DISCRETE MATH SEMINAR

Forbidden subgraphs and spherical two distance sets

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Abstract: Given a real number λ, what can we say about the family $G(\lambda)$ of graphs with eigenvalues bounded from below by -λ The Cauchy interlacing theorem implies that that the family $G(\lambda)$ is closed under taking (induced) subgraphs. Similar to Wagner's theorem, which describes the family of planar graphs by finite forbidden minors, it is natural to ask for which λ the family $G(\lambda)$ has a finite forbidden subgraph characterization. In this talk, I will illustrate the key ideas in answering this question, and I will demonstrate a peculiar connection to spherical two distance sets — a set of unit vectors in a Euclidean space the pairwise inner products of which assume only two values. Joint work with Alexandr Polyanskii, Jonathan Tidor, Yuan Yao, Shengtong Zhang and Yufei Zhao.

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