

Hind, H. R.

An upper bound for the total chromatic number. (English) Zbl 0725.05043
Graphs Comb. 6, No. 2, 153-159 (1990).

The chromatic number, the edge chromatic number, and the total chromatic number of a graph H are respectively denoted by $\chi(H)$, $\chi'(H)$, and $\chi''(H)$. Theorem: For any graph H , $\chi''(H) \leq \chi'(H) + 2\lceil\sqrt{\chi(H)}\rceil$. Let $\Delta(H)$ be the maximum degree of graph H . The proof of the theorem relies on the following interesting lemma: Let $H = (V, E)$ be a graph with $\chi'(H) = \Delta(H)$ and W be an independent subset of V . Any coloring of W with $\Delta(H)$ colors can be extended to a proper coloring of $W \cup E$ with $\Delta(H) + 1$ colors such that if edge e is colored with the new color, then one of the vertices incident with e is in W .

Reviewer: J.Mitchem (San José)

MSC:

05C15 Coloring of graphs and hypergraphs

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