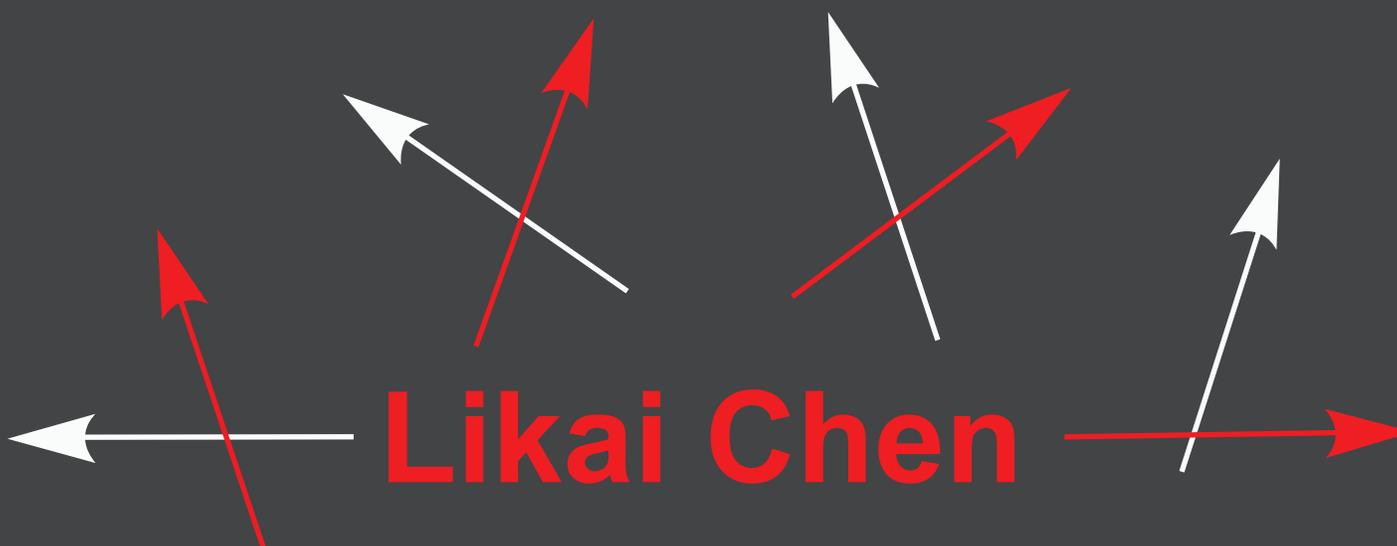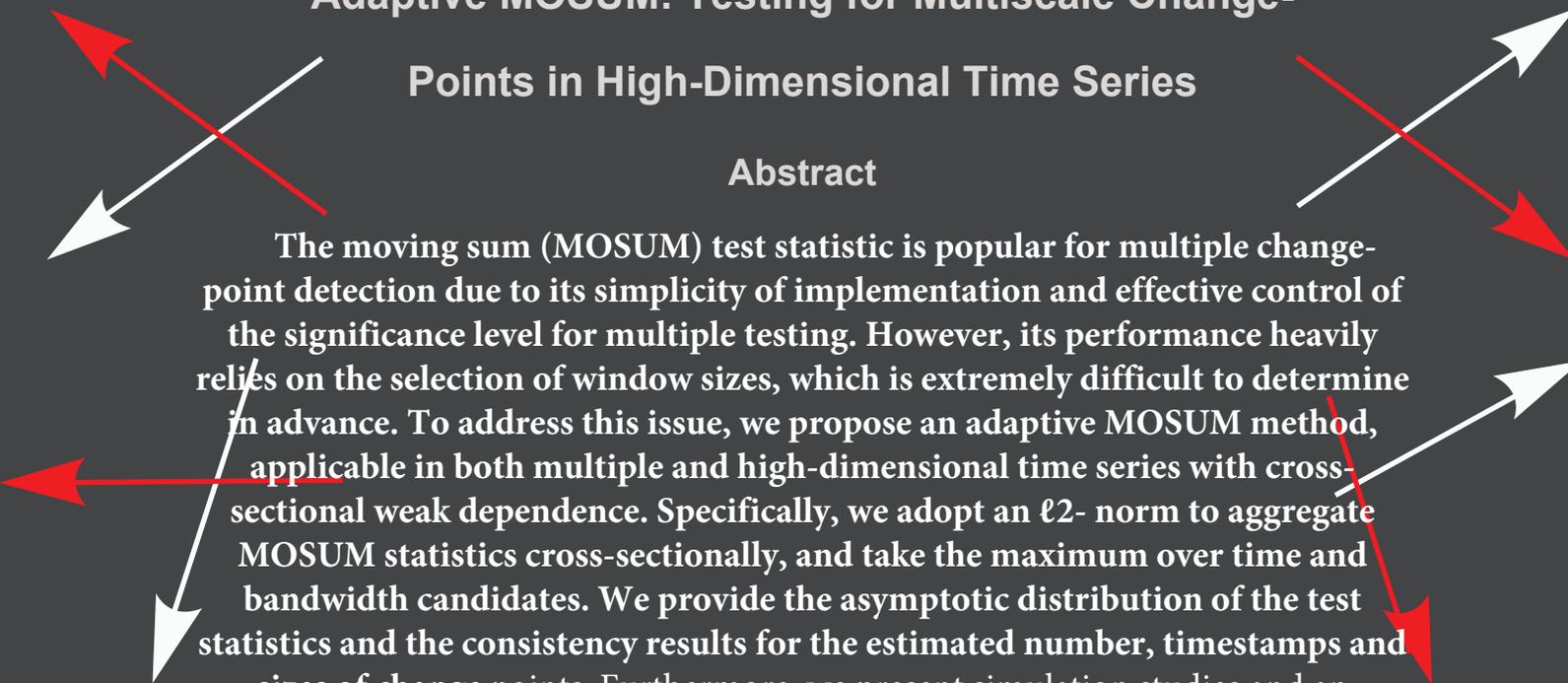# COLLOQUIUM

SMSS SIUC

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Adaptive MOSUM: Testing for Multiscale Change-Points in High-Dimensional Time Series

Abstract

The moving sum (MOSUM) test statistic is popular for multiple change-point detection due to its simplicity of implementation and effective control of the significance level for multiple testing. However, its performance heavily relies on the selection of window sizes, which is extremely difficult to determine in advance. To address this issue, we propose an adaptive MOSUM method, applicable in both multiple and high-dimensional time series with cross-sectional weak dependence. Specifically, we adopt an $\ell2$- norm to aggregate MOSUM statistics cross-sectionally, and take the maximum over time and bandwidth candidates. We provide the asymptotic distribution of the test statistics and the consistency results for the estimated number, timestamps and sizes of change points. Furthermore, we present simulation studies and an application using real-world COVID-19. We observe distinct outbreak stages among subjects of different age groups, which can facilitate analysis of epidemics, pandemics, and data from various fields of knowledge exhibiting similar patterns.

Time: 3:30PM
Date: February 26, 2026
Place: Neckers A 156

Reception immediately following in Math Library.

02.26.26