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# A Study on Power-3 Heronian Odd Mean Labeling for some Path Related Graphs

P.Shalini[1], S.Tamizharasi[2]
[1]*Associate Professor in Mathematics,* [2]*PG & Research Department of Mathematics, Cauvery College For Women (Autonomous), Tiruchirapalli-620018, India*

***Abstract:*** ***In this article, we discussed Power-3 Heronian odd Mean Labeling for some path related graphs. A function is said to be Power 3 Heronian odd mean labeling of a graph G with q edges, if f is a bijective function from the vertices of G to the set{1,3,5,.....2p-1}such that when each edges uv is assigned the label, then the resulting edge labels are distinct numbers.***

$$\beta^*(e = uv) = \left\lfloor \sqrt[3]{\frac{\beta(u)^3 + (\beta(u)\beta(v))^{\frac{3}{2}} + \beta(v)^3}{3}} \right\rfloor$$

***Keywords: Mean labeling, multiplicative labeling, Additive labeling.***

## 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. A vertex labeling is a function of V to a set of labels. A graph with such a vertex labeling function is defined as vertex – labeled graph. An edge labeling is a function of E to a set of labels and a graph with such a function is called an edge labeled graph. 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 [13,14,15,16,17,18,19] which has a wide range of application in automata theory. There are many applications in graph labeling under undirected [20,24,25,26,27,28,29,30] and directed graph [21,22,23]. Graph labeling is also extended to different types of domination as cited [3,4,5,9,10,11,12]

## II. BASIC DEFINITIONS

DEFINITION 2.1
A Star $S_n$ is the complete bipartite graph $K_{1,n}$
DEFINITION 2.2
$Y_n$ is connected graph without any circuits.
DEFINITION 2.3
A Bistar graph is the graph obtained by joining the centre(apex) vertices of two copies of $K_{1,n}$ by an edge and it is denoted by $BS_n$

## III. MAIN RESULTS

### A. *Theorem 3.1*

The Star $K_{1,n}$ is a Power 3 Heronian odd mean Labeling of graphs for $n \geq 2$
PROOF:
Let G be a graph of Star $K_{1,n}$
Let $K_{1,n}$ be a star with vertices as $v_1$ ; $u_1,u_2,u_3,\ldots,u_n$
Define $f : V(G) \rightarrow \{1,3,5,\ldots\ldots\ldots,p-1\}$ by

$f(v_1) = 1$

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

Therefore, the edges of the star graph receive distinct numbers.
Hence, the Star $K_{1,n}$ is a Power 3 Heronian Odd Mean Labeling of Graphs.

 

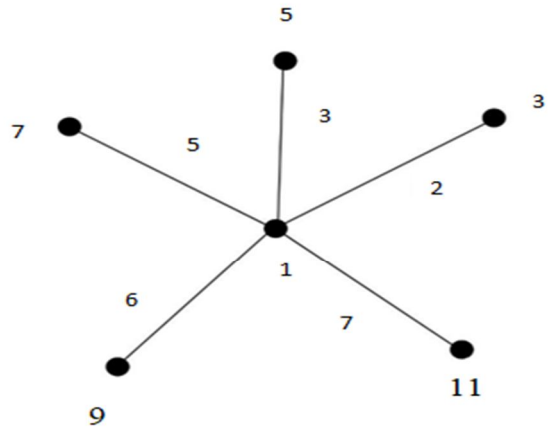


Fig 3.1 Star $K_{1,5}$

*B. Theorem 3.2*

$Y_n$ is a Heronian Odd Mean Labeling of Graphs for $n \geq 2$

PROOF:

Let G be a graph of $Y_n$

Let $Y_n$ be a graph with vertices as $u_1$ ; $v_1$ ; $w_1$, $w_2$, …,$w_n$

Define f :V(G) → {1,3,5,……,n-1} by ,

$f(u) = 2n + 1$

$f(v) = 2n + 3$

$f(w_i) = 2i - 1$ ; $1 \leq i \leq n$

Therefore, the edges of $Y_n$ graph receive distinct numbers

Hence, $Y_n$ is a Heronian Odd Mean Labeling of Graphs

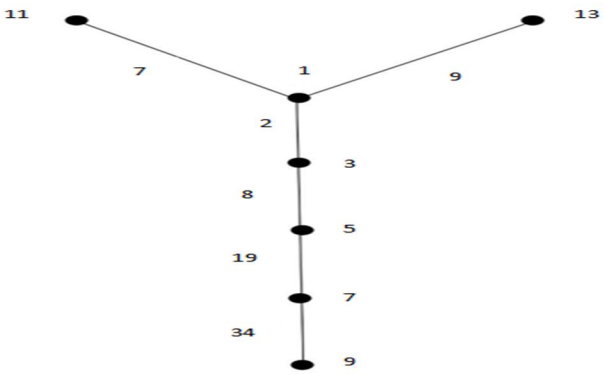


Fig 3.6 $Y_5$

*C. Theorem 3.3*

The Bistar $BS_n$ is a Heronian odd mean Labeling of graph for $n \geq 2$

Proof:

Let G be a graph of Bistar $BS_n$

Let $BS_n$be a bistar with vertices as $u_1$, $v_1$, $v_2$, …,$v_n$; $w_{n+1}$, $w_{n+2}$, …, $w_{n+n-1}$

Define f:V(G) →{1,3,5,7,……,2n-1} by ,

$f(u_1)=1$

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

$f(w_i)=2i+11$, $1 \leq i \leq n$

Therefore, the edges of the bistargraph $BS_5$receive distinct numbers
Hence, the bistar graph $BS_5$ is a Power -3 Heronian Odd mean Labeling of graphs.

