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Path related extended mean cordial graphs

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Abstract

Let G = (V,E) be a graphs with p vertices and q edges. A Extended Mean Cordial Labeling of a Graph G with vertex set V is a bijection from V to {-1,0,1} such that each edge uv is assigned the label (|f(u)+f(v)|)/2 where |x| is the least integer greater than or equal to x with the condition that the number of vertices labeled with 0 and the number of vertices labeled with 1 differ by at most 1 and the number of edges labeled with 0 and the number of edges labeled with 1 differ by almost 1. The graph that admits an Extended Mean Cordial Labeling is called Extended Mean Cordial Graph. In this paper, we proved that path related graphs $(P_n{:}S_m)$, (z-p_n), $P_n \odot P_2, JD_2(C_2), (P_n \odot K_1) + v$ are Extended Mean Cordial Graphs.

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Keywords: Extended Mean Cordial Graph, Extended Mean Cordial Labeling

1. Introduction

A graph G is finite nonempty 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 edges or a line of G. In this paper, we proved that path related graphs $(P_n{:}S_m)$, (z-p_n), $P_n \odot P_2, JD_2(C_2), (P_n \odot K_1) + v$ are Extended Mean Cordial Graphs. For graph theory terminology we follow [2].

2. Priliminaries

Let G = (V,E) be a graphs with p vertices and q edges. A Extended Mean Cordial Labeling of a Graph G with vertex set V is a bijection from V to {-1,0,1} such that each edge uv is assigned the label (|f(u)+f(v)|)/2 where |x| is the least integer greater than or equal to x with the condition that the number of vertices labeled with 0 and the number of vertices labeled with 1 differ by at most 1 and the number of edges labeled with 0 and the number of edges labeled with 1 differ by almost 1. The graph that admits an Extended Mean Cordial Labeling is called Extended Mean Cordial Graph. In this paper, we proved that path related graphs $(P_n{:}S_m)$, (z-p_n), $P_n \odot P_2, JD_2(C_2), (P_n \odot K_1) + v$ are Extended Mean Cordial Graphs.

Definition 2.1.1

Star of length one is joined with every vertex of a path P_n through an edge. It is denoted by $\mathbf{(P_n{:}S_m)}$.

Definition 2.1.2

In pair of path P_n with vertex of a path P1 is joined with i+1 th vertex of a path P2. It is denoted by **(z-$\mathbf{p_n}$).**

Definition 2.1.3

$P_n \odot P_2$ is a graph obtained from path of length n by joining one end of P_2 at each and every vertex of P_n.

Definition 2.1.4

Let G be a connected graph. A graph constructed by taking two copies of G say $G_1$and G_2 and joining each vertex u in G to the neighbours of the corresponding vertex through a vertex w in G_2. The resulting graph is known as join shadow graph and it is denoted by $JD_2(C_2)$.

Definition 2.1.5

It is a graph obtained from comb by joining a pendent vertex at one end of path P_n. It is denoted by $P_n^+ + v$ (or) $(P_n \odot K_1) + v$.

3. Main Result

Theorem 3.1

Graphs $(P_n{:}S_m)$is a extended mean cordial graphs.

Proof:

Let $v(P_n{:}S_m)$={[$(u_i v_i)$:1≤i≤n]U[$(v_{i1} v_{i2})$:1≤i≤n]}

Let $E(P_n{:}S_m)$={[$(u_i u_{i+1})$:1≤i≤n]U[$(u_i v_i)$:1≤i≤n]U[$(v_i v_{i1})$:1≤i≤n]
[$(v_i v_{i2})$:1≤i≤n]}

Define f:v(P_n:S_m)→{-1,0,1} by

The vertex labeling are

$f(u_i) = -1, 1 \leq i \leq n$
$f(v_i) = 1, 1 \leq i \leq n$
$f(v_{i1}) = 0, 1 \leq i \leq n$
$f(v_{i2}) = 1, 1 \leq i \leq n$

The induced edge labeling are

$f^*(u_i u_{i+1}) = 1, 1 \leq i \leq n-1$
$f^*(u_i v_i) = 0, 1 \leq i \leq n$
$f^*(v_i v_{i1}) = 0, 1 \leq i \leq n$
$f^*(v_i v_{i2}) = 0, 1 \leq i \leq n$

Here ef(0)=2n, ef(1)=2n-1

Hence, (P_n:S_m)is satisfies the condition |ef(0)-ef(1)|≤1.

