Additivities in Fuzzy Coalition Games with Side-Payments.

Milan Mareš

Abstract: The fuzzy coalition game theory brings a more realistic tools for the mathematical modelling of the negotiation process and its results. In this paper we limit our attention to the fuzzy extension of the simple model of coalition games with side-payments, and in the frame of this model we study one of the elementary concepts of the coalition game theory, namely its "additivities", i.e., superadditivity, subadditivity and additivity in the strict sense. In the deterministic game theory these additivites indicate the structure of eventual cooperation, namely the extent of finally formed coalitions, if the cooperation is possible. The additivities in fuzzy coalition games play an analogous role. But the vagueness of the input data about the expected coalitional incomes leads to consequently vague validity of the superadditivity, subadditivity and additivity. In this paper we formulate the model of this vagueness depending on the fuzzy quantities describing the expected coalitional pay-offs, and we introduce some elementary results mostly determining the links between additivities in a deterministic coalition game and its fuzzy extensions.