COST Action IC1205 on Computational Social Choice: STSM Report

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During my visit at HUJI, I colsely worked with Omer Lev, in the end of his PhD under Jeff's supervision.

We worked on extending the setting of iterative voting to capture farsighted voters – that is, voters who look several steps ahead instead of applying myopic improving moves, as assumed in previous works on iterative voting. Specifically, we associate each voter with a so called *radius*, which is simply the number of steps, whithin which a voter may expect (positive) effects of his move. These expectations may though differ, depending on how optimistic/cautious a voter can be. Thus, an optimistic voter i with radius R_i, would consider all possible paths of length r_i, started with his move, and if any of those lead to an outcome, which more preferred by i than the current outcome (given i's preferences over the available alternatives), voter i would apply the move under consideration. A more cautious voter would restrict the set of all possible paths of length r_i to only those that contain the moves by other voters that voter i believe may really happen (for instance, he may not expect other voters to worsen a position of a current winner on a given step if they had previously chosen to promote one, or make other "unreasonable" moves). Note though, that in any case, we do not assume that voter i has any knowledge about the preferences of other voters.

At first glance, the ability of looking farther ahead should give a voter the advantage against other (especially if still myopc) voters, and indeed, we find examples where farsightedness works in favour of the voter. However, we demonstrate that it can also be harmful. That is, there are examples where a dynamic process converges to an equilibrium state with a final winner being less preferred by the farsighted voter than if he acted myopically. Moreover, it turns out that these negative results are valid even when the voters try to learn the other voters' preferences from their moves and outcomes along the improvement path, in order to use this knowledge in planning their own moves. We also observe, that in certain cases farsighted voters may create cycles in dynamics where convergence is guaranteed under the myopia assumption (e.g., best-response dynamics under Plurality).

Given these - both positive and negative - observations, it makes then sense to look at the average effect of farsightedness in iterative voting. To this end, we have planned a set of experimental studies where we aim to compare the convergence properties and the quality of outcomes (with respect to both individual voters' preferences and some global characteristics, such as, for example, the Condorcet criterion) for the following three cases: (i) there is a single farsighted voter, and the rest are myopic; 2) all voters have the same radius of farsightedness; 3) all voters are farsighted with possibly different radiuses. This work is currently in progress.