*South East Asian J. of Mathematics and Mathematical Sciences*
*Vol. 21, No. 3 (2025), pp. 273-294*

DOI: 10.56827/SEAJMMS.2025.2103.17 **ISSN (Online): 2582-0850**

**ISSN (Print): 0972-7752**

# $L(3,2,1)$-LABELING OF SOME CYCLE RELATED GRAPHS

**C. M. Barasara and A. R. Oza**

Department of Mathematics,
Hemchandracharya North Gujarat University,
Patan - 384265, Gujarat, INDIA

E-mail : chirag.barasara@gmail.com, ashvin.r.oza@gmail.com

(**Received:** *May 05, 2025* **Accepted:** *Dec. 01, 2025* **Published:** *Dec. 30, 2025)*

**Abstract:** Let $G = (V(G), E(G))$ be a connected graph. For $i, j, k \in \mathbb{N}$ with $i \geq j \geq k$, $L(i,j,k)$-labeling of graph $G$ is an integer labeling of the vertices of graph $G$ such that labels of adjacent vertices differ by at least $i$, labels of vertices at distance two differ by at least $j$ and labels of vertices at distance three differ by at least $k$. In this paper, we discuss $L(3,2,1)$-labeling for crown, arm crown, tadpole, and closed helm graphs.

**Keywords and Phrases:** Graph Labeling, Cycle Graph, $L(3,2,1)$-labeling.

**2020 Mathematics Subject Classification:** 05C78.

## 1. Introduction

The main objective in the set-up of a wireless communication system is the assignment of channels to radio transmitters. A proper channel assignment to radio transmitters that satisfies interference constraints with minimum use of the spectrum is desirable. The inference between two channels is inversely proportional to the distance between transmitters. That is, in a network, if two transmitters are closer than the inference is higher between them. In this case, the channel assigned to these two transmitters must have a large separation to avoid inference. Also, if the distance between two transmitters is sufficiently large, the same channel can be assigned to both transmitters. Hale [9] studied this problem for the first time in 1980, and later it was modified by Roberts [14], which is called the channel assignment problem. Motivated by channel assignment, Griggs and Yeh [8] have