Available online at http://scik.org
J. Math. Comput. Sci. 10 (2020), No. 4, 881-890
https://doi.org/10.28919/jmcs/4540
ISSN: 1927-5307

4-TOTAL DIFFERENCE CORDIAL LABELING OF CORONA OF SNAKE GRAPHS WITH K_1

R. PONRAJ[1,*], S. YESU DOSS PHILIP[2,†], R. KALA[2]

[1]Department of Mathematics, Sri Paramakalyani College, Alwarkurichi-627412, Tamilnadu, India

[2]Department of Mathematics, Manonmaniam Sundarnar University, Abishekapatti, Tirunelveli, 627012, Tamilnadu, India

Abstract. Let G be a graph. Let $f : V(G) \to \{0,1,2,\ldots,k-1\}$ be a map where $k \in \mathbb{N}$ and $k > 1$. For each edge uv, assign the label $|f(u) - f(v)|$. f is called k-total difference cordial labeling of G if $\left|t_{df}(i) - t_{df}(j)\right| \leq 1$, $i, j \in \{0,1,2,\ldots,k-1\}$ where $t_{df}(x)$ denotes the total number of vertices and the edges labeled with x. A graph with admits a k-total difference cordial labeling is called k-total difference cordial graphs. In this paper we investigate the 4-total difference cordial labeling behaviour of corona of snake graphs with K_1.

Keywords: $T_n \odot K_1$; $Q_n \odot K_1$; $A(T_n \odot K_1)$.

2010 AMS Subject Classification: 05C78.

1. INTRODUCTION

All graphs in this paper are finite, simple and undirecte. The k-total difference cordial graph was introduced in [3]. In [3, 4], 3-total difference cordial labeling behaviour of path, complete graph, comb, armed crown, crown, wheel, star etc have been investigated . Also 4-total difference cordial labeling of path, star , bistar, comb, crown, $P_n \cup K_{1,n}$, $S(P_n \cup K_{1,n})$, $P_n \cup B_{n,n}$

*Corresponding author

†Research scholar, Register number 182240120910010

E-mail address: ponrajmaths@gmail.com

Received February 24, 2020

etc.,have been invetigated [5]. In this paper we investigate 4-total difference of cordial labeling of Corona of triangular snake and quadrilateral snake graphs with K_1.

2. PRELIMINARIES

Definition 2.1. Let G be a graph. Let $f : V(G) \to \{0,1,2,\dots,k-1\}$ be a function where $k \in \mathbb{N}$ and $k > 1$. For each edge uv, assign the label $|f(u)-f(v)|$. f is called k-total difference cordial labeling of G if $\left|t_{df}(i)-t_{df}(j)\right| \leq 1,\ i,j \in \{0,1,2,\dots,k-1\}$ where $t_{df}(x)$ denotes the total number of vertices and the edges labelled with x. A graph with a k-total difference cordial labeling is called k-total difference cordial graph.

Definition 2.2. The Triangular snake T_n is obtained from the path $P_n : u_1u_2\dots u_n$ with $V(T_n) = V(P_n) \cup \{v_i : 1 \leq i \leq n-1\}$ and $E(T_n) = E(P_n) \cup \{u_iv_i, u_iv_{i+1} : 1 \leq i \leq n-1\}$.

Definition 2.3. The Quadrilateral snake Q_n is obtained from the path $P_n : u_1u_2\dots u_n$ with $V(Q_n) = V(P_n) \cup \{v_i, w_i : 1 \leq i \leq n-1\}$ and $E(Q_n) = E(P_n) \cup \{u_iv_i, u_{i+1}w_i : 1 \leq i \leq n-1\}$.

Definition 2.4. The The Alternate triangular snake of $A(T_n)$ is obtained from the path P_n : $u_1u_2\dots u_n$ by joining u_i and u_{i+1} (alternatively) to the vertex v_i. That is every alternate edge of a path is replaced by C_3.

