

On buffered time series models

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Abstract

We extend the classical threshold models via the regime switching mechanism mimicking a climatological example. It leads to a new model, which is called the buffered threshold model since there is a buffer zone for the model to switch regimes. This paper concentrates on the self-exciting buffered threshold autoregressive (BAR) model, and a sufficient condition is given for the geometric ergodicity of the two-regime BAR process. The conditional least squares estimation is considered for the BAR model, and its asymptotic properties including the strong consistency and the asymptotic distributions are also derived. Monte Carlo experiments give further support to the methodology developed for the new model, and two empirical examples demonstrates the importance of the BAR model.