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5969OS Advanced Seminar Dynamical Systems

Speaker:

Elvira Moreno
Caltech California Institute of Technology

Date:

Monday, 2 June 2025, at 4:00 pm

via zoom (please scan QR-code below)

Spectral methods for polynomial optimization

Abstract:

We propose a hierarchy of tractable relaxations based on spectral methods for polynomial optimization problems (POPs). Concretely, our hierarchy of spectral relaxations yields a monotonic sequence of bounds for the optimal value of a POP, each of which is computed as the minimum eigenvalue of a matrix obtained from the problem data. Because spectral methods are less computationally demanding than semidefinite programs, which underpin state-of-the-art techniques based on SOS certificates of non-negativity, our hierarchy provides an attractive alternative for obtaining bounds on large-scale problems. We identify the algebraic structure underlying a POP that makes it amenable to spectral relaxations, and we demonstrate the efficiency and applicability of our framework with numerical examples.

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