Parameterized Games and K-Correspondences

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Abstract

For a large class of nonatomic, parametrized games, including all nonatomic discounted stochastic games of the type studied by Nowak and Raghavan (1992), we show that each game in the class has a Nash payoff correspondence that is a K-correspondence - or equivalently, is a correspondence having the K-limit property.[1] We then show that if a Nash payoff correspondence has the K-limit property, then its induced Nash payoff selection correspondence is approximable in the weak star topology and therefore has fixed points. Our results lead directly to the resolution of a long-standing open problem in the theory of discounted stochastic games (see Page, 2014).

[1] Stated informally, a correspondence is a K-correspondence if for each sequence contained in its graph, there is at least one K-subsequence (Komlos subsequence) whose K-limit is contained in the graph.