Therefore, (P_n:S_m) is a extended mean cordial graphs, for example, (P_n:S_m) is a extended mean cordial graph as shown in the figure 3.2

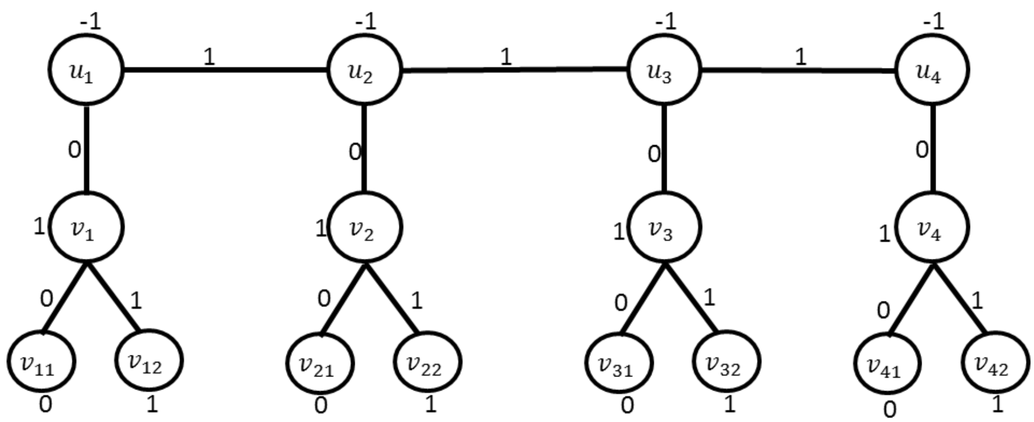

Fig 3.2(P_n:S_m)

Theorem: 3.2
Graph (z-p_n) is a extended mean cordial graphs

Proof

Let v(z-p_n)={[$u_i v_i$:1≤i≤n]}
Let E(z-p_n)={[($u_i u_{i+1}$):1≤i≤n-1]U[($v_i v_{i+1}$):1≤i≤n-1]U[($u_{i+1} v_i$):1≤i≤n-1]}
Define f:v(z-p_n)→{-1,0,1} by

The vertex labeling are

$f(u_i) = \begin{cases} 1 & i \equiv 1 \bmod 2 \\ 0 & i \equiv 0 \bmod 2 \end{cases}, 1 \leq i \leq n,$
$f(v_i) = \begin{cases} -1 & i \equiv 1 \bmod 2 \\ 0 & i \equiv 0 \bmod 2 \end{cases}, 1 \leq i \leq n$

The induced edge labeling are

$f^*(u_i u_{i+1})$ = 0, 1≤i≤n-1, $f^*(v_i v_{i+1})$ = 0, 1≤i≤n-1
$f^*(u_{i+1} v_i) = \begin{cases} 1 & i \equiv 1 \bmod 2 \\ 0 & i \equiv 0 \bmod 2 \end{cases}, 1 \leq i \leq n$

Here, When n = 2m

ef(0) = m, ef(1) = m+1
When n =2m+1
ef(0) = ef(1) = 3m

Hence, (z-p_n) is satisfies the condition |ef(0)-ef(1)|≤1
Therefore, (z-p_n) is a extended mean cordial graph. For example, (z-p_n) is a extended mean cordial graph as shown in the figure 3.4

