Research Paper

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HARMONIC MEAN LABELLING OF SUBDIVISION AND SOME SPECIAL GRAPHS

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ABSTRACT:

A chart G = (V, E) with p vertices and q edges is supposed to be a Harmonic mean diagram in the event that it is feasible to name the vertices xƐv with particular marks f(x) from 1,2,…. q+1 so that when each edge e =uv is named with the edge names are unmistakable. For this situation f is called Harmonic mean marking of G. In this paper we demonstrate the Harmonic mean naming conduct for some extraordinary diagrams.

Keywords: Graph, Harmonic mean chart, way, brush, kite, Ladder, Crown.

INTRODUCTION

We think about just limited, basic and undirected charts. Let G(V,E) be a diagram with p vertices and q edges. For documentations and wording we follow [1]. In a diagram G, the development of an edge uv is the way toward erasing the edge uv and presenting another vertex w and the new edges uw and vw. In the event that each edge of G is partitioned precisely once, the resultant diagram is meant by S(G) and is known as the development chart of G. For example, a star $K_{1,5}$ and its subdivision graph $S(K_{1,5})$.

The association of two diagrams G_1 and G_2 is a chart $G_1 \cup G_2$ with vertex set $V(G_1 \cup G_2)=VG_1 \cup VG_2$ and $E(G_1 \cup G_2)= EG_1 \cup EG_2$. mG is the diagram acquired from $K_{1,n} \cup K_{1,m}$ by joining the focal vertices of from $K_{1,n} \cup K_{1,m}$ through an edge. The recently added edge is known as the focal edge of $B_{n,m}$.

A task f :V(G)→{0,1,2,… ,q} is known as a mean marking in the event that

e = uv is labeled $[\frac{2f(u)f(v)}{2}]$ if f(u) + f(v) is odd then, edge labels are distinct. The chart that concedes a mean marking is known as a mean diagram. Numerous outcomes on mean marking have been demonstrated in [4] and [5]. In a comparative way, [6] have presented the idea of symphonious mean marking of a diagram.

An assignment: f:V(G)→{0,1,2,… ,q+1} is called a **harmonic mean labeling.**

More outcomes on consonant mean naming have been demonstrated in [6]. A well assortment of results on chart naming has been done in the review [2].

In this paper, we build up the consonant mean naming of some standard charts like region of star (K_1), region of bistar (B_n), the separated diagram $S(K_{1,n}) \cup kC_m$ and so forth

By a chart, we mean a limited undirected diagram without circles or numerous edges. The vertex set is signified by V(G) and the edge set is meant by E(G).

A pattern of length n is C_n and a way of length n is signified by P_n. For any remaining standard phrasing and documentations, we follow Harary [1].

We present Harmonic mean naming of charts in [3] and considered their conduct in [4], [5] and [6]. In this paper, we examine Harmonic mean marking for some unique charts. The definition and other data which are helpful for the current examination are given beneath.

PRELIMINARY DEFINITION

Definition 1.1

A chart G= (V,E) with p vertices and q edges is known as a Harmonic mean chart in the event that it is feasible to mark the vertices x∈V with particular labels from 1,2… q+1 so that when edge e=uv is named with f(e=uv)= $[\frac{2f(u)f(v)}{f(u)f(v)}]$at that point the edge names are particular. For this situation, f is known as a Symphonious mean marking of G.

Definition 1.2

Leave v alone a vertex of a diagram G. At that point the duplication of v is a chart G(v) acquired from G by adding another vertex v' with N(v′)=N(v).

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Definition 1.3

Let e=uv be an edge of G. At that point duplication of an edge e=uv is a chart G(uv) acquired from G by adding another edge u′v′ to such an extent that

N(u′)=N(u)∪{v′}-{v} and N(v′)= N(v)∪{u′}-{u} .

Definition 1.4

Think about two duplicates of C_n, associate a vertex of first shy to a vertex of second duplicate with another edge, the new diagram acquired is called joint amount of C_n.

Definition 1.5

Leave u and v alone two unmistakable vertices of a diagram G. Another chart G1is developed by recognizing two vertices u and v by a solitary vertex w is such that each edge which was occurrence with one or the other u or v in G isn't episode with w in G.

Definition 1.6

An (m, n) kite chart comprises of pattern of length m with n edge way appended to one vertex of a cycle.

Definition 1.7

Brush is a chart gotten by joining a solitary pendant edge to each vertex of a way.

Definition 1.8

The item chart $P_m \times P_n$ is known as a planar network and $P_2 \times P_n$ is known as a stepping stool.

Definition 1.9

The crown of two chart $G_1$and G_2 is the diagram $G=G_1$ o G_2 framed by one duplicate of $G_1$and $|V(G_1)|$ duplicates of G_2 where the i^{th} vertex of G_1 is nearby to each vertex in the i^{th} duplicate of G_2.

