Kreines, E. M.; Novikova, N. M.; Pospelova, I. I.

Multicriteria competitive games as models in operations research. (English. Russian original) Zbl 1452.91017

Summary: The problem of a priori estimation of the result of a multicriteria two-person competitive game is considered in the framework of operations research. Various aspects of decision making in such games are discussed. Relations between the values of a vector best guaranteed result (BGR) for both players are obtained. The difference of the multicriteria antagonistic game considered as a model of taking into account the natural uncertainty from the multicriteria zero-sum game considered as interaction with a purposeful opponent is formalized. Special attention is paid to the concepts of the value and solution of the latter game. As the basic solution of this game, we use the multicriteria Shapley equilibrium when it gives to each player the result not worse than her or his BGR. It is shown that the last condition is not restrictive. The definition of the one-sided value of the multicriteria game as the player’s BGR if her BGR is independent of the order of the players’ moves and the definition of the corresponding one-sided solution are given. It is proved that the equilibrium is weaker than the one-sided solution, and the equilibrium always exists in mixed strategies. The existence of a one-sided solution in mixed strategies is guaranteed by a special interpretation of multicriteria averaging. To justify the conclusions, Slater’s value of the multicriteria optimum is parameterized using Germeier’s scalarizing function.

MSC:
91A10 Noncooperative games
91A05 2-person games
90B50 Management decision making, including multiple objectives

Keywords:
multicriteria competitive games; decision-making; multicriteria equilibrium; Germeier’s scalarization; average scalarizing function; tradeoff

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