Definition 2.5. Let G_1, G_2 respectively be p_1, q_1, p_2, q_2 graphs. The corona of G_1 with $G_2, G_1 \odot G_2$ is the graph is obtained by taking one copy of G_1 and p_1 copies of G_2 and joining the i^{th} vertex of G_1 with an edge to every vertex in the i^{th} copy of G_2.

3. MAIN RESULTS

Theorem 3.1. The corona of triangular snake T_n with K_1, $T_n \odot K_1$ is 4-total difference cordial.

Proof. Take the vertex set and edge set of T_n as in definition 2.1. Let $x_i(1 \leq i \leq n-1)$ be the pendent vertices adjacent to $u_i(1 \leq i \leq n-1)$ and $y_i(1 \leq i \leq n)$ be the pendent vertices adjacent to $u_i(1 \leq i \leq n-1)$. Clearly $|V(T_n)|+|E(T_n)| = 9n-6$.

Case 1. $n > 3$. Fix the labels $1,1,3,3,3,3,3,1,1$ and 1 to the vertices x_1, x_2, v_1, v_2, u_1, u_2, u_3, y_1, y_2 and y_3. Next assign the label 3 to the all path vertices $u_1u_2\dots u_n$. Next assign the labels $1,2,1$ and 3 to the vertices v_3, v_4, v_5 and v_6 . Similarly assign the labels $1,2,1$ and 3 to the next four vertices v_7, v_8, v_9 and v_{10}. Continue in this pattern until we reach the vertex v_{n-1}. Clearly the vertex v_{n-1} receive the label 1 when $n \equiv 1,3 \pmod 4$ and 2 or 3 according as $n \equiv 0 \pmod 4$ or $n \equiv 2 \pmod 3$.

Next assign the labels $2,3,2$ and 1 to the vertices x_3, x_4, x_5 and x_6. Assign the labels $2,3,2$ and 1 to the next four vertices x_7, x_8, x_9 and x_{10}. Proceeding in this way until we reach the vertex x_{n-1}. Clearly the vertex x_{n-1} receive the label 2 when $n \equiv 1,3 \pmod 4$ and 3 or 1 according as $n \equiv 0 \pmod 4$ or $n \equiv 2 \pmod 3$.

Next assign the labels $1,3,3$ and 3 to the vertices y_3, y_4, y_5 and y_6 . Assign the labels $1,3,3$ and 3 to the next four vertices y_7, y_8, y_9 and y_{10}. Proceeding like this until we reach the vertex y_n. Clearly the vertex y_n receive the label 3 or 1 when $n \equiv 0,1,2 \pmod 4$ or $n \equiv 3 \pmod 4$.

Case 2. $n \leq 3$.

Table 1 gives a 4-total difference cordial labeling for this case.

n	u_1	u_2	u_3	v_1	v_2	x_1	x_2	y_1	y_2	y_3
2	3	3		3		1		1	1	
2	3	3	3	3	3	1	1	1	1	1

TABLE 1

The table 2 shows that this vertex labeling is a 4-total difference cordial labeling.

Values of n	$t_{df}(0)$	$t_{df}(1)$	$t_{df}(2)$	$t_{df}(3)$
$n \equiv 0 \pmod 4$	$\frac{9n-4}{4}$	$\frac{9n-8}{4}$	$\frac{9n-4}{4}$	$\frac{9n-8}{4}$
$n \equiv 1 \pmod 4$	$\frac{9n-5}{4}$	$\frac{9n-5}{4}$	$\frac{9n-9}{4}$	$\frac{9n-5}{4}$
$n \equiv 2 \pmod 4$	$\frac{9n-6}{4}$	$\frac{9n-6}{4}$	$\frac{9n-6}{4}$	$\frac{9n-6}{4}$
$n \equiv 3 \pmod 4$	$\frac{9n-7}{3}$	$\frac{9n-7}{4}$	$\frac{9n-7}{4}$	$\frac{9n-7}{4}$

TABLE 2

□

Example 3.1. A 4-total difference cordial labeling of $T_6 \odot K_1$ is shown in Figure 1

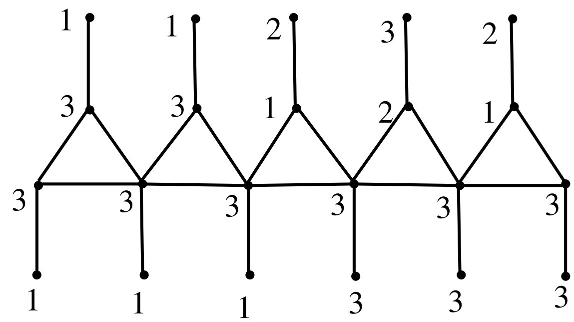

FIGURE 1

Theorem 3.2. The corona of quadrilateral snake Q_n with K_1, $Q_n \odot K_1$ is 4-total difference cordial.

Proof. Take the vertex set and edge set of Q_n as in definition 2.2. Let x_i be the pendent vertices adjacent to v_i and z_i be the pendent vertices adjacent to $w_i (1 \leq i \leq n-1)$. Let $y_i (1 \leq i \leq n)$ be the pendent vertices adjacent to $u_i (1 \leq i \leq n)$. It is easy to verify that $|V(Q_n)| + |E(Q_n)| = 13n - 10$.

Assign the label 3 to the all the path vertices $u_1 u_2 \dots u_n$. Next assign the labels $3, 3, 1$ and 1 to the vertices v_1, v_2, v_3 and v_4. Assign the labels $3, 3, 1$ and 1 to the vertices v_5, v_6, v_7 and v_8. Continue in this pattern until we reach the vertex v_{n-1}. Clearly the vertex v_{n-1} receive the label 3 or 1 according as $n \equiv 1, 2 \pmod 4$ or $n \equiv 0, 3 \pmod 4$.

We now consider the vertices w_i. Assign the labels $3, 3, 1$ and 2 to the vertices w_1, w_2, w_3 and w_4. Next assign the labels $3, 3, 1$ and 2 to the vertices w_5, w_6, w_7 and w_8. Proceeding like this until we reach the vertex w_{n-1}. Clearly the vertex w_{n-1} receive the label 3 when $n \equiv 1, 2 \pmod 4$ and 1 or 2 when $n \equiv 0, 3 \pmod 4$.

Now we consider the vertices x_i. Assign the labels $1, 1, 2$ and 3 to the vertices x_1, x_2, x_3 and x_4. Next assign the labels $1, 1, 2$ and 3 to the vertices x_5, x_6, x_7 and x_8. Proceeding like this until we reach the vertex x_{n-1}. Clearly the vertex x_{n-1} receive the label 1 when $n \equiv 1, 2 \pmod 4$ and 2 or 3 when $n \equiv 3, 0 \pmod 4$.

We now move to the vertices z_i. Assign the labels $1, 1, 3$ and 3 to the vertices z_1, z_2, z_3 and z_4. Next assign the labels $1, 1, 3$ and 3 to the vertices z_5, z_6, z_7 and z_8. Proceeding like this until we reach the vertex z_{n-1}. Clearly the vertex z_{n-1} receive the labels 1 or 3 according as $n \equiv 1,2 \pmod 4$ or $n \equiv 3,0 \pmod 4$.

Next we move to the pendent vertices of path. Fix the label 1 to the vertex y_i. Assign the labels $1,1,3$ and 3 to the vertices y_2, y_3, y_4 and y_5. Next assign the labels $1,1,3$ and 3 to the vertices y_6, y_7, y_8 and y_9. Proceeding like this until we reach the vertex y_n. Clearly the vertex y_n receive the label 1 or 3 according as $n \equiv 2,3 \pmod 4$ or $n \equiv 0,1 \pmod 4$.
The table 3 shows that this vertex labeling is a 4-total difference cordial labeling.

