DEPARTAMENTO DE
ESTADÍSTICA E IO

Instituto de Matemática Interdisciplinar

Seminario

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"Values for cycle-free directed graph games"

joint work together with Dolf Talman (Tilburg University)

Abstract:

In standard cooperative game theory it is assumed that any coalition of players may form. However, in many practical situations the collection of feasible coalitions is restricted by some social, economical, hierarchical, communicational, or technical structure. The study of TU games with limited cooperation introduced by means of communication graphs was initiated by Myerson (1977). In this paper we restrict our consideration to the class of cycle-free digraph games in which all players are partially ordered and a possible communication via bilateral agreements between participants is presented by a directed graph (digraph) without directed cycles. A cycle-free digraph cooperation structure allows modeling of various flow situations when some links may merge while others split into several separate ones. Following Myerson, we assume that for a given game with cooperation structure, cooperation is possible only among connected players, while we consider connectedness with respect to directed paths.

We introduce values for cycle-free digraph games axiomatically and provide their explicit formula representation. We also study stability and distribution of Harsanyi dividends. Furthermore, we show that the problem of sharing a river with a delta and with multiple sources among different agents located at different levels along the river bed can be embedded into the framework of a cycle-free digraph game.

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