# ABSTRAK

**Ayu Kristianna, 2013. *Pelabelan Total Ajaib Sisi Kuat pada Graf Sikel dengan Tambahan $n$ Anting untuk $n \geq 3$ dan $n$ Ganjil*. Program Studi Pendidikan Matematika, Jurusan Pendidikan Matematika dan Ilmu Pengetahuan Alam, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Sanata Dharma, Yogyakarta.**

Penelitian ini menyelidiki pelabelan total ajaib sisi kuat pada graf sikel dengan tambahan $n$ anting untuk $n \geq 3$ dan $n$ ganjil. Tujuan dari penelitian ini adalah meninjau apakah graf sikel dengan tambahan $n$ anting untuk $n \geq 3$ dan $n$ ganjil memenuhi pelabelan total ajaib sisi kuat, menentukan nilai konstanta ajaib yang terbentuk, serta menentukan nilai label untuk masing-masing titik dan sisi. Penelitian ini mengkaji beberapa buku, jurnal, dan hasil penelitian sebelumnya untuk mendapatkan teori-teori yang mendukung.

Hasil penelitian ini menunjukkan bahwa pelabelan total ajaib sisi kuat berlaku pada graf sikel dengan tambahan $n$ anting untuk $n \geq 3$ dan $n$ ganjil dengan nilai konstanta ajaib $c$ terletak pada interval $\frac{9n+3}{2} \leq c \leq \frac{11n+3}{2}$. Nilai label titik dan sisi untuk pelabelan total ajaib sisi kuat pada graf sikel dengan tambahan $n$ anting, $n \geq 3$ dan $n$ ganjil untuk $c = \frac{9n+3}{2}$ dan $c = \frac{11n+3}{2}$ adalah sebagai berikut:

a. Untuk $c = \frac{9n+3}{2}$

1) $n = 2k + 1, k = 1, 3, 5, \ldots,$

$$w(v_i) = \begin{cases} \dfrac{i+1}{2} & i = 1, 3, 5, \ldots, n \\ \dfrac{n+i+1}{2} & i = 2, 4, 6, \ldots, n-1 \end{cases}$$

$$w(v_{n+i}) = \begin{cases} \dfrac{3n+i+2}{2} & i = 1, 3, 5, \ldots, n-2 \\ \dfrac{2(n+1)+i}{2} & i = 2, 4, 6, \ldots, n-1 \\ n+1 & i = n \end{cases}$$

$$w(e_{i,i+1}) = 4n - i \qquad i = 1, 2, 3, \dots, n-1$$
$$w(e_{1,i}) = 4n \qquad i = n$$
$$w(e_{i,n+i}) = \begin{cases} 3n - i & i = 1, 2, 3, \dots, n-1 \\ 3n & i = n \end{cases}$$

2) $n = 2k + 1, k = 2, 4, 6, \dots,$

$$w(v_i) = \begin{cases} \dfrac{i+1}{2} & i = 1, 3, 5, \dots, n \\ \dfrac{n+1+i}{2} & i = 2, 4, 6, \dots, n-1 \end{cases}$$
$$w(v_{n+i}) = 2n - i + 1 \qquad i = 1, 2, 3, \dots, n$$
$$w(e_{i,i+1}) = 4n - i \qquad i = 1, 2, 3, \dots, n-1$$
$$w(e_{1,i}) = 4n \qquad i = n$$
$$w(e_{i,n+i}) = \begin{cases} \dfrac{5n+i}{2} & i = 1, 3, 5, \dots, n \\ \dfrac{4n+i}{2} & i = 2, 4, 6, \dots, n-1 \end{cases}$$

b. Untuk $c = \frac{11n+3}{2}$

$$w(v_i) = \begin{cases} \dfrac{2n+i+1}{2} & i = 1, 3, 5, \dots, n \\ \dfrac{3n+i+1}{2} & i = 2, 4, 6, \dots, n-1 \end{cases}$$
$$w(v_{n+i}) = \begin{cases} n - i & i = 1, 2, 3, \dots, n-1 \\ n & i = n \end{cases}$$
$$w(e_{i,i+1}) = 3n - i \qquad i = 1, 2, 3, \dots, n-1$$
$$w(e_{1,i}) = 3n \qquad i = n$$
$$w(e_{i,n+i}) = \begin{cases} \dfrac{7n+i+2}{2} & i = 1, 3, 5, \dots, n-2 \\ \dfrac{6n+i+2}{2} & i = 2, 4, 6, \dots, n-1 \\ 3n+1 & i = n \end{cases}$$

