

(Γ, D) -Distance Magic Labeling of Some Cubic Graphs

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Let $G = (V, E)$ be a simple finite undirected graph with n vertices and let $d = \text{diam}(G)$. For an Abelian group Γ of order n and a set $D \subseteq \{0, 1, \dots, d\}$, we define a bijection $f : \Gamma \rightarrow V$.

By $N_D(x)$ we denote the D -neighborhood of x , defined as the set of all vertices at distance k from x , where $k \in D$; that is,

$$N_D(x) = \{y \mid \text{dist}(x, y) \in D\},$$

and by $w(x)$ we denote the *weight* of vertex x , defined as

$$w(x) = \sum_{y \in N_D(x)} f(y).$$

The mapping f is called a (Γ, D) -*distance magic labeling* of G if the *weight* of every vertex of G is constant; that is, if there exists $\mu \in \Gamma$ such that $w(x) = \mu$ for all $x \in V$.

A graph G admitting a (Γ, D) -distance magic labeling is then called a (Γ, D) -*distance magic graph*.

We present $(\mathbb{Z}_n, \{0, 1\})$ -distance magic labelings for some classes of cubic graphs. Notice that when $D = \{0, 1\}$, the neighborhood $N_D(x)$ is sometimes called the *closed neighborhood* of x and denoted just $N[x]$.

Keywords: Γ -distance magic labeling, D -distance magic labeling, (Γ, D) -distance magic labeling