**MEAN CORDIAL LABELING OF BISTAR GRAPHS**

**Ansari Saima, Assistant professor, Maharashtra College, Mumbai-08**

**Mob.8655128619**

**Email: saimaansari87@gmail.com**

**ABSTRACT:** Let be a function from to . Give a numerical value (label) from {0, 1, 2} for every edge . is called a mean cordial labeling if and , where and represent the number of vertices and edges respectively labeled as . A mean cordial graph has mean cordial labels. In this chapter, this study examines the mean cordial labeling pattern of bistar graphs .

**KEYWORDS:** mean cordial labeling, bistar graph.

**INTRODUCTION:** The graphs under consideration are simple, finite, and undirected. and represent the set of vertices and set of edges of a graph , respectively. The number of elements of and is called the order and size of respectively. Tracking system, route design, broadband networks, astrographs, and coding-encoding are just a few of the fields where labeled graphs are used (Gallian, 2022)4. Cahit introduced the cordial labeling concept in 1987 (Cahit, 1987).

**Definition 1:** A graph is said to be bipartite if its vertex set can be partitioned into two disjoined subsets and such that and every edge of has one end vertex in and one end vertex in (*Bipartite Graphs*, n.d.).

**Definition 2:** A graph is said to be complete bipartite if it is bipartite and if every vertex of is adjacent to every vertex of . If and then the complete bipartite graph is denoted by .

**Definition 3:** Let be a function. Give a numerical value (label) for every edge . is called a mean cordial labeling of G if and , where and represent the number of vertices and edges respectively labeled as A graph that admits mean cordial labeling is called a mean cordial graph (Ponraj et al., 2012).

If we reduce the codomain of to then this definition becomes the definition of product cordial labeling. M. Sundaram, R. Ponraj, and Somasundaram established the concept of cordial product labelling (Sundaram et al., 2004).

I examine the mean cordial labeling pattern of bistar graphs. The sign represents the greatest integer not exceeding and represents the smallest integer exceeding . Terminologies not described in this paper are used in Harary’s context (*Book 1 (Harary).Pdf*, n.d.).

**Definition 4:** A Bistar graph is the graph obtained by joining the centre (apex) vertices of two copies of by an edge and it is denoted by (S. Khunti et al., 2020).

Here and .

Example 1:



**Figure 1. Bistar graph**

**Definition 5:** Let be a mapping from to . For every edge of , nominate the label or . is called a mean cordial labeling of if and , where and represent the number of vertices and edges respectively labeled as . An illustration using mean cordial labeling is referred to as a mean cordial graph.

**MAIN RESULT:**

**Theorem:** Let be a bipartite graph, then admits mean cordial labeling .

**Proof.** Define

**Case 1:**  : That is, , where is positive integer.

We define vertex labeling as follows:

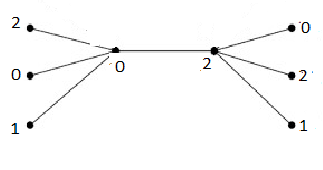
We define edge labeling as follows:

,

In this case, we have , and

, .

Example 2. Figure 2 represents the mean cordial labeling of bistar graph .



**Figure2: bistar graph**

**Case 2:** : That is, , where is positive integer.

We define vertex labeling as follows:

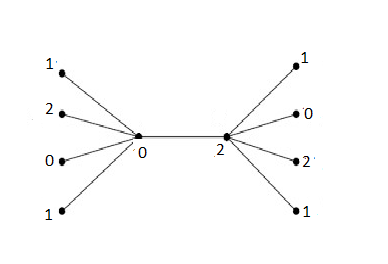
;

We define edge labeling as follows:

,

In this case, we have , and

Example 3. Figure 3 represents the mean cordial labeling of bistar graph .



**Figure3: bistar graph**

**Case 3:** : That is, , where is positive integer.

We define vertex labeling as follows:

;

;

We define edge labeling as follows:

,

In this case, we have and

,

Example 4. Figure 2 represents the mean cordial labeling of bistar graph .



**Figure4: bistar graph**

**REFERENCES:**

*Bipartite Graphs*. (n.d.). Retrieved July 23, 2023, from https://www.skedsoft.com/books/discrete-mathematics/bipartite-graphs

*Book 1 (Harary).pdf*. (n.d.). Retrieved May 19, 2023, from https://users.metu.edu.tr/aldoks/341/Book%201%20(Harary).pdf

Cahit, I. (1987). *Cordial graphs: A weaker version of graceful and harmonious graphs*. https://www.academia.edu/850965/Cordial\_graphs\_a\_weaker\_version\_of\_graceful\_and\_harmonious\_graphs

Gallian, J. A. (2022). A Dynamic Survey of Graph Labeling. *The Electronic Journal of Combinatorics*, *1000*, DS6: Dec 2. https://doi.org/10.37236/11668

Ponraj, R., Sivakumar, M., & Sundaram, M. (2012). Mean cordial labeling of graphs. *Open Journal of Discrete Mathematics*, *2*(4), 145.

S. Khunti, S., A. Chaurasiya, M., & P. Rupani, M. (2020). Maximum eccentricity energy of globe graph, bistar graph and some graph related to bistar graph. *Malaya Journal of Matematik*, *8*(4), 1521–1526. https://doi.org/10.26637/MJM0804/0032

Sundaram, M., Ponraj, R., & Somasundaram, S. (2004). Product cordial labeling of graphs. *Bulletin of Pure and Applied Sciences*, *23E*, 155–163.