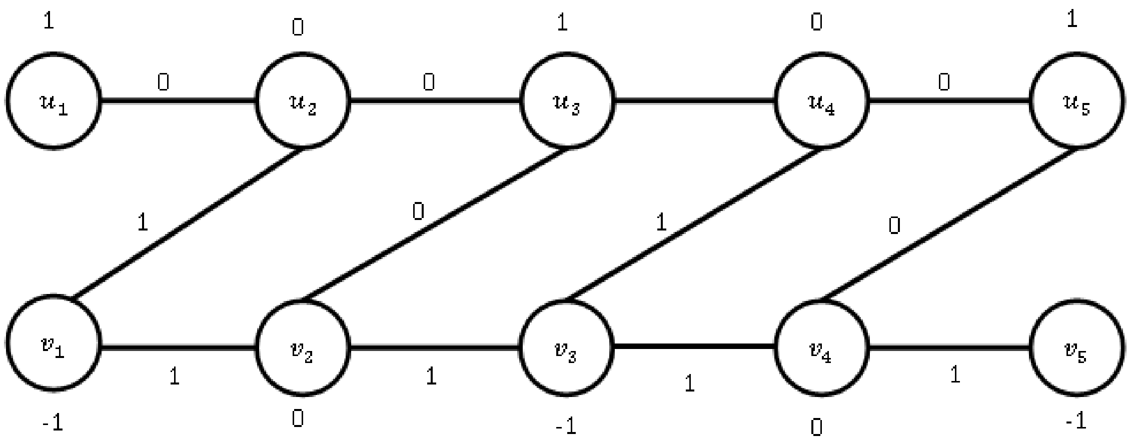

Fig 3.4 (z-p_n)

Theorem 3.5
Graph $P_n \odot P_2$ is a extended mean cordial graph

Proof
Let v($P_n \odot P_2$) = {[(v_i):1≤i≤n,($u_{i1}u_{i2}$):1≤i≤n]}
Let E($P_n \odot P_2$) ={[($u_{i1}u_{i2}$):1≤i≤n]U[(v_iv_{i+1}):1≤i≤n-1]U[(v_iu_{i1}):1≤i≤n]}
Define f : v($P_n \odot P_2$)→{-1,0,1} by

The vertex labeling are

f(u_{i1}) = 0, 1≤i≤n
f(u_{i2}) = 0, 1≤i≤n
$$f(v_i) = \begin{cases} -1 \ i \equiv 1 \ mod2 \\ 0 \ i \ \equiv 0 \ mod \ 2 \end{cases}, 1 \le i \le n$$

The induced edge labeling are

f*(v_iv_{i+1}) = 1, 1≤i≤n-1
f*($u_{i1}u_{i2}$) = 0, 1≤i≤n
$$f^*(v_iu_{i1}) = \begin{cases} 1 \ i \ \equiv 1 \ mod \ 2 \\ 0 \ i \ \equiv 0 \ mod \ 2 \end{cases}, 1 \le i \le n$$

Here, When n = 2m
ef(0) = 3m
ef(1) = 3m-1
When n=2m-1
ef(0) = ef(1) = 3m+1

Hence, $P_n \odot P_2$is satisfies the condition |ef(0)-ef(1)|≤1
Therefore, $P_n \odot P_2$ is a extended mean cordial graph For example, $P_n \odot P_2$ is a extended mean cordial graph as shown in figure 3.6

