Nash Equilibria in Reactive Strategies

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We study the Nash equilibrium in infinitely repeated bimatrix games where payoffs are determined by reactive strategies [1]; we consider limit of means payoffs. Reactive strategies are stochastic memory-one strategies such that a probability of players' actions depends only on the opponent's preceding move.

We provided a characterization of all Nash equilibria in the class of reactive strategies and derived a characterization for all symmetric stage games admitting Nash equilibria in the class of reactive strategies. Note that in [2] Arkady Kryazhimskiy obtained conditions sufficient for the existence of a Nash equilibrium within subsets of memory-one strategies. The conditions were obtained by means of the Kakutani fixed-point theorem. Unfortunately, in our case the last approach can not be applied without 'unnatural' topological constructions for an extension of sets of strategies.

We calculated a probability for an arbitrary symmetric game to have a Nash equilibrium. Finally, we compared our results with the available ones for memory-one strategies (see [3]). Namely, we showed that payoff relevant indeterminacy holds true and there is no folk theorem; we demonstrated that the reverse dominance condition does not influence the existence of Nash equilibria. Extensively using examples, we illustrated new effects connected with Nash equilibria in the class of reactive strategies.

References

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