Abstract

The purpose of this research is to study the robustness of Step – down independent bootstrap min P procedure and Step – down dependent bootstrap min P procedure for comparing several means with a control. The procedures are further compared with the Dunnett's statistic.

The population distributions of this study are normal distribution with unequal variances for each treatment and lognormal distribution with equal variances for all treatments. In this study, 3 treatment groups and 1 control group are considered. The sample size for each testing group is equally distributed at 3, 5, 7, 10 and 15 respectively. The significance level (α) of the test is set at 0.05. Furthermore, the number of bootstrap resampling is 1,000 replicates. The number of copies of the sample data for the dependent bootstrap is being investigated at 2 and 4 copies. Monte Carlo simulation with 1,000 repetitions is currently a realization.

The results show that under normal distribution with unequal variances for each treatment, the probability of type I error of all test statistics can be controlled in some cases. Mostly, the empirical power of Step – down independent bootstrap min P procedure and Step – down dependent bootstrap min P procedure are very close to those of Dunnett's statistic except for a few cases where their powers are slightly higher.

Under lognormal distribution with equal variances for all treatments, the probability of type I error of all test statistics can be controlled for all cases and the empirical power of Step – down independent bootstrap min P procedure and Step – down dependent bootstrap min P procedure are higher than Dunnett's statistic except for the cases where the sample size is equal to 3.