

Nariaki Sugiura · Hidetoshi Murakami · Seong Keon Lee
Yasutomo Maeda

Biased and unbiased two-sided Wilcoxon tests for equal sample sizes

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Abstract This paper answers the long-standing question of whether the two-sided Wilcoxon rank test for equal sample sizes is unbiased against a location parameter family of distributions by giving a counterexample. It is also shown that the non-randomized two-sided Wilcoxon test for equal sample sizes with the least positive significance level is unbiased.

Keywords Rank test · Unbiasedness · Two-sample problem · Power curve · Location parameter · Beta distribution