

On $\mathbb{Z}_2 \times \mathbb{Z}_2$ -Magic Graphs and Circuits

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For any additive abelian group A , a graph $G = (V, E)$ is said to be A -magic if there exists an edge labeling $l : E(G) \rightarrow A \setminus \{0\}$ such that for each vertex v , the sum of the labels of all edges incident to v is equal to the same constant. Here, we consider whether graphs are V -magic or not, where $V = \mathbb{Z}_2 \times \mathbb{Z}_2$ is the Klein four-group. We show that the existence of circuits through vertices with even or odd degrees can be used to determine whether a graph is V -magic or not.

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