ABSTRACTS OF PAPERS

(Abstracts of papers presented at the Central Regional meeting, Lincoln, Nebraska, April 1–3, 1965. Additional abstracts appeared in earlier issues.)

15. On Some c-Sample Nonparametric Tests for Location in the Behrens-Fisher Situation. P. V. RAMACHANDRAMURTY, Case Institute of Technology.

When the variances of the underlying populations differ, the usual rank tests for location in the c-sample problem ($c \geqq 2$) do not have the stated level of significance even asymptotically since the asymptotic variance of the test statistics depends on the unknown variances. An obvious way of overcoming this difficulty is by replacing the asymptotic variance by a consistent nonparametric estimator. The resulting test does not usually have the minimum property of consistency for *all* alternatives because of the indistinguishability of the null hypothesis and the alternative. We show here that for the Kruskal-Wallis test the above method can be applied in such a way that the resulting test is consistent for all alternatives for which the underlying populations are symmetric; in fact, for all generalized Behrens-Fisher alternatives. When there are only two populations, the above method gives a test which is asymptotically equivalent to the studentised Wilcoxon test given by Sen. (*Ann. Inst. Statist. Math. Tokyo* **14**. This test is shown to be better than a conservative test proposed by Pothoff (*Ann. Math. Statist.* **34**).

(Abstracts of papers presented at the Eastern Regional meeting, Tallahassee, Florida, April 29–May 1, 1965. Additional Abstracts appeared in earlier issues.)

12. Adaptive Statistical Procedures in Reliability and Maintenance Problems. JOSEPH L. GASTWIRTH and J. H. VENTER, Johns Hopkins University and Potchefstroom University. (Invited address)

In the present paper the following problem is considered:

A "system" with an exponentially distributed lifetime is to be inspected at times $t_1 < t_2 < \cdots$. If inspection reveals that the system is in-operative, it is repaired, otherwise nothing is done. The problem is to choose the sequence $\{t_i\}$ in an optimal manner. Most of the previous literature is concerned with the choice of the times $\{t_i\}$ when λ (the failure rate) is known. In the present work we assume that λ is unknown and several sequential inspection plans are proposed. These plans use the information as it becomes available from inspection to estimate λ and thereby approach the plan that would be optimum if λ were known. We discuss the problem of finding optimum sequential plans (called adaptive plans) when the objective is either to obtain the maximum limiting average information about the parameter λ or to minimize the average expected loss. In this second case our loss function takes into account the cost of an inspection, the cost of repair or replacement and the cost incurred while the system is inoperative.

13. Principles for Ranking Independent Variables by Order of Importance in the General Linear Hypothesis Model. KLAUS ABT, U. S. Naval Weapons Laboratory.

Three principles for the ranking of individual, or groups of, independent variables ("IV's") by order of importance are stated and justified. These principles are applicable