

1163-91-228

Ruimeng Hu* (rhu@ucsb.edu). *Convergence Of Deep Fictitious Play For Stochastic Differential Games.*

In this talk, I will focus on the convergence analysis for deep fictitious play, which is a novel machine learning algorithm for finding Markovian Nash equilibrium of large N -player asymmetric stochastic differential games. By incorporating the idea of fictitious play, the algorithm decouples the game into N sub-optimization problems, and identifies each player's optimal strategy with the deep backward stochastic differential equation method parallelly and repeatedly. I will show the proof of convergence of the algorithm to the true Nash equilibrium, and show that the strategy based on DFP forms an ϵ -Nash equilibrium. I will also discuss some generalizations by proposing a new approach to decouple the games and present numerical results of large population games showing the empirical convergence of the algorithm beyond the technical assumptions in the theorems. (Received August 28, 2020)