Analysis Seminar

On the Convergence of (Self-interested) Learning Dynamics in Stochastic games

By

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Abstract: Stochastic games, also known as Markov games, have attracted interest in modeling multi-agent reinforcement learning in forefront AI applications, from playing complex (board) games to the decentralized control of robot fleets. However, the literature on the theory of learning in stochastic games has either focused on experimental-only studies or clustered around equilibrium computation. In this talk, I will present our recent contributions on whether non-equilibrium adaptation of self-interested learning agents would reach equilibrium in essential classes of stochastic games, including zero-sum and identical-interest games. Previously, such convergence guarantees were known only for repeated play of games due to the core challenge of the non-stationarity induced by the concurrent adaptations of agents in stochastic games. We addressed this issue through a two-timescale learning framework based on the premise that choices evolve faster than preferences. The new technical tools developed can be of independent interest in analyzing fixed-point iterations through a dynamical systems viewpoint.

Date: Tuesday, November 22, 2022
Time: 16:00-17:00, GMT+3
Place: SA141 Mathematics Seminar Room