

DISTINCT DEGREES AND HOMOGENEOUS SETS IN GRAPHS

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In this talk I will discuss some recent work examining the extremal relationship between two well-studied graph parameters: the order of the largest homogeneous set in a graph G and the maximal number of distinct degrees appearing in an induced subgraph of G , denoted respectively by $hom(G)$ and $f(G)$.

Our main theorem improves estimates due to Bukh and Sudakov and to Narayanan and Tomon and shows that if G is an n -vertex graph with $hom(G)$ at least $n^{1/2}$ then $f(G) > (n/hom(G))^{1-o(1)}$. The bound here is sharp up to the $o(1)$ -term, and asymptotically solves a conjecture of Narayanan and Tomon. In particular, this implies that $\max\{hom(G), f(G)\} > n^{1/2-o(1)}$ for any n -vertex graph G , which is also sharp.

The relationship between these parameters changes when $hom(G) < n^{1/2}$. I hope to discuss the suspected relationship in this other region, along with supporting results.

Joint work with Eoin Long.