Jump detection in time series nonparametric regression models: a polynomial spline approach

Yujiao Yang · Qiongxia Song

Abstract For time series nonparametric regression models with discontinuities, we propose to use polynomial splines to estimate locations and sizes of jumps in the mean function. Under reasonable conditions, test statistics for the existence of jumps are given and their limiting distributions are derived under the null hypothesis that the mean function is smooth. Simulations are provided to check the powers of the tests. A climate data application and an application to the US unemployment rates of men and women are used to illustrate the performance of the proposed method in practice.

Keywords B splines · Discontinuities · Jump detection · α-Mixing process · Time series · Nonparametric regression