

COST Action IC1205 on Computational Social Choice: STSM Report

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During my visiting to AGH University of Science and Technology I was working on the joint paper "On swap distance geometry of voting rules" (AAMAS-2013) with Dr. Faliszewski. We discussed how the current version can be extended for the journal publication. The research results, obtained during the visit, cover the following directions.

First, we finished the characterization of restricted domains as well as voting rules from the convexity point of view. To be more precise the following results were obtained.

- Nonexistence of  $\forall$ -convexity and existence of  $\exists$ -convexity for Single-crossing profiles.
- NP-completeness of problem of finding monochromatic shortest path in the case of Copeland rule.

Second, we focused on the connections of axiomatic and geometric properties of voting rules. We described all possibilities for combining one of the properties (neutrality, unanimity) and one of the convexities ( $\forall$ -convexity,  $\exists$ -convexity). We proved nonexistence of the voting rule which is simultaneously neutral, unanimous and  $\forall$ -convex. Connection between unanimity,  $\forall$ -convexity and Maskin monotonicity was also established.

The third part of our discussion was dedicated to star convexity. We considered star convexity distinguishing  $\forall$ -star convexity and  $\exists$ -star convexity. We described all possibilities for combining one of the properties (neutrality, unanimity) and  $\forall$ -star convexity. We also characterized the kernels of several sets (Majority, Condorcet) through the set of unanimous elections.