Friday, 9:00–10:00

Room 148

Optimization via Branch Decomposition

William Cook, Rice University

Robertson and Seymour introduced branch-width as a new connectivity invariant of graphs in their proof of the Wagner conjecture. Decompositions based on this invariant provide a natural framework for implementing dynamic programming algorithms to solve graph optimization problems. In earlier work on the traveling salesman problem we used this framework in a heuristic algorithm to obtain near-optimal solutions to large-scale instances. In this talk we will discuss the computational issues involved in using branch-width as as a general tool in discrete optimization. We will present applications to euclidean steiner tree problems, graph bipartition, maximum cut problems, and maximum stable set problems.

11:30–12:30

Room 148

The Traveling Salesman Problem

William Cook, Rice University

The traveling salesman problem, or TSP for short, is easy to state: given a number of "cities" along with the cost of travel between each pair of them, find the cheapest way of visiting all the cities and returning to your starting point. We will present a survey of recent progress in algorithms for very large TSP instances, including the solution of a million city instance to within 0.09% of optimality. We will discuss extensions of TSP techniques to other path-routing problems, and present some open combinatorial questions whose solution would lead to improved methods for the TSP.