

ON TOPOLOGICAL INDICES OF ROOTED PRODUCT OF GRAPHS

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Abstract. The reciprocal sum-connectivity index, sombor index, and reverse sombor index of a molecular graph G , defined over its vertex set $V(G)$ and edge set $E(G)$, exhibit interrelations through degree-based topological indices. This paper aims to derive the aforementioned topological indices for rooted product of path graph (P_n), cycle (C_n), complete graph (K_n), star graph (S_n), and complete bipartite graph ($K_{m,n}$) with star graph (S_m), denoted by, $P_n \circ S_m$, $C_n \circ S_m$, $K_n \circ S_m$, $S_n \circ S_m$, and $K_{m,n} \circ S_r$ respectively.

Keywords. Reciprocal sum-connectivity index, Sombor index, Reverse Sombor index, Rooted product.

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1 Introduction

In chemical graph theory, a molecular descriptor is a numerical value obtained by analysing the structures of chemical compounds. A topological descriptor (topological index) is one such molecular descriptor whose values are enumerated from the molecular graphs. A molecular graph is a topological representations of various chemical compounds whose atoms represents the vertices and the bonding (linkage of atoms) represents the edges. All the graphs considered here are undirected, loopless, connected molecular graphs. The values obtained from topological indices such as Harmonic index, PI index and Zagreb indices have shown a close relation to various physiