

Algorithmic Game Theory

Practice Problems: Equilibrium Concepts, Matrix Games

Palash Dey
Indian Institute of Technology, Kharagpur

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1. Give an example of a game which has a PSNE but the best response dynamics can run forever.
2. In Local-Weighted-Max-Not-All-Equal-2SAT problem, we are given a set of 2SAT clauses each having a weight. An assignment of the variables is said to satisfy a clause if and only if it makes exactly one of its literal true. The goal is to find an assignment which is locally optimal — by changing the assignment of any one variable, it is not possible to increase the sum of weights of the clauses satisfied. Prove that Local-Weighted-Max-Not-All-Equal-2SAT is PLS-complete.
3. In Local-Weighted-Max-2SAT problem, we are given a set of 2SAT clauses each having a weight. An assignment of the variables is said to satisfy a clause if and only if it makes at least one of its literal true. The goal is to find an assignment which is locally optimal — by changing the assignment of any one variable, it is not possible to increase the sum of weights of the clauses satisfied. Prove that Local-Weighted-Max-2SAT is PLS-complete.