Duality Theory in Linear Programming and Semidefinite Programming

by

Qinghong Zhang

Mathematics and Computer Science

Linear programming has been recognized as one of the most significant discoveries of the twentieth century. It is concerned with the optimization of a linear function while satisfying a set of linear equality and inequality constraints or restrictions. To fully understand the theory and numerical algorithms of linear programming problems, one needs to take a graduate level course. However, the basic concepts of linear programming and the simplex method can be explained to undergraduate students, as we do in MA103 (Finite Mathematics). One of the most recent extensions of linear programming is **semidefinite programming**. This new variant of linear programming has found relevance and applications in some areas of continuous optimization, discrete and combinatorial programming, statistics, matrix optimization, multiquadratic programming, eigenvalue optimization, and control theory, among others.

Duality theory in optimization plays important roles. In this talk, I will discuss how the duality model can be formulated for linear programming using Lagrange multipliers. I would also like to report the recently obtained duality results for semidefinite programs and their use in the design of embedding methods.

Thursday
March 29, 2007
4:00 p.m.
NSF 1209

Mathematics and Computer Science Colloquium and Seminar Series