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MIN-MAX EDGE ANTIMAGIC LABELING ON BOOK GRAPH

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ABSTRACT

In this article the existences of odd min-max edge, even min-max edge, in-max edge Antimagic labeling of Book graph is shown.

Key: Magic, Labeling, min-max edge labeling, Odd, Even etc.

I. INTRODUCTION

A labeling of a simple graph G is an assignment of integers to the vertices or edges or both subject to certain conditions. Most graph labeling methods extract their origin from a paper published by ROSA in 1967.Rosa called a function of β-valuation of a graph G with q edges of f is an injection from the vertices of G to the set {0, 1, 2, 3,…..q} such that when each edge us is assigned the label |f(u)-f(u)| the resulting edge labels are distinct. Dynamic survey on Labeling is an important survey to known about the different labeling.[3]

Min-Max labeling was introduced by J.Jayapriya in the year 2016 [4].In this paper the existences of min-max edge Antimagic labeling of Book graph is shown.

II. BASICS DEFINITION

Definition 2.1. Let G (V, E) be a simple graph with p vertices and q edges.

A bijection f : V(G) → {1,2,…p}, is said to be min-max edge antimagic labeling if for every edge uv in E, the real valued weight λ(uv) = $\frac{\min\{f(u), f(v)\}}{\max\{f(u), f(v)\}}$ are distinct.[4]

Definition 2.2. Let G (V, E) be a simple graph with p vertices and q edges. A bijective function f : V(G) → {1,3,5,….,2p-1} is said to be odd min-max edge antimagic labeling if for every edge uv in E, the edge weights λ(uv) = $\frac{\min\{f(u), f(v)\}}{\max\{f(u), f(v)\}}$ are distinct.[4]

Definition 2.3. A bijective function f : V(G) → {2,4,6,…., 2p} is said to be even min-max edge antimagic labeling if for every edge uv in E, the edge weights λ(uv) = $\frac{\min\{f(u), f(v)\}}{\max\{f(u), f(v)\}}$ are distinct.[4]

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Definition 2.4. Book graph is defined as the graph Cartesian product $S_{m+1} \square P_2$.

III.MAIN RESULT

Theorem 1:

The B_6 graph admits min-max edge, odd min-max, even min-max edge anti-magic labeling.

Proof:

Let G {V, E} be the B_6 graph with V = {v_1, v_2,….v_{14}} and E={e_1,e_2,....e_{19}}

Case (1):

Let f: V —> {1, 2,….14} such that f(v_i)= i, 1≤i≤14.

Also, the edges are connected with those vertices such that the adjacent vertex labeling say f(v_i), f(v_j) for 1≤i, j≤14 are co-prime.

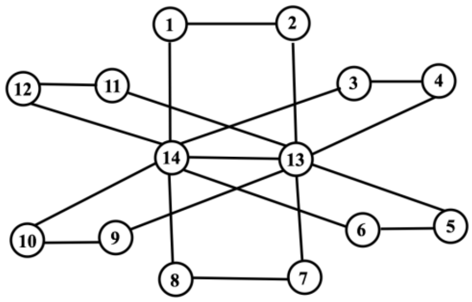

Figure 3.1: Antimagic labeling of B_6 graph

In the above figure, the edge vertices are {0.5,0.07,0.15,0.75,0.21,0.31,0.83,0.38,0.43,0.875,0.54,0.57,0.9,0.69,0.71,0.92,0.79,0.85,0.86}

Case (2):

Let f: V —> {1, 3, 5, ….31}, 1≤i≤14 such that f(v_i)= 2i-1, 1≤i≤14.

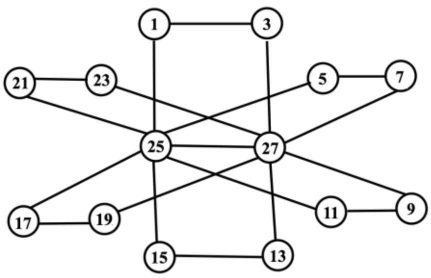

Figure 3.2 : Odd Antimagic labeling of B_6 graph

The edge values are
{0.33,0.11,0.04,0.71,0.2,0.26,0.82,0.33,0.44,0.87,0.48,0.6,0.89,0.70,0.68,0.91,0.84,0.85,0.93}.

Case (3):

Let f: V —> {2, 4, 6, ….28}, 1≤i≤14 such that $f(v_i)$= 2i, 1≤i≤14.

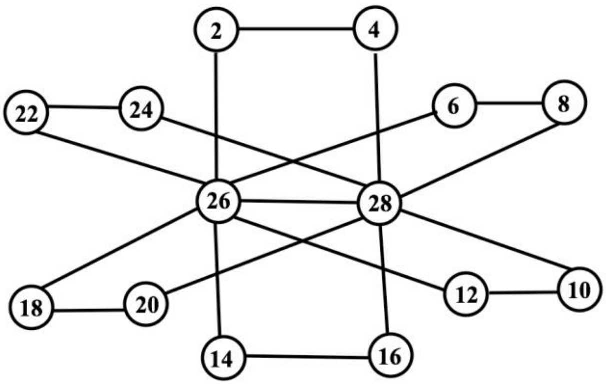

Figure 3.3 : Even Antimagic labeling of B_6 graph

The edge values are
{0.5,0.14,0.07,0.75,0.23,0.29,0.83,0.38,0.46,0.875,0.57,0.54,0.9,0.69,0.71,0.92,0.85,0.86,0.93}.

Then it is observed that the edge values are distinct.

Hence the min-max edge Antimagic labeling exists.

Theorem 2:

The B_5 graph admits min-max edge, odd min-max, even min-max edge anti-magic labeling.

Proof:

Let G {V, E} be the B_5 graph with V={v_1, v_2,….v_{12}} and E={e_1,e_2,....e_{16}}

Case (1):

Let f: V —> {1, 2,….12} such that $f(v_i)$= i, 1≤i≤12.

Also, the edges are connected with those vertices such that the adjacent vertex labeling say $f(v_i)$, $f(v_j)$ for 1≤i, j≤12 are co-prime.

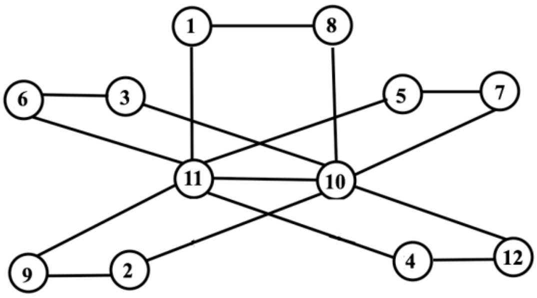

Figure 3.4 : Antimagic labeling of B_5 graph

In the above figure, the edge vertices are {0.125,0.8,091,0.09,0.3,0.55,0.5,0.71,0.45,0.7,0.83,0.33,0.36,0.2,0.22,0.82}

Case (2):

Let f: V —> {1, 3, 5, ….23}, 1≤i≤12 such that $f(v_i)$= 2i-1, 1≤i≤12.

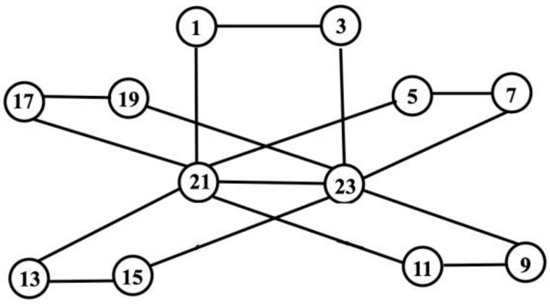

Figure 3.5 : Antimagic labeling of B_5 graph

The edge values are {0.33,0.13,0.91,0.05,0.83,0.81,0.89,0.24,0.71,0.30,0.39,0.81,0.52,0.65,0.87,0.62}.

Case (3):

Let f: V —> {2, 4, 6, ….24}, 1≤i≤12 such that $f(v_i)$= 2i, 1≤i≤12.

The edge values are {0.6,0.5,0.92,0.91,0.18,0.29,0.58,0.25,0.375,0.73,0.33,0.44,0.82,0.45,0.2,0.08}.

Then it is observed that the edge values are distinct.

Hence the min-max edge Antimagic labeling.

Theorem 3:

The B_4 graph admits min-max edge, odd min-max, even min-max edge anti-magic labeling**.**

Proof:

Let G {V, E} be the B_4 graph with V ={v_1, v_2,….v_{10}} and E={e_1,e_2,....e_{13}}

Case (1):

Let f: V —> {1, 2,….10} such that f(v_i)= i, 1≤i≤10.

Also, the edges are connected with those vertices such that the adjacent vertex labeling say f(v_i), f(v_j) for 1≤i, j≤10 are co-prime.

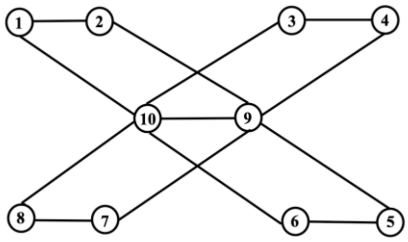

Figure 3.6: Antimagic labeling of B_4 graph

In the above figure, the edge vertices are {0.5,0.1,0.22,0.75,0.3,0.44,0.83,0.55,0.6,0.875,0.78,0.8,0.9}

Case (2):

Let f: V —> {1, 3, 5, ….19}, 1≤i≤10 such that f(v_i)= 2i-1, 1≤i≤10.

The edge values are {0.33,0.18,0.05,0.71,0.26,0.41,0.65,0.47,0.82,0.87,0.88,0.68,0.81}.

Case (3):

Let f: V —> {2, 4, 6, ….20}, 1≤i≤10 such that f(v_i)= 2i, 1≤i≤10.

The edge values are {0.5,0.22,0.1,0.75,0.3,0.44,0.83,0.55,0.6,0.875,0.78,0.8,0.9}.

Then it is observed that the edge values are distinct.

Hence the min-max edge Antimagic labeling exists.

IV.CONCLUSION

The existences of Odd min-max, even min-max and min-max edge Antimagic labeling is shown.

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