

Homework #3

Deadline: Tuesday, 21 April 2020, 18:00

Question 1 (10 marks)

Consider the basic model of liquid democracy introduced in class. Suppose the voters are situated on a social network that is a directed acyclic graph and voters will only consider delegating to other voters they can “see”, i.e., we can be certain that the delegation graph will not contain any cycles. Recall the “Paradox of Unwelcome Delegation” discussed in class, which occurs when a voter i^* who chooses to vote herself (i.e., who is a guru) would benefit from some other voter *not* choosing i^* as a proxy (but to vote herself instead).

Prove that every resolute voting rule F that is the result of pairing a positional scoring rule with a lexicographic tie-breaking rule is subject to this paradox when used to aggregate the induced preferences to compute a winning alternative.

Briefly discuss the conditions on n (the number of voters) and m (the number of alternatives) under which you are able to obtain this result.

Question 2 (10 marks)

We saw in class that the greedy approval mechanism is strategyproof for the restricted domain of participatory budgeting instances for which all projects have the same cost. We also saw that the same mechanism is approximately strategyproof in the general case. Do these two results also apply to the max-approval mechanism? For each of them either prove that it does or provide a counterexample that illustrates a successful manipulation attempt.

Question 3 (10 marks)

Find out everything you can about the use of participatory budgeting in one specific place and at one specific time in history. We are particularly interested in understanding the mechanism used—this includes not only the precise mechanics of the mechanism itself, but also the form of ballots, any restrictions imposed on admissible ballots, and any constraints imposed on acceptable outcomes. Beyond the immediate social choice aspect, also report on matters such as the amount of budget at stake, the range of costs of projects, the number of eligible and actual voters, the method used to select projects to appear on the ballot sheet, public reception before and after the event, and so forth. The point of this exercise is to understand better how participatory budgeting is used in practice and how this may inform future research on the topic in computational social choice.

Write between one and two pages of text. If you become aware of another student writing about one specific instance, then please pick a different one.