

Diameter of 4-colorable Graphs

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Erdős, Pollack, Pach and Tuza conjectured that for fixed integers $r, \delta \geq 2$, if G is a connected K_{2r+1} -free graph with minimum degree δ and $(3r-1)|\delta$, then the diameter of G is at most $\frac{(3r-1)n}{r\delta} + O(1)$. They constructed graphs that show that this upper bound is best possible. A weakening of this conjecture is to replace the condition K_{2r+1} -free with $2r$ -colorable. We make the first step towards proving the weakened conjecture by showing that for any $\delta \geq 4$ the diameter of a $2r$ -colorable connected graph G is at most $\frac{5n}{2\delta} - 1$.