ISSN: 0975-766X
CODEN: IJPTFI
Available Online through **Research Article**
www.ijptonline.com

0-EDGE MAGIC LABELING OF GENERALIZED *Y*-TREE AND TREE

J.Jayapriya, D.Muruganandam
Department of Mathematics, Sathyabama University, Chennai-119, India.
Email: priyanandam_1975@rediffmail.com

Received on: 11-02-2017 *Accepted on: 31-03-2017*

Abstract: In this article *0*-edge magic labeling of generalized *Y*-tree and Tree is shown.

Keywords: labeling, Tree, Y-tree, 0-edge magic labeling.

1. Introduction: Labeled graphs are becoming an increasingly useful family of mathematical models for a broad range of applications. They are useful in many coding theory problems, including the design of good radar type codes, missile guidance codes and convolution codes with optimal auto correlation properties. They gave birth to families of graphs with attractive names such as magic, graceful, harmonious, felicitous and elegant. A useful survey to know about the numerous graph labeling methods is the one by J.A. Gallian, (2013) [2].Here in this article for a new labeling namely 0-edge magic labeling which was introduced by J.Jayapriya in the year 2012 [1], the existences of same is shown for generalized Y-tree and Tree.

2. Basic Definition:

Definition 2.1.1. [2]: A *0*-edge magic labeling of a simple graph G with vertex set V is a function f from V to $\{-1, 1\}$ such that every edge uv has the label $f(u) + f(v) = 0$.

Definition 2.1.2. : The generalized *Y*-tree is defined as a tree with exactly three vertices of degree one.

3. Main Result:

Theorem 3.1.1. Generalized *Y*-tree admits *0*-edge magic labeling.

Proof. Let $G = (V, E)$ be the generalized Y-tree. Let the vertex set be

$V = \{v_i, u_j : 1 \le i \le n, 1 \le j \le m\}$, $|V| = n+m$ and the edge set be

$E = \{v_i v_{i+1} : 1 \le i \le n-1\} \cup \{u_j u_{j+1} : 1 \le j \le m-1\} \cup \{v_k u_1\}$ for some k, $2 \le k \le n-1$. Let $f : V \to \{1, -1\}$ such that

$f(v_i) = (-1)^i : 1 \le i \le n$

$f(u_j) = (-1)^{k+j} : 1 \le j \le m.$

The weight of the edges is calculated as follows:

$f(v_i) + f(v_{i+1}) = 0,\ 1 \le i \le n-1$

$f(u_j) + f(u_{j+1}) = 0,\ 1 \le j \le m-1$

$f(v_k) + f(u_1) = (-1)^k + (-1)^{k+1} = 0$

Thus all edge labels are 0. Hence Y-tree graph admits 0-edge magic labeling.

Figure 3.1 is an example of generalized Y-tree.

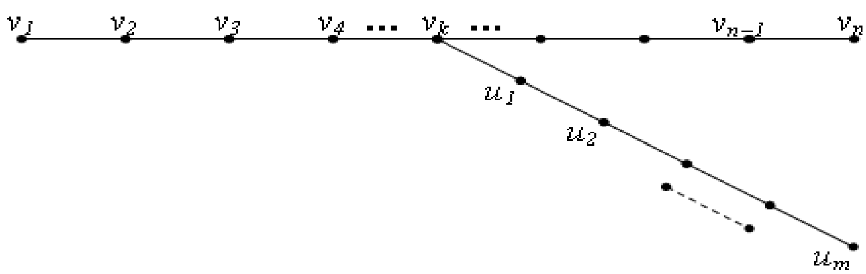


Figure 3.1 Generalized *Y*-Trees.

Theorem 3.1.2. Any tree is 0-edge magic.

Proof. Let $G(V, E)$ be the tree and $V(G) = \{ v_1, v_2, \ldots, v_n\}$.

