World Journal of Research and Review (WJRR)
ISSN:2455-3956, Volume-3, Issue-2, August 2016 Pages 74-77

Path Relatively Prime Cordial Graph

Dr. A. Nellai Murugan ,V.Nishanthini

***Abstract*— Let $G = (V,G)$ be a graph with p vertices and q edges. A Analytic Mean Cordial Labeling of a Graph G with vertex set is a bijection from $v = \{1,2 \ldots..p\}$.The induced edge labelling are defined by $f(u,v) = 0$ if either $f(u)$ divides $f(v)$ (or) $f(v)$ divides $f(u)$ one otherwise and if any one of the vertex label is 1, the induced edge label is 0.**

The graph that admits a Relatively Prime Cordial Graph is called Relatively Prime Cordial Graph. In this paper, we proved that path related graphs P_n , $P_n \odot K_1$, Pn^2, $P_2{:}S_n$,$P_n + K_1$ are Relatively Prime Cordial Graph.

***Index Terms*— Relatively Prime Cordial Graph, Relatively Prime Cordial Labeling.**

I. Introduction

A graph G is a finite non-empty set of objects called vertices together with a set of unordered pairs of distinct vertices of G which is called edges. Each pair $e = \{u,v\}$ of vertices in E is called an edge or a line of G in which e is said to join u and v. We write $e = uv$ and say that u and v are adjacent vertices (sometimes denoted as $u\ adj\ v$); vertex u and the edge e are incident with each other, as are v and e. If two distinct edges $e_1$and e_2 are incident with a common vertex, then they are called $adjacent\ edges$. A graph with p vertices and q edges is called $(p,q) -$ graph. In this paper,we proved that path related graphs P_n,$P_n \odot K_1$, Pn^2, $P_2{:}S_n$,$P_n + K_1$ are Relatively Prime Cordial Graph. For graph theory terminology, we follow [2].

II.PRELIMINARIES

Let $G = (V,G)$ be a graph with p vertices and q edges. A Analytic Mean Cordial Labeling of a Graph G with vertex set is a bijection from $v = \{1,2 \ldots..p\}$.The induced edge labelling are defined by $f(u,v) = 0$ if either $f(u)$ divides $f(v)$ (or) $f(v)$ divides $f(u)$ one otherwise and if any one of the vertex label is 1, the induced edge label is 0.

The graph that admits a Relatively Prime Cordial Graph is called Relatively Prime Cordial Graph. In this paper, we proved that path related graphs P_n ,$P_n \odot K_1$, Pn^2,$P_2{:}S_n$,$P_n + K_1$ are Relatively Prime Cordial Graph.

Definition: 2.1 P_n is a path of length $n - 1$.

Definition: 2.2 The Corona $= G_1 \odot G_2$ of two graph G_1 and G_2 is defined as the graph G obtained by taking one copy of G_1 (which has P_1 points) and P_1 copies of G_2 and joining the i^{th} point of G_1 to every point in the i^{th}copy of G_2 ,The graph $P_n \odot K_1$is called a $comb$.

Definition: 2.3

(Pn^2) is a path of length n-1 of twice.

Definition: 2.4

Star of length one is joined with every vertex of a path Pn through an edge. It is denoted by $P_2{:}S_n$

Definition: 2.5

The join of G_1 and G_2 is the graph G $= G_1 + G_2$ with vertex set V $= V_1$ U V_2 and edge set E $= E_1$ U E_2 U{UV :u ϵ V_1,v ϵ V_2 }.The graphP_n+K_1 is called a Fan.

II. MAIN RESULTS

THEOREM: 3.1

Path P_n is Relatively Prime Cordial Graph.

