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ARTICLE

Some results on cyclic interval edge colorings of graphs

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Abstract

A proper edge coloring of a graph G with colors $1,2,\ldots,t$ is called a *cyclic interval t-coloring* if for each vertex v of G the edges incident to v are colored by consecutive colors, under the condition that color 1 is considered as consecutive to color t. We prove that a bipartite graph G of even maximum degree $\Delta(G) \geq 4$ admits a cyclic interval $\Delta(G)$-coloring if for every vertex v the degree $d_G(v)$ satisfies either $d_G(v) \geq \Delta(G) - 2$ or $d_G(v) \leq 2$. We also prove that every Eulerian bipartite graph G with maximum degree at most eight has a cyclic interval coloring. Some results are obtained for (a,b)-biregular graphs, that is, bipartite graphs with the vertices in one part all having degree a and the vertices in the other part all having degree b; it has been conjectured that all these have cyclic interval colorings. We show that all (4, 7)-biregular graphs as well as all $(2r-2,2r)$-biregular ($r \geq 2$) graphs have cyclic interval colorings. Finally, we prove that all complete multipartite graphs admit cyclic interval colorings; this proves a conjecture of Petrosyan and Mkhitaryan.