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Title:

"Changepoint in Linear Error-Prone Relations"

Abstract:

Linear relations, containing measurement errors in input and output data, are considered. Parameters of these so-called errors-in-variables models can change at some unknown moment. The aim is to test whether such an unknown change has occurred or not. For instance, detecting a change in trend for a randomly spaced time series is a special case of the investigated framework. The designed changepoint tests are shown to be consistent and involve neither nuisance parameters nor tuning constants, which makes the testing procedures effortlessly applicable. A changepoint estimator is also introduced and its consistency is proved. A boundary issue is avoided, meaning that the changepoint can be detected when being close to the extremities of the observation regime. As a theoretical basis for the developed methods, a weak invariance principle for the smallest singular value of the data matrix is provided, assuming weakly dependent and non-stationary errors. The results are presented in a simulation study, which demonstrates computational efficiency of the techniques. The completely data-driven tests are illustrated through problems coming from calibration and insurance, however, the methodology can be applied to other areas such as clinical measurements, dietary assessment, computational psychometrics, or environmental toxicology as manifested in the talk.