Drexel Analysis Seminar

May 5, 2023

12-1 PM, Korman 245

Speaker: Jeffrey Zhang (Carnegie Mellon)

Title: On Local Minima of Cubic Polynomials

Abstract: We study local minima of cubic polynomials. We first give a characterization of local minima, and show that this characterization can be checked in polynomial time. We then give an SDP-based approach for finding local minima of cubic polynomials, in spite of the fact that it is NP-hard to decide if a given cubic polynomial has any critical points. To do this, we show that the second-order points of any cubic polynomial form a spectrahedral set, and give an explicit representation based only on the coefficients of the polynomial. We also show that the problem of finding second-order points of cubic polynomials has equivalent complexity to the semidefinite feasibility problem.