

Waseda Seminar on Mathematical Statistics

Date: May 21 (Tue.), 2024

Venue: Meeting Room (Dept of Pure & Appl. Math), Building 63-1, Nishi-Waseda Campus,
Waseda University

(Access map: <https://www.waseda.jp/top/en/access/nishiwaseda-campus>)

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Program

14:00 ~ 15:30

Testing for Change-points in Heavy-tailed Time Series — A Winsorized CUSUM Approach

Shiqing Ling (Hong Kong University of Science and Technology)

Abstract: It is well-known how to detect the change-point in heavy-tailed time series is an open problem since the traditional tests may not have a power. This article proposes a winsorized CUSUM approach to solve this problem. We begin by investigating the winsorized CUSUM process and deriving the limiting distributions of the Kolmogorov-Smirnov test and the Self-normalized test under the null hypothesis. Under the alternative hypothesis, we firstly uncover the behavior of change-point magnitude after the winsorized data and show that our tests have a power approaching to 1 as the sample size $n \rightarrow \infty$. We then extend the winsorizing technique to tests for multiple change-points without the prior information on the number of actual change points. Our framework is quite general and its assumption is very weak. This enables the application of our tests to both linear time series and nonlinear time series, such as TAR and G-GARCH processes. The empirical results illustrate the effectiveness of our proposed procedures for change-point detection. (This is a joint work with Rui She and Linlin Dai)

15:30 ~ 16:00

Coffee Break & Joint Discussion