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Clique partitions of dense graphs

In this talk I will prove that for any forest $F \subset K_n$, $K_n \backslash E(F)$ is a union of at most roughly $n \log n$ cliques. This result generalizes a number of preceding theorems on clique partitions of complements of paths. In addition, it will be shown that the minimum number of cliques required to partition $K_n \backslash E(G)$ when $G \subset K_n$ has maximum degree $O(n^{1-\epsilon})$, where $\epsilon > 0$ is a constant independent of n, is at most $n^{2-\epsilon/2}(\log n)^2$ and at least $\epsilon^2 n^{2-2\epsilon}$, for n large enough relative to ϵ.

We leave the following two basic open problems. First, to show that if a graph $G \subset K_n$ has maximum degree $o(n)$, then $K_n \backslash E(G)$ can be partitioned into $o(n^2)$ cliques, and second, to exhibit a forest F such that $K_n \backslash E(F)$ cannot be partitioned into any linear number of cliques.

This is joint work with Mike Cavers.