



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

## PHD STUDENT SEMINAR

**Graphon mean field game of mutual holding**

By

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### Abstract

We study a mutual holding problem in  $N$ -agent and mean-field settings, where agents' interactions are governed by a graphon, which is defined to be a symmetric bounded measurable function, and are represented as positive finite measures. We provide an explicit solution of this problem in the limiting setting, i.e. a graphon equilibrium. Under modest assumptions on the denseness of the interaction graph among the agents, we construct an approximate Nash equilibrium for the  $N$ -player problem using the graphon equilibrium. This result is achieved via an appropriate relaxed formulation of the problem as well as compactness arguments. In addition, characterizing the equilibrium dynamics in the limiting game gives rise to a stochastic differential equation of McKean-Vlasov type with some irregularity, for which we provide a weak solution. Our result has an implementation for modeling strategic interaction between different types of economic entities, which can help understand the key determinants of financial distress contagion and systemic risk.

**Date : 27 April 2026, Monday**

**Time : 4:00pm**

**Venue : Room 4472 (Lifts 25/26)**

*All are Welcome!*