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# A Study on Root Cube Even Mean Labeling for Some Special Graphs

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***Abstract:** A graph G = (V,E) with p vertices and q edges is said to be a Root Cube Even Mean Graph if it is possible to label the vertices x $\in$ Vwith distinct elements f(x) from 1,2......,q+1 in such a way that when each edge e = uv is labeled with f(e = uv)* $=\left\lceil\sqrt{\frac{f(u)^3+f(v)^3}{2}}\right\rceil$ *or* $\left\lfloor\sqrt{\frac{f(u)^3+f(v)^3}{2}}\right\rfloor$*, then the resulting edge labels are distinct. Here f is called a Root Cube Even Mean Labeling of G. In this paper we prove that Quadrilateral snake, Triangular Snake,* $P_{n\,\Theta}\,K_{1,3}$ *, Star is a root cube even mean labeling.*
***Key Words:** Labeling, Root Mean Square Graph, Graceful graph*

## I. INTRODUCTION

All Graphs in this paper are finite and undirected. The symbols V(G) and E(G) denote the vertex set and edge set of a graph G. The cardinality of the vertex set is called the order of G denoted by p. The cardinality of the edge set is called the size of G denoted by q edges is called a(p,q) graph. A graph labeling is an assignment of integers to the vertices or edges. Bloom and Hsu [2] extended the notion of graceful labeling to directed graphs. Further this work can be extended in the field of automata theory [6,7,8,9,10,11] which has a wide range of application in automata theory. There are many applications in graph labeling under undirected [16,17,18,19,20,21] and directed graph[12,13,14,15]

## II. BASIC DEFINITIONS

### A. *Definition 2.1*

The graph $P_{n\,\Theta}\,K_{1,3}$ is obtained by attaching complete bipartite graph $K_{1,3}$ to each vertex of path $P_{n.}$

### B. *Definition 2.2*

The graph is called a Quadrilateral Snake graph which is defined as series connection of non-adjacent vertices of N number of cycle.

### C. *Definition 2.3*

A triangular $T_n$ is obtained from a path $u_1,u_2,u_3,\ldots u_n$ and $v_1,v_2,v_3\ldots v_n$.That is every edge of a path.

## III. MAIN RESULTS

### A. *Theorem 3.1*

$P_{n\,\Theta}\,K_{1,3}$is a Root Cube Even Mean Labeling Graph.

Proof

Let $P_{n\,\Theta}\,K_{1,3}$with vertices as $v_1,v_2,\ldots.v_n$ ; $w_1,w_2,\ldots w_n$ ; $u_1,u_2,\ldots u_n$ and $x_1,x_2,\ldots x_n$

Define a function $f:V(G)\rightarrow\{2,4,6,8\ldots 8n\}$

$f(v_i) = 8i-6,\ 1\leq i\leq n$

$f(w_i) = 8i-4,\ 1\leq i\leq n$

$f(v_i) =8i-2,\ 1\leq i\leq n$

$f(u_i)\ 8i,\ 1\leq i\leq n$

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The edge of the graph $P_n \odot K_{1,3}$ receive distinct numbers .
Hence $P_n \odot K_{1,3}$ is root cube even mean labeling graph.

