



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

**V-Uniform Ergodicity for
Multiple-Regime Threshold VARMA Models**

By

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Abstract

Multiple-regime Threshold Vector ARMA (MT-VARMA) models with CCC-GARCH innovations effectively capture structural breaks and volatility clustering in macroeconomic time series. In this talk, we establish a rigorous framework for proving the V-uniform (geometric) ergodicity of these highly non-linear systems. To handle the theoretical challenges posed by threshold discontinuities, we embed the process into a general piecewise Markovian framework. We establish psi-irreducibility and the Feller property by exploiting local non-linear controllability and imposing measure-theoretic regularity on the regime boundaries, formally classifying the system as a T-chain. To satisfy the Foster-Lyapunov drift criterion, we abstract the dynamics into a matrix-dominated setting based on the system's spectral properties. By considering distinct global and tail contraction paradigms, we prove that the process converges exponentially fast to a unique stationary distribution. Our results provide the essential theoretical foundation for asymptotic inference.

Date : 27 April 2026 (Monday)

Time : 12:00nn

Venue : Room 4472 (near Lifts 25/26)

All are Welcome!