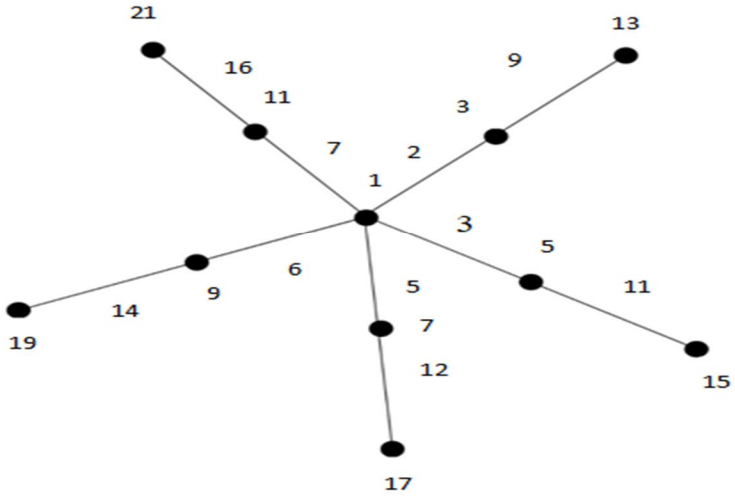


Figure 3.3 : $BS_5$

## IV. CONCLUSION

In this article, we proved some families of graphs which admits Power-3 Heronian odd Mean Labeling .Therefore, Star $S_n$,$Y_n$, Bistar are Power-3 Heronian Odd Mean Labeling

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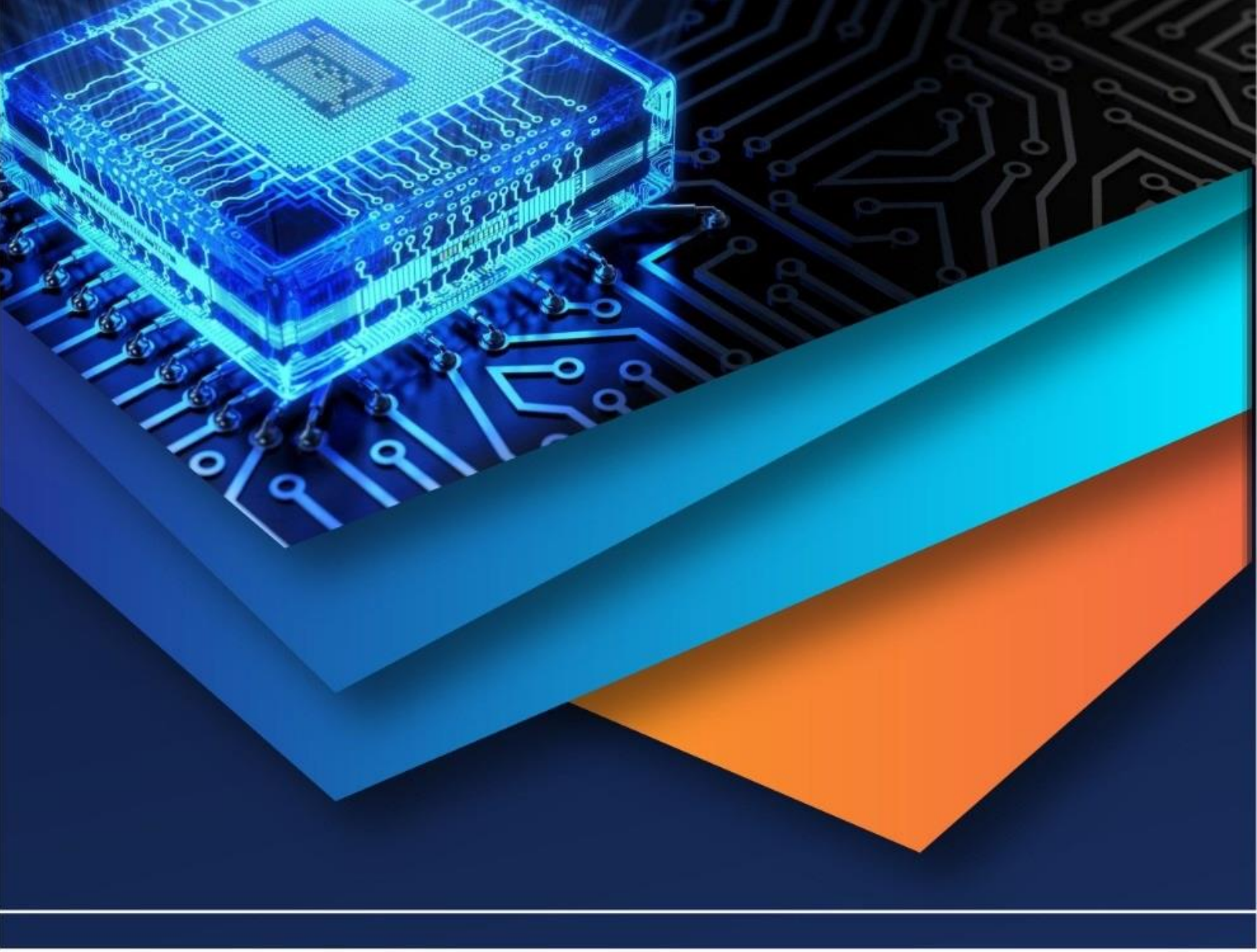

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