

COST Action IC1205 on Computational Social Choice: STSM Report

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The aim of this visit was to continue our common research on the teachers assignment problem. This is a model motivated by the organization of education in Slovakia where each upper elementary/lower secondary teacher specializes in two different subjects and capacities of schools are defined separately for individual subjects. In a recent publication by K. Cechlárová, T. Fleiner, D. Manlove, I. McBride and E. Potpinková (Central European Journal of Operations Research, DOI10.1007/s10100-014-0356-5) we assumed that neither schools nor teachers have preferences and the goal is to find a maximum cardinality matching. This corresponds to the situation concerning practical placement of trainee teachers. However, when graduates seek their first jobs, it is more realistic to assume that they form some expectations about their employers and likewise, schools are able to rank order their applicants.

Together with David Manlove and Tamás Fleiner (with whom we planned our visits to overlap) we proposed a suitable notion of stability for this case and studied the computational complexity of problems connected with stable matchings in the teachers assignment problem. We proved that as soon as there are at least three subjects, the problem of deciding the existence of a stable matching is NP-complete. By contrast, a unique stable matching exists and it can be found by a variant of serial dictatorship if either the preferences of schools or preferences of applicants are derived from a single master list, irrespectively of the number of subjects.

We considered also approximation possibilities for the maximum cardinality matching problem and explored other optimality criteria.

A common publication is under preparation. I plan to give a presentation on the teachers assignment problem in the conference Mathematical Methods in Economics and Industry that will take place this September in Smolenice, Slovakia.