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Limit on Connected Two Star Super Mean Graphs

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Abstract. Let G be a (p, q) graph and f : V(G) $\rightarrow$ {1, 2, 3, , p + q} be an injection. For each edge e = uv, let $f^*(e) = \dfrac{f(u)+f(v)}{2}$ if $f(u)+f(v)$ is even and $f^*(e) = \dfrac{f(u)+f(v)+1}{2}$ if $f(u)+f(v)$ is odd. Then f is called super mean labeling if $f(V) \cup \{f^*(e) : e \in E(G)\} = \{1, 2, 3, , p+q\}$. A graph that admits a super mean labeling is called a super mean graph. In this paper we with an edge in common is a super mean graph if and only if $|m-n| \leq 1$.

Key words: Super mean labeling, super mean graph, wedge and star.

1. Introduction

By a graph we mean a finite, simple and undirected one. The vertex set and the edge set of a graph G are denoted by V(G) and E(G) respectively. The disjoint union of two graph G_1 and G_2 is the graph $G_1 \cup G_2$with $V(G_1 \cup G_2) = V(G_1) \cup V(G_2)$ and $E(G_1 \cup G_2) = E(G_1) \cup E(G_2)$. The disjoint union of two star $K_{1,\,m}$ and $K_{1,\,\mathrm{n}}$ is denoted by $K_{1,\,m} \cup K_{1,\,\mathrm{n}}$. The wedge of two star is obtained by an edge joining two first copy and second copy of two star for all u_i and v_j such that $\dfrac{f(u_i)+f(v_j)+1}{2} = 2m+2$.Much work is done by researchers on super mean labeling applying it on a variety of graphs [4], [5], [6], [7], [8]. Motivated by these work, we have struck at the concept of super mean labeling on any two star graph.

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2. Pre requisites

Definition 2.1. ***Super Mean Labeling***

Let G be a (p, q) graph and $f: V(G) \rightarrow \{1, 2, 3, \cdots p+q\}$ *be an injection. For each edge* $e = uv$, *let* $f^*(e) = \dfrac{f(u)+f(v)}{2}$ *if* $f(u) + f(v)$ *is even and* $f^*(e) = \dfrac{f(u)+f(v)+1}{2}$ *if* $f(u) + f(v)$ *is odd. Then f is called super mean labeling if* $f(V) \cup \{f^*(e) : e \in E(G)\} = \{1, 2, 3, \cdots p+q\}$. *A graph that admits a super mean labeling is called a super mean graph.*

2.1. **Wedge.** A wedge is defined as a bridge connecting two components of a graph,denoted as $\wedge$. $\omega(G\wedge) < \omega(G)$.

$K_{1,\,m} \cup K_{1,\,n}$is a two starand is a two component or a disconnected graph, whereas $K_{1,\,m} \wedge K_{1,\,n}$is a two star but a connected graph .which means adding a wedge to a disconnected graph with two components becomes a connected or a single component graph.

In the following theorem we prove that any path is a Relaxed Skolem mean like labeling.

3. Results and Discussions

Theorem 3.1. *If* $n \geq 4$, $K_{1,\,n}$ *is not a super mean graph.*

Proof. Let $\{v_1,\ v_2\}$ be the bipartition of $K_{1,\,\mathrm{n}}$ with $v_1 = \{u\}$ and $v_2 = \{u_1,\ u_2,\ u_3, \ldots,\ u_n\}$. Suppose $K_{1,\,\mathrm{n}}$ is a super mean graph.

Then there exists a function f : V (G) $\rightarrow \{1, 2, 3, \cdots 2n+1\}$ be an injection. For each edge e = uv,

$$\text{Let } f^*(e) = \begin{cases} \dfrac{f(u)+f(v)}{2} & if \quad f(u)+f(v) \text{ is even} \\ \dfrac{f(u)+f(v)+1}{2} & if \quad f(u)+f(v) \text{ is odd.} \end{cases}$$

then $f(V) \cup \{f^*(e) : e \in E(G)\} = \{1, 2, 3, \cdots \mathrm{p+q}\}$.

Let $G = K_{1,\,m}$, $p = 1+m$, $q = m$ *and* $p+q = 2m+1$.

