

Editorial

Editorial: Special Issue on Matching under Preferences

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Abstract: This special issue of Algorithms is devoted to the study of matching problems involving ordinal preferences from the standpoint of algorithms and complexity.

Keywords: stable marriage problem; hospitals/residents problem; stable roommates problem; optimal matching; stable matching; stable flow; algorithms and complexity

1. Introduction

Matching problems with preferences occur in widespread applications, such as the assignment of school-leavers to universities, junior doctors to hospitals, students to campus housing, children to schools, kidney transplant patients to donors and so on. The common thread is that individuals have ordinal preferences over the possible outcomes and the task is to find a matching of the participants that is in some sense optimal with respect to these preferences. Due to the large numbers of agents typically involved in such applications, efficient algorithms are of paramount importance.

These types of problems can generally be categorized according to whether the problem is bipartite or non-bipartite. In the former case there are two disjoint sets of agents who seek to become matched to one another. Typical examples include the Stable Marriage, Hospitals/Residents and House Allocation problems, which have applications in school choice, for example. Non-bipartite matching problems

involve a single set of agents seeking to become matched within themselves, and a typical problem in this category is the Stable Roommates problem, which has applications in kidney exchange, P2P networking and tournament design.

2. Special Issue

This special issue focuses on matching problems involving preferences from an algorithms and complexity point of view. The call for papers was issued following the workshop MATCH-UP 2012: the Second International Workshop on Matching Under Preferences, which took place in Budapest on 19–20 July 2012. Hence some of the papers appearing in this issue are fully revised and extended versions of papers that appeared in the informal workshop proceedings. However, submission to the special issue was not restricted to papers that appeared at this workshop.

In response to the call for papers, we received a total of 15 submissions. All submissions were reviewed by experts. We selected 11 submissions for the special issue, all of which are of high quality, reflecting the growing interest in the area of matching under preferences in the community. The final versions of these articles were published as [1–11].

Acknowledgments

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Conflicts of Interest

The authors declare no conflict of interest.

References

1. Király, T.; Pap, J. Stable Multicommodity Flows. *Algorithms* **2013**, *6*, 161–168.
2. Inoshita, T.; Irving, R.W.; Iwama, K.; Miyazaki, S.; Nagase, T. Improving Man-Optimal Stable Matchings by Minimum Change of Preference Lists. *Algorithms* **2013**, *6*, 371–382.
3. Cheng, C.T.; McDermid, E. Maximum Locally Stable Matchings. *Algorithms* **2013**, *6*, 383–395.
4. Király, Z. Linear Time Local Approximation Algorithm for Maximum Stable Marriage. *Algorithms* **2013**, *6*, 471–484.
5. Cseh, Á.; Matuschke, J.; Skutella, M. Stable Flows over Time. *Algorithms* **2013**, *6*, 532–545.
6. Gelain, M.; Pini, M.S.; Rossi, F.; Venable, K.B.; Walsh, T. Local Search Approaches in Stable Matching Problems. *Algorithms* **2013**, *6*, 591–617.
7. Pini, M.S.; Rossi, F.; Venable, K.B.; Walsh, T. Stability, Optimality and Manipulation in Matching Problems with Weighted Preferences. *Algorithms* **2013**, *6*, 782–804.

8. Georgiadis, G.; Papatriantafilou, M. Overlays with Preferences: Distributed, Adaptive Approximation Algorithms for Matching with Preference Lists. *Algorithms* **2013**, *6*, 824–856.
9. Fleiner, T. On Stable Matchings and Flows. *Algorithms* **2014**, *7*, 1–14.
10. Fleiner, T.; Jankó, Z. Choice Function-Based Two-Sided Markets: Stability, Lattice Property, Path Independence and Algorithms. *Algorithms* **2014**, *7*, 32–59.
11. Paluch, K. Faster and Simpler Approximation of Stable Matchings. *Algorithms* **2014**, *7*, 189–202.

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