Summary: When the data contain outliers or come from population with heavy-tailed distributions, which appear very often in spatio-temporal data, the estimation methods based on the least square method will not perform well. More robust estimation methods are required. We propose the local linear estimation for the spatio-temporal model based on the local modal method. Asymptotic theory properties and data analysis results show that the proposed estimator is more efficient than the ordinary least square-based estimation in the case of outliers or heavy-tailed error distributions, and as asymptotically efficient as the least square estimator when there are no outliers and the error is a normal distribution. The modal expectation-maximization algorithm is adopted and the asymptotic distributions of estimators are driven when the data are mixing correlation.

MSC:
62G08 Nonparametric regression and quantile regression
62G05 Nonparametric estimation
62G20 Asymptotic properties of nonparametric inference

Keywords: spatio-temporal model; modal expectation-maximization; mixing correlation; local linear regression

Full Text: DOI