COST Action IC 1205 on Computational Social Choice: STSM report

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Purpose of the STSM: A minor purpose was to complete a joint paper on lexicographic allocations for assignment games. The main purpose was to initiate a new research project on the core in permutation games, which are the transferable utility variants of the basic house-swapping model of markets with indivisible goods. The core of permutation games is known to be non-empty, but not much is known about its structure. This is in sharp contrast with the many features known for the core of assignment games, although an assignment game can be seen as a special permutation game (on the same player set), moreover, the core of a permutation game can be obtained from the core of a double-size assignment game.

Description of the work carried out: Our paper *Lexicographic allocations and extreme core payoffs: the case of the assignment game* has been completed. It presents several results on how to obtain extreme core payoffs in assignment games by using various easy-to-compute lexicographic allocation methods.

During this STSM we have concentrated on cyclic permutation games (a large subclass which includes assignment games), i.e. we assume that the maximum-value permutation of the players consists of a single cycle. This circular 'ordering' of the players enables us to define 'connectedness' of coalitions. The quadratic many interval coalitions are known to determine the core of a cyclic permutation game (Solymosi et al., EJOR, 2005). Now, we devised an efficient algorithm to compute the (entrywise) maximum matrix which induces the (coalitionwise) maximum cyclic permutation game with the same core as of the original game. This 'exactification' algorithm systematically checks a property of the underlying matrix, and modifies the entries for which it is violated. It seems that the dual upper bounds for core payoffs and the set of dual coalitionally rational payoffs can be easily and directly obtained from the output matrix of this algorithm, paving the way for the extension to (cyclic) permutation games of our aforementioned results on assignment games.

Future collaborations and foreseen publications: The applicant and the host will continue working on the related open questions necessary to achieve a publishable body of results on the core of (cyclic) permutation games.

Confirmation of successful execution of the STSM: On behalf of the host institution, Marina Núnez confirms that the STSM was successfully executed.
For further queries please contact her at mnunez@ub.edu

Other comments: During this STSM I have also consulted with Ata Atay (PhD student of Marina Núnez) on his work regarding stability of the core in multi-sided assignment games.