

Title: Algorithmic complexity of solution concepts in selected classes of non-cooperative games

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Abstract In the presented work we study natural algorithmic problems rising from the concept of Nash Equilibrium. The problem of its existence is trivial, because it follows from Nash Theorem of completeness of Nash Equilibria. Even related search problem doesn't seem to belong to NP-complete class, the reason being the very fact, that existence of Nash Equilibria is certain. Interesting observation is that every natural extension of this problem seems to be NP-complete. Many of such problems have been proven to be NP-complete through reduction of SAT problem, Klike problem or problem of searching subcover of certain size. The question, whether the problem of existence of asymmetric Nash equilibria of symmetric game fits with the others, in being NP-complete, has been an open problem. Here we show how to alternate the proof from [?] and apply the construction to problem of existence of asymmetric equilibria and therefore prove its NP-completeness.

Keywords: Nash equilibrium, Algorithmic complexity, Non-cooperative games, Game Theory, Asymmetric equilibria,
