1、文章信息

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题目：Distributed Nash Equilibrium Seeking by a Consensus Based Approach

2、背景、目的及结论

背景

In this paper, Nash equilibrium seeking among a network of players is considered. Different from many existing works on Nash equilibrium seeking in noncooperative games, the players considered in this paper cannot directly observe the actions of the players who are not their neighbors. Instead, the players are supposed to be capable of communicating with each other via an undirected and connected communication graph.

目的

By a synthesis of a leader-following consensus protocol and the gradient play, a distributed Nash equilibrium seeking strategy is proposed for the noncooperative games. Analytical analysis on the convergence of the players' actions to the Nash equilibrium is conducted via Lyapunov stability analysis.

结论

For games with nonquadratic payoffs, where multiple isolated Nash equilibria may coexist in the game, a local convergence result is derived under certain conditions. Then, a stronger condition is provided to derive a nonlocal convergence result for the nonquadratic games. For quadratic games, it is shown that the proposed seeking strategy enables the players' actions to converge to the Nash equilibrium globally under the given conditions.

3、结果与讨论

4、文章好在哪里

内容:

由于参考文献[2]-[18]中的方法，都不需要利用模型信息去实施。

所以本文设法解决实现Nash equilibrium seeking在局部通信网络中，即玩家只能与其邻居进行交流。而本文利用leader-following consensus protocol去传播局部信息，即每个agent都充当一个虚拟的leader去提供自己的行动作为参考信号，agents会通过leader-following consensus protocol估计其他玩家的行动。

本文考虑的Nash equilibrium seeking问题时在确定的和连续时间场景。

==优点==：

1. 基于leader-following consensus protocol和the gradient play设计Nash equilibrium seeking策略，玩家只需要与邻居交流，就可以估计所有玩家的行动。避免了在博弈论在实际工程系统中的限制——玩家无法充分的与所有玩家进行交流。

2. 通过Lyapunov稳定性分析，可以证明提出的方法在一定条件的二次博弈与非二次博弈中，都能让玩家的行动收敛到Nash equilibrium。

==不足==：

5、自我想法