Prime Cordial Labeling of Some Graphs

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Abstract

A bijection f from the vertex set V of a graph G to $\{1,2,\ldots|V|\}$ is called a prime cordial labeling of G if each edge uv is assigned the label 1 if gcd $(f(u),f(v)) = 1$ and 0 if gcd $(f(u),f(v))>1$, where the number of edges labeled with 0 and the number of edges labeled with 1 differ at most by one. In this paper we prove that 8- polygonal snake containing n number of 8- polygon, Splitting graph of C_n for $n\geq5$ and Armed Crown $C_{2k}\odot P_m$ for all $k\geq3$ and $m\geq2$ admit prime cordial labeling.

Key words: Graph labeling, prime labeling, cordial labeling, prime cordial labeling, 8- polygonal snake, splitting graph, armed crown.

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1. Introduction

Graph labeling is a strong relation between numbers and structure of graphs. Graph labeling was first introduced in the late 90's. Many studies in graph labeling refer to Rosa's research in 1967 [4]. A dynamic survey on different graph labeling problems with an extensive bibliography can be found in J.A. Gallian [3]. The concept of cordial labeling was introduced by Cahit [2]. Sundaram et al [6] introduced the concept of prime cordial labeling.

Graph labeling is an active area of research in graph theory which has mainly evolved through its many applications in coding theory, communication networks, mobile telecommunication system, optimal circuit layouts and graph decomposition problems. A systematic study of various theories in graph labeling were carried out by Bloom and Golomb [1].

2. Preliminaries

The following theorems are proved by S.K. Vaidya and P.L. Vihol [8]

Theorem 2.1

The graph obtained by duplicating each edge by a vertex in a cycle C_n admits prime cordial labeling except for $n = 4$.

Theorem 2.2

The graph obtained by duplicating a vertex by an edge in cycle C_n is a prime cordial graph.

Theorem 2.3

The path union of m copies of cycle C_n is a prime cordial graph.

Theorem 2.4

The friendship graph f_n is a prime cordial graph for $n \geq 3$

The following theorems are proved by M. A. Seoud, A. T. M. Matar, R.A. Al-Zuraiqi [5]

Theorem 2.5

If G is not a prime cordial graph of order m then $G \cup K_{1,n}$ is a prime cordial graph if E (G) $=n$-1, n or n+1.