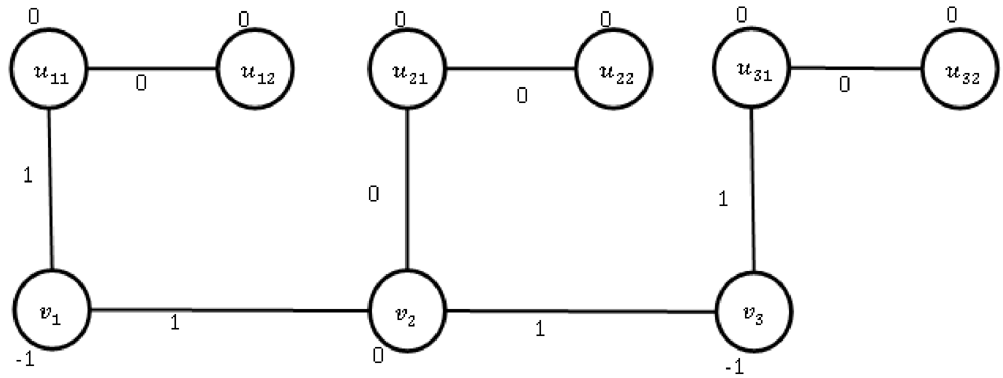

Fig 3.6 $P_n \odot P_2$

Theorem 3.7
Graph J$D_2(C_2)$is a extended mean cordial graph

Proof

Let v(J$D_2(C_2)$) = {[($u_i v_i$):1≤i≤n,(w_i):1≤i≤n]}
Let E(J$D_2(C_2)$) ={[($u_i u_{i+1}$)U($w_i w_{i+1}$)U($u_i v_i$)U($u_{i+1} v_i$)U($w_i v_i$) U($w_{i+1} v_i$):1≤i≤n-1]}
Define f : v(J$D_2(C_2)$)→{-1,0,1} by

The vertex labeling are

f(u_i) = 1, 1≤i≤n
f(w_i) = 0, 1≤i≤n
f(v_i) = -1, 1≤i≤n

The induced edge labeling are

f*($u_i u_{i+1}$) = 1, 1≤i≤n-1
f*($w_i w_{i+1}$) = 0, 1≤i≤n-1
f*($u_i v_i$) = 0, 1≤i≤n-1
f*($u_{i+1} v_i$) = 0, 1≤i≤n-1
f*($w_i v_i$) = 1, 1≤i≤n-1
f*($w_{i+1} v_i$) = 1, 1≤i≤n-1

Here, When n = m+1
ef(0) = ef(1) = 3m

Hence, J$D_2(C_2)$is satisfies the condition |ef(0)-ef(1)|≤1
Therefore, J$D_2(C_2)$is a extended mean cordial graph
For example, J$D_2(C_2)$is a extended mean cordial graph as shown in figure 3.8

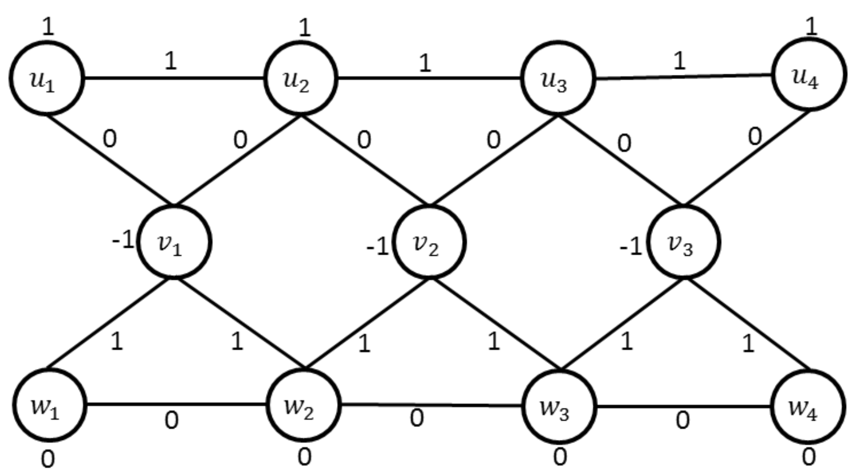

Fig 3.8 J$D_2(C_2)$

Theorem 3.9
Graph $(P_n \odot K_1) + v$is a extended mean cordial graph

Proof

Let v($(P_n \odot K_1) + v$) = {[$(u_i v_i)$:1≤i≤n]}
Let E($(P_n \odot K_1) + v$) ={[$(u_i u_{i+1})$:1≤i≤n]U[[$(v_i u_{i+1})$:1≤i≤n]}
Define f:v($(P_n \odot K_1) + v$)→{-10,1}

