

5969OS Advanced Seminar Dynamical Systems

Speaker:

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Date:

Monday, 5 May 2025, at 4:00 pm

Room:

(IM) SR 034

Title:

Lower bounds for the shadiness constant of finite-dimensional normed spaces

Abstract:

By the Hahn-Banach theorem, every Banach space admits rank-one projections with operator norm one. This is false for higher-rank projections. Define the shadiness constant of a d -dimensional normed space as the maximal C , such that every projection with rank different from 1 and d has operator norm at least C . Bosznay and Garay showed that there exist d -dimensional normed spaces with shadiness constant larger than one for every d greater than two. We use optimization techniques and sum-of-squares decompositions to rigorously show that a certain three-dimensional normed space has shadiness constant at least 1.01, significantly improving earlier results. Furthermore, we show that in dimension three, every norm whose unit ball is a polytope with at most ten vertices has shadiness constant equal to one.