JOURNAL OF ALGEBRAIC STATISTICS
Volume 13, No. 3, 2022, p. 4874-4878
https://publishoa.com
ISSN: 1309-3452

Radio Analytic Antipodal Mean Number of some graphs

K. Sivakumar
Associate Professor
Department of Mathematics, Roever Engineering College,Perambalur, Tamil Nadu, India.
Email ID: sivabarathkumar@gmail.com

P. Poomalai,
Assistant Professor
Department of Mathematics, Roever Engineering College,Perambalur, Tamil Nadu, India.
Email Id: poomalairec@gmail.com

P. Malliga
Assistant Professor
Department of Mathematics , Dhanalakshmi srinivasan college of Arts science for women (Autonomous), Perambalur, Tamil Nadu, India.
Email Id: Malligakavinesh@gmail.com

S. Sangeetha
Assistant Professor
Department of Mathematics , Dhanalakshmi srinivasan college of Arts science for women (Autonomous), Perambalur, Tamil Nadu, India.
Email Id: sangeethasankar2016@gmail.com

ABSTRACT

Let G(V,E) be a graph with p vertices and q edges with vertex set V and edge set E. let 'd' denote the diameter of G and d(u,v) denote the distance between the vertices u and v in G.
P.Poomalai et [9]al was introduced the concept of radio analytic mean labeling in 2019.And he also indicated one more concept radio analytic mean D-distance number 2020. here we introduce a new labeling graph called Radio Antipodal Analytic mean labeling. An Radio Antipodal Analytic mean labelling of G is a function f that assigns to each vertex a non-negative integer such that $f(u) \neq f(v)$ if $d(u,v) + \lceil f(u)^2 - f(v)^2 \lceil /2 \geq d$ for any two distinct vertices u, v € V(G). The Antipodal Analytic mean number of f denoted by $a_{amn}(f)$ is the maximum number assigned to any vertex of G. The Radio Antipodal Analytic mean number of G, denoted by $A_{amn}(G)$ is the maximum value of $A_{amn}(f)$ taken over all Radio Antipodal mean labelling f of G. We prove P_n, Cycle Cn, Star $K_{1,n}$,Ladder L_n, n-bistar $B_{n,n}$ and fan f_{2n+1} are the Radio Antipodal Analytic mean graphs.

1. Introduction :

Here a graph we mean a finite, undirected simple graph with vertex set V(G) and E(G) respectively. Graph labelling where the vertices and edges are assigned real values (or) subset of a set are subject to certain conditions.

Definition 1.1:

A graph labelling is the assignment of unique identification to the edges and vertices of a graph.

Definition1.2:

A graph G(V,E) is said to be Radio Radio Antipodal Analytic mean graph if it is possible to label the vertices v in V with distinct from 0,1,2,3,--- p-1 is such a way that when each edge e=uv is labelled with a of function $f(e=uv)=\lceil f(u)^2 – f(v)^2 \lceil / 2$ and $d(u,v) + \lceil f(u)^2 – f(v)^2 \lceil / 2 \geq dim(G)$ for any two distinct vertices u,v € V(G). In this case ,f is called an Radio Antipodal Analytic mean labelling of G.

Definition 1.3 :

A complete bipartite graph $k_{1,n}$ is called a star and it has n+1 vertices and n edges.Definition 1.4 :
The n-bisector $B_{n,n}$ is the graph obtained from two copies of $k_{1,n}$ by joining the vertices of maximum degree by an edges and vertices of a graph.

Definition1.5:

The fan $f_n(n \geq 2)$ is obtained by joining all vertices of P_n to a further vertex called the centre and contains n+1 vertices and 2n-1 edges

2.Main Results

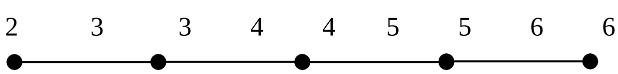
Theorem 2.1

Every path P_n admits an Radio Antipodal Analytic mean labelling.

