PRIME E-CORDIAL LABELING OF SOME SPECIAL GRAPHS

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Abstract : *Let G be a simple (p,q) graph and let f:E(G)→{1,2,3,……n} be a mapping. Then f is called a prime E-cordial labelling of a graph G, if there exists an induced labeling f^*:V(G)→{0,1} defined by f^*(V)={∑f(uv/uv € E(G) (mod 2)}.*

A graph G which admits prime E-cordial labeling is called a prime E-cordial graph.

Here, we have proved that Peterson graph, Fan graph, Flower graph admits prime E-cordial labeling.

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I. Introduction

We consider a finite, connected, undirected and simple graph G=(V(G), E(G)) with p-vertices and q-edges which is denoted by G(p,q). For standard terminology and notations we refer Gathon [4].

Definition 1.1:

The graph labeling is an assignment of numbers to the vertices or edges or both subject to certain conditions.

Definition 1.2:

A binary vertex labeling of a graph G with on induced edge labeling f*:E(G)→{0,1} defined by f^*(e=uv) = │f(u)-f(v)│ is called a cordial labeling if │$v_f(0)$-$v_{f(1)}$│≤1 and │$e_f(0)$-$e_f(1)$ ≤1. A graph G is a cordial graph if G admits a cordial labelling.

The concept of cordial labeling was introduced by Ebrahim Cahit (Turkey) as a weaker version of graceful and harmonious labelings. He also investigated several results on this newly defined concept.

Definition 1.3:

Let G be a graph with vertex set V(G) and edge set E(G) and let f: E(G)→{0,1} define a mapping f^* on V(G) by f^*(V) = ∑f(uv) / uv € E(G) (mod2). The function f is called an E-cordial labeling of G if │$V_f(0)$-$V_f(1)$│≤1 and │$e_f(0)$-$e_f(1)$│≤1. A graph G is called E-cordial graph if G admits an E-cordial labeling.

In 1997,Yilmag and Cahit[3] introduced E-cordial labeling as a weaker version of edge-graceful labeling and with the blend of cordial labeling.

Definition 1.4:

The Peterson graph is a 3-regular graph with 10 vertices and 15 edges.

Definition 1.5:

The Fan graph is denoted by F_n and described as $F_n=P_n+K_1$, where P_n indicates the path graph with n vertices.

Definition 1.6:

The Helm graph H_n is the graph obtained from a wheel graph W_n by attaching a pendant vertex through an edge tip end rim vertex of W_n.

Definition 1.7:

The Flower graph Fl_n is the graph obtained from a helm H_n by joining each pendant vertices of the helm to the apex vertex. Here the pendant vertices of helm H_n are referred as extended vertices of Fl_n.

2. Main Results:

Theorem 2.1:

Peterson graph P_n admits prime E-cordial labeling.

Proof:

Peterson graph is a 3-regular graph with 10 vertices and 15 edges.

Let $u_0,u_1,\ldots u_{14}$ be the edges and let $v_0,v_1,\ldots v_9$ be the vertices of the graph.

Let $e_1,e_2,\ldots e_5$ be the inner edges.

We defined the labeling as follows f: E(G)→{1,2,3,5,…..15} then the induced function f^*(V) = ∑f(uv / uv€E(G) (mod 2))

Thus the labeling defined above satisfies the conditions of prime E-cordial labeling.

Hence, the proof.

Illustration 2.2:

