

Use of Partial Cumulative Sum to Detect Trends and Change Periods in Time Series Analysis with Fuzzy Statistics

ABSTRACT

Because the structural change of a time series from one pattern to another may not switch at once but rather experience a period of adjustment time, conventional change point detection may be inappropriate to apply under this circumstance. Furthermore, changes in time series often occur gradually so that there is a certain amount of fuzziness in the change point. For this, many research have focused on the theory of change periods detection for a better model to fit. However, a change period in some small observation time interval may seem a neglectable noise in a larger observation time interval. In this paper, we propose an approach to detect trends and change periods with fuzzy statistics through using partial cumulative sum. By controlling the parameters, we can filter the noises and find out suitable change periods. With the change periods, we can further find the trends in a time series. Finally, some simulated data and empirical examples are studied to test our approach. Simulation and empirical results show that the performance of our approach is satisfactorily successful.

Keywords: fuzzy time series, change periods, partial cumulative sum, trend, noise.