Kata Kunci : graf, pelabelan graf, graf sikel dengan tambahan $n$ anting, pelabelan total ajaib sisi kuat

## ABSTRACT

**Ayu Kristianna, 2013. *Strong Edge Magic Total Labeling on The Cycle Graph with $n$ Extra Arms for $n \geq 3$ and $n$ is Odd*. Mathematics Education Study Program. Mathematics and Science Education Department, Faculty of Teachers Training and Education, Sanata Dharma University, Yogyakarta.**

This research observed the strong edge magic total labeling on the cycle graph with $n$ extra arms for $n \geq 3$ and $n$ is odd. The purpose of this research is to observe whether the cycle graph with $n$ extra arms for $n \geq 3$ and $n$ is odd satisfy the strong edge magic total labeling, to observe the value of magic constant, and to find the labeling values for each vertex and edge. This research examined several books, journals, and the result of previous researches to obtain the supporting theories.

The result of this research show that the cycle graph with $n$ extra arms for $n \geq 3$ and $n$ is odd satisfy the strong edge magic total labeling with the value of magic constant $\frac{9n+3}{2} \leq c \leq \frac{11n+3}{2}$. The labeling values for each vertex and edge on the strong edge magic total labeling on the cycle graph with $n$ extra arms, $n \geq 3$ and $n$ is odd for $c = \frac{9n+3}{2}$ and $c = \frac{11n+3}{2}$ are shown as below:

a. For $c = \frac{9n+3}{2}$

1) $n = 2k + 1, k = 1, 3, 5, \ldots,$

$$w(v_i) = \begin{cases} \frac{i+1}{2} & i = 1, 3, 5, \ldots, n \\ \frac{n+i+1}{2} & i = 2, 4, 6, \ldots, n-1 \end{cases}$$

$$w(v_{n+i}) = \begin{cases} \frac{3n+i+2}{2} & i = 1, 3, 5, \ldots, n-2 \\ \frac{2(n+1)+i}{2} & i = 2, 4, 6, \ldots, n-1 \\ n+1 & i = n \end{cases}$$

$$w(e_{i,i+1}) = 4n - i \qquad i = 1, 2, 3, \ldots, n-1$$

$$w(e_{1,i}) = 4n \qquad i = n$$

$$w(e_{i,n+i}) = \begin{cases} 3n - i & i = 1, 2, 3, \dots, n-1 \\ 3n & i = n \end{cases}$$

2) $n = 2k + 1, k = 2, 4, 6, \dots,$

$$w(v_i) = \begin{cases} \dfrac{i+1}{2} & i = 1, 3, 5, \dots, n \\ \dfrac{n+1+i}{2} & i = 2, 4, 6, \dots, n-1 \end{cases}$$

$$w(v_{n+i}) = 2n - i + 1 \qquad i = 1, 2, 3, \dots, n$$

$$w(e_{i,i+1}) = 4n - i \qquad i = 1, 2, 3, \dots, n-1$$

$$w(e_{1,i}) = 4n \qquad i = n$$

$$w(e_{i,n+i}) = \begin{cases} \dfrac{5n+i}{2} & i = 1, 3, 5, \dots, n \\ \dfrac{4n+i}{2} & i = 2, 4, 6, \dots, n-1 \end{cases}$$

b. For $c = \frac{11n+3}{2}$

$$w(v_i) = \begin{cases} \dfrac{2n+i+1}{2} & i = 1, 3, 5, \dots, n \\ \dfrac{3n+i+1}{2} & i = 2, 4, 6, \dots, n-1 \end{cases}$$

$$w(v_{n+i}) = \begin{cases} n - i & i = 1, 2, 3, \dots, n-1 \\ n & i = n \end{cases}$$

$$w(e_{i,i+1}) = 3n - i \qquad i = 1, 2, 3, \dots, n-1$$

$$w(e_{1,i}) = 3n \qquad i = n$$

$$w(e_{i,n+i}) = \begin{cases} \dfrac{7n+i+2}{2} & i = 1, 3, 5, \dots, n-2 \\ \dfrac{6n+i+2}{2} & i = 2, 4, 6, \dots, n-1 \\ 3n+1 & i = n \end{cases}$$

Key words : graph, graph labeling, cycle graph with $n$ extra arms, strong edge magic total labeling