



Semidefinite Programming, Combinatorial Optimization and Real Algebraic Geometry

A tutorial by
Prof Janez Povh (Slovenia)

Part I:

16 Sep 2014
9:00-12:00

Part II:

17 Sep 2014
9:00-12:00

**4325B James Clerk
Maxwell Building, Kings
Buildings, The University
of Edinburgh**

Attendance is FREE

organizer: Peter Richtarik

Abstract

In the last decade, semidefinite programming (loosely speaking: optimization problems with variables being symmetric positive semidefinite matrices) has proved to be a very successful and powerful tool for approximately solving hard problems arising in combinatorial optimization (e.g., MAX-CUT, Quadratic assignment problem, Graph colouring problem) and for approximately computing the optimum of a real polynomial over a semialgebraic set.

In both cases, the objective function and the feasible set is simplified so that the new problem is an instance of the semidefinite programming problem. The solution of the relaxation provides lower or upper bound for the original problem and often also a starting point for obtaining good feasible solutions.

The tutorial will cover basic definitions and fundamental results in the theory of semidefinite programming, and will demonstrate how these can be used to approach several well-known problems arising in combinatorial optimization and real algebraic geometry.

Audience

The tutorial is aimed at PhD students, and young and established researchers interested in the topics. It is accessible also to advanced undergraduate and MSc students. The material is of interest to people of varying backgrounds, including convex and combinatorial optimization, semidefinite programming, algebraic geometry, graph theory, operational research and computer science.