Example 3.1

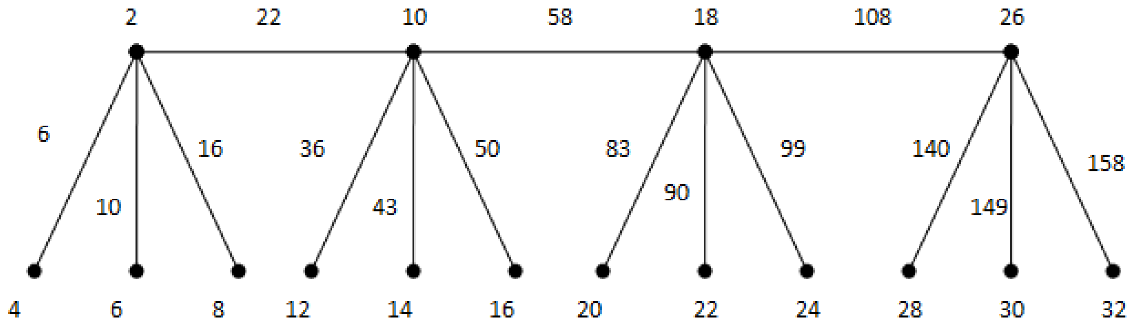


Figure: 3.1 $P_n \odot K_{1,3}$

*B. Theorem:3.2*

The Star $K_{1,n}$ is a Root Cube Even Mean Labeling Graph

Proof

Let G be a graph $k_{1,n}$

Let $k_{1,n}$ be a star with vertices as $v_1, v_2, \ldots, v_n$

Define $f: V(G) \rightarrow \{2,4,6,8\ldots..2n+1\}$

$f(v)=2i+2$ ; $1 \leq i \leq n$

Then the edge labels as $2i+1$ ; $1 \leq i \leq n$

Therefore, the edge of the star graph receive distinct numbers

Hence ,the star $K_{1,n}$ is a root cube even mean labeling

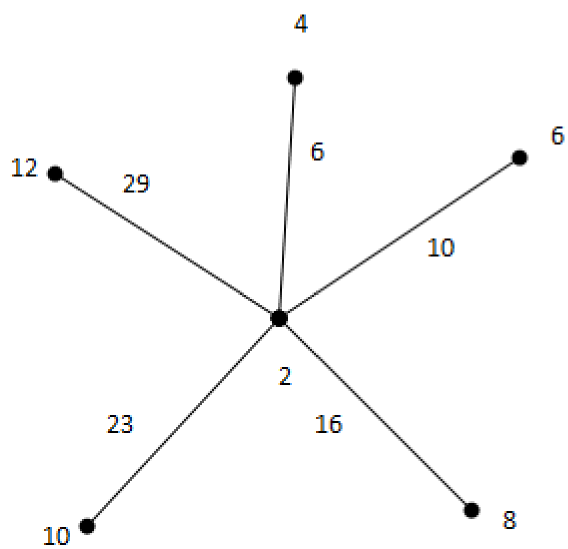


Figure:3.2 Star $k_{1,n}$

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### *C. Theorem: 3.3*

$Q_3$ is a root cube even mean labeling graph

*Proof*

Let $Q_3$ is a graph

Let $Q_3$ with vertices $v_1,v_2,\ldots.v_n$ ; $w_1,w_2,\ldots w_n$ ; $u_1,u_2,\ldots u_n$ and $x_1,x_2,\ldots x_n$

Define a function $f:V(G) \rightarrow \{2,4,6\ldots.n\}$

$f(u_i)=6i-2$

$f(v_i)=6i-4$

$f(w_i)=6i$

Then the edge labels are distinct.

Therefore, $Q_3$ is said to be a root cube even mean labeling of graph.

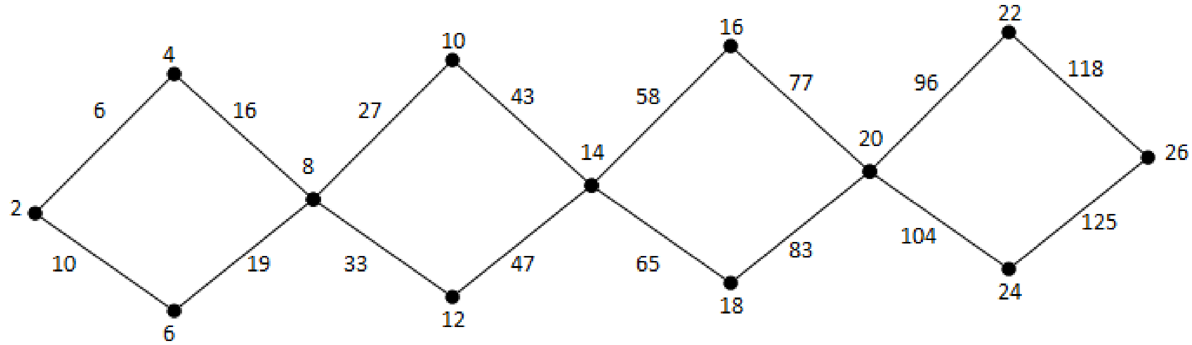


Figure:3.3 Quadrilateral snake

### *D. Theorem :3.4*

$T_4$ is a root cube even mean labeling of graph

Proof

Let $T_4$ be a triangular snake

Let $T_4$ with vertices $v_1,v_2,\ldots.v_n$ ; $w_1,w_2,\ldots w_n$ ; $u_1,u_2,\ldots u_n$ and $x_1,x_2,\ldots x_n$

Define a function $f:V(G) \rightarrow \{2,4,6\ldots.n\}$

$f(u_i)=2i-2$

$f(v_i)=2i$

Then the edge labels are distinct.

Therefore, $T_n$ is said to be a root cube even mean labeling of graph.

