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Spatial quantile estimation of multivariate threshold time series models

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Highlights in this article:

1. In the literature, there is little work about the spatial QR. This motivates us to work on the spatial QR estimation for multivariate time series data.

2. We study spatial QR estimation for multivariate thresholding time series models and established its asymptotics: the Bahadur representation and asymptotic normality, where the former furnishes a convenient tool for statistical inference about the model and the latter naturally provides approximating confidence intervals of the model parameters.

3. We also propose an efficient weighted spatial QR estimation method. Our simulation studies demonstrate nice performance of the proposed method. In real application, we employ a bivariate two regime threshold autoregressive model to fit the Iceland river flow dataset and discover that the daily flow changed over time in similar patterns at different levels of flows.

4. Our methodology is very useful for detecting the nonlinear dependence on the covariates in the lower and upper tails, as well as in the central, of the vector time series.

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