DATA DRIVEN TESTS FOR UNIVARIATE SYMMETRY ABOUT AN UNKNOWN MEDIAN

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Abstract: We propose new data driven score rank tests for univariate symmetry about an unknown center. We construct test statistics, state assumptions and define estimators of nuisance parameters. We prove that the test statistics are asymptotically distribution-free under the null hypothesis. Using simulations, we verify these asymptotic results for finite samples and show that, under the assumptions and when they are somewhat violated, the size of the test is stable when changing the null distribution. We also compare the empirical behaviour of the new tests with those proposed in the literature. We show that for families of distributions commonly applied to model asymmetry the new tests overcome their competitors on average and for most individual alternatives.

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Keywords and phrases: Testing symmetry, unknown center of symmetry, data driven score test, effective score, Schwarz type rule, model selection, rank test, kernel estimation, robust estimation, Monte Carlo study.

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