□

Values of n	$t_{df}(0)$	$t_{df}(1)$	$t_{df}(2)$	$t_{df}(3)$
$n \equiv 0 \pmod 4$	$\frac{13n-8}{4}$	$\frac{13n-12}{4}$	$\frac{13n-8}{4}$	$\frac{13n-12}{4}$
$n \equiv 1 \pmod 4$	$\frac{13n-13}{4}$	$\frac{13n-9}{4}$	$\frac{13n-9}{4}$	$\frac{13n-9}{4}$
$n \equiv 2 \pmod 4$	$\frac{13n-10}{4}$	$\frac{13n-10}{4}$	$\frac{13n-10}{4}$	$\frac{13n-10}{4}$
$n \equiv 3 \pmod 4$	$\frac{13n-7}{3}$	$\frac{13n-11}{4}$	$\frac{13n-11}{4}$	$\frac{13n-11}{4}$

TABLE 3

Example 3.2. A 4-total difference cordial labeling of $Q_5 \odot K_1$ is shown in Figure 2

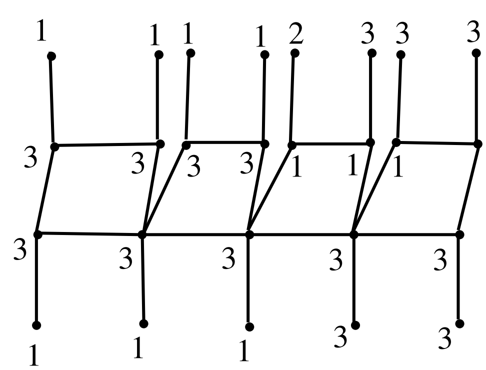

FIGURE 2

Theorem 3.3. The corona of alternate triangular snake $A(T_n)$ with K_1, $A(T_n) \odot K_1$ is 4-total difference cordial.

Proof. Take the vertex set and edge set of $A(T_n)$ as in definition 2.3.

Case 1. The edge u_1u_2 lies in a triangle and the edge $u_{n-1}u_n$ lies in a triangle.

Let $x_i(1 \le i \le n-1)$ be the pendent vertices adjacent to $v_i(1 \le i \le n-1)$ and $y_i(1 \le i \le n)$ be the pendent vertices adjacent to $u_i 1 \le i \le n-1$. Clearly n is even. In this case $|V(A(T_n)) \odot K_1| + |E(A(T_n))| = \frac{13n-2}{2}$.

Assign the label 3 to the path vertices $u_1u_2 \ldots u_n$. Next fix the label 3 and 3 to the vertices v_1 and v_2. Fix the label 1 to the vertices x_1, x_2, y_1 and y_2. Next assign the labels $2,3,2$ and 1 to the vertices x_3, x_4, x_5 and x_6. Assign the labels $2,3,2$ and 1 to the next four vertices x_7, x_8, x_9 and x_{10}. Continue in this pattern until we reach the vertex $x_{\frac{n}{2}}$. Clearly the vertex $x_{\frac{n}{2}}$ receive the label 2 when $n \equiv 1,3 \pmod 4$ and 3 or 1 according as $n \equiv 0 \pmod 4$ or $n \equiv 2 \pmod 3$.

We now consider the vertices v_i. Assign the labels $1,2,1$ and 3 to the vertices v_3, v_4, v_5 and v_6 . Similarly assign the labels $1,2,1$ and 3 to the next four vertices v_7, v_8, v_9 and v_{10}. Continue in this pattern until we reach the vertex $v_{\frac{n}{2}}$. Clearly the vertex $v_{\frac{n}{2}}$ receive the label 1 when $n \equiv 1,3 \pmod 4$ and 2 or 3 according as $n \equiv 2 \pmod 4$ or $n \equiv 0 \pmod 3$.

Consider the vertices y_i. Assign the labels $1,1,1,3,1,3,1$ and 3 to the vertices $y_3, y_4, y_5, y_6, y_7, y_8, y_9$ and y_{10}. Next assign the labels $1,1,1,3,1,3,1$ and 3 to the vertices $y_{11}, y_{12}, y_{13}, y_{14}, y_{15}, y_{16}, y_{17}$ and y_{18}. Continue in this pattern until we reach the vertex y_n. Clearly the vertex y_n receive the label 1 or 3 according as $n \equiv 1,3,4,5,7 \pmod 8$ or $n \equiv 0,2,6 \pmod 4$.

