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On the convexity of independent set games. (English) [Zbl 1460.05130]

Summary: Independent set games are cooperative games defined on graphs, where players are edges and the value of a coalition is the maximum cardinality of independent sets in the subgraph defined by the coalition. In this paper, we investigate the convexity of independent set games, as convex games possess many nice properties both economically and computationally. For independent set games introduced by X. Deng et al. [Math. Oper. Res. 24, No. 3, 751–766 (1999; Zbl 1064.91505)], we provide a necessary and sufficient characterization for the convexity, i.e., every non-pendant edge is incident to a pendant edge in the underlying graph. Our characterization implies that convex instances of independent set games can be recognized efficiently. Besides, we introduce a new class of independent set games and provide a necessary and sufficient characterization for the convexity.

MSC:
05C57 Games on graphs (graph-theoretic aspects)
91A43 Games involving graphs
91A46 Combinatorial games

Keywords:
cooperative game; convexity; independent set

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References:


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