

On Functions Inducing Proper Vertex Colorings Via Edge Weightings

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Let $f : \mathcal{M} \rightarrow I$ be a function which maps finite multisets of natural numbers to an arbitrary set I . An edge k -weighting of a (nice) graph $G = (V, E)$ is a function $l : E \rightarrow \{1, \dots, k\}$. For $v \in V$ we denote by $L(v)$ the multiset of weights on edges incident to v . We say that l induces a vertex coloring by f if

$$f(L(v)) \neq f(L(u))$$

for all adjacent vertices $u, v \in V$. The corresponding coloring parameter $\chi_f(G)$ is the smallest value k such that G has a k -weighting inducing a vertex coloring by f .

In the literature, several inducing coloring functions f have been studied, e.g., sums and products. In this talk, we discuss some properties of f which ensure that $\chi_f(G)$ is finite and bounded by a function of the maximum degree of G .

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