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Perfect Divisibility of Fork-Free Graphs

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Abstract of Report Talk: A *coloring* of a graph G is a function $c : V(G) \to \{1, 2, 3 \ldots n\}$ such that for adjacent vertices v, w, $c(v) \neq c(w)$. The *chromatic number* of G, denoted $\chi(G)$, is the minimum number of colors required in a coloring of G. A *clique* is a set of vertices all pairwise adjacent. The *clique number* of G, denoted $\omega(G)$, is the size of a largest clique in G. A graph G is called *perfect* if $\omega(G) = \chi(G)$. Given a vertex set $S \subseteq V$, let $G|S$ denote the subgraph induced by S. A graph G is called *perfectly divisible* if, for every induced subgraph H of G, $V(H)$ can be partitioned into two sets V_1, V_2 so that $\omega(H|V_1) < \omega(H)$ and $H|V_2$ is perfect. The class of perfectly divisible graphs is of interest because it is χ-bounded; meaning, chromatic numbers of graphs in this class are bounded by a certain function of their clique numbers. This presentation will include a proof that fork-free, P_5-free graphs are perfectly divisible, and will discuss our progress on Sivaraman's conjecture that all fork-free graphs are perfectly divisible.

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