A Self-Normalized Approach to Sequential Change-point Detection for Time Series

by

Mr. Wai Leong NG

Department of Statistics
The Chinese University of Hong Kong

Date: February 27, 2019 (Wednesday)
Time: 11:00am – 12:00noon
Venue: Room 4047 (LSK Business Building)

Abstract: This paper proposes a self-normalization sequential change-point detection method for time series. In monitoring for parameter changes in real time, most of the traditional sequential monitoring schemes utilize a CUSUM-based test statistic, which involves a long-run variance estimator. However, the commonly used long-run variance estimators require the choice of bandwidth parameter which could be sensitive to the performance. Moreover, the traditional schemes usually suffer from severe size distortion due to the slow convergence rate to the limit distribution in the early monitoring stage. In this article, a self-normalization method is proposed to tackle these issues. We establish null asymptotic and the consistency of the proposed sequential change-point test under general regularity conditions. Simulation experiments and applications to railway bearing temperature data are conducted for illustrations.

Bio: Mr. Wai Leong NG is currently a Ph.D. candidate in the Department of Statistics at The Chinese University of Hong Kong. He received his B.Sc. and M.Phil. degrees in Risk Management Science from The Chinese University of Hong Kong. His main research interests include change-point analysis, bootstrap resampling method, time series and spatial statistics. He is currently working on retrospective multiple change-point detection in spatiotemporal data and bootstrap statistical inference for change-point analysis.