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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 $x \in V$ with 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, $P_n \odot K_{1,3}$, 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 $P_n \odot K_{1,3}$ 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 $u_1, u_2, u_3, \dots u_n$ and $v_1, v_2, v_3 \dots v_n$. That is every edge of a path.

III. MAIN RESULTS

A. Theorem 3.1

$P_n \odot K_{1,3}$ is a Root Cube Even Mean Labeling Graph.

Proof

Let $P_n \odot K_{1,3}$ with vertices as $v_1, v_2, \dots v_n$; $w_1, w_2, \dots w_n$; $u_1, u_2, \dots u_n$ and $x_1, x_2, \dots x_n$

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

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

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

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

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

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.
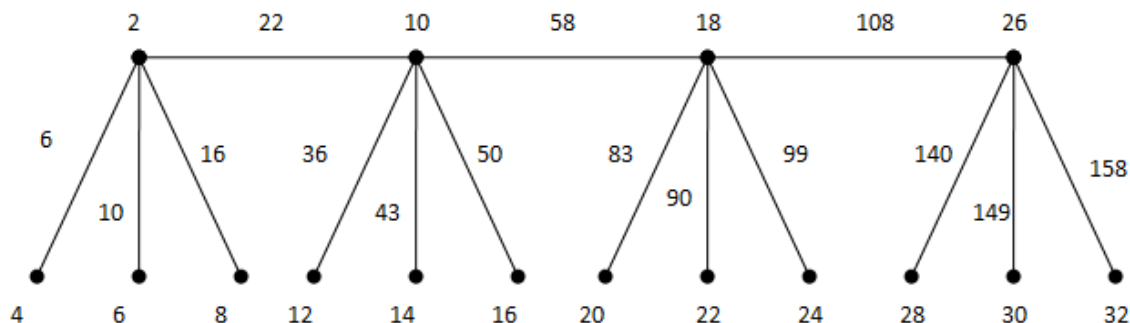
Example 3.1

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 $f:V(G) \rightarrow \{2,4,6,8 \ldots 2n+1\}$
$f(v)=2i+2$; $1 \le i \le n$
Then the edge labels as $2i+1$; $1 \le i \le n$
Therefore, the edge of the star graph receive distinct numbers
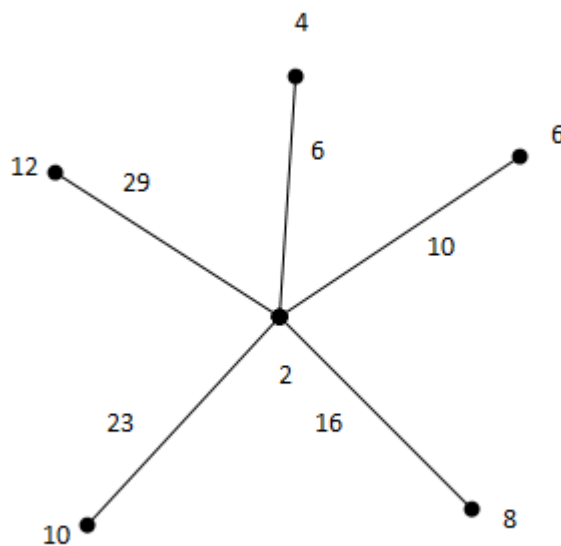Hence ,the star $K_{1,n}$ is a root cube even mean labeling

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

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....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.
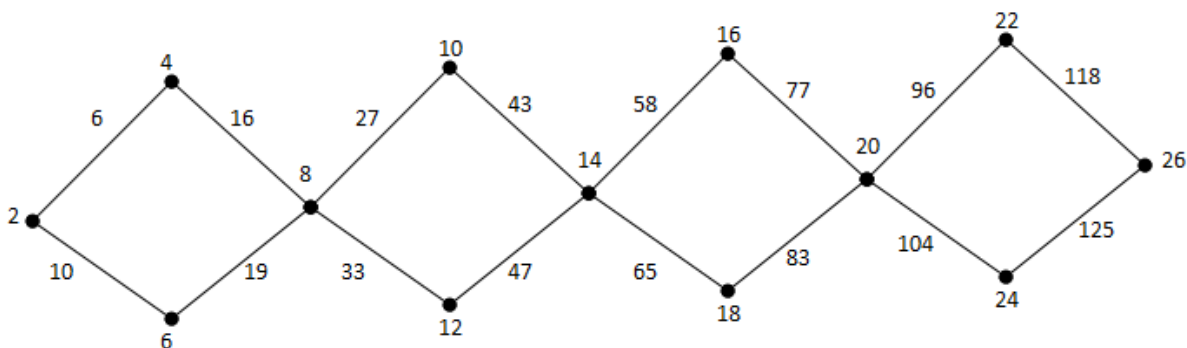

Figure:3.3 Quadrilateral snake

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....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.
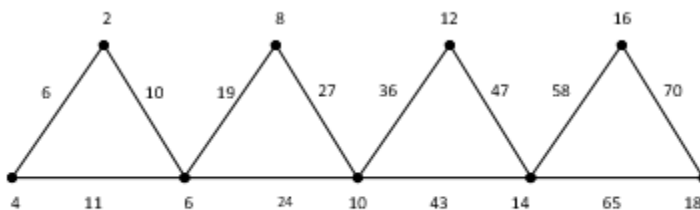
Example: 3.4

Figure 3.4 Triangular Snake

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