Fast First-Order Methods for Semidefinite Programming Relaxations of Combinatorial Optimization Problems

Date Tuesday, September 29

Time 3 pm

Location 622 Math

Abstract: Many combinatorial optimization problems have semidefinte programming (SDP) relaxations. We present two fast first-order methods that are well suited for solving these SDPs. The first is a row-by-row (RBR) method that is based on the idea that by fixing any (n-1)x(n-1) principal submatrix B of an n x n positive semidefinte matrix X and using the (generalized) Schur Complement of B, the positive semidefinite constraint is reduced to a simple second-order cone constraint. To handle linear constraints, we use an augmented Lagrangian function approach. Specialized versions are presented for the maxcut SDP relaxation and the Lovasz theta and theta plus functions. Our second method is an alternating direction augmented Lagrangian method. Numerical results on fairly large instances will be presented. This is joint work with Zaiwen Wen, Shiqian Ma and Katya Scheinberg