Proof:

Let G be P_n

Let $V(G) = \{u_i : 1 \le i \le n\}$

Let $E(G) = \{(u_i u_{i+1}) : 1 \le i \le n-1\}$

$Define\ f : V(G) \to \{1,2,\ldots.p\}$

The vertex labeling are

When $n = even$

$$f(u_i) = 2i \qquad 1 \le i \le \frac{n}{2}$$

$$f(u_{n+1-i}) = 2i - 1 \qquad 1 \le i \le \frac{n}{2}$$

When $n = odd$

$$f(u_i) = 2i \qquad 1 \le i \le \frac{n-1}{2}$$

$$f(u_{n+1-i}) = 2i - 1 \qquad 1 \le i \le \frac{n+1}{2}$$

The induced edge labeling are,

When $n = even$

$$f^*(u_{n-1}u_n) = 0$$

$$f^*(u_i u_{i+1}) = 0 \qquad 1 \le i \le \frac{n-2}{2}$$

$$f^*(u_i u_{i+1}) = 1 \qquad \frac{n}{2} \le i \le n-2$$

When $n = odd$

$$f^*(u_{n-1}u_n) = 0$$

Dr. A.Nellai Murugan, Dept. of Mathematics, V.O. Chidambaram College, Tuticorin.

V.Nishanthini, Dept. of Mathematics, V.O. Chidambaram College, Tuticorin.

$f^*(u_i u_{i+1}) = 0 \qquad 1 \le i \le \frac{n-2}{2}$

$f^*(u_i u_{i+1}) = 1 \qquad \frac{n-1}{2} \le i \le n-2$

Here, When $n = 2m, m > 1$

$e_f(0) = m$

$e_f(1) = m - 1$

$n = 2m + 1$, m>1

$e_f(0) = m = e_f(1)$

$| e_f(1) - e_f(0) | \le 1$

Hence , Path P_n is Relatively Prime Cordial Graph.

For example, The Relatively Prime Cordial Graph of P_5 are shown in the figure

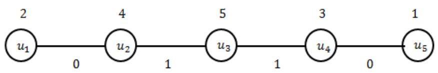


figure 3.1

THEOREM: 3.2

$P_n \odot K_1$ is a Relatively Prime Cordial Graph.

Proof:

Let G be $P_n \odot K_1$

Let $V(G) = \{ (u_i, v_i) : 1 \le i \le n \}$

Let

$E(G) = \{ [(u_i u_{i+1}) : 1 \le i \le n - 1] \, U \, [(u_i v_i) : 1 \le i \le n] \}$

$Define \; f : V(G) \to \{1,2, \ldots . . p\}$

The vertex labeling are ,

$f(u_i) = 2i \qquad 1 \le i \le n$

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

The induced edge labeling are,

$f^*(u_i u_{i+1}) = 0 \qquad 1 \le i \le n-1$

$f^*(u_1 v_1) = 0$

$f^*(u_i v_i) = 1 \qquad 2 \le i \le n$

Here, When $n = m, m > 1$

$e_f(0) = m$

$e_f(1) = m - 1$

$| e_f(1) - e_f(0) | \le 1$

Hence, $P_n \odot K_1$ is Relatively Prime Cordial Graph.

For example, Relatively Prime Cordial Graph, $P_5 \odot K_1$ are shown in the fig

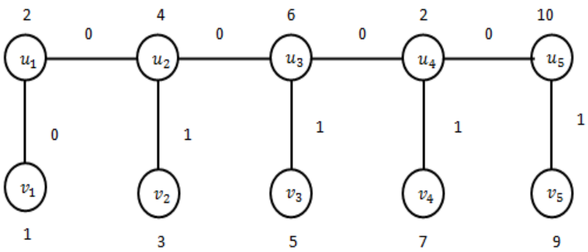


figure 3.2

THEOREM: 3.3

Graph Pn^2 is a Relatively Prime Cordial Graph.

Proof:

Let G be Pn^2 Graph

Let $V(G) = \{ u_i, : 1 \le i \le n \}$

Let

$E(G) = \{ [(u_i u_{i+1}) : 1 \le i \le n-1] \, U \, [(u_i u_{i+2}) :$

$Define \; f : V(G) \to \{1,2, \ldots . . p\}$

Vertex Labeling:

When $n = even$

$f(u_i) = 2i \qquad 1 \le i \le \frac{n}{2}$

$f(u_i) = 2i - 1 \qquad \frac{n+2}{2} \le i \le n$

When $n = odd$

$f(u_i) = 2i \qquad 1 \le i \le \frac{n-1}{2}$

$f(u_{n+1-i}) = 2i - 1 \qquad 1 \le i \le \frac{n+1}{2}$

Edge Labeling:

When $n = even$

$f^*(u_n u_{n-1}) = 0$

$f^*(u_i u_{i+1}) = 0 \qquad 1 \le i \le \frac{n-2}{2}$

$f^*(u_i u_{i+1}) = 1 \qquad \frac{n}{2} \le i \le n-2$

$f^*(u_{n-2} u_n) = 0$

$f^*(u_i u_{i+2}) = 0 \qquad 1 \le i \le \frac{n-4}{2}$

$f^*(u_i u_{i+2}) = 1 \qquad \frac{n-2}{2} \le i \le n-2$

When $n = odd$

$f^*(u_i u_{i+1}) = 0 \qquad 1 \le i \le \frac{n-3}{2}$

$f^*(u_i u_{i+1}) = 1 \qquad \frac{n-1}{2} \le i \le n-2$

$f^*(u_{n-1} u_n) = 0$

$f^*(u_{n-2} u_n) = 0$

$f^*(u_i u_{i+2}) = 0 \qquad 1 \le i \le \frac{n-3}{2}$

$f^*(u_i u_{i+2}) = 1 \qquad \frac{n-1}{2} \le i \le n-3$

When $n = 2m + 1, m > 1$

$e_f(0) = 2m - 1$

$e_f(1) = 2m$

Hence, Path $P5^2$ is a Relatively Prime Cordial Graph.

For example, The Relatively Prime Cordial Graph of $P5^2$ are shown in the figure

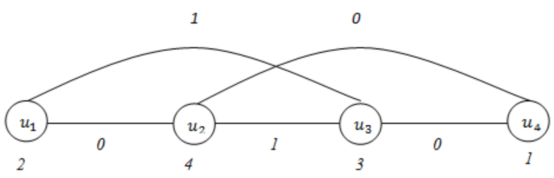


figure 3.3

THEOREM: 3.4

Graph $(P_2{:}S_n)$ is a Relatively Prime Cordial Graph.

Proof:

Let

$V\ (p_2{:}s_n)\ =\ \{\ u_{i,}:\ 1\ \le\ i\ \le\ 4; u_{1i}, u_{2i}, 1 \le i \le n\ \}$

Let

$E(p_2{:}\,s_n) = \{\ [\ u_3u_4\ ]U{:}\ [\ u_1u_4\ ]U[\ u_2u_3\ ]U[\ u_1u_{1i}\ {:}1 \le i \le n]U\ [\ u_2u_{2i}\ {:}1 \le i \le n]\}$

$Define\ f\ :\ V\ (G)\ \rightarrow \{1,2, \ldots\ldots p\}$

Vertex Labeling:

$f(u_i) = i \qquad 1 \le i \le 4$

$f(u_{1i}) \ = 2i + 4 \qquad 1 \le i \le n$

$f(u_{2i}) \ = 2i + 3 \qquad 1 \le i \le n$

Edge labeling:

$f^*(u_iu_{i+1}) = 1 \quad 2 \le i \le 3$

$f^*(u_1u_4) = 0$

$f^*(u_1u_{1i}) = 0 \qquad 1 \le i \le n$

$f^*(u_2u_{2i}) = 1 \qquad 1 \le i \le n$

Here, When $n\ = m$

$e_f(0) =\ n+1$

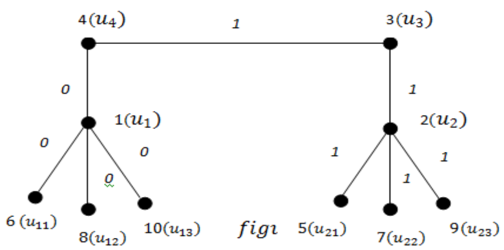
$e_f(1)\ =\ n+2$

$e_f(0) + 1\ =\ e_f(1)$

$|\ e_f(1) - e_f(0)\ | \le 1$

Hence, $P_2{:}S_n$ is Relatively Prime Cordial Graph.

For example, The Relatively Prime Cordial Graph of $P_2{:}S_n$ are shown in the figure



figi

THEOREM: 3.5

Graph $P_n + K_1$ is Relatively Prime Cordial graph.

