

Robust tests of mutual independence between functional time series

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We propose a new test of mutual independence between two or more sequences of functional observations. Our method is based on empirical characteristic functions and, therefore, it requires less moment assumptions and also deals with true dependence and not just lack of covariance. After formulating the null hypothesis and suitable criteria, we investigate the asymptotic behavior of the test statistic and discuss computational issues. Simulated heavy-tailed functional observations are used to establish validity of block bootstrap and to investigate robustness of the proposed test in comparison to tests using empirical cross covariance operators or distance covariances. An application to real data investigates possible dependencies between time series of intraday returns of stock indices and cryptocurrencies.