

Oberseminar Theoretische Informatik
Wintersemester 2009/2010

Nadja Betzler

Towards a Dichotomy of Finding Possible Winners in Elections Based on Scoring Rules

Montag, 25.01.2010 14:00 (c.t.) Seminarraum 3319 (Ernst-Abbe-Platz 2, 3.
Stock).

To make a joint decision, agents (or voters) are often required to provide their preferences as linear orders. To determine a winner, the given linear orders can be aggregated according to a voting protocol. However, in realistic settings, the voters may often only provide partial orders. This directly leads to the POSSIBLE WINNER problem that asks, given a set of partial votes, if a distinguished candidate can still become a winner. In this work, we consider the computational complexity of POSSIBLE WINNER for the broad class of voting protocols defined by scoring rules. A scoring rule provides a score value for every position which a candidate can have in a linear order. Prominent examples include plurality, k -approval, and Borda. Generalizing previous NP-hardness results for some special cases and providing new many-one reductions, we settle the computational complexity for all but one scoring rule. More precisely, for an unbounded number of candidates and unweighted voters, we show that POSSIBLE WINNER is NP-complete for all pure scoring rules except plurality, veto, and the scoring rule defined by the scoring vector $(2, 1, \dots, 1, 0)$, while it is solvable in polynomial time for plurality and veto.

Homepage:

<http://theinfl.informatik.uni-jena.de/teaching/ws0910/oberseminar-ws0910>