There are (m+1) odd integers and m even integers in the set $\{1, 2, 3, \cdots 2n+1\}$.

Even integers are $2 \leq\ 2k \leq\ 2n$.

Odd integers are $1 \leq\ (2k+1) \leq\ n+1$.

Assuming f(u) be an even integers, there are 3 cases to be considered, $f(u) = 2$, $f(u) = 2k,\ k < n\ f(u) = 2n$.

Case (a): Let $f(u) = 2$, if $f(u_1) = 1$

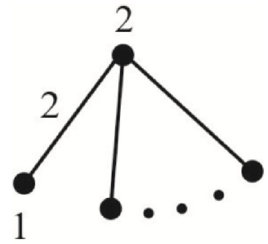
Then the corresponding edge label is $f^*(uu_1) = 2$. As the vertex value and the edge value get assigned the same number.

1 cannot be a pendent vertex of $K_{1,\,m}$ if $f(u) = 2$.

Also 1 cannot take up the edge value at all.

Therefore 1 is missed

Therefore G is not a super mean graph $f(u) = 2$.

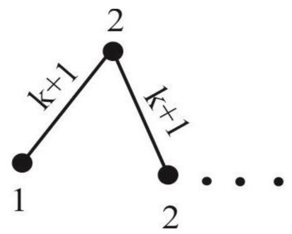


Case (b): Let $f(u) = 2k$, $k < n$

If $f(u_1) = 1$, $f(u_2) = 2$

Then the corresponding edge label is $f^*(uu_1) = k+1$, $f^*(uu_2) = k+1$. As the two edge labels have the same value corresponding it is considered the pendent vertices 1 and 2.

Therefore G is not a super mean graph $f(u) = 2k$.



Case (c): Hence, super mean labeling is not available, if f(u) takes any even integral value, then there is no super mean labeling on G is proved.

Now, consider the cases when f(u) is an odd integer (i.e.) $f(u) = 1$, $f(u) = 2k+1$, $k < 1$, $f(u) = 2n+1$. Let $f(u) = 2n$.

If $f(un) = 2n+1$.

Then the corresponding edge label is $f^*(uu_m) = 2n+1$. As the pendent vertex and the edge value get assigned the same number, so 2n+1 cannot be an pendent vertex.Suppose 2n+1 is an edge value.

The only number to be considered for the pendent vertex with respect to 2n+1 is as the edge value is $2n-1$.

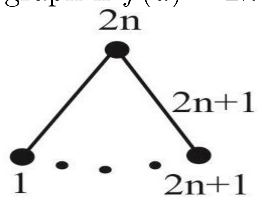
So, $f(u_{n-1}) = 2n-1$.

Then the corresponding edge label is $f^*(uu_{n-1}) = \dfrac{2n+2n-1}{2} = \dfrac{4n-1}{2}$ $= 2n \neq 2n+1$.

Therefore 2n+1 cannot be an edge value.

Therefore 2n+1 is missed.

Therefore G is not super mean graph if $f(u) = 2n$.



Case (d): Let f(u)=1

If $f(un) = 2m+1$

$f(un-1) = 2m$

Then the corresponding edge label is $f^*(uu_n) = n+1,\ f^*(uu_{n-1}) = 2n+1$. As two edge values with respect to two different pendent vertices of the same. 2n cannot be an pendent vertex.

Suppose 2n is an edge value.

The only number to be considered for the pendent vertex with respect to 2n as the edge value is $2n-1$.

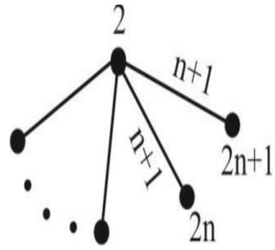
So, $f(u_{n-1}) = 2n-1$.

Then the corresponding edge label is $f^*(uu_n) = \dfrac{2n-1+1}{2} = n \neq 2n$.

Therefore 2n cannot be an edge value.

Therefore 2n is missed.

Therefore G is not super mean graph if $f(u) = 1$.



Case (e): Let $f(u) = 2k + 1,\ k < n$.

If $f(u_n) = 2n + 1$.

$f(u_{n-1}) = 2n$.

Then the corresponding edge label is $f^*(uu_n) = k + n + 1$, $f^*(uu_{n-1}) = k + n + 1$. As two edge values with respect to two different pendent vertices are the same. 2n cannot be an pendent vertex.

