

Detecting Structural Shifts in Interval-Based Time Series

孫立憲
國立中央大學統計研究所

Abstract

We address the open problem of conducting multiple change-points analysis for interval-valued time series data. The proposed model contains daily opening (O), up (U), low (L), and closing (C) values, based on the log-transformed geometric Brownian motion model rather than traditional opening and closing values model. The joint distribution for these interval-valued observations can be obtained using the reflection principle and Girsanov's theorem. The change-point can be identified by the MLE method and PELT algorithm.

We investigate the performance of the model through extensive simulations and real data analysis using S\&P500 returns during the 2020 COVID-19 pandemic. The results demonstrate that the proposed OULC model consistently outperforms the traditional OC model, in terms of offering more accurate and reliable change-point detection.