Modeling Interval Time Series Based on Stochastic Differential Equation

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Abstract

In economics, a large number of analysis and models are developed based on the daily closing price, or even at lower frequencies such as weekly or monthly. We may discard some valuable intra-daily information such as maximum and minimum prices. In this study, we provide an interval time series model, including the maximum, minimum and closing prices, and apply to the interval forecasts. The likelihood function of this model is constructed by using the stochastic differential equation. To see the efficiency of the proposed estimator, a simulation study is performed for illustration. In real data analysis, S&P 500 index is conducted to show that the interval forecasts of proposed method outperforms than several alternatives; meanwhile, a portfolio selection via maximum utility function is also performed.

Keywords: Forecast, Interval time series, Stochastic differential equation.