

베이지 통계을 활용한 적응적 지수평활법

Adaptive exponential smoothing with Bayesian statistics

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Abstract

Exponential smoothing methods do not adapt well to unexpected changes in underlying process. Over the past few decades a number of adaptive smoothing models have been proposed which allow for the continuous adjustment of the smoothing constant value in order to provide a much earlier detection of unexpected changes. However, most of previous studies presented ad hoc procedure of adaptive forecasting without any theoretical background. In this paper, we propose a new adaptive exponential smoothing method based on Bayesian statistical theory. From simple exponential smoothing and Holt's linear method, we derive level and slope change detection statistics, and present a procedure to test for the occurrence of a structural change and to modify the forecast. At each time point, we calculate the posterior probability of change and compare it with the critical value to reject the null hypothesis of no level or slope change. Based on the test result, we decide to change the smoothing parameter or not at each time point. The proposed procedure is compared with previous adaptive forecasting models using simulated data and economic time series data

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