Strongly Symmetric Equilibria in Bandit Games

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Tuesday, 27th September 2016
12:30pm Room 3-E4-SR03 Via Rontgen 1 Milano

Abstract
This paper studies strongly symmetric equilibria (SSE) in continuous-time games of strategic experimentation with Poisson bandits. SSE payoffs can be studied via two functional equations similar to the HJB equation used for Markov equilibria. This is valuable for three reasons. First, these equations retain the tractability of Markov equilibrium, while allowing for punishments and rewards: the best and worst equilibrium payoff are explicitly solved for. Second, they capture behavior of the discrete-time game: as the period length goes to zero in the discretized game, the SSE payoff set converges to their solution. Third, they encompass a large payoff set: there is no perfect Bayesian equilibrium in the discrete-time game with frequent interactions with higher asymptotic efficiency.

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