

CS 538: Combinatorial Optimization

Objectives

- The course will introduce techniques and tools for combinatorial optimization problem such as maximum weight graph matching, with rigorous analysis of polynomial-time algorithms.
- At the end of the course, students should be able to model real-time problems (such as optimization of computer networks) and, if possible, reduce the problem to one of the studied combinatorial optimization problem.

Prerequisites

CS 430 and a linear algebra course.

Syllabus

- Introductory concepts - convexity, linear programs
- Modeling and Integer Programming
- Linear programming- geometry of LP's, Simplex Method, Duality, Complementary slackness
- Polynomial-time algorithm(s) for Linear Programming
- Solving maximum flows, minimum-cost flows
- Matching and weighted matching in bipartite and general graphs
- Matroids (time permitting)
- Approximation Algorithms: Set Cover, Traveling Salesman

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