistics (inference on the processes of stochastic geometry) but this tends to be more superficial. My impression is that this reflects the literature; the probability theory follows the path blazed for point processes but few deep applications of the other processes have yet emerged. I was least happy about the final chapter on stereology, which has a dated feel, overlooking recent developments such as Sterio's "disector". Stereology