

# Classification of Generalized Petersen Graphs having Locating Chromatic Number Five

<sup>1</sup>Asmiati, <sup>2</sup>Lyra yulianti, <sup>1</sup>Aristoteles

<sup>1</sup>Mathematics Departement, Faculty of Mathematics and Natural Sciences,  
Lampung University, Indonesia

asmiasi308@yahoo.com, asmiati.1976@fmipa.unila.ac.id

<sup>2</sup>Andalas University, Kampus UNAND Limau Manis, Padang 25163, Indonesia

## Abstract

Let  $G$  be a connected graph and  $c$  be a proper coloring of  $G$ . For  $i = 1, 2, \dots, k$  define the color class  $C_i$  as the set of vertices receiving color  $i$ . The color code  $c_{\Pi}(v)$  of a vertex  $v$  in is the ordered  $k$ -tuple  $(d(v, C_1), \dots, d(v, C_k))$  where  $d(v, C_1)$  is the distance of  $v$  to  $C_i$ . If all distinct vertices of  $G$  have distinct color codes, then  $c$  is called a locating-coloring of  $G$ . The locating-chromatic number of graph  $G$ , denoted by  $\chi_L(G)$  is the smallest  $k$  such that  $G$  has a locating coloring with  $k$  colors. The generalized Petersen graph  $P(n, m)$ ,  $n \geq 3$  and  $1 \leq m \leq \lfloor (n-1)/2 \rfloor$ , consists of an outer  $n$ -cycle  $y_1, y_2, \dots, y_n$ , a set of  $n$  spokes  $y_i x_i$ ,  $1 \leq i \leq n$ , and  $n$  edges  $x_i x_{i+m}$ ,  $1 \leq i \leq n$ , with indices taken modulo  $n$ . In this paper, we determine classification of generalized Petersen graphs having locating chromatic number five.

**Keywords :** coloring, color code, locating-chromatic number, generalized Petersen graph.