The table 4 shows that this vertex labeling is a 4-total difference cordial labeling.

Values of n	$t_{df}(0)$	$t_{df}(1)$	$t_{df}(2)$	$t_{df}(3)$
$n \equiv 0 \pmod 8$	$\frac{13n}{8}$	$\frac{13n}{8}$	$\frac{13n-8}{8}$	$\frac{13n}{8}$
$n \equiv 2 \pmod 8$	$\frac{13n-2}{8}$	$\frac{13n-2}{8}$	$\frac{13n-2}{8}$	$\frac{13n-2}{8}$
$n \equiv 4 \pmod 8$	$\frac{13n+4}{8}$	$\frac{13n-4}{8}$	$\frac{13n-4}{8}$	$\frac{13n-4}{8}$
$n \equiv 6 \pmod 8$	$\frac{13n+2}{8}$	$\frac{13n-6}{8}$	$\frac{13n+2}{8}$	$\frac{13n-6}{8}$

TABLE 4

Case 2. The edge u_1u_2 lies in a triangle and the edge $u_{n-2}u_{n-1}$ lies in a triangle.In this case n is odd.

Clearly removal of the edge $u_{n-1}u_n$ is the graph as in case(i). Assign the label to the vertices $u_i(1 \leq i \leq n-1)$ and $v_i(1 \leq i \leq \frac{n-1}{2})$ as in case (i). Finally assign the labels 3 and 1 respect to the vertices u_n and v_n.

The table 5 shows that this vertex labeling is a 4-total difference cordial labeling.

Values of n	$t_{df}(0)$	$t_{df}(1)$	$t_{df}(2)$	$t_{df}(3)$
$n \equiv 1 \pmod 8$	$\frac{13n-5}{8}$	$\frac{13n-5}{8}$	$\frac{13n-13}{8}$	$\frac{13n-5}{8}$
$n \equiv 3 \pmod 8$	$\frac{13n-7}{8}$	$\frac{13n-7}{8}$	$\frac{13n-7}{8}$	$\frac{13n-7}{8}$
$n \equiv 5 \pmod 8$	$\frac{13n-9}{8}$	$\frac{13n-17}{8}$	$\frac{13n-17}{8}$	$\frac{13n-17}{8}$
$n \equiv 7 \pmod 8$	$\frac{13n-11}{8}$	$\frac{13n-19}{8}$	$\frac{13n-11}{8}$	$\frac{13n-19}{8}$

TABLE 5

Case 3. The edge u_2u_3 lies in a triangle and the edge $u_{n-2}u_{n-1}$ lies in a triangle.

Obviously removal of the edge u_1u_2 as in case(ii). Assign the label to the vertices $u_i(2 \leq i \leq n)$ and $v_i(2 \leq i \leq \frac{n-2}{2})$ as in case (i). Next assign the labels 3 and 1 respect to the vertices u_1 and v_1.

The table 6 shows that this vertex labeling is a 4-total difference cordial labeling.

□

Values of n	$t_{df}(0)$	$t_{df}(1)$	$t_{df}(2)$	$t_{df}(3)$
$n \equiv 0 \pmod 8$	$\frac{13n-8}{8}$	$\frac{13n-16}{8}$	$\frac{13n-8}{8}$	$\frac{13n-16}{8}$
$n \equiv 2 \pmod 8$	$\frac{13n-10}{8}$	$\frac{13n-10}{8}$	$\frac{13n-18}{8}$	$\frac{13n-10}{8}$
$n \equiv 4 \pmod 8$	$\frac{13n-12}{8}$	$\frac{13n-12}{8}$	$\frac{13n-12}{8}$	$\frac{13-12}{8}$
$n \equiv 6 \pmod 8$	$\frac{13n-6}{8}$	$\frac{13n-14}{8}$	$\frac{13n-14}{8}$	$\frac{13n-14}{8}$

TABLE 6

Theorem 3.4. The corona of alternate quadrilateral snake $A(Q_n)$ with K_1, $A(Q_n) \odot K_1$ is 4-total difference cordial.

