

Chromatic number of P_5 -free graphs: χ -binding functions

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In this talk we study the chromatic number of P_5 -free graphs. Gyárfas has shown the following

Theorem Let G be a P_k -free graph for $k \geq 4$ with clique number $\omega(G) \geq 2$. Then $\chi(G) \leq (k-1)^{\omega(G)-1}$.

We will show that there is a polynomial χ -binding function for several subclasses of P_5 -free graphs. Our main result is the following.

Theorem Let G be a P_5 -free graph of order n and clique number $\omega(G)$, and let Gem^+ denote the graph $(K_1 + (K_1 \cup P_4))$. If G is

(i) *Claw*-free or (ii) *Paw*-free or (iii) *Diamond*-free or (iv) *Dart*-free or
(v) *Cricket*-free or (vi) *Gem*-free or (vii) Gem^+ -free,

then $\chi(G) \leq \omega^2(G)$.

We also show that the class of $(P_5, windmill)$ -free graphs has a polynomial χ -binding function.

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