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Web Related Analytic Mean Cordial Graph

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Abstract :

Let G= (V,E) be a graph with p vertices and q edges. A Analytic Mean Cordial Labeling of a Graph G with vertex set V is a bijection from V to {-1,1} such that edge uv is assigned the label $|f(u) - f(v)|/2$ with the condition that the number of vertices labeled with -1 and the number of vertices labeled with 1 differby atmost 1 and the number of edges labeled with 1 anad the number of edges labeled with 0 differ atmost 1.The graph that admits a Analytic Mean Cordial Labelling is called Analytic Mean Cordial Graph. In this paper, we proved that web related graphs Triangular web, rectangular web, spider web are Analytic Mean Cordial Graphs.

Keywords – Analytic Mean Cordial Graph, Analytic Mean Cordial Labeling.

2000 Mathematics Subject classification 05C78.

I.Introduction

A Graph G is a finite nonempty set of object 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 web related graphs Triangular web, rectangular web, spider web are Analytic Mean Cordial Graphs. 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 to {-1,1} such that edge uv is assigned the label $|f(u) - f(v)|/2$ with the condition that the number of vertices labeled with -1 and the number of vertices labeled with 1 differ by atmost 1 and the number of edges labeled with 1 and the number of edges labeled with 0 differ atmost 1.

The graph that admits a Analytic Mean Cordial Labeling is called Analytic Mean Cordial Graph. In this paper, we proved that web related graphs Triangular web, rectangular web, spider web are Analytic Mean Cordial Graphs.

2. Preliminaries

Definition:2.1

Crown of $P_n \times C_3$ is called Triangular Web.

Definition:2.2

Crown of $P_n \times C_8$ is called Spider Web.

3.Main result

Theorem: 3.1

Triangular Web is Analytic Mean Cordial Graph.

Proof:

Let G be Triangular web

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

Let $E(G) = \{[(u_i u_{i+1}) \cup (v_i v_{i+1}) \cup (u_i v_i) \cup (w_i w_{i+1}) \cup (w_i v_i) \cup (u_i w_i) : 1 \leq i \leq n-1)] \cup (u_1 u) \cup (u_2 u) \cup (u_3 u)]\}$

Define $f : V(G) \to \{-1, 1\}$

The vertex labeling are ,

$$f(u) = -1$$

$$f(u_i) = 1$$

$$f(v_i) = -1 \quad 1 \leq i \leq n$$

$$f(w_i) = \begin{cases} 1 & i \equiv 1 mod 2 \\ -1 & i \equiv 0 mod 2 \end{cases} \quad 1 \leq i \leq n$$

The induced edge labeling are,

$$f^*(u_1 u) = 1$$

$$f^*(u_2 u) = 0$$

$$f^*(u_3 u) = 1$$

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

$$f^*(v_i v_{i+1}) = 0 \quad 1 \leq i \leq n-1$$

$$f^*(w_i w_{i+1}) = 1 \quad 1 \leq i \leq n-1$$

$$f^*(u_i v_i) = 1 \quad 1 \leq i \leq n-1$$

$$f^*(w_i v_i) = \begin{cases} 1 & i \equiv 1 mod 2 \\ 0 & i \equiv 0 mod 2 \end{cases} \quad 1 \leq i \leq n-1$$

$$f^*(w_i u_i) = \begin{cases} 0 & i \equiv 1 mod 2 \\ 1 & i \equiv 0 mod 2 \end{cases} \quad 1 \leq i \leq n-1$$

Here,

When n = 2m, m > 0

$$v_f(1) = v_f(-1) = 3m + 2 \text{ and}$$

$$e_f(1) = 5m + 3, \quad e_f(0) = 7m$$

When n = 2m + 1, m > 0

$$v_f(1) = 3m, \quad v_f(-1) = 3m + 1 \text{ and}$$

$$e_f(1) = 7m - 4, \quad e_f(0) = 7m - 3$$

Therefore, Triangular Web satisfies the conditions

$$|v_f(1) - v_f(-1)| \leq 1$$

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

Hence, Triangular Web is Analytic Mean Cordial Graph.

For example, The Analytic Mean Cordial Graph are shown in the figure

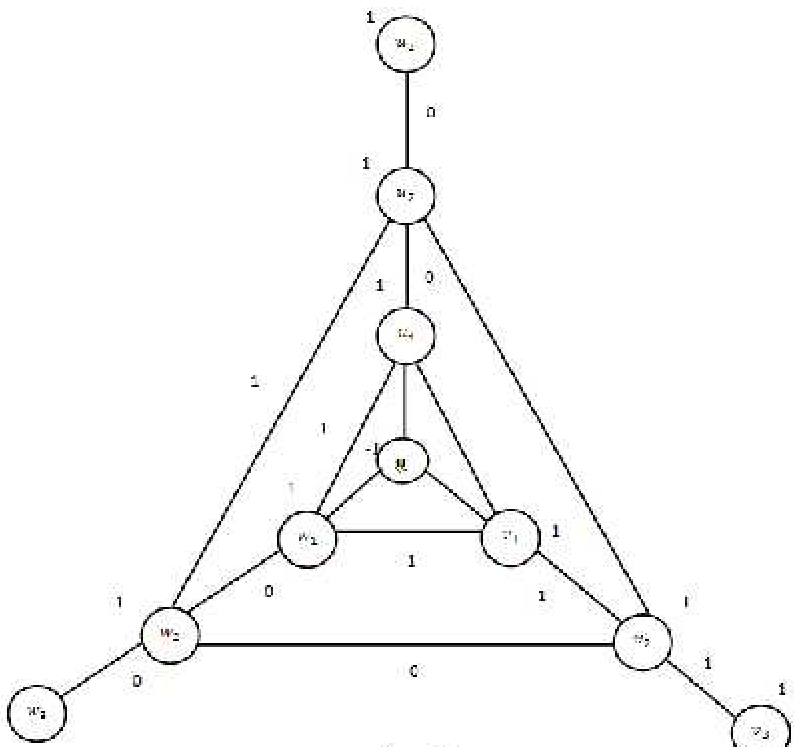

Figure 3.2

Theorem :3.3

Spider Web is Analytic Mean Cordial Graph.

Proof :

Let G be Spider web

Let $V(G) = \{u_{ij} : 1 \leq i \leq n\}$

Let $E(G) = \{[(uu_{ij}) : 1 \leq i \leq 8] \cup (u_{ij}v_{i(j+1)}) \cup (u_{ij}v_{(i+1)j}) : 1 \leq i \leq 8, 1 \leq j \leq n-1]\}$

Define $f : V(G) \rightarrow \{-1, 1\}$

The vertex labeling are ,

$$f(u) = 1$$

$$f(u_{ij}) = \begin{cases} 1 & i \equiv 1 mod 2 \\ -1 & i \equiv 0 mod 2 \end{cases} \quad 1 \leq i \leq 8, 1 \leq j \leq n$$

The induced edge labeling are,

$$f^*(uu_{i1}) = \begin{cases} 1 & i \equiv 1 mod 2 \\ 0 & i \equiv 0 mod 2 \end{cases} \quad 1 \leq i \leq 8$$

$$f^*(u_{ij}u_{i(j+1)}) = 0 \quad 1 \leq i \leq 8, 1 \leq j \leq n-1$$

$$f^*(u_{ij}u_{(i+1)j}) = 1 \quad 1 \leq i \leq 8, 1 \leq j \leq n-1$$

Here,

When n = 2m, m > 0

$v_f(1) = 8m + 5$, $v_f(-1) = 16m - 4$ and

$e_f(0) = e_f(1) = 16m + 4$

When n = 2m + 1, m > 0

$v_f(1) = 8m + 1$, $v_f(-1) = 8m$ and

$e_f(0) = e_f(1) = 16m - 4$

Therefore, Rectangular Web satisfies the conditions

$$|v_f(1) - v_f(-1)| \leq 1$$

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

Hence, Spider Web is Analytic Mean Cordial Graph.

For example, The Analytic Mean Cordial Graph are shown in the figure

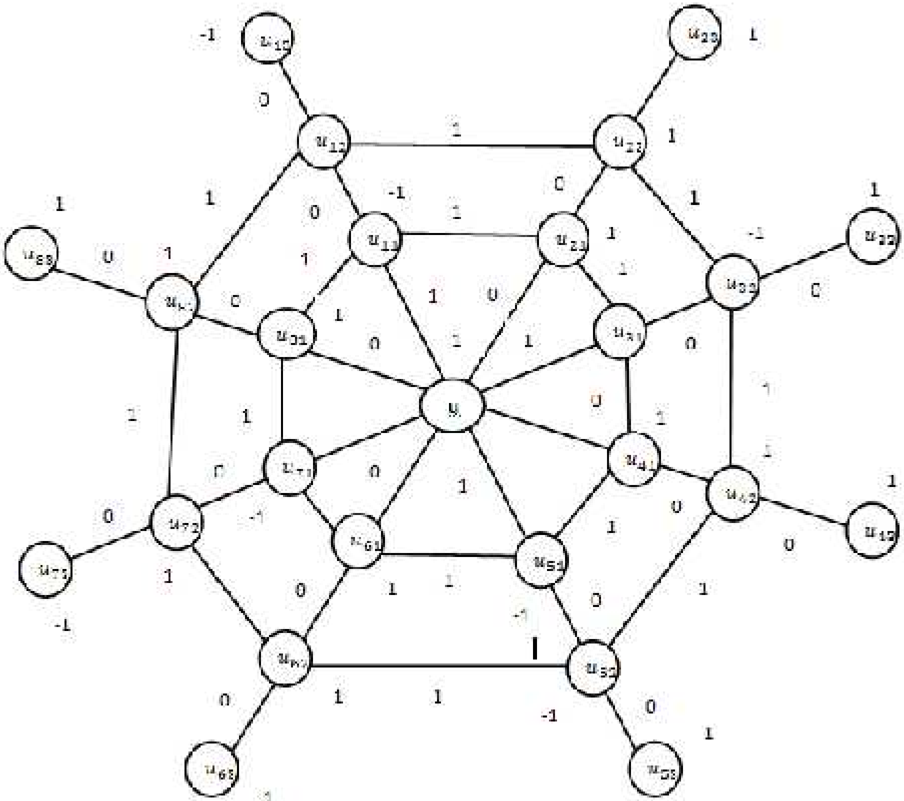

Figure 3.4

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