CO 769, Winter 2017

Geometric Representations of Graphs via Convex Optimization

Class Times: M,W 2:30-3:50p.m. at MC6486.

Instructor: Levent Tunçel, MC 5136, ext. 35598, ltuncel@math

Topics covered:
We will study geometric representations of graphs. Our focus will be on the interplay with convex geometry and convex optimization problems (in particular, optimization problems over matrix spaces, including Semidefinite Optimization problems) that give rise to such representations, and their theoretical properties.

We will use the manuscript:
L. Lovász, *Geometric Representations of Graphs*, Institute of Mathematics, Eötvös Lorand Univ., Budapest, Hungary, 2014 (273 pages).
`http://www.cs.elte.hu/~lovasz/geomrep.pdf`
as the main source. In addition, connections to convex geometry and optimization theory will be made. Moreover, many recent papers as well as some classical ones will be covered as the subject and our discussion warrant them.

Grading Scheme: There will be some homework assignments and one takehome exam. Student(s) will be required to complete a survey report, and perhaps make some in-class presentations.

Prerequisites:

- For C&O graduate students: some familiarity with linear optimization and graph theory should suffice (we will cover the required convex optimization theory in class).

- For undergraduate students: either instructor's consent or math249, co255, co342, and fourth year standing are required.

- For graduate students outside C&O: while not strictly necessary, having successfully completed at least one of the following courses would be very useful:
co642, co644, co650, co663, co671.