iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** III **Month of publication:** March 2023

DOI: https://doi.org/10.22214/ijraset.2023.49699

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue III Mar 2023- Available at www.ijraset.com

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

Dr. P. Shalini[1], D. Madhumitha[2]
[1]*Associate Professor in Mathematics,* [2]*PG Student, PG & Research Department of Mathematics, Cauvery College for women (Autonomous), Tiruchirappalli-620018, India*

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

III. MAIN RESULTS

A. *Theorem 3.1*

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

Proof

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

Define a function f:V(G) $\rightarrow$ {2,4,6,8…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, $1\leq i\leq n$

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

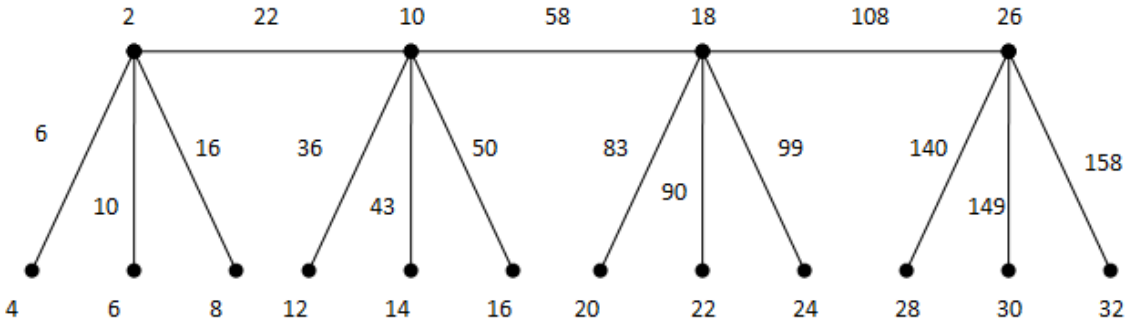


Figure: 3.1 $P_n \odot K_{1,3}$

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

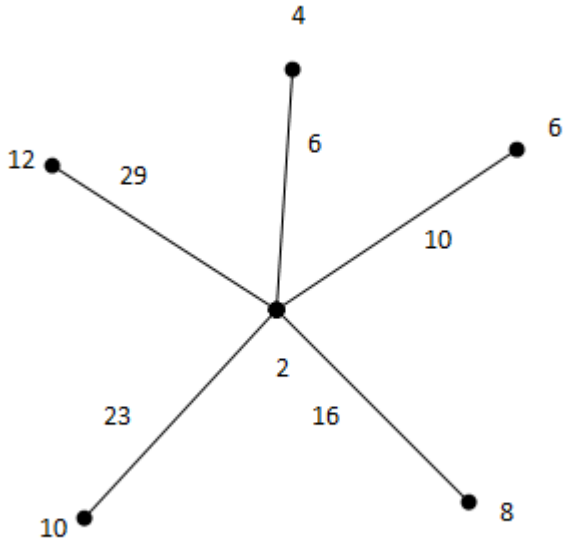


Figure:3.2 Star $k_{1,n}$

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.

