Robust mixed strategies in fuzzy non-cooperative Nash games

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Abstract-

theory has traditionally used real-valued utility functions Game in decision-making problems. However, the real information available to assess these utility functions is normally uncertain, suggesting the use of uncertainty distributions for a more realistic modelling. In this sense, utilities results or pay-offs have been normally modelled with probability distributions, assuming random uncertainty. However, when statistical information is unavailable, probability may not be the most adequate paradigm, and can lead to very large execution times when some real complex problems are addressed. In this article possibility distributions are used to model the uncertainty of utility functions when the strategies are probability distributions (mixed strategies) over a set of original and discrete strategies (pure strategies). Two dual approaches to solve the resulting non-cooperative fuzzy games are proposed: modelling players\' risk aversion, and thus providing realistic conservative strategies. Two examples show the robustness of the strategies obtained with the proposed approaches.

Index Terms- non-cooperative games; fuzzy games; Nash equilibrium; chance constraints

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