The vertex labeling are

f(u_i) = 1, 1≤i≤n and f(v_i) = -1, 1≤i≤n

The induced edge labeling are

f*($u_i u_{i+1}$) = 1, 1≤i≤n
f*($v_i u_{i+1}$) = 0, 1≤i≤n

Here, When n = 2m
ef(0) = ef(1) = 2m-1
When n=2m+1
ef(0) = ef(1) = 2m

Hence, $(P_n \odot K_1) + v$is satisfies the condition |ef(0)-ef(1)|≤1
Therefore, $(P_n \odot K_1) + v$is a extended mean cordial graph. For example,$(P_n \odot K_1) + v$ is a extended mean cordial graph as shown in figure 3.10

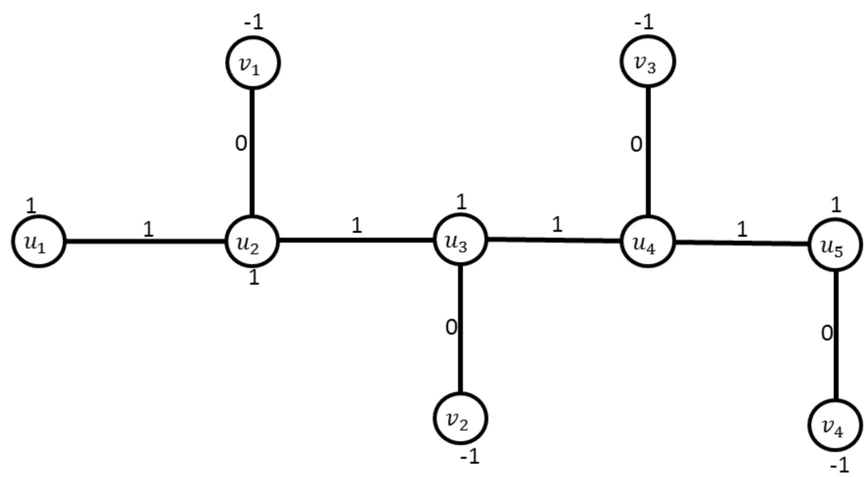

Fig 3.10 $(P_n \odot K_1) + v$

4. References

1. Gallian JA. 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. Nellai Murugan A, Baby Suganya V. A study on cordial labeling of Splitting Graphs of star Attached C_3 and (2k+1)C_3 ISSN 2321 8835, Outreach, A Multi-Disciplinary Refreed Journal. 2014; VII:142 -147. I.F 6.531.
4. Nellai Murugan A, Brinda Devi V. A study on Star Related Divisor cordial Graphs, ISSN 2321 8835, Outreach, A Multi-Disciplinary Refreed Journal. 2014; VII:169-172. I.F 6.531.
5. Nellai Murugan A, Taj Nisha M. A study on Divisor Cordial Labeling Star Attached Path Related Graphs, ISSN 2321 8835, Outreach, A Multi-Disciplinary Refreed Journal. 2014; VII:173-178. I.F 6.531.
6. Nellai Murugan, Sripratha V. Mean Square Cordial Labelling, International Journal of Innovative Research & Studies, ISSN 2319-9725, 2014; 3(10):262-277.
7. Nellai Murugan A, Poornima AL. Meanness of Special Class of Graphs, International Journal of Mathematical Archive. ISSN 2229-5046, 2014; 5(8):151-158.
8. Nellai Murugan A, Mathubala A. Path Related Homo- cordial graphs, International Journal of Innovative Science, Engineering & Technology, ISSN 2348-7968, 2015; 2(8):888-892. IF 1.50,IBI-Factor 2.33
9. Nellai Murugan A, Selva Vidhya V, Mariasingam M. Results On Hetro- cordial graphs, International Journal of Innovative Science, Engineering & Technology, ISSN 2348-7968, 2015; 2(8):954-959. IF 1.50, IBI-Factor 2.33.

