

Products of Cycles Labeled by Cyclic Groups

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A graph $G = (V, E)$ with $|V| = p, |E| = q$ is called Γ -*distance magic* if there exists a bijection f from V to an Abelian group Γ of order p such that the *weight* $w(x)$ of each vertex x is equal to the same *magic element* μ . In other words,

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

for all $x \in V$ and some $\mu \in \Gamma$. The labeling is called a Γ -*distance magic labeling*.

Similarly, G is called Γ -*vertex magic* (or just Γ -*magic*) if there exists a bijection h from E to an Abelian group Γ of order q such that the weight $w(x)$ of each vertex x is again constant, that is,

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

for all $x \in V$ and some $\mu \in \Gamma$. The labeling is called a Γ -*vertex magic labeling* or just Γ -*magic labeling*.

The first two authors investigated Γ -distance magic labelings of Cartesian products $C_m \square C_n$ for $\Gamma = \mathbb{Z}_{mn}$ and some other groups.

We present some preliminary results on \mathbb{Z}_q -vertex magic labeling of Cartesian products of two or more cycles.

Keywords: Group distance magic labeling, group vertex magic labeling