

Consistent testing for pairwise dependence in time series

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Abstract

We consider the problem of testing pairwise dependence for stationary time series. We suggest the use of a Box-Ljung type test statistic which is formed after calculating the distance covariance function among pairs of observations. The distance covariance function is a suitable measure for detecting dependencies among data as it is based on the distance between the characteristic function of the joint distribution of the random variables to the product of the marginals. We show that, under the null hypothesis of independence and under mild regularity conditions, the test statistic converges to a normal random variable. The results are complemented by several examples.

Keywords characteristic function, distance covariance, kernel, U -statistic, V -statistic, white noise.

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