Suppose 2n is an edge value.

The only number to be considered for the pendent vertex with respect to 2n as the edge value is $2n - 1$.

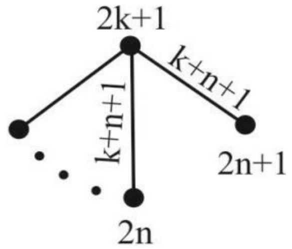
So$f(u_{n-1}) = 2n - 1$.

Then the corresponding edge label is $f^*(uu_n) = \dfrac{2n - 1 + 2k + 1}{2} = n + k \neq 2n$.

Therefore $2n$ cannot be an edge value.

Therefore $2n$ is missed.

Therefore G is not super mean graph if $f(u) = 2k + 1$.



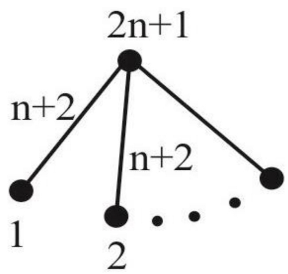
Case (f): Let $f(u) = 2n + 1$, the largest odd integer. If $f(u_1) = 1$.

$f(u_2) = 2$.

The corresponding edge label is $f^*(uu_1) = n + 2$, $f^*(uu_2) = n + 2$. As the two edge values with respect to two different pendent vertices are the same.

(1 or 2) cannot be an pendent vertex also cannot assume the edge values at all.

Therefore G is not a super mean graph if $f(u) = 2n + 1$.



□

Remark 3.2. *The $K_{1,\,n}$ is not a super mean graph, which is established by assigning all possible odd and even values of $f\,(u)$. For $n\leq\,3$, the graph $K_{1,\,n}$ admits super mean labeling.*

It is concluded that $K_{1,\,n}$ for$n\geq 4$, is not a skolem mean graph.

Theorem 3.3. *Theorem 3. 2: The two star $G\,=\,K_{1,\,m}\Lambda K_{1,\,n}$ with an edge in common is a super mean labeling iff $|m-n|\leq\,1$.*

Proof. Without loss of generality we assume that $m\leq\,n$.

Let us first take the case that $|m-n|\leq\,1$.

There are two cases viz $n=m$, $n=m+1$.

In each case we have to prove that G is a super mean labeling

Case (1): Let $n=m$

Consider the graph $G\,=\,2(K_{1,\,m})$ with an edge in common. Let $\{u\}\cup\{u_i:1\leq i\leq m\}$ and $\{v\}\cup\{v_j:1\leq j\leq m\}$ be the vertex set of first and second copies of $K_{1,\,m}$ respectively. Then G has $2m\,+\,1$ edges and $2m\,+\,2$ vertices.

We have $V(G)\,=\,\{u,\;v\}\cup\{u_i:1\leq i\leq m\}\cup\{v_j:1\leq j\leq m\}$. The required vertex labeling $f\;:\;V(G)\;\rightarrow\;\{1,\;2,\;3,\;\ldots,\;2m+2\}$ is defined as follows,

$f(u)=1;\quad f(v)=4m+3$

$f(u_i)=3+4(i-1),\quad 1\leq i\leq m$

$f(v_j)=\,5+4(j-1),\quad 1\leq j\leq m$

The corresponding edge labeling $f^{*}:E(G)\rightarrow\{1,\;2,\;3,\;\ldots,\;2m+1\}$ is defined as follows:

The edge label of $f^{*}(uu_i)=2+2(i-1),$ *and* $1\leq i\leq m.$

The edge label of $f^{*}(vv_j)=2m+4+2(j-1),\;\;1\leq j\leq m.$

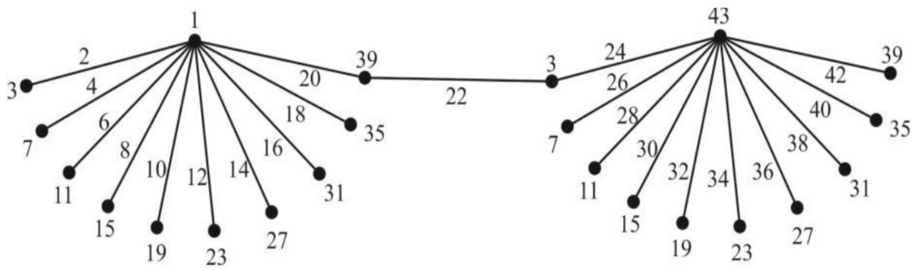
Also the edge label of u_iv_j is 2m+2 for all $u_i$and v_j such that $\dfrac{f(u)+f(v)}{2}=2m+2.$

