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A more powerful test identifying the change in mean of functional data

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Abstract An existence of change point in a sequence of temporally ordered functional data demands more attention in its statistical analysis to make a better use of it. Introducing a dynamic estimator of covariance kernel, we propose a new methodology for testing an existence of change in the mean of temporally ordered functional data. Though a similar estimator is used for the covariance in finite dimension, we introduce it for the independent and weakly dependent functional data in this context for the first time. From this viewpoint, the proposed estimator of covariance kernel is more natural one when the sequence of functional data may possess a change point. We prove that the proposed test statistics are asymptotically pivotal under the null hypothesis and consistent under the alternative. It is shown that our testing procedures outperform the existing ones in terms of power and provide satisfactory results when applied to real data.

Keywords Change point detection · Functional data analysis · Covariance kernel

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