Definition 1.10

The chart P_m $AK_{1,n}$ is gotten by joining $K_{1,n}$ to each vertex of P_m.

Definition 1.11

An assignment f : (G) → {1, 2 , … , p + q } is called a super harmonic

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labelling mean if whenever each edge e=uv is labeled with $\lceil\frac{2f(u)f(v)}{f(u)+f(v)}\rceil$ or $\lfloor\frac{2f(u)f(v)}{f(u)+f(v)}\rfloor$ then the edge labels are distinct. Any graph that admits a super harmonic mean labelling is called a super harmonic graph.

Definition 1.12

An Alternate Triangular snake $A(T_n)$ is obtained from a path $u_1u_2.....u_n$ by joining u_i and u_{i+1}(alternatively) to new vertex v_i That is every alternate edge if a path is replaced by C_3.

Definition 1.13

An Alternate Quadrilateral Triangular snake $A(Q_n)$ is acquired from a way $u_1,u_2,u_3,.......u_n$ by joining u_i,u_{i+1} (then again) to new vertices v_iw_i individually and afterward joining v_i and w_i.

That is each substitute edge of a way is supplanted by a cycle C4.

HARMONIC MEAN LABELLING OF SOME CYCLE RELATED GRAPHS

Theorem 2.1

Proof:

Let $C_n = v_1v_2.......v_nv_1$ be the cycle Let v_i' be the duplicated vertex of v_i.

Define a function f: $V(G(v_i))\rightarrow\{1,2.....q+1\}$ by $f(v_1) = n+3$ $f(v_1') =$
1
$f(v_i) = i+3, 2 \le i \le n$

Hence f is harmonic mean labelling of the graph $G(v_i)$

HARMONIC MEAN LABELLING FOR SOME SPECIAL GRAPHS

Theorem 3.1:

Proof:

Let $u_1 u_2 u_3......u_mu_1$ be the cycle of length m and $v_1v_2.....v_n$ be given path of length n. Define a function f: $V(G) \rightarrow\{1,2....q+1\}$ by $f(u_i) = i, 1 \le i \le m$, $f(v_i) = n+i$, $1 \le i \le n$
The edge marks of the cycle are $f(u_1u_m) = 1$, $(u_iu_{i+1}) = i+1, 1 \le i \le m_i$

Theorem: 4.1

Proof:

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Let $V(P_n) \square \{v_i ;1\square\ i \square n\}$and

$E(P_n) \square\{e_i \square v_i ,v_{i\square 1};1\square i \square n\square 1\}$

Define a function $f : V(P_n) \square \{k, k \square 1, k \square 2, \ldots\ldots\ldots\ldots\ldots\ldots, k \square q\}$ by

$$f(v_i) \square k \square i \square 1, \square 1 \square i \square n$$

Then the induced edge labels are

$$f^*(e_i) \square k \square i \square 1, \square 1 \square i \square n \square 1$$

In this paper we demonstrate the Harmonic mean marking conduct for some uncommon diagrams.

Hence P_n is a k-harmonic mean graph.

CONCLUSION

In this paper we examine Harmonic mean naming conduct of some cycle related diagrams like duplication, joint amount of the cycle and ID of cycle. Additionally, we explore Harmonic mean marking conduct of Alternate Triangular Snake $A(T_n)$, Alternate Quadrilateral Snake $A(Q_n)$.

In this paper, we build up consonant mean names of some notable development charts and some disengaged diagrams.

In this paper we demonstrate the Harmonic mean naming conduct for some uncommon diagrams.

In this paper, we set up the symphonious mean marking of some standard diagrams like development of star ($K_{1,}$), region of bistar (B_n), the disengaged chart $S(K_{1,n}) \cup kC_m$.

REFERENCES

1. Harary.F., 1988, Graph hypothesis and Narosa Publishing House of New Delhi.
2. Somasundaram.S., and Ponraj R., 2003, Mean naming of charts National Academy of Science Letters vol.26, p.210-213
3. Somasundaram S., Ponraj R., and Sandhya S.S., Harmonic mean marking of charts conveyed.
4. Sandhya S.S., Somasundaram S., and Ponraj R., Some Results on Harmonic Mean Graphs, International journal of Contemporary Mathematical Sciences 7(4) (2012), 197-208.
5. Sandhya S.S., Somasundaram S., and Ponraj R., Some More Results on Harmonic Mean Graphs Journal of Mathematics Research 4(1) (2012) 21-29.
6. Sandhya S.S., and Ponraj R, Harmonic Mean Labeling of Some Cycle Related Graphs, International Journal of Mathematics Analysis vol.6, 2012. No.40 1997-2005.