

## **Compact preference representation and computational complexity in social choice**

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Abstract: in many real-world social choice problems, the set of alternatives is defined as the Cartesian product of (finite) domain values for each of a given set of variables, and these variables cannot be assumed to be preferentially independent (to take an example, if  $X$  is the main dish of a dinner and  $Y$  the wine, preferences over  $Y$  depends on the value taken for  $X$ ). Such combinatorial domains are much too large to allow for representing preference relations or utility functions explicitly (that is, by listing alternatives together with their rank or utility); for this reason, artificial intelligence researchers have been developing languages for specifying preference relations or utility functions as compactly as possible. This talk first gives a brief survey of compact representation languages, and then discusses its role for representing and solving social choice problems, especially from the point of view of computational complexity. In particular we investigate the complexity of determining the outcome of different voting rules when preferences are represented compactly.