

Rank Tests for Two-Sample Problems Based on Multiple Type-II Censored Data

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In this article, we study the effect of censoring on the asymptotic efficiency of the two-sample rank tests based on multiple Type-II censored data. Since the scores generating functions associated with these test statistics have a finite number of jump discontinuities, we use a slightly modified version of a theorem of Dupac and Hajek (1969) to obtain their asymptotic distributions under fixed alternatives. This modified version, which leads to a simpler centering constant, is proved by Dupac (1970) in the light of results of Hoeffding (1968), an earlier version of Hoeffding (1973). Hence, we obtain the Pitman ARE's of these rank tests relative to the corresponding tests based on the complete samples. The ARE's are computed for some well known rank tests for two-sample location and scale problems, when the combined ordered samples from different underlying distributions are censored using triple and lower order Type-II censoring schemes. The effect of all these censoring schemes on the ARE's of the different tests is examined numerically. It is found that there is a gain in efficiency due to censoring in many of the cases considered here. This suggests that in such cases it is possible to improve the efficiency of rank tests by discarding suitable portions of the data. Keywords Asymptotic relative efficiency; Generalized Wilcoxon test; Generalized normal scores test; Generalized Ansari-Bradley test; Generalized Capon test; Multiple Type-II censoring; Loss of efficiency; Rank tests