Proof:

Let $p_n + k_1, n > 1$

Let $V\ (p_n + k_1) = \{u, u_i{:}1\ \le i \le n\}$

Let

$E\ (p_n + k_1)\ =\ \{[uu_i]; 1 \le i \le n\ U\ [u_iu_{i+1}]; 1 \le i \le n-1\}$

$Define\ f\ :\ V\ (G)\ \rightarrow \{1,2, \ldots\ldots p\}$

Vertex Labeling:

$f(u) = 1$

$f(u_i)\ = i + 1 \qquad 1 \le i \le n$

Edge Labeling:1

$f^*(uu_i) = 1$

$f^*(u_iu_{i+1})\ = 1 \qquad 1 \le i \le n-1$

Here, When $n\ = m$, m>1

$e_f(0) =\ m$

$e_f(1) = m - 1$

$|\ e_f(1) - e_f(0)\ | \le 1$

Hence, $P_n + K_1$ is Relatively Prime Cordial Graph.

For example, The Relatively Prime Cordial Graph of $P_n + K_1$ are shown in the figure

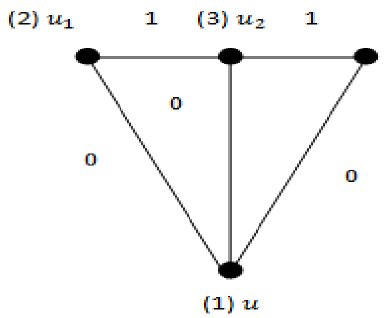


figure 3.5

REFERENCES

[1] Gallian J.A, A Dynamic Survey of Graph Labelling, The Electronic Journal of Combinatorics, 6 (2001) #DS6

[2] Harray. F, Graph Theory, Adadison-Wesley Publishing Company Inc, USA, 1969

[3] A.Nellai Murugan and V.Baby Suganya, A study on cordial labeling of Splitting Graphs of star Attached C3 and (2k+1)C3 ISSN 2321 8835, Outreach , A Multi Disciplinary Refreed Journal, Volume . VII, 2014, 142 -147. I.F 6.531

[4] A.Nellai Murugan and V.Brinda Devi , A study on Star Related Divisor cordial Graphs ,ISSN 2321 8835, Outreach , A Multi Disciplinary Refreed Journal, Volume . VII, 2014, 169-172. I.F 6.531

[5] A.Nellai Murugan and M. Taj Nisha, A study on Divisor Cordial Labeling Star Attached Path Related Graphs, ISSN 2321 8835, Outreach , A Multi Disciplinary Refreed Journal, Volume . VII, 2014, 173-178. I.F 6.531

[6] A. Nellai Murugan and V .Sripratha, Mean Square Cordial Labelling , International Journal of Innovative Research & Studies, ISSN 2319-9725 ,Volume 3, Issue 10Number 2 ,October 2014, PP 262-277.

[7] A.Nellai Murugan and A.L Poornima ,Meanness of Special Class Of Graphs, International Journal of Mathematical Archive. ISSN 2229-5046, Vol 5 , issue 8, 2014, PP 151-158.

[8] A.Nellai Murugan and A.Mathubala, Path Related Homo- cordial graphs, International Journal of Innovative Science, Engineering & Technology , ISSN 2348-7968,Vol.2, Issue 8 ,August. 2015,PP 888-892. IF 1.50,IBI-Factor 2.33

[9] A.Nellai Murugan ,V.Selva Vidhya and M Mariasingam, Results On Hetro- cordial graphs, International Journal of Innovative Science, Engineering & Technology , ISSN 2348-7968,Vol.2, Issue 8 ,August. 2015,PP 954-959. IF 1.50,IBI-Factor 2.33

[10] A.Nellai Murugan , and R.Megala, Path Related Relaxed Cordial Graphs , International Journal of Scientific Engineering and Applied Science (IJSEAS) - ISSN: 2395-3470,Volume-1, Issue-6, September ,2015 ,PP 241-246 IF ISRA 0.217.

[11] A.Nellai Murugan and J.Shiny Priyanka, Tree Related Extended Mean Cordial Graphs, International Journal of Research -Granthaalayah, ISSN 2350-0530,Vol.3, Issue 9 ,September. 2015, PP 143-148. I .F . 2.035(I2OR).

[12] A.Nellai Murugan and S.Heerajohn, Cycle Related Mean Square Cordial Graphs, International Journal Of Research & Development Organization – Journal of Mathematics,Vol.2, Issue 9 ,September. 2015, PP 1-11.

