

## NEW VERSION OF PI INDEX AND EXAMINATION OF ITS PROPERTIES FOR GRAPHS

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### ABSTRACT

A topological index is a numeric quantity from the structural graph of a molecule. In this paper, some questions about most important topological index named "CO-PI" is included.

**Keywords:** Topological Index, Molecular Graphs, "CO-PI"

### INTRODUCTION

Let  $G$  be a simple molecular graph without directed and multiple edges and without loops; the vertex and edge-shapes of which are represented by  $V(G)$  and  $E(G)$ , respectively. The graph  $G$  is said to be connected if for every vertices  $x$  and  $y$  in  $V(G)$  there exists a path between  $x$  and  $y$ . In this paper, we only consider connected graphs. If  $e$  is an edge of  $G$  connecting the vertices  $u$  and  $v$ , then we write  $e = uv$  and the distance between a pair of vertices  $u$  and  $w$  of  $G$  is denoted by  $d(u, w)$ .

The Wiener index is the oldest topological index. Numerous of its chemical applications were reported and its mathematical properties are well understood. Khadikar (Khadikar *et al.*, 2000; 2001; 2002) defined a new topological index and named it Padmakar-Ivan (PI) index. This newly proposed topological index, does not coincide with the Wiener index ( $W$ ) for acyclic (trees) molecules. The derived PI index is very simple to calculate and has a discriminating power similar to that of the Wiener index.

Iranmanesh *et al.*, introduced the new index similar to the vertex version of PI index (Hasani *et al.*, 2010). This index is the vertex version of Co-PI index which is equal to:

$$Co - PI_v(G) = \sum_{e \in E(G)} |n_e(u) - n_e(v)|.$$

In this paper, some questions about CO-PI index of molecular graphs is included. Our notation is standard and is similar to khadikar's papers (Khadikar, 2002).

### RESULT AND DISCUSSION

In this section some questions about CO-PI index of molecular graph is included.

**Question1.** What is the relation between vertex PI index and CO-PI index of an arbitrary molecular graph  $G$ ?

**Question2.** Suppose that  $G$  is an arbitrary simple molecular graph. What is the relation or en-equality between CO-PI index and Edge PI index of  $G$ ?

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