Vizing, V. G.

On connected coloring of graphs in prescribed colors. (Russian) Zbl 0931.05033

Diskretn. Anal. Issled. Oper., Ser. 1 6, No. 4, 36-43 (1999).

Suppose each vertex v of a graph G is assigned a set $A(v)$ of admissible colors. Then a connected list vertex coloring of G is a decomposition of its vertices into subsets, called color classes, such that the color $c(v)$ of v belongs to $A(v)$ for each $v \in V(G)$ and each color class induces a connected subgraph of G. The symbol $\alpha(G)$ denotes the minimum k such that G has a connected coloring whenever $|A(v)| \geq k$ for each $v \in V(G)$. In particular, it is proven that each G has $\alpha(G)$ at least as large as its independence number $\varepsilon(G)$, and if G is bipartite then $\alpha(G) = \varepsilon(G)$. For the similarly defined connected list edge colorings of a multigraph G, the analog of $\alpha(G)$ is denoted by $\beta(G)$. The main result asserts that, if each connected component of G has an even number of edges, then $\beta(G) \leq |E(G)|/2$. Let $\pi(G)$ be the edge independence number of a multigraph G. It is conjectured that $\beta(G) \leq \max\{\pi(G), |E(G)|/2\}$ for each G.

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MSC:

05C15 Coloring of graphs and hypergraphs
05C69 Vertex subsets with special properties (dominating sets, independent sets, cliques, etc.)

Keywords:

independence number; list coloring