

Γ -supermagic labeling of $C_m \square C_n$ with non-Abelian groups

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Let $G = (V, E)$ be a simple finite undirected graph with p vertices and q edges, and let Γ be a group of order q .

A bijection $f : \Gamma \rightarrow E$ is called a Γ -*supermagic labeling* of G if the sum of labels of all edges incident with every vertex of G (called the *weight* of the vertex) is the same element of Γ . In other words, for a vertex $x \in G$, we define its weight as

$$w(x) = \sum_{xy \in E} f(xy)$$

and say that f is a Γ -supermagic labeling if there exists $\mu \in \Gamma$ such that for every $x \in G$,

$$w(x) = \mu.$$

A graph G admitting a Γ -supermagic labeling is then called a Γ -*supermagic graph*. The labeling is also sometimes called a *vertex-magic edge Γ -labeling*.

So far, in all results on Γ -supermagic labeling we are aware of the group Γ is Abelian. We present a report on work in progress on labeling of Cartesian products of two cycles with non-Abelian groups.

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