Popular Matchings

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Mini-course, 7-21.05.2024

Lecture 1 : *Introduction to popular matchings*.

Tuesday, May 7th 2024, 16h, Institut Galilée B107.

The problem of computing a stable matching in a bipartite graph is an old and well-studied problem. Gale and Shapley showed in 1962 that such a matching always exists and can be efficiently computed. This is a classical result in algorithms with many applications in economics and computer science. Stability is a strong and rather restrictive notion. This series of talks will be on a relaxation of stability called "popularity". In the first talk we will see simple and efficient algorithms for some popular matching problems. No background in algorithms or matching theory will be assumed.

Lecture 2 : *Popular matchings and optimality*.

Tuesday, May 14th 2024, 14h, Institut Galilée B107.

In this talk we will consider algorithms for finding optimal popular matchings. While it is easy to find max-size popular matchings, it is NP-hard to find a min-cost popular matching. This motivates us to relax popularity to a weaker notion called "quasi-popularity". Describing the popular and quasi-popular matching polytopes is hard, but there is an easy-to-describe integral polytope sandwiched between these two hard ones (see the illustration). So we can efficiently find a quasi-popular matching of cost at most that of a min-cost popular matching.

Lecture 3 : *Popular assignments and extensions*.

Tuesday, May 21st 2024, 14h, Institut Galilée B107.

This talk will be on popular matchings in the one-sided preferences model. Popular matchings need not always exist in this model and there is a simple combinatorial algorithm to decide if one exists. We will see an LP-duality inspired algorithm for the more general problem of deciding if a popular assignment (i.e., a popular maximum-matching) exists or not. This algorithm can be generalized to solve the popular common base problem in the intersection of two matroids where one matroid is the partition matroid, this implies the popular arborescence problem (relevant in liquid democracy) can be solved efficiently.

Link for online attendance of the mini-course:
http://bbb.lipn.univ-paris13.fr/b/ban-kpe-96w

For more information and updates:
https://eur.univ-paris13.fr/evenements/