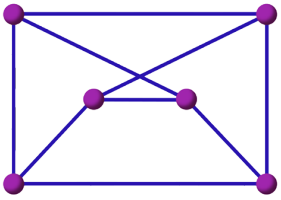

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# PRODUCT OF CYCLES LABELED BY CYCLIC GROUPS

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(joint work with Sylwia Cichacz-Przeniosło, James McKeown, John McKeown and Michael McKeown)

A graph $G = (V, E)$ with $|V| = p, |E| = q$ is called $\Gamma$-*distance magic* if there exists a bijection $f$ from $V$ to an Abelian group $\Gamma$ of order $p$ such that the *weight* $w(x)$ of each vertex $x$ is equal to the same *magic element* $\mu$. 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 $\Gamma$-*distance magic labeling*. Similarly, $G$ is called $\Gamma$-*vertex magic* (or just $\Gamma$-*magic*) if there exists a bijection $h$ from $E$ to an Abelian group $\Gamma$ 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 $\Gamma$-*vertex magic edge labeling* or just $\Gamma$-*magic labeling*.

The presenter and Sylwia Cichacz investigated $\Gamma$-distance magic labelings of Cartesian products $C_m \Box C_n$ 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