



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

**Online Inference for Extreme Parameters in
High Dimensions with Diverging Stages**

By

Mr. Tiankai HU

Abstract

Online inference of extreme parameters in high-dimensional spaces is essential for the timely detection and response to rare but significant events in complex, data-rich environments. However, existing approaches for inference of extreme parameters in high dimensions heavily rely on resampling techniques, which are challenging to implement in online settings. In this work, we propose a novel online framework for inference on extreme parameters in high dimensions. Specifically, the estimated candidate set of extreme parameters is adaptively updated at each stage, significantly reducing computational cost and improving accuracy by leveraging real-time data. Critically, we derive a theoretical bound on the number of online stages required to maintain the validity of our inference procedure. We show that inference remains valid even with a diverging number of online learning stages, provided the number of stages is asymptotically dominated by a specific rate we establish. This allows for robust and scalable inference in dynamic environments. The confidence interval is derived solely from the summary statistics and the adaptively estimated candidate set. Both theoretical and numerical results are provided to support the validity and enhanced accuracy of our proposed method, demonstrating its practical applicability and theoretical guarantees.

Date : 15 May 2025 (Thursday)

Time : 3:00pm

Venue : Room 1409 (near Lifts 25/26)

All are Welcome!