

Maximal Independent Sets in Clique-free Graphs

Sam Spiro

Department of Mathematics

UCSD

Abstract

An independent set I of a graph G is said to be a maximal independent set (MIS) if it is maximal with respect to set inclusion. Nielsen proved that the maximum number of MIS's of size k in an n -vertex graph is asymptotic to $(n/k)^k$, with the extremal construction being a disjoint union of k cliques with sizes as close to n/k as possible. In this talk we study how many MIS's of size k an n -vertex graph G can have if G does not contain a clique K_t . We prove for all fixed k and t that there exist such graphs with $n^{\lfloor \frac{(t-2)k}{t-1} \rfloor - o(1)}$ MIS's of size k by utilizing recent work of Gowers and B. Janzer on a generalization of the Ruzsa-Szemerédi problem. We prove that this bound is essentially best possible for triangle-free graphs when $k \leq 4$.

This is joint work with Xiaoyu He and Jiayi Nie.