*Example: 3.4*

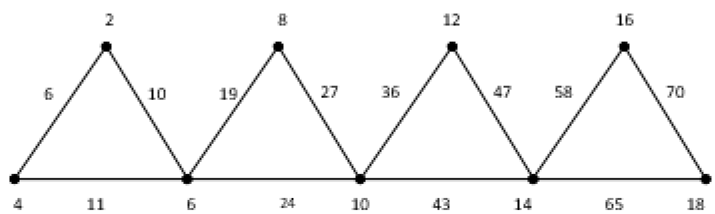


Figure 3.4 Triangular Snake

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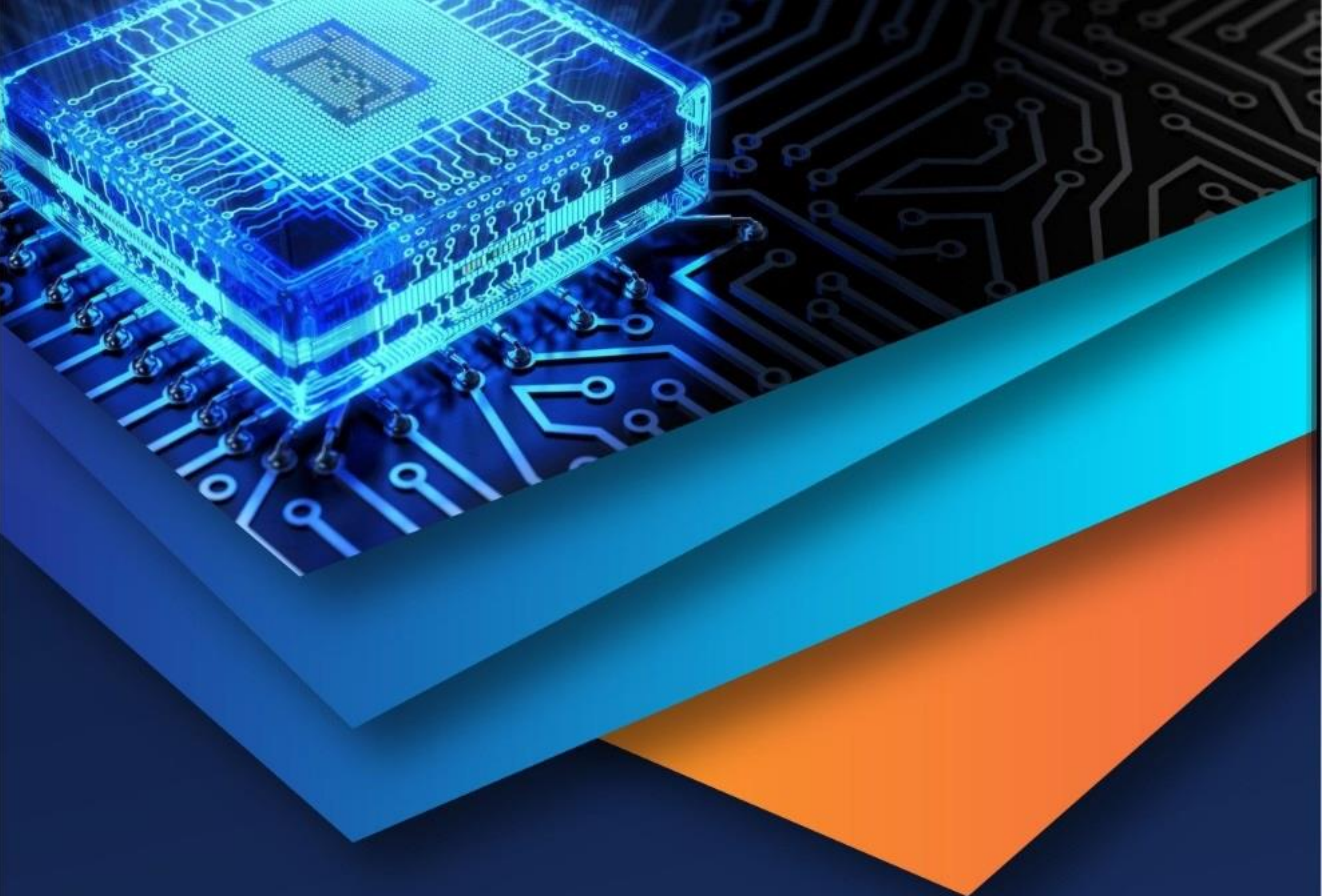

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