M_f-edge colorings of graphs

J. Ivančo, <u>A. Onderko</u>

P. J. Šafárik University, Institute of Mathematics, Košice, Slovakia

For a graph G and a function f which assigns positive integers to vertices of G, an M_f-edge coloring is an edge coloring of G in which, for each vertex v, the number of colors used on edges incident to v is at most $f(v)$. The maximum number of colors of an M_f-edge coloring of G is denoted by $\mathcal{K}_f(G)$. It was proved in [1] that the problem of computing $\mathcal{K}_f(G)$ is NP-hard; it is NP-hard even in the case when $f(v) = 2$ for each vertex v. We present several bounds on $\mathcal{K}_f(G)$ and graphs attaining these bounds. As a consequence, we determine exact values of $\mathcal{K}_f(G)$ for graphs of particular classes, such as trees, complete graphs, complete multipartite graphs etc. We also present the algorithm which computes $\mathcal{K}_f(G)$ of a cactus graph G in quadratic time with respect to the order of G.

References

[1] A.Adamaszek, A.Popa, Approximation and hardness results for the maximum edge q-coloring problem, *J. Discrete Algorithms* 2016 pp.1-8.