

A Sequential Procedure to Detect and Estimate Multiple Change-points in a Series of Independent and Normally Distributed Observations

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Abstract

To assess the number of structural changes in hydrological time series, statistical procedures requires test to determine the number of changes in the series. From a classical approach of statistics, there is not a closed-form expression of the exact distribution of the likelihood ratio test (LRT) statistic for multiple change points in a series of normal and independent observations. To solve this issue, researchers had opted to develop heuristic methods based on loss functions and parsimonious considerations. In this research we approximate sequentially the critical values of the LRT statistic for multiple change-point by simulation, whereas an evolutionary algorithm is used to find the maximum likelihood estimators of the multiple change-points. Monte Carlo simulations show the performance of this procedure, power function of the test and bias of the estimators, when comparing with other methods. This procedure can be used for practitioners interested in a mayor control of the Type I Error in the structural change analysis.

References

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