Construction of local antimagic 3-colorable graphs of fixed even size | matrix approach

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Abstract. An edge labeling of a connected graph G = (V, E) containing m edges is said to be local antimagic if it is a bijection $f : E \to \{1, \ldots, m\}$ such that for any pair of adjacent vertices u and v, $f^+(u) \neq f^+(v)$, where the induced vertex label $f^+(u) = \sum f(e)$, with e ranging over all the edges incident to u. The local antimagic chromatic number of G, denoted by $\chi_{la}(G)$, is the minimum number of distinct induced vertex labels over all local antimagic labelings of G. Suppose $\chi_{la}(G) = \chi_{la}(H)$ and G_H is obtained from G and H by merging some vertices of G with some vertices of H bijectively. In this paper, we give ways to construct matrices with integers in $[1, 10k], k \geq 1$, that meet certain properties. Consequently, we obtained many families of (disconnected) bipartite (and tripartite) graphs of size 10k with local antimagic chromatic number 3.

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