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Some questions in geometric functional analysis, analytic theory of polynomials and convex geometry

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Abstract

Consider the following three questions.1) Given a real symmetric matrix with zero diagonal, find a principal submatrix of small norm. 2) Given a polynomial with average of its roots 0, how many times do we need to differentiate it so that all the roots of this higher derivative lie in in the unit disc. 3) Given a origin symmetric convex body in R^n, find a compression to a lower dimensional subspace whose volume is small. All three are classical and important problems, interesting both mathematically and with a view to applications. Some remarkable results due to Petter Branden and Julius Borcea on one hand and Adam Marcus, Daniel Spielman and Nikhil Srivastava on the other have introduced a new collection of tools to make significant progress on all three. I'll talk about this new toolkit, some results on mine using this toolkit on the above three problems and the connections of these to theoretical computer science, probability, combinatorics and real algebraic geometry.

Date: Wednesday, December 7, 2016
Time: 15:00
Place: Erdal İNÖNÜ Seminar Hall, Ataköy Campus, İstanbul Kültür University