Homework #4

Deadline: Friday, 30 April 2021, 18:00

Question 1 (10 marks)

Your main task for this exercise is to design a resolute multiwinner voting rule F with ranked ballots for $n \in \mathbb{N}$ voters and a finite set $A = \{a_1, a_2, \ldots, a_m\}$ of alternatives to elect a committee of size $k = 3$ such that F is strategyproof under the following two assumptions. The first assumption is that the true preferences of the voters regarding individual alternatives are single-peaked with respect to the dimension $a_1 \gg a_2 \gg \cdots \gg a_m$. The second assumption is that any given voter will prefer committee S to committee S' if and only if she prefers her second most preferred member of S to her second most preferred member of S'. Your voting rule should be as 'reasonable' as possible.

Start by writing down formal definitions of single-peakedness and strategyproofness—specifically for the scenarios of interest here (that is, do not simply recall the standard definitions, but adapt them to the setting considered here). Then define your rule, show that it is strategyproof given our assumptions, and argue (briefly) why you consider it to be a reasonable rule. Finally, (again, briefly) point out one shortcoming of your rule.

Question 2 (10 marks)

The International Conference on Autonomous Agents and Multiagent Systems (AAMAS) is one of the main conferences where work on computational social choice gets presented. Due to the coronavirus, the 2021 edition of the conference, taking place in early May, will be held online. While active participation requires a registration fee, the papers to be presented at the conference and pre-recorded videos of the corresponding talks are freely available to everyone. The programme includes five sessions on computational social choice.

Watch one of the talks from one of those sessions and write a report about it. Consult the corresponding paper where necessary, but try to get as much as possible out of the talk itself. Your report should be around two pages long and it should cover the following points:

- Title and full names of all authors of the paper. Direct links to paper and talk.
- Write a short summary of the paper (or the part of the paper discussed in the talk), mentioning the research area, the question or problem addressed, the methodology employed, and the results obtained. Write at most half a page of text for this part.
- Report on the history of the paper. Questions you might consider include: Does the paper answer a question raised in an earlier paper? Have the same authors collaborated before, maybe on the same topic? Is the paper part of a larger project?
- Paraphrase what you consider to be the most interesting contribution discussed in the talk. This might be a single theorem proved or a single experiment conducted.
- Identify a weakness of the paper. In principle, this could be a technical mistake, but more likely it will be an unrealistic assumption or similar.

- Sketch a possible direction for future work one might take to build on the work reported on in the paper (and that is not already mentioned in the paper itself).

Try to be led by the talk rather than the paper, formulate things in your own words rather than the words of the speaker or the authors of the paper, and wherever applicable use the terminology of the course (which might be subtly different from the speaker's terminology).