Therefore the edge labels of $G\,=\,\{2,\;4,\;6,\ldots,\;2m,\;2m+2,\ldots,\;4m+2\}$ and has 2m+1 distinct edges.

Hence the induced edge labels and vertices of G are distinct.

Illustration (1): Consider the graph $G(V,\ E) = K_{1,\ 10} \cup K_{1,\ 10}$ with an edge in common for $m = 10$.

Then $|V| = p = 22$ *and* $|E| = q = 21$.



Case (2): Let $n = m + 1$.

Consider the graph $G = K_{1,\ m} \Lambda K_{1,\ m+1}$ with an edge in common.

Let $\{u\} \cup \{u_i : 1 \leq i \leq m\}$be the vertices of $K_{1,\ m}$ and $\{v\} \cup \{v_j : 1 \leq j \leq m + 1\}$ be those of $K_{1,\ m+1}$. Then G has 2m+3 vertices 2m+2 edges.

We have $V(G) = \{u,\ v\} \cup \{u_i : 1 \leq i \leq m\} \cup \{v_j : 1 \leq j \leq m + 1\}$.

The required vertex labeling $f : V(G) \rightarrow \{1,\ 2,\ 3, \ldots, 2m + 3\}$ is defined as follows,

$f(u) = 1; \quad f(v) = 4m + 3$

$f(u_i) = 3 + 4(i - 1),\ 1 \leq i \leq m$

$f(v_j) = 5 + 4(j - 1),\ 1 \leq j \leq m + 1$

The corresponding edge labeling $f^* : E(G) \rightarrow \{1,\ 2,\ 3, \ldots, 2m + 2\}$ is defined as follows:

The edge label of $f^*(uu_i) = 2 + 2(i - 1), 1 \leq i \leq m$

The edge label of $f^*(vv_j) = 2m + 4 + 2(j - 1), 1 \leq j \leq m + 1$

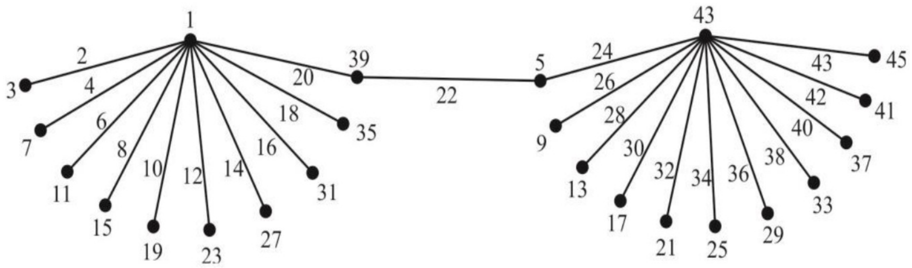
Also the edge label of $u_i v_j$ is 2m+2 for all $u_i$and v_j such that $\dfrac{f(u) + f(v)}{2} = 2m + 2$.

Therefore the edge labels of $G = \{2,\ 4,\ 6, \ldots,\ 2m,\ 2m + 2, \ldots,\ 4m + 2\}$ and has 2m+1 distinct edges.

Also the edge label and vertices of G are distinct.

Illustration (2): Consider the graph $G(V,\ E) = K_{1,\ 10} \cup K_{1,\ 11}$ with an edge in common for $m = 10$.

Then $0 \leq j \leq 3$ $|V| = p = 23$ *and* $|E| = q = 22$.



Hence the graph G is a super mean graph if $|m - n| \leq 1$.

Conversely, let us take the case that $|m - n| > 1$.

Suppose that $G = K_{1,\, m} \Lambda K_{1,\, n}$ with an edge in common for $n = m + r$ for $r \geq 2$ is a super mean graph.

Let us assume that $G = G_1 \Lambda G_2$ with an edge in common for $G_1 = K_{1,\, m}$ and $K_{1,\, m+r}$.

