

## Testing for positive expectation dependence

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**Abstract** In this paper, hypothesis testing for positive first-degree and higher-degree expectation dependence is investigated. Some tests of Kolmogorov–Smirnov type are constructed, which are shown to control type I error well and to be consistent against global alternative hypothesis. Further, the tests can also detect local alternative hypotheses distinct from the null hypothesis at a rate as close to the square root of the sample size as possible, which is the fastest possible rate in hypothesis testing.

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A nonparametric Monte Carlo test procedure is applied to implement the new tests because both sampling and limiting null distributions are not tractable. Simulation studies and a real data analysis are carried out to illustrate the performances of the new tests.

**Keywords** Expectation dependence · Nonparametric Monte Carlo · Test of Kolmogorov–Smirnov type