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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 $(P_2Umk_1) + N_2, (P_n \otimes S_m), (P_n \odot K_1)$are Extended Mean Cordial Graphs.

Keywords: Extended Mean Cordial Graph, Extended Mean Cordial Labeling**.**

2000 Mathematics Subject classification 05C78.

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 $(P_2Umk_1) + N_2, (P_n \otimes S_m), (P_n \odot K_1)$ 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 $(P_2Umk_1) + N_2, (P_n \otimes S_m), (P_n \odot K_1)$ are Extended Mean Cordial Graphs.

Definition:2.1.1

The graphs is a graphs with vertex set $\{z_1, z_2, x_1, x_2 \dots \dots, x_m\}$ U $\{y_1, y_2\}$ and edge set $\{[(y_1z_1), (y_1z_2), (y_2z_1), (y_2z_2), (z_1z_2)]$ U $[(y_1x_i), (y_2x_i): 1 \le i \le m]\}$.

Definition:2.1.2

$(P_n \otimes S_m)$is a graph obtained from a path P_n by attaching root of a star S_m at every vertex of P_n.

Definition:2.1.3

The corona $G_1 O G_2$ of two graphs 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 $P_n O K_1$ is called a comb.

Theorem:2.1.1

Graph$(P_2 U m k_1) + N_2$ is a extended mean cordial graphs.

Proof:

Let V$(P_2 U m k_1) + N_2$={$[u, v, x, y, (u_i)$:1≤i≤n]}

Let E $(P_2 U m k_1) + N_2$ = {[(uv) U (ux) U (uy) U (xv) U (yv)] U [(xu_i)U(yu_i):1≤i≤n]}

Define f:v$(P_2 U m k_1) + N_2$→{-1,0,1} by

The vertex labeling are

f$(u) = -1$

f$(v) = 1$

f$(x) = 0$

f$(y) = 1$

f$(u_i) = 1,\ 1 \le i \le n$

The induced edge labeling are

f*$(uv) = 0$

f*$(ux) = 1$

f*$(uy) = 0$

f*$(xv) = 0$

f*$(xu_i) = 0$, $1 \le i \le n$

f*$(yu_i) = 1 , 1 \leq i \leq n$

Here , When n = 2m-1

ef(0)=2m+2 , ef(1)=2m+1

When n = 2m

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

Hence ,$(P_2Umk_1) + N_2$ is satisfies the condition |ef(0)-ef(1)|≤1.

Therefore ,$(P_2Umk_1) + N_2$is a extended mean cordial graphs

For example ,$(P_2Umk_1) + N_2$is a extended mean cordial graph as shown in the figure 2.1.1.

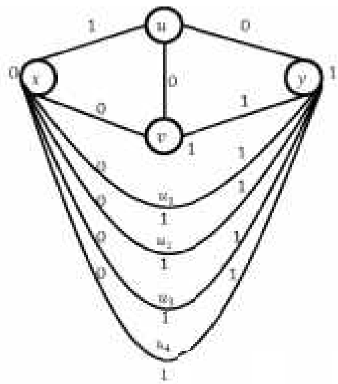

Figure 2.1.1 $(P_2Umk_1) + N_2$

Theorem:2.1.2

Graph$(P_n \otimes S_m)$ is a extended mean cordial graphs.

Proof:

Let V$(P_n \otimes S_m)$={[$(u_i), (u_iu_{i1}), (u_iu_{i2}), (u_iu_{i3})$:1≤i≤n]}

Let E $(P_n \otimes S_m)$ = {[$(u_iu_{i+1}): 1 \leq i \leq n-1$] U [$(u_iu_{i1})U(u_iu_{i2})U(u_iu_{i3})$:1≤i≤n]}

Define f:v$(P_n \otimes S_m)$→ {-1,0,1} by

The vertex labeling are

f$(u_i) = -1 , 1 \leq i \leq n$

f$(u_iu_{i1}) = 1 , 1 \leq i \leq n$

f$(u_iu_{i2}) = 0 , 1 \leq i \leq n$

f$(u_iu_{i3}) = 1 , 1 \leq i \leq n$

The induced edge labeling are

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

$f^*(u_iu_{i1}) = 0,\ 1 \le i \le n$

$f^*(u_iu_{i2}) = 1,\ 1 \le i \le n$

$f^*(u_iu_{i3}) = 0,\ 1 \le i \le n$

Here , When n = 2m-1

ef(0)=4m-2 , ef(1)=4m-3

When n = 2m

ef(0)=4m , ef(1)=4m-1

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

Therefore ,$(P_n \otimes S_m)$is a extended mean cordial graphs

For example ,$(P_n \otimes S_m)$is a extended mean cordial graph as shown in the figure 2.1.2.

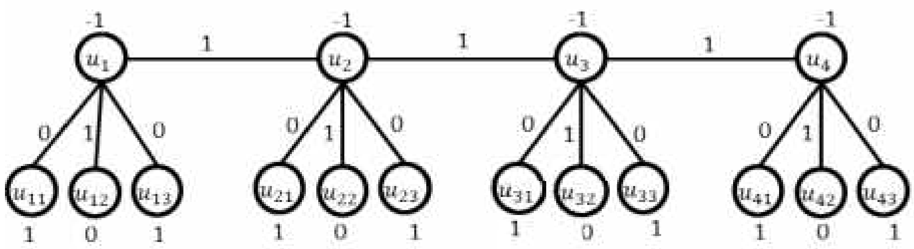

Figure 2.1.2 $(P_n \otimes S_m)$

Theorem:2.1.3

Graph$(P_n \odot K_1)$ is a extended mean cordial graphs.

Proof:

Let V$(P_n \odot K_1)$={[(u_i), (v_i):1≤i≤n]}

Let E$(P_n \odot K_1)$= {[(u_iu_{i+1}): $1 \le i \le n-1$]U [(u_iv_i):1≤i≤n]}

Define f:v$(P_n \odot K_1)$→{-1,0,1} by

The vertex labeling are

$$f(u_i) = \begin{cases} -1 \text{ if } i \equiv 1 \bmod 2 \\ 1 \text{ if } i \equiv 0 \bmod 2 \end{cases},1 \le i \le n$$

$$f(v_i) = \begin{cases} 0 \text{ if } i \equiv 1 \bmod 2 \\ 1 \text{ if } i \equiv 0 \bmod 2 \end{cases},1 \le i \le n$$

The induced edge labeling are

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

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

Here , When n = 2m

ef(0)=2m+1 , ef(1)=2m

When n = 2m+1

ef(0)=2m , ef(1)=2m+1

Hence ,$(P_n \odot K_1)$is satisfies the condition |ef(0)-ef(1)|≤1.

Therefore ,$(P_n \odot K_1)$is a extended mean cordial graphs

For example ,$(P_6 \odot K_1)$is a extended mean cordial graph as shown in the figure 2.1.3.

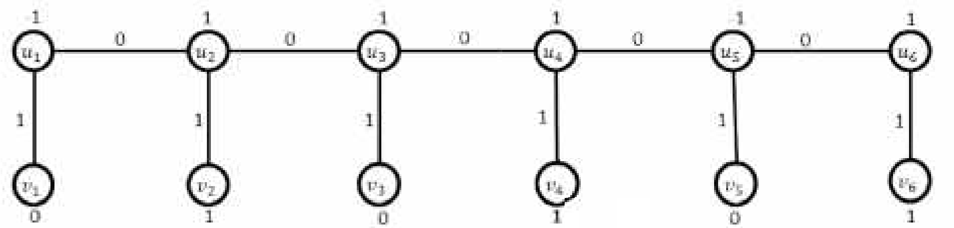

Figure 2.1.3 $(P_6 \odot K_1)$

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