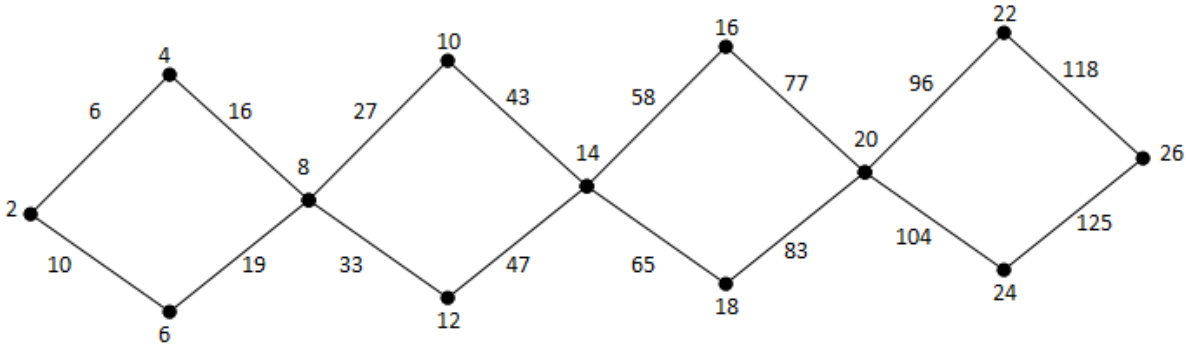


Figure:3.3 Quadrilateral snake

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

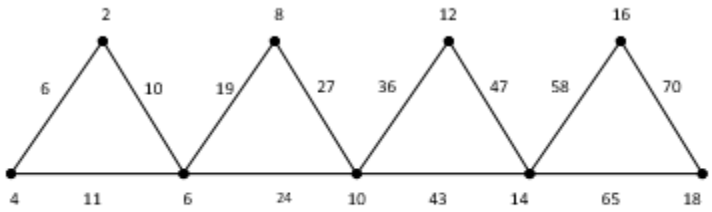
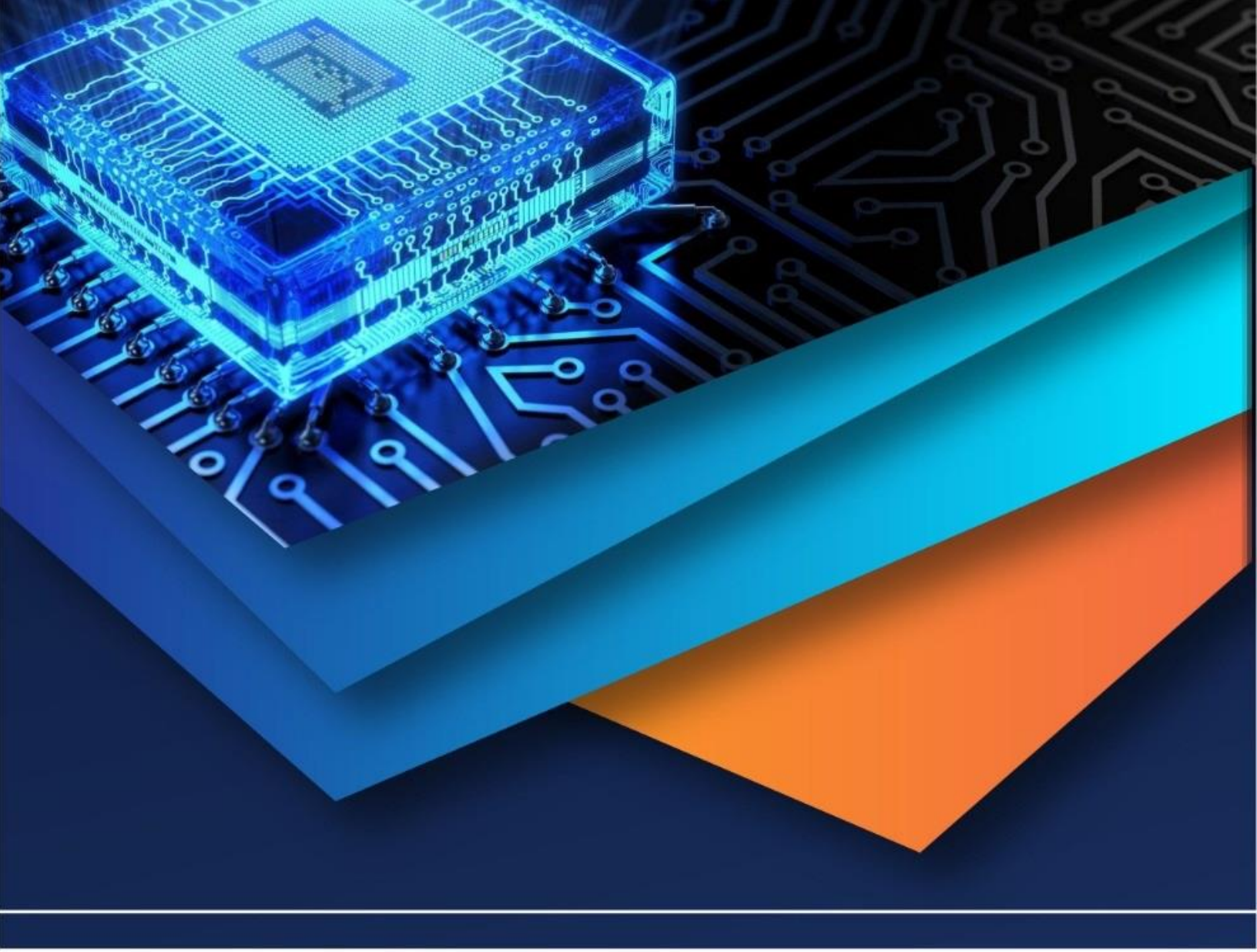


