BOOK REVIEWS

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JAROSLAV HÁJEK AND ZBYNĚK ŠIDÁK, *Theory of Rank Tests*. Academic Press, New York and London. Academia Publishing House of the Czechoslavak Academy of Sciences, Prague, 1967. $8.00. 297 pp.

Review by WASSILY HOEFFDING

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Some of the main features of this monograph are concisely described in the Preface: "This book is designed for specialists, teachers and advanced students in statistics. We assume the reader to be acquainted with the basic facts about the theory of testing hypotheses, measure theory, stochastic processes, and the central limit theorem. ... Striving for compactness and lucidity of the theory, we concentrated on contiguous alternatives and on problems concerning location and scale parameters. In this respect the results obtained are almost complete. The two most serious gaps still left are the absence of an effective method for the estimation of the type of a density, and the failure to carry out an adequate asymptotic treatment of the alternatives for the hypothesis of independence. Relatively little space has been given to the non-contiguous alternatives and to the famous Chernoff-Savage theorem, and no space at all to the interesting investigations on the possibility of employing rank tests for estimation problems [started by Lehmann and Hodges in 1963]."

Within these self-imposed bounds the authors have written an admirable monograph. Much of its content appears for the first time in book form. A number of new results are included. The material is skillfully organized. Proofs are carefully and elegantly carried out. The mathematical development is supplemented by lucid discussion of the relation of theory to applications. Each chapter ends with a section of problems and complements which contain much additional material. The reviewer noticed only a few trivial errors, mostly misprints, which are easily corrected by the reader.

Rank tests are applicable when the hypothesis implies invariance of the distribution of the observations under some group of permutations and this invariance is not shared by the alternatives under consideration. They have proved to be important both for practical and for theoretical reasons. They are "exact" and are quick and simple to apply (all of this subject to rather obvious qualifications). They can be used when only ranking data are available. When applied to numerical observations, rank tests may seem to discard much information contained in the sample. However, it is now known that for many parametric alternatives there are rank tests which are highly efficient in large samples com-