Let us now consider the case that when $r = 2$ and $m = 1$.

Then the graph $G = K_{1,\, 1} \Lambda K_{1,\, 3}$ with an edge in common have 6 vertices and 4 edges.

Let $V(G) = \{v_{1,\, j} : 0 \leq j \leq 1\} \cup \{v_{2,\, j} : 0 \leq j \leq 3\}$ and $E(G) = \{v_{1,\, 0} v_{1,\, j} = 1\} \cup \{v_{2,\, 0} v_{2,\, j} : 1 \leq j \leq 3\} \cup \{v_{1,\, 1}\ v_{2,\, j}$: for any one of vertex $v_{2,\, j}$ for $1 \leq j \leq 3\}$.

Suppose G is a super mean graph.

Let $p = |V| = 5$ *and* $q = |E| = 4$.

Then there exists a function $f : V(G) \rightarrow \{1, 2, 3, \ldots, p + q\}$ be an injection. For each edge $e = uv$, let $f^*(e) = \dfrac{f(u) + f(v)}{2}$ if $f(u) + f(v)$ is even and $f^*(e) = \dfrac{f(u) + f(v) + 1}{2}$ if $f(u) + f(v)$ is odd. Then f is called super mean labeling if $f(V) \cup \{f^*(e) : e \in E(G)\} = \{1, 2, 3, \ldots, p + q\}$.

Then the vertex and edge mappings of G is given by $f(V) \cup f^*(e) = \{1, 2, 3, \ldots, p + q\}$.

Now let us consider the following cases

Let $\{u, u_1\}$ and $\{v, v_1, v_2, v_3\}$ be the vertices of the graph $G = K_{1,\, 1} \cup K_{1,\, 3}$.

We define a labeling $f : V(G) \rightarrow \{1, 2, 3, \ldots, p + q\}$ as follows:

$f(u) = 1\,; \quad f(v) = 7$

$f(u_1) = 3$; $f(v_1) = 5$; $f(v_2) = 9$; $f(v_3) = 11$

Let $t_{i,\,j}$ be the label given to the vertex $v_{1,\,j}$for $0 \le j \le 3$ and $v_{2,\,j}$for $0 \le j \le 3$, $x_{i,\,j}$ be the corresponding edge label of the$v_{1,\,0}v_{1,\,1}$ and $v_{2,\,0}v_{2,\,j}$for $1 \le j \le 3 y_{1,\,j}$be the edge label of $t_{1,1}t_{2,\,j}$ for $1 \le j \le 3$.

Case (a) : Let us first consider $t_{1,\,0} = 1$

Let $t_{1,\,1} = 3$

$t_{2,\,0} = 7$

$t_{2,\,1} = 5$

$t_{2,\,2} = 9$

$t_{2,\,3} = 11$

Also the edge label of $x_{1,\,1} = 4$ for then the corresponding edge label is $x_{1,\,1} = 2$,$x_{2,\,1} = 6$,$x_{2,\,2} = 8$,$x_{2,\,3} = 9$.

$t_{2,\,2} = 9 = x_{2,\,3}$

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 1$.

Case (b) : Let us next consider the case that $t_{1,\,0} = 2$ then $t_{1,\,1} = 4$

$t_{2,\,0} = 8$

$t_{2,\,1} = 6$

$t_{2,\,2} = 10$

$t_{2,\,3} = 11$

Then the corresponding edge label is $x_{1,\,1} = 3$,$x_{2,\,1} = 7$,$x_{2,\,2} = 9$, $x_{2,\,3} = 10$.

Also the edge label of $y_{1,\,1} = 4$.

$t_{2,\,2} = 10 = x_{2,\,3}$

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 2$.

Case (c) : Let us next consider the case that $t_{1,\,0} = 3$ then $t_{1,\,1} = 5$

$t_{2,\,0} = 9$

$t_{2,\,1} = 7$

$t_{2,\,2} = 11$

$t_{2,\,3} = 1$

Then the corresponding edge label is $x_{1,\,1} = 4$, $x_{2,\,1} = 8$, $x_{2,\,2} = 10$, $x_{2,\,3} = 5$.

Also the edge label of $y_{1,\,1} = 6$.

