

HKUST ECON Seminar by Prof Noah Williams, University of Miami

Date: 25 February 2026 (Wed)

Paper title: “Uncertain Network Dynamics.”

Abstract:

“I study the dynamics of flows on networks under uncertainty. I analyze the dynamic transmission across a network of shocks with uncertain dynamic properties, which can capture both exogenous stochastic shocks and uncertainty in the network structure. I show how to map uncertain network dynamics into a control system, which allows me to apply tools from robust control theory to analyze system performance. I study two main classes of applications: production networks and consensus problems with local information diffusion. I characterize the response of these networks to perturbations, whether due to (1) stochastic shocks with specified properties, where performance is measured by the volatility of the network output, or (2) uncertain but norm-bounded inputs, leading to a robust measure of worst-case shock amplification. I analyze several examples to illustrate how the network topology affects shock propagation and amplification.”