Figure 3.4 Triangular Snake

REFERENCES

[1] Bodendick, R. and Walther, G., On number theoretical methods in graph labelingsRes.Exp.Maths (2,/1995) 3-25.
[2] Bloom, D.F. Hsu, On graceful directed graphs, SIAMJ, Alg. Discrete Math.,6(1985),519-536.
[3] Gallian, M.A., "A Dynamic survey of graph labelings" Electronic journal, 2000 (Volume-23).
[4] Harary, F., Graph Theory, New Delhi: Narosa Publishing House, 2001.
[5] Hedge, S.M., Labeled graphs and Digraphs: Theory and Application.
[6] Saridha.S. and Rajaretnam, T., "Algebraic Properties of Plus Weighted Finite State Machine", International Journal Of Applied Engineering Research, e-ISSN:0973-9769, p-ISSN:0973-4652, Vol.13, Number 21, 2018, 14974-14982.
[7] Saridha, S. and Rajaretnam, T., "A Study On Plus Weighted Multiset Transformation Semigroups", International Journal Of Information And Computing Science, e-ISSN:0972-1347, Vol.6, Issue I, January 2019, 84-98.
[8] Saridha, S. and Rajaretnam, T., "On Regular Properties Of Plus Weighted Multiset Finite State Automaton", Journal Of Applied Science And Computations, e-ISSN:1076-5131, Vol.5, Issue XII, December 2018, 87-95.
[9] Saridha, S., Rajaretnam, T., Plus weighted finite state automaton, in Journal Of Computer And Mathematical Sciences (JCMS 2017), Vol.8, Issue 11, ISSN 0976-5727, pp 674-690.
[10] Saridha, S. and Rajaretnam, T., "Some properties of plus weighted multiset grammars", International Journal Of Information And Computing Science, e-ISSN:0972-1347, Vol.6, Issue 5, May 2019, 24-37
[11] Saridha, S. and Haridha Banu . S, "A New Direction Towards Plus weighted Grammar", International Journal for Research in Applied Science and Engineering Technology(IJRASET), ISSN: 2321 – 9653, Vol. 11, Issue II, February 2023.
[12] Shalini. P, Paul Dhayabaran. D, "Proper Colourings in Magic and Anti-magic Graphs", International Journal of Engineering and Research Technology , Vol. 3, Issue. 2, pages 815-818. February 2014.
[13] Shalini. P, Paul Dhayabaran. D, "Generalization of Skolem Even Graceful Digraphs for Various Graphs", International Journal of Mathematical Archive, 5(4), 2014, pages 65-69.
[14] Shalini. P, Paul Dhayabaran. D, "Skolem Graceful Signed Graphs on Directed Graphs", Asian Journal of Current Engineering and Maths, 3:2 March-April(2014),pages33-34.
[15] Shalini. P, Paul Dhayabaran. D, "Generalization of Skolem Odd Graceful Digraphs for Various Graphs", *International Journal of Scientific and Research Technology*,(2015) Volume-3, Pages 1-3.
[16] Shalini. P, Paul Dhayabaran. D, An Absolute Differences of Cubic and Square Difference Labeling, International Journal of Advanced Scientific and Technical Research, May-June 2015, Issue-5, Volume-3, pages 1-8.
[17] Shalini. P, Paul Dhayabaran. D, A Study on Root Mean Square Labelings in Graphs, International Journal of Engineering Science and Innovative Technology, May 2015, Volume-4, Issue-3, pages 305-309.
[18] Shalini. P, Paul Dhayabaran. D, Minimization of Multiplicative Graphs, International Journal of Current Research, Volume 7, Issue-08,pages 19511-19518,August 2015.
[19] Shalini. P, Gowri. R, Paul Dhayabaran. D, An absolute Differences of Cubic and Square Difference Labeling For Some Families of Graphs, International Journal of Analytical and Experimental Modal Analysis, Vol.11, Issue 10, October 2019, Pages 538 - 544, Impact Factor: 6.3. ISSN No: 0886 - 9367.
[20] Shalini. P, S.A.Meena , Lehmer -4 mean labeling of graphs, International journal for research in Applied Science and Engineering Technology (IJRASET) , Volume 10, Issue XII, December 2022,Page no: 1348-1351,ISSN : 2321-9653.
[21] Shalini.P, Tamizharasi.S, Power-3 Heronian Odd Mean Labeling of Graphs, International Journal for Research in Applied Science and Engineering Technology (IJRASET), Volume 10 Issue XII , December 2022, Page no: 1605-1608,ISSN:2321-9653.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY