

# 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. For this, 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 between observations as it is based on the distance between the characteristic function of the joint distribution of the random variables and 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. We also study the concept of distance covariance testing methodology in the context of multivariate time series. The results are complemented by several examples.