10. Nellai Murugan A. Megala R. Path Related Relaxed Cordial Graphs, International Journal of Scientific Engineering and Applied Science (IJSEAS) - ISSN: 2395-3470, 2015; 1(6):241-246. IF ISRA 0.217.
11. Nellai Murugan A, Shiny Priyanka J. Tree Related Extended Mean Cordial Graphs, International Journal of Research - Granthaalayah, ISSN 2350-0530, 2015; 3(9):143-148. I.F. 2.035(I2OR).
12. Nellai Murugan A, Heerajohn S. Cycle Related Mean Square Cordial Graphs, International Journal Of Research & Development Organization – Journal of Mathematics. 2015; 2(9):1-11.
13. Nellai Murugan A, Mathubala A. Special Class Of Homo- Cordial Graphs, International Journal Emerging Technologies in Engineering Research, ISSN 2524-6410, 2015; 2(3):1-5.
14. Nellai Murugan A, Megala R. Tree Related Relaxed Cordial Graphs, International Journal of Multi-disciplinary Research & Development, ISSN: 2349-4182, 2015; 2(10):80-84. IF 5.742.
15. Nellai Murugan A, Mathubala A. Cycle Related Homo-Cordial Graphs, International Journal of Multi-disciplinary Research & Development, ISSN: 2349-4182, 2015; 2(10):84-88. IF 5.742.
16. Pandiselvi L, Nellai Murugan A, Navaneethakrishnan S. Some Results on Near Mean Cordial, Global Journal of Mathematics, ISSN 2395-4760, 2015; 4(2):420-427.
17. Nellai Murugan A, Selvavidhya V. Path Related Hetro- Cordial Graphs, International Journal Emerging Technologies in Engineering Research, ISSN 2524-6410, 2015; 2(3):9-14.
18. Nellai Murugan A, Heerajohn S. Special Class of Mean Square Cordial Graphs, International Journal Of Applied Research, ISSN 2394-7500, 2015; 1(11):128-131.I F 5.2.
19. Nellai Murugan A, Shinny Priyanka J. Extended Mean Cordial Graphs of Snakes, International Journal Emerging Technologies in Engineering Research, ISSN 2524-6410, 2015; 3(1):6-10.
20. Nellai Murugan A, Megala R. Special Class of Relaxed Cordial Graphs, International Journal Emerging Technologies in Engineering Research, ISSN 2524-6410, 2015; 3(1):11-14.
21. Nellai Murugan A, Iyadurai Selvaraj P. Cycle and *Armed Cap Cordial graphs*, Global Scholastic Research Journal of Multidisciplinary, ISSN 2349-9397, 2015; 11:1-14. ISRA 0.416.
22. Nellai Murugan A, Shinny Priyanka J. Path Related Extended Mean Cordial Graphs, International Journal of Resent Advances in Multi- Disciplinary Research, ISSN 2350-0743, 2015; 2(10):0836-0840. I F 1.005.
23. Nellai Murugan A, Devakiruba G. Divisor cordial labeling of Book and C_n @ $K_{1,n}$., OUTREACH, A Multi-Disciplinary Refereed Journal. 2015; VIII:86-92.
24. Nellai Murugan A, Iyadurai Selvaraj P. Path Related Cap Cordial Graphs, OUTREACH, A Multi- Disciplinary Refereed Journal. 2015; VIII:100-106.
25. Nellai Murugan, Meenakshi Sundari A. Product Cordial Graph of Umbrella and C_4 @ S_n., OUTREACH, A Multi-Disciplinary Refereed Journal. 2015; VIII:113-119.
26. Nellai Murugan, Sripratha V. Mean Square Cordial Labeling, OUTREACH, A Multi-Disciplinary Refereed Journal, 2015; VIII:125-131.
27. Nellai Murugan A, Poornima AL. Meanness of Special Class of Graph, OUTREACH, A Multi-Disciplinary Refereed Journal. 2015; VIII:140-145.
28. Nellai Murugan A, Esther G. Mean Cordial Labeling of Star, Bi-Star and Wheel, OUTREACH, A Multi-Disciplinary Refereed Journal. 2015; VIII:155-160.
29. Nellai Murugan A. Iyadurai Selvaraj P. Cycle & Armed Cap Cordial Graphs, International Journal of Mathematical Combinatorics, ISSN 1937 1055, 2016; II:144-152.