$t_{1,\,1} = 5 = x_{2,\,3}$

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 3$.

Case (d) : Let us next consider the case that $t_{1,\,0} = 4$ then $t_{1,\,1} = 6$

$t_{2,\,0} = 10$

$t_{2,\,1} = 8$

$t_{2,\,2} = 11$

$t_{2,\,3} = 1$

Then the corresponding edge label is $x_{1,\,1} = 5$,$x_{2,\,1} = 9$,$x_{2,\,2} = 11$, $x_{2,\,3} = 6$.

Also the edge label of $y_{1,\,1} = 7$.

$t_{2,\,2} = 11 = x_{2,\,2}$

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 4$.

Case (e) : Let us next consider the case that $t_{1,\,0} = 5$ then $t_{1,\,1} = 7$

$t_{2,\,0} = 11$

$t_{2,\,1} = 9$

$t_{2,\,2} = 2$

$t_{2,\,3} = 4$

Then the corresponding edge label is $x_{1,\,1} = 6$,$x_{2,\,1} = 10$,$x_{2,\,2} = 7$, $x_{2,\,3} = 8$.

Also the edge label of $y_{1,\,1} = 8$.

$t_{1,\,1} = 7 = x_{2,\,2}$.

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 5$.

Case (f) : Let us next consider the case that $t_{1,\,0} = 6$ then $t_{1,\,1} = 8$

$t_{2,\,0} = 3$

$t_{2,\,1} = 10$

$t_{2,\,2} = 1$

$t_{2,\,3} = 5$

Then the corresponding edge label is $x_{1,\,1} = 7$,$x_{2,\,1} = 7$,$x_{2,\,2} = 2$, $x_{2,\,3} = 4$.

Also the edge label of $y_{1,\,1} = 9$.

$x_{1,\,1} = 7 = x_{2,\,1} = 7$.

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 6$.

Case (g) : Let us next consider the case that $t_{1,\,0} = 7$ then $t_{1,\,1} = 9$

$t_{2,\,0} = 1$

$t_{2,\,1} = 11$

$t_{2,\,2} = 3$

$t_{2,\,3} = 4$

Then the corresponding edge label is $x_{1,\,1} = 8$,$x_{2,\,1} = 6$,$x_{2,\,2} = 2$.

Also the edge label of $y_{1,\,1} = 10$.

$x_{2,\,2} = 3 = x_{2,\,3}$.

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 7$.

Case (h) : Let us next consider the case that $t_{1,\,0} = 8$ then $t_{1,\,1} = 10$

$t_{2,\,0} = 3$

$t_{2,\,1} = 11$

$t_{2,\,2} = 3$

$t_{2,\,3} = 5$

Then the corresponding edge label is $x_{1,\,1} = 9$,$x_{2,\,1} = 7$,$x_{2,\,2} = 4$.

Also the edge label of $y_{1,\,1} = 11$.

$t_{2,\,1} = 11 = y_{1,\,1}$.

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 8$.

Case (i) : Let us next consider the case that $t_{1,\,0} = 9$ then $t_{1,\,1} = 11$

$t_{2,\,0} = 3$

$t_{2,\,1} = 1$

$t_{2,\,2} = 5$

$t_{2,\,3} = 7$

Then the corresponding edge label is $x_{1,\,1} = 10$,$x_{2,\,1} = 2$,$x_{2,\,2} = 4$,$x_{2,\,3} = 10$.

Also the edge label of $y_{1,\,1} = 6$.

$x_{1,\,1} = 10 = x_{2,\,3}$.

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 9$.

Case (j) : Let us next consider the case that $t_{1,\,0} = 10$ then $t_{1,\,1} = 6$

$t_{2,\,0} = 5$

$t_{2,\,1} = 3$

$t_{2,\,2} = 7$

$t_{2,\,3} = 11$

Then the corresponding edge label is $x_{1,\,1} = 6$,$x_{2,\,1} = 4$,$x_{2,\,2} = 6$,$x_{2,\,3} = 8$.

Also the edge label of $y_{1,\,1} = 2$.

$x_{1,\,1} = 6 = x_{2,\,2}$.

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 10$.

