

DREXEL ANALYSIS SEMINAR

May 31, 2024

3-4 PM, Korman 245

Speaker: Thomas Yu (Drexel)

Title: Semidefinite programming and data sciences, convexification and de-convexification

Abstract: One of the breakthroughs in computer science and data sciences is the discovery that many intractable problems can be solved approximately by relaxing them into “convenient” convex optimization problems (typically taking the form of semidefinite programming problems (SDPs)), which can then be solved in polynomial time using primal-dual interior point methods.

Solving SDPs in the traditional way, however, does not scale well in practice as the problem size gets large.

Surprisingly, in the early 21st century, a simple trick, credited to Burer and Monteiro, was found to handle large SDPs very efficiently. This trick recasts an SDP to a non-convex problem, but it can be shown that in many cases the non-convexity is benign.

We will outline connections to the matrix completion problem and the Kuramoto model for synchronization phenomena.