Inference for multiple change-points in time series via likelihood ratio scan statistics

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Abstract

We propose a likelihood ratio scan method (LRSM) for estimating multiple change-points in piece-wise stationary processes. Using scan statistics reduces the computationally infeasible global multiple change-point estimation problem to a number of single change-point detection problems in various local windows. The computation can be efficiently performed with order \$O(n\log n)\$. Consistency for the estimated numbers and locations of the change-points are established. Moreover, a procedure is developed for constructing confidence intervals for each of the change-points. Simulation experiments and real data analysis are conducted to illustrate the efficiency of the LRSM.