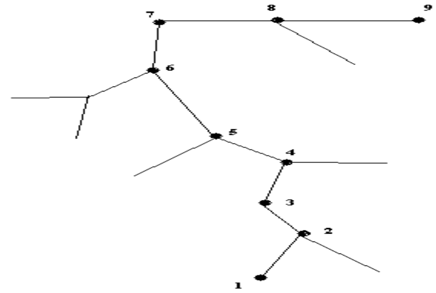
Let $f: V \rightarrow \{1, -1\}$. To prove that G admits 0-edge magic labeling, choose the longest path P of the tree G and denote the vertices of the path P as $v_1, v_2, \ldots, v_m$ where $m < n$. In a tree any two vertices are connected by a unique path starting from the vertex v_1, label the vertices of the path P alternately with +1 and −1. Suppose $v_j \in P, 1 \le j \le m$ have branches, then choose the longest path in the branches of v_j starting from v_j say

$p_j = v_j, v_j^1, v_j^2, \ldots, v_j^k$ label the vertices of p_j as follows.

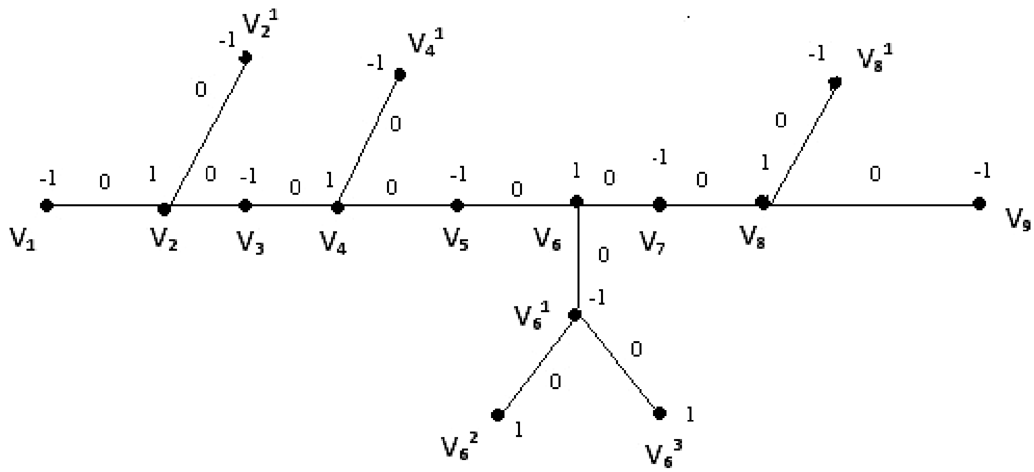
If $f(v_j) = 1$ then $f(v_j^k) = (-1)^k$, $1 \le i \le k$.

If $f(v_j) = -1$ then $f(v_j^k) = -(-1)^k$, $1 \le i \le k$.

If we continue the procedure for all the sub branches of p_j and all the branches of P, then we get for any edge $uv \in E(G)$, $f(u) = -f(v)$. Therefore all $uv \in E$, has the label $f(u) + f(v) = 0$. Thus all the edge labels are zero. Hence any tree admits 0-edge magic labeling. Given tree and constructed tree are shown in Figure 3.2.



(a) Figure 3.2 (a) Given Tree



(b) Figure 3.2 (b) labeled Constructed Tree

4. Conclusion: *0*-edge magic labeling of generalized *Y*-tree and Tree is shown.

References

1. J.A .Gallian, (2013) “A dynamic survey of graph labeling”, Electronic Journal of Combinatorics, Vol. 20, DS6.
2. J. Jayapriya and K.Thirusangu , *0*-Edge magic labeling for some class of graphs, Indian Journal of Computer Science and Engineering, Vol. 3, No. 3 (2012), pp. 425–427.
3. J. Jayapriya 0-Edge magic labeling of Shadow graph”, International Journal Of Pharmacy & Technology, pp.1-5, Feb 2016.
4. J. Jayapriya *“0*-Edge magic labeling of Spillitting graph”, Global Journal of Pure and Applied Mathematics, Volume 12, Number 1 ,(2016), pp. 421-426.