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Data segmentation for time series based on a general moving sum approach

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Abstract
We consider the multiple change point problem in a general framework based on estimating equations. This extends classical sample mean-based methodology to include robust methods but also different types of changes such as changes in linear regression or changes in count data including Poisson autoregressive time series. In this framework, we derive a general theory proving consistency for the number of change points and rates of convergence for the estimators of the locations of the change points. More precisely, two different types of MOSUM (moving sum) statistics are considered: A MOSUM-Wald statistic based on differences of local estimators and a MOSUM-score statistic based on a global inspection parameter. The latter is usually computationally less involved in particular in nonlinear problems where no closed form of the estimator is known such that numerical methods are required. Finally, we evaluate the methodology by some simulations as well as using geophysical well-log data.

Keywords Multiple change points · *M*-estimators · Estimating function · Robust statistics · Poisson autoregression · Linear regression · Median

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