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"Multicoalitional solutions"

Abstract:

Extending the concept of core for unbalanced games is one of the most important goals in cooperative game theory. The c-core and the aspiration core (or d-core) are extensions which ensure coalitional rationality for any TU game. Generally, to ensure payment given by the c-core or the d-core, we assume that the players are not necessarily in the grand coalition, but shared in several sub-coalitions: the most common assumption is to consider that each player is active during a fraction of his total time in a coalition which then produces the corresponding fraction of its value. In this paper we propose an implementation of the solution given by the c-core and d-core, first by characterizing active coalitions in the game and proving that active coalitions correspond to the autonomous coalitions, then by proving the existence of optimal timetables which associate coalitions to each point of time while ensuring a locational and time consistency, i.e., while ensuring that two players cannot be in two coalitions at once and each player is active during exactly one unit of time. This being established, we examine how to generalize this implementation, i.e., we do not require that all players are active during exactly one unit of time: each player is active the time he wants with whomever he wants. Then we propose to characterize the games which can give a rational "productivity", i.e., a payment which satisfies coalitional rationality compared to the minimum time necessary to achieve a timetable for that payment: We conclude that it is possible to give a coalitionally rational productivity if and only if the game restricted to its players with a nonnegative productivity has a nonempty c-core.