

First-order methods for finding weighted graphs with high algebraic connectivity

Date Tuesday, November 30

Time 4 pm

Location 303 Mudd

Abstract: We consider the problem of finding a graph which has a fixed degree sequence and maximum algebraic connectivity, which is the second smallest eigenvalue of the associated graph Laplacian. Algebraic connectivity is of importance in several areas including chemistry, biology, and transportation. We formulate a weighted version of our problem as a semidefinite program (SDP). Since barrier methods scale poorly with problem size, we develop two algorithms that can solve the SDP efficiently in practice and in theory using ideas from the approximation algorithms and nonsmooth optimization communities. Our algorithms are first-order in the sense they use (only) gradient information from an associated Lagrangian. We present both the main algorithmic ideas as well as computations.