RELEVANT CHANGE POINTS IN HIGH DIMENSIONAL TIME SERIES

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This paper investigates the problem of detecting relevant change points in the mean vector of a high dimensional time series, which means that in at least one component of the vector the (absolute) difference between the means before and after the change point is larger than a given threshold. This formulation of the testing problem is motivated by the fact that in many applications a modification of the statistical analysis might not be necessary, if the differences between the parameters before and after the change points in the individual components are small.

We propose a new test for this problem based on the maximum of squared and integrated CUSUM statistics and investigate its properties as the sample size and the dimension of the time series both converge to infinity. In particular, using Gaussian approximations for the maximum of a large number of dependent random variables, we show that on certain points of the boundary of the null hypothesis a standardised version of the maximum converges weakly to a Gumbel distribution. Moreover, a multiplier bootstrap procedure is proposed, which improves the finite sample performance of the test.