Proof:
Let $V(P_n) = \{v_i : 1 \leq i \leq n \}$ Let $E(P_n) = \{v_i v_{i+1} : 1 \leq i \leq n \}$
Define f: $V(P_n) \rightarrow \{d-1,d,d+1,d+2,\ldots d+n-2\}$ by $f(v_i) = d+i-1$ for $0 \leq i \leq n-1$.
Let f^* be the induce edge label of fThen $f^*(v_i v_{i+1}) = d+i$ if $0 \leq i \leq n-2$
Then the induced edge label are $\{ d,d+1,d+2,\ldots d+n-2\}$.Hence the theorem.

Example 2.2

The Radio Antipodal analytic mean labelling of a path P_5 are shown in the figure.



Here dim(G) = 4

Theorem 2.3:

Any cycle C_n is an Radio Antipodal analytic mean graph.
Proof:
Let $C_n = v_1 v_2 \ldots v_n v_1$ be the cycle .
Let $E(C_n) = \{ v_1 v_2, \ldots v_i v_{i+1} : 0 \leq i \leq n-1 \}$

Define f: $V(C_n) \rightarrow \{d-1,d,d+1,d+2,\ldots d+n-2\}$ by $f(v_i) = d+i-1$ for $0 \leq i \leq n-1$.
Let f^* be the induce edge label of f

Then $f^*(v_i v_{i+1}) = \{(n(n-4)+2d(n-1)+3)/2$ if n is odd$\}$ or $f^*(v_i v_{i+1}) = \{(n(n-4)+2d(n-1)+4)/2$ if n is even$\}$
Then the induced edge label are
$\{ d,d+1,d+2,\ldots (n(n-4)+2d(n-1)+3)/2$ or $(n(n-4)+2d(n-1)+4)/2\}$.
Hence the theorem.

Theorem 2.4:

All stars $k_{1,n}$ is an Radio Antipodal analytic mean graph.
Proof:
Let $V(K_{1,n}) = \{v_i : 1\leq i\leq n+1\}$ Let $E(K_{1,n}) = \{v_iv_{i+1} : 1\leq i\leq n\}$
Define f: $V(K_{1,n})\rightarrow\{d-1,d,d+1,d+2,\ldots d+n-2\}$ by $f(v_i) = d+i-2$ for $1\leq i\leq n$.
Let f^* be the induce edge label of f

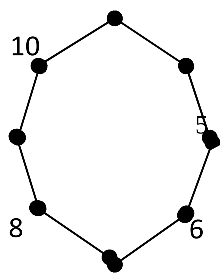
Then $f^*(v_iv_{i+1}) =\{(d+i-2)^2+1$ if i is odd$\}$ or $f^*(v_iv_{i+1}) =\{(d+i-2)^2$ if i is even $\}$ and $1\leq i\leq n$.
Then the induced edge label are $\{d,d+1,d+2,\ldots (d+i-2)^2+1$ or $(d+i-2)^2\}$.

Example 2.5

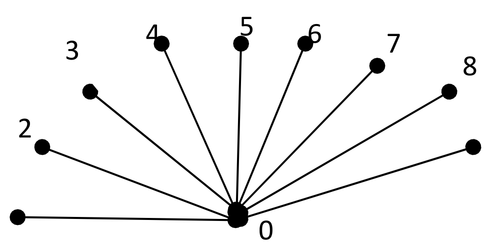
An Radio Antipodal analytic mean labeling of a Cycle C_8 and star $K_{1,9}$ are shown in the figure-1 and figure-2

.

3
4
9
9
7



1



Theorem 2.6

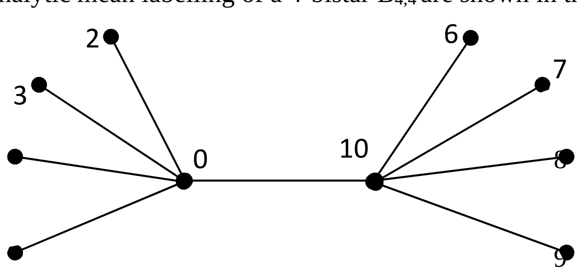
The n-bistar Bn,n is an Radio Antipodal analytic mean graph.**Proof:**
Let $V(B_{n,n}) = \{u_i ,v_i : 1\leq i\leq n+1\}$