Proof. Take the vertex set and edge set of $A(Q_n)$ as in definition 2.3.
Case 1. The edge u_1u_2 lies in a Quadrilateral and the edge $u_{n-1}u_n$ lies in a Quadrilateral.
Let $x_i(1 \leq i \leq n)$ be the pendent vertices adjacent to $v_i(1 \leq i \leq n)$ and $z_i(1 \leq i \leq \frac{n}{2})$ be the pendent vertices adjacent to $w_i(1 \leq i \leq n)$ and $y_i(1 \leq i \leq n)$ be the pendent vertices adjacent to $u_i 1 \leq i \leq n$. Clearly n is even. In this case $|V(A(Q_n)) \odot K_1| + |E(A(Q_n))| = \frac{17n-11}{2}$.

Assign the label 3 to the path vertices $u_1u_2 \ldots u_n$. Next fix the label 3 to the vertices v_1 and w_1. Fix the label 1 to the vertices x_1, z_1 and $y_i(1 \leq i \leq n)$. Next assign the labels $1, 3, 3$ and 3 to the vertices x_2, x_3, x_4 and x_5. Assign the labels $1, 3, 3$ and 3 to the next four vertices x_6, x_7, x_8 and x_9. Continue in this pattern until we reach the vertex $x_{\frac{n}{2}}$. Clearly the vertex $x_{\frac{n}{2}}$ receive the label 1 when $n \equiv 2 \pmod 4$ and 3 when $n \equiv 0, 1, 3 \pmod 4$.

We now consider the vertices $z_i(1 \leq i \leq \frac{n}{2})$. Assign the labels $1, 2, 3$ and 2 to the vertices z_2, z_3, z_4 and z_5 . Similarly assign the labels $1, 2, 3$ and 2 to the next four vertices z_6, z_7, z_8 and z_9. Continue in this pattern until we reach the vertex $z_{\frac{n}{2}}$. Clearly the vertex $z_{\frac{n}{2}}$ receive the label 2 when $n \equiv 1, 3 \pmod 4$ and 1 or 3 according as $n \equiv 0, 2 \pmod 4$.

Consider the vertices $v_i(1 \leq i \leq \frac{n}{2})$. Assign the label 3 to the vertices $v_1, v_2, v_{\frac{n}{2}}$. Next assign the labels $3, 1, 2$ and 1 to the vertices w_2, w_3, w_4 and w_5. Assign the labels $3, 1, 2$ and 1 to the next four vertices w_6, w_7, w_8 and w_9. Continue in this way until we reach the vertex $w_{\frac{n}{2}}$. Clearly the vertex $w_{\frac{n}{2}}$ receive the label 1 when $n \equiv 1, 3 \pmod 4$ and 3 or 2 when $n \equiv 0, 2 \pmod 4$.

The table 7 shows that this vertex labeling is a 4-total difference cordial labeling.

Case 2. The edge u_1u_2 lies in a quadrilateral and the edge $u_{n-2}u_{n-1}$ lies in a quadrilateral. In this case n is odd.
Clearly removal of the edge $u_{n-1}u_n$ is the graph as in case(i). Assign the label to the vertices

Values of n	$t_{df}(0)$	$t_{df}(1)$	$t_{df}(2)$	$t_{df}(3)$
$n \equiv 0 \pmod 8$	$\frac{17n}{8}$	$\frac{17n}{8}$	$\frac{17n-8}{8}$	$\frac{17n}{8}$
$n \equiv 2 \pmod 8$	$\frac{17n-2}{8}$	$\frac{17n-2}{8}$	$\frac{17n-2}{8}$	$\frac{17n-2}{8}$
$n \equiv 4 \pmod 8$	$\frac{17n+4}{8}$	$\frac{17n-4}{8}$	$\frac{17n-4}{8}$	$\frac{17n-4}{8}$
$n \equiv 6 \pmod 8$	$\frac{17n+2}{8}$	$\frac{17n-6}{8}$	$\frac{17n+2}{8}$	$\frac{17n-6}{8}$