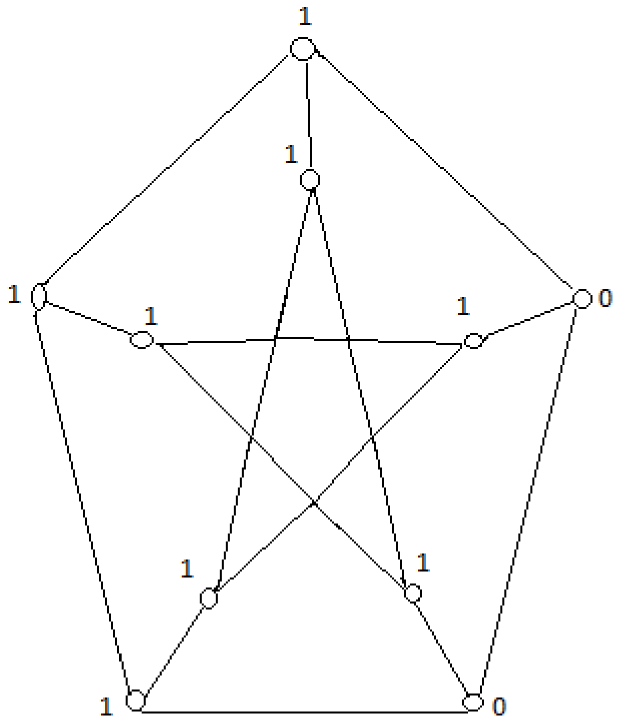

Figure 1: Prime E-cordial labeling of Peterson $P_n$graph

Theorem 2.3:

The fan graph F_n admits prime E-cordial labeling.

Proof:

Let F_n be a fan graph joining by a path P_n of length n-1.

Let $u_0, u_1, \ldots\ldots u_{n-1}$ be the edges and let $v_0, v_1, \ldots\ldots$vn-1 be the vertices of the graph.

We defined the labeling function as follows f: E(G)→{1,2.3,5,…..n} then the induced function $f^*(v) = \sum f(uv / uv € E(G) \pmod 2)$

Thus the labeling defined above satisfies the conditions of prime E-cordial labeling. Hence, F_n is a prime E-cordial graph.

Illustration 2.4:

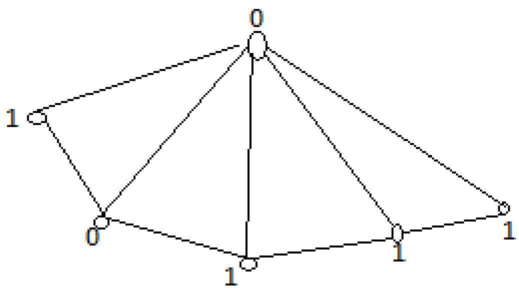

Figure 2: Prime E-cordial labeling of F_8

Theorem 2.5:

The flower graph fl_n admits prime E-cordial labeling.

Proof:

Let fl_n be a flower graph.

The flower graph fl_n joining by a path P_n of length n-1.

Let u_0 be the apex vertex $u_1, u_2, \ldots\ldots u_n$ be the rim vertices and let $u_1^1, u_2^1, \ldots. u_n^1$ be the external vertices.

We defined the labeling function as follows f : E(G)→{1,2,3,…..n} then the induced function.

$f^*(V) = \sum f(uv / uv € E(G) \pmod 2)$

Thus the labeling defined above satisfies the conditions of prime E-cordial labeling. Thus, the flower graph fl_n is a prime E-cordial labeling.

Illustration 2.6:

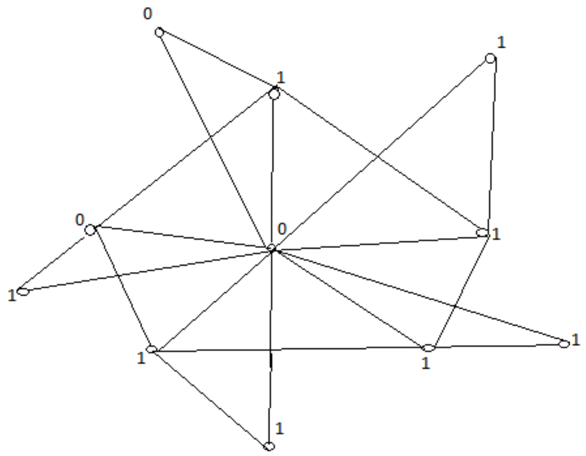

Figure 3: Prime E-cordial labeling of $fl_{5.}$

Conclusion:

In this paper, we have obtained prime E-cordial labeling for Peterson graph, Fan graph and the Flower graph. We further motivated to verify the above labeling process for some more special classes of graphs.

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