Case (k) : Let us next consider the case that $t_{1,\,0} = 11$ then $t_{1,\,1} = 1$

$t_{2,\,0} = 5$

$t_{2,\,1} = 3$

$t_{2,\,2} = 7$

$t_{2,\,3} = 10$

Then the corresponding edge label is $x_{1,\,1} = 6$,$x_{2,\,1} = 4$,$x_{2,\,2} = 6$,$x_{2,\,3} = 8$.

Also the edge label of $y_{1,\,1} = 2$.

$x_{1,\,1} = 6 = x_{2,\,2}$.

It is not possible to label that two of them will induce the same label.

Therefore G is a not a super mean graph. When $t_{1,\,0} = 11$.

G is not a relaxed super mean graph all values of $t_{1,\,0}$.

Therefore $G = K_{1,\,1}\Lambda K_{1,\,3}$with an edge in common is not a super mean graph when $|m - n| = 2$.

Similarly, we can prove that $G = K_{1,\,1}\Lambda K_{1,\,4}$with an edge in common is not a super mean graph $|m - n| = 3$.

Therefore,$G = K_{1,\,m}\Lambda K_{1,\,n}$ with an edge in common is not a super mean graph if $|m - n| \geq 2$. $\square$

3.1. **Application of Graph Labeling in Communication Networks.** The Graph Theory plays a vital role in various fields. One of the important area is Graph (Skolem mean) Labeling, used in many applications like coding theory, X - ray crystallography, radar, astronomy, circuit design, communication network addressing and data base management. Applications of labeling (Skolem Mean) of graphs extends to heterogeneous fields but here we mainly focus on the communication networks. Communication network is of two types Wired Communication and Wireless Communication. Day by day wireless networks have been developed to ease communication between any two systems, results more efficient communication. To explore the role of labeling in expanding the utility of this channel assignment process in communication networks. Also, graph labeling has been observed and identified its usage towards communication networks. We address how the concept of graph labeling can be applied to network security, network addressing, channel assignment process and social networks.

Network representations play an important role in many domains of computer science, ranging from data structures and graph algorithms, to parallel and communication networks.

Geometric representation of the graph structure imposed on these data sets provides a powerful aid to visualizing and understanding the data. The graph labeling is one of the most widely used labeling methods of graphs. While the labeling of graphs is perceived to be a primarily theoretical subject in the field of graph theory and discrete mathematics, it serves as models in a wide range of applications as listed below.

The coding theory.

The x-ray crystallography.

The communication network addressing.

Fast Communication in Sensor Networks Using Graph Labeling.

Automatic Channel Allocation for Small Wireless Local Area Network.

Graph Labeling in Communication Relevant to Adhoc Networks.

Effective Communication in Social Networks by Using Graphs.
Secure Communication in Graphs.

4. Conclusion

Researchers may get some information related to graph labeling and its applications in communication field and work on some ideas related to their field of research.

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References

[1] J. C. Bermond, Graceful graphs, radio antennae and French windmills, Graph theory and Combinatorics, Pitman, London, (1979), 13 37.

[2] V. Balaji, D. S. T. Ramesh and A. Subramanian, Skolem Mean Labeling, Bulletin of Pure and Applied Sciences, vol. 26E No. 2, 2007, 245 248.

[3] V. Balaji, D. S. T. Ramesh and A. Subramanian, Some Results on Skolem Mean Graphs, Bulletin of Pure and Applied Sciences, vol. 27E No. 1, 2008, 67 74.

[4] P. Jeyanthi, D. Ramya and P. Thangavelu, On super mean graphs, AKCE Int.J.Graphs.Combin, 6 (1) (2009), 103-112.

[5] R. Ponraj and D. Ramya, on super mean graphs of order 5, Bulletin of Pure and Applied Sciences, (Section E Maths and Statistics) 25E (2006), 143-148.

[6] D.Ramyaand P. Jeyanthi, Super mean labeling of some classes of graphs,International J.Math.Combin.1 (2012), 83-91.

[7] R. Vasuki and A. Nagarajan, Some results on super mean graphs, International Journal of Mathematical Combinatorics, 3 (2009), 82-96.

[8] R. Vasuki and A. Nagarajan, On the construction of new classes of super mean graphs, Journal of Discrete Mathematical Sciences and Cryptography, 13 (3) (2010), 277-290.