TABLE 7

$u_i(1 \leq i \leq n-1)$ and $v_i(1 \leq i \leq \frac{n}{2})$ and $w_i(1 \leq i \leq \frac{n}{2})$ as in case (i). Finally assign the labels 3 and 1 respect to the vertices u_n and $v_{\frac{n}{2}}$.

The table 8 shows that this vertex labeling is a 4-total difference cordial labeling.

Values of n	$t_{df}(0)$	$t_{df}(1)$	$t_{df}(2)$	$t_{df}(3)$
$n \equiv 1 \pmod 8$	$\frac{17n-9}{8}$	$\frac{17n-9}{8}$	$\frac{17n-17}{8}$	$\frac{17n-9}{8}$
$n \equiv 3 \pmod 8$	$\frac{17n-11}{8}$	$\frac{17n-11}{8}$	$\frac{17n-11}{8}$	$\frac{17n-11}{8}$
$n \equiv 5 \pmod 8$	$\frac{17n-5}{8}$	$\frac{17n-13}{8}$	$\frac{17n-13}{8}$	$\frac{17n-13}{8}$
$n \equiv 7 \pmod 8$	$\frac{17n-7}{8}$	$\frac{17n-15}{8}$	$\frac{17n-7}{8}$	$\frac{17n-15}{8}$

TABLE 8

Case 3. The edge u_2u_3 lies in a Quadrilatral and the edge $u_{n-2}u_{n-1}$ lies in a Quadrilatral. Obviously removal of the edge u_1u_2 as in case(ii). Assign the label to the vertices $u_i(2 \leq i \leq n)$ and $v_i(2 \leq i \leq n-1)$ and $w_i(1 \leq i \leq \frac{n}{2})$ as in case (i). Next assign the labels 3 and 1 respect to the vertices u_1 and v_1.

The table 9 shows that this vertex labeling is a 4-total difference cordial labeling.

□

Values of n	$t_{df}(0)$	$t_{df}(1)$	$t_{df}(2)$	$t_{df}(3)$
$n \equiv 0 \pmod 8$	$\frac{17n-32}{8}$	$\frac{17n-40}{8}$	$\frac{17n-32}{8}$	$\frac{17n-40}{8}$
$n \equiv 2 \pmod 8$	$\frac{17n-34}{8}$	$\frac{17n-34}{8}$	$\frac{17n-42}{8}$	$\frac{17n-34}{8}$
$n \equiv 4 \pmod 8$	$\frac{17n-20}{8}$	$\frac{17n-20}{8}$	$\frac{17n-20}{8}$	$\frac{17n-20}{8}$
$n \equiv 6 \pmod 8$	$\frac{17n-30}{8}$	$\frac{17n-38}{8}$	$\frac{17n-38}{8}$	$\frac{17n-38}{8}$

TABLE 9

CONFLICT OF INTERESTS

The author(s) declare that there is no conflict of interests.

REFERENCES

[1] J.A. Gallian, A Dynamic survey of graph labeling, Electron. J. Comb. 19 (2017), #Ds6.

[2] F. Harary, Graph theory, Addision wesley, New Delhi, 1969.

[3] R. Ponraj, S. Yesu Doss Philip and R. Kala, *k*-total difference cordial graphs, J. Algorithms Combut. 51(2019), 121-128.

[4] R. Ponraj, S. Yesu Doss Philip and R. Kala, 3-total difference cordial graphs, Glob. Eng. Sci. Res. 6 (2019), 46-51.

[5] R. Ponraj, S. Yesu Doss Philip and R. Kala, Some families of 4-total difference cordial graphs J. Math. Comput. Sci. 10 (2020), 150-156.