[13] A.Nellai Murugan and A.Mathubala, Special Class Of Homo- Cordial Graphs, International Journal Emerging Technologies in Engineering Research, ISSN 2524-6410,Vol.2, Issue 3 ,October 2015, PP 1-5.

[14] A.Nellai Murugan , and R.Megala ,Tree Related Relaxed Cordial Graphs, International Journal of Multi disciplinary Research & Development , ISSN: 2349-4182,Volume-2, Issue-10, October ,2015 ,PP 80-84 . IF 5.742.

[15] A.Nellai Murugan , and A.Mathubala ,Cycle Related Homo-Cordial Graphs , International Journal of Multi disciplinary Research & Development, ISSN: 2349-4182,Volume-2, Issue-10, October ,2015 ,PP 84-88 . IF 5.742.

[16] L. Pandiselvi , A. Nellai Murugan , and S. Navaneethakrishnan , Some Results on Near Mean Cordial , Global Journal of Mathematics , ISSN 2395-4760,Volume 4,No : 2,August-2015, PP 420-427.

[17] A.Nellai Murugan and V.Selvavidhya , Path Related Hetro- Cordial Graphs, International Journal Emerging Technologies in Engineering Research, ISSN 2524-6410,Vol.2, Issue 3 ,October 2015, PP 9-14.

[18] A.Nellai Murugan and S.Heerajohn, Special Class of Mean Square Cordial Graphs, International Journal Of Applied Research ,ISSN 2394-7500,Vol.1, Issue 11 ,Part B , October 2015, PP 128-131.I F 5.2

[19] A.Nellai Murugan and J.Shinny Priyanka , Extended Mean Cordial Graphs of Snakes ,International Journal Emerging Technologies in Engineering Research, ISSN 2524-6410,Vol.3, Issue 1 ,October 2015, PP 6-10.

[20] A.Nellai Murugan and R.Megala Special Class of Relaxed Cordial Graphs ,International Journal Emerging Technologies in Engineering Research, ISSN 2524-6410,Vol.3, Issue 1 ,October 2015, PP 11-14.

[21] A.Nellai Murugan and P. Iyadurai Selvaraj, Cycle and Armed Cap Cordial graphs, Global Scholastic Research Journal of Multidisciplinary , ISSN 2349-9397,Volume , Issue 11, October 2015, PP 1-14. ISRA 0.416

[22] A.Nellai Murugan and J.Shinny Priyanka , Path Related Extended Mean Cordial Graphs ,International Journal of Resent Advances in Multi- Disciplinary Research, ISSN 2350-0743,Vol.2, Issue 10 ,October 2015, PP 0836-0840. I F 1.005.

[23] A.Nellai Murugan and G.Devakiruba., Divisor cordial labeling of Book and Cn @ K1,n., OUTREACH, A Multi-Disciplinary Refereed Journal, Volume VIII, 2015, Pp. 86-92.

[24] A. Nellai Murugan and P. Iyadurai Selvaraj, Path Related Cap Cordial Graphs, OUTREACH, A Multi- Disciplinary Refereed Journal, Volume VIII, 2015, Pp. 100-106.

[25] A. Nellai Murugan, and A.Meenakshi Sundari, Product Cordial Graph of Umbrella and C4 @ Sn., OUTREACH , A Multi-Disciplinary Refereed Journal, Volume VIII, 2015, Pp. 113 – 119.

[26] A. Nellai Murugan, and V.Sripratha, Mean Square Cordial Labeling, OUTREACH, A Multi-Disciplinary Refereed Journal, Volume VIII, 2015, Pp. 125 – 131.

[27] A.Nellai Murugan and A.L.Poornima, Meanness of Special Class of Graph, OUTREACH, A Multi-Disciplinary Refereed Journal, Volume VIII, 2015, Pp. 140 – 145.

[28] A.Nellai Murugan and G.Esther, Mean Cordial Labeling of Star, Bi-Star and Wheel, OUTREACH , A Multi-Disciplinary Refereed Journal, Volume VIII, 2015, Pp. 155 – 160.

[29] A. Nellai Murugan and P. Iyadurai Selvaraj, Cycle & Armed Cap Cordial Graphs, International Journal of Mathematical Combinatorics, ISSN 1937 1055 , Volume II, June 2016,pp 144-152.