

TITLE: On preference aggregation rules and social rankings

ADVISOR: Stefano Moretti and Roberto Lucchetti (Politecnico di Milano)

DESCRIPTION OF THE SUBJECT:

A preference aggregation rule is a function aggregating preferences of individuals over a set of alternatives into a collective ranking over the alternatives. This type of problems applies to different contexts, from voting to classifying performances of Olympic athletes in some disciplines, like diving, skating and gymnastic, to the ranking of a set of people having information on their performances into their subgroups. There exist classical results in this sense, starting from the most important result in Social Choice, Arrow's theorem, and more recent ones, like the majority judgement method (see [1]), or the lexicographic excellence solution, introduced in [2].

Several potential applications of these methods, possible extensions, require better understanding of the properties characterizing these types of rules. Just to quote some of them, to give a unified approach to some rules like those in [1] and [2], which are characterized by some common properties, one should focus on alternative neutrality assumptions assuming that the "voters" have the same importance when these are subgroups of a given set of individuals.

In the context of social ranking solutions [2], another direction of this thesis project will be devoted to investigating some generalizations of famous indices that consider exclusively minimal winning coalitions within the equivalence classes of a coalitional ranking, like the Deegan-Packel index (DPI) [3] or the Public Good Index (PGI) [4] in the context of dichotomous coalitional rankings (i.e., simple games).

DESIRED QUALIFICATIONS: The ideal applicant possesses strong basis in social choice, game theory and the recent literature on social rankings [2,5].

REFERENCES

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- [4] Holler, M.J. (1982) Forming coalitions and measuring voting power. *Political Studies*, 30, 262–271.
- [5] Lucchetti, R., Moretti, S., Tommaso, R. (2022) Coalition Formation Games and Social Ranking Solutions. In *Proc. of the 21st International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2022)*, Online, May 9–13, 2022, IFAAMAS, 9 pages.