

Vertex colorings induced by edge coloring and total coloring

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Given a proper edge coloring with colors in $\{1, 2, \dots, k\}$, let $w(v)$ and $S(v)$ denote the sum of the colors and the set of colors of the edges incident with v , respectively, for each vertex $v \in V(G)$.

What is the minimum integer k that yields distinct sums at adjacent vertices or distinct sets at adjacent vertices? Those are neighbor sum distinguishing edge coloring and neighbor distinguishing edge coloring. By analogy, one could seek the minimum number of colors in a total coloring that yields distinct sets at adjacent vertices. In this talk, I will talk about recent results on those three problems.