



# Analysis Seminar

## Computing Mean-Field Equilibria via Homotopy Method I

By

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**Abstract:** Mean Field Games (MFGs) provide a powerful framework for modeling strategic interactions among a large number of agents, where each individual's impact on the collective dynamics is negligible. As the population size tends to infinity, the dynamics of a representative agent can be described by a state-distribution-constrained Markov Decision Process (MDP). In this talk, we explore how the state-distribution-constrained MDP formulation of MFGs leads to generalized Nash equilibrium problem through the linear programming formulation of MDPs, from which the associated Karush–Kuhn–Tucker (KKT) conditions emerge. These conditions reduce the equilibrium computation to a root-finding problem. We will discuss how the homotopy continuation method can be effectively used to solve this root-finding problem.

**Date:** October 8, Wednesday

**Time:** 14:00-15:00

**Place:** Mathematics Seminar Room, SA – 141