

Action IC1205 on Computational Social Choice: STSM Report

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During my STSM stay at the Université Paris-Dauphine, France, I was hosted by Jérôme Lang. I was working together with Jérôme Lang (Université Paris-Dauphine), Britta Dorn (University of Tübingen), Andreas Darmann (University of Graz) and Sebastian Schneckeburger (University of Tübingen). The latter two researchers also traveled to Paris with STSM funds.

We continued previous joint work on a simplified variant of the group activity selection problem, where we considered the case in which agents' preferences only depend on the activities subject to constraints, e.g., with restrictions on the number of agents that can be assigned to an activity. The goal in this setting is to find a “good” assignment.

We took into account a natural stability notion, i.e., virtual stability, that we did not consider before and were able to derive several complexity results for this concept, both for the question whether such an assignment exists and the task of deciding whether it is possible to assign at least a given number of agents to a non-void activity.

Considering the concept of individual rationality with the restriction that each activity can only take place with exactly two participants, we found that the second question mentioned in the latter paragraph has a nice graph theoretic interpretation involving rainbow matchings. Despite this, the computational complexity of the problem remains open (to the best of our knowledge there are no known complexity results for finding a maximum rainbow matching in the graph class arising in our construction).

Furthermore, we gained new insights on Pareto-optimality in our setting and investigated the tension between envy-freeness and Pareto-optimality. Moreover, we also considered the approval scenario, where the agents' preferences are trichotomous.

Finally, I continued joint work with Andreas Darmann on planar variants of the monotone¹ satisfiability problem for boolean formulae in conjunctive normal form with bounded variable appearances.

¹Monotone means that for each clause either all contained literals are positive or all of them are negative, respectively.