Implementation of Linear Core-based Criterion for Testing Extreme Exact Games

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Poster Abstract

The notion of a (discrete) *coherent lower probability* and that of an induced *credal set* (of discrete probability distributions) are traditional topics of interest in the theory of imprecise probabilities. These notions correspond to the game-theoretical concepts of an *exact game* and its *core* (polytope), widely used in the context of cooperative coalition games. The collection of (standardized) exact games forms a pointed polyhedral cone. Extreme rays of that cone are usually known as extreme exact games.

In (Studený and Kratochvíl, 2017), we have introduced a criterion for testing whether an exact game is extreme - extending a former necessary and sufficient condition for the extremity of a supermodular game (Studený and Kroupa, 2016). The criterion leads to solving simple linear equation systems determined by (the vertices of) the core polytope (of the game) and it is shown to be necessary for an exact game to be extreme.

In this poster we present an implementation of the criterion - we created a web platform for testing the extremity of a supermodular/exact game in the respective cone for a reasonably limited number of players.

Moreover, we have achieved some theoretical progress with respect to (Studený and Kratochvíl, 2017) and we already have a necessary and sufficient linear criterion for testing extremity - also implemented and presented in the poster.

Acknowledgments

References

M. Studený and T. Kroupa. Core-based criterion for extreme supermodular functions. *Discrete Applied Mathematics*, 20:122–151, 2016.

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