Let $E(B_{n,n}) = \{u_{n+1}v_{n+1}, u_iu_{n+1}\ v_iv_{i+1} : 1\leq i\leq n\}$ Define f: $V(B_{n,n})\rightarrow\{d-1,d,d+1,d+2,\ldots d+2n-1\}$ by $f(u_i) = d+i-1$ for $0\leq i\leq n-1$.
$f(v_i) = d+i+n-1$ for $0\leq i\leq n-1$. $f(u_{n+1}) =0$, $f(v_{n+1})=d+2n-1$
Let f^* be the induce edge label of fThen $f^*(u_{n+1}v_{n+1}) =(d+2n-1)^2/2$
$f^*(u_iu_{n+1}) =\{((d+i-1)^2+1)/2$ if i is odd $\}$and $1\leq i\leq n-1$. $f^*(u_iu_{n+1}) =\{(d+i-1)^2/2$ if i is even $\}$and $1\leq i\leq n-1$.
$f^*(v_{2i-1}v_{n+1}) =\{((d+2n-1)^2-(d+i+n-1)^2+1)/2$ if i is odd $\}$and $0\leq i\leq n-1$. $f^*(v_{2i-1}v_{n+1}) =\{((d+2n-1)^2-(d+i+n-1)^2)/2$ if i is even $\}$and $0\leq i\leq n-1$.
Then the induced edge label are $\{d-1,d,d+1,d+2,\ldots, (d+2n-1)^2/2, ((d+i-1)^2+1)/2$ or $(d+i-2)^2/2, ((d+2n-1)^2-(d+i+n-1)^2+1)/2$ or $((d+2n-1)^2-(d+i+n-1)^2)/2\}$.

Example 2.7

An Radio Antipodal analytic mean labelling of a 4-bistar $B_{4,4}$ are shown in the figure-5

4
5



Theorem 2.8

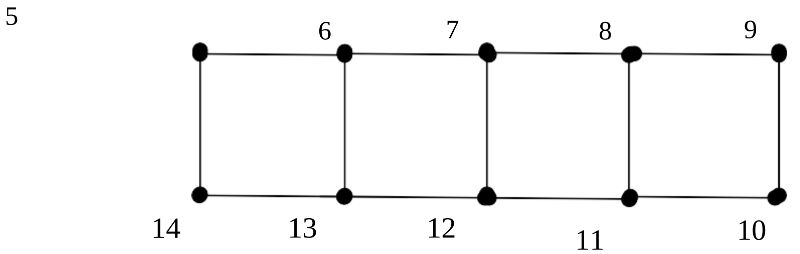
The Ladder L_n is an Radio Antipodal analytic mean graph.**Proof:**

JOURNAL OF ALGEBRAIC STATISTICS
Volume 13, No. 3, 2022, p. 4874-4878
https://publishoa.com
ISSN: 1309-3452

Let $V(L_n) = \{v_i : 1\leq i\leq 2n \}$

Let $E(L_n) = \{ v_iv_{i+1} : 1\leq i\leq 2n\ v_iv_{2n+1-i} : 1\leq i\leq n \}$Define f: $V(L_n)\rightarrow\{d,d+1,d+2,\dots d+2n-1\}$ by $f(v_i) = d+i-1$ for $0\leq i\leq 2n$
Let f^* be the induce edge label of fThen $f^*(v_i v_{i+1}) =d+i$
$f^*(v_iv_{2n+1-i}) =\{((d+2n-i)^2 – (d+i-1)^2)/2$ if $1\leq i\leq n-1$.

Then the induced edge label are $\{ d+1,d+2,\dots , ((d+2n-1)^2 –d^2)/2$Example 2.9
An Radio Antipodal analytic mean labelling of a ladder L_5 is shown in the figure-6



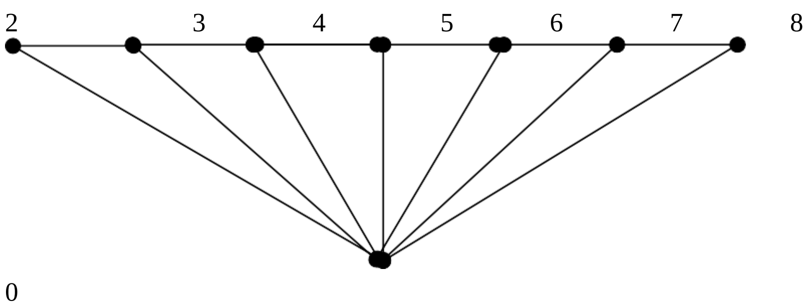
Theorem 2.9

All Fan graph f_{2n+1} is an Radio Antipodal analytic mean graph.
Proof:
Let $V(f_{2n+1}) = \{v_i : 1\leq i\leq 2n+2 \}$

Let $E(f_{2n+1}) = \{v_iv_{i+1} : 1\leq i\leq 2n ; v_iv_{2n+2} : 1\leq i\leq 2n+1 ; \}$

Define f: $V(f_{2n+1})\rightarrow\{d,d+1,d+2,\dots d+n\}$ by$f(v_i) = d+i-1$ for $1\leq i\leq 2n+2$.
Let f^* be the induce edge label of fThen $f^*(v_iv_{i+1}) =\{d+i\ 1\leq i\leq 2n \}$ or
$f^*(v_{2n+3}v_{i+1}) =\{((d+i-1)^2-(2n+3)^2)/2$ if $1\leq i\leq 2n+1$.

Then the induced edge label are $\{ d,d+1,d+2,\dots ((d+i-1)^2-(2n+3)^2)/2\}$.Example 2.5
An Radio Antipodal analytic mean labelling of a Fan graph f_{2n+1} 1 is shown in the figure-6



Conclusions :

In this paper we have discussed the construction of various graphs , such as degree splitting graph in future.

REFERENCES.
[1] Tharmaraj,P. B. Sarasija, Analytic Mean Graphs. Int. Journal of Math. Analysis, Vol. 8, 2014,no. 12, 595 - 609
[2] J.A.Gallian,A dynamic survey of graph labeling,The Electronic journal ofcombinatorics, 5(2002),# DS6,1-144.
[3] F.Harary, Graph Theory,Addison-Wesley,Reading,Massachusetts,1972.
[4] K.Murugan , A.Subramanian , Labeling of Subdivided Graphs, American Jr. ofMathematics and Sciences, Vol.1 , No.1 (January 2012),143-149.
[5] S.S.Sandhya , S.Somasundaram , R.Ponraj , Harmonic Mean Labeling of Some Cycle Related Graphs , Int.Journal.of

JOURNAL OF ALGEBRAIC STATISTICS
Volume 13, No. 3, 2022, p. 4874-4878
https://publishoa.com
ISSN: 1309-3452

Math.Analysis, Vol. 6, 2012, no.40, 1997-2005.
[6] D. D.-F. Liu and M. Xie, "Radio number for square paths," Ars Combin, vol. 90, pp. 307-319, 2009.
[7] T. Nicholas, K. J. Bosco, and M. Antony, "Radio mean D-distance labeling of somegraphs," to appear, 2017.
[8] R. Ponraj, S. S. Narayanan, and R. Kala, "Radio mean labeling of a graph," AKCE International Journal of Graphs and Combinatorics, vol. 12, pp. 224-228, 2015.
[9] P. Poomalai, R. Vikramaprasad, and P. Malliga, "Radio analytic mean labeling of some graphs," in Journal of Physics: Conference Series, 2020, p. 012024.
[10] D. R. Babu and P. LN Varma, "D-distance in graphs," 2013.
[11] D. R. Babu and P. Varma, "Average D-distance between edges of a graph," Indian Journal of Science and Technology, vol. 8, p. 163, 2015.
[12] P. Poomalai, R. Vikramaprasad, and P. Malliga, "Radio analytic mean number of some subdivision graphs , '' Journal of Advanced Research in Dynamical and control systems vol 12, p. 577-583
[13] S.Sangeetha, Fuzzy Graph Thoery in Coloring Graph, Materials Today Proceeding.
[14]. S.Sangeetha, N.Malini , A Study On Fuzzy Multi Groups, Volume 6 , Issue 2 April 2020.
[15]. S.Sangeetha, P.Priya , Forest And Fuzzy Trees, IJERT, Volume 8, Issue 12, 2019.