

Testing for SETAR Non-linearity Using Wavelet Variance

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Abstract

A test procedure to detect non-linear self-exciting threshold autoregressive (SETAR) processes is proposed using a test statistic that is based on wavelet variance. The method of surrogate data is used to approximate the distribution of the test statistic under the null hypothesis that the data is generated by a linear process. Due to the complexity of the hypothesis being tested, whether the test is uniformly most powerful is not established. Instead, it is compared against other tests on both well-known and simulated datasets. The comparisons showed that each test has strong and weak spots, and that no test completely dominates the others for all cases. Comparing with other tests, the proposed test showed a little less power but overall the performance is comparable with the other tests.

Keywords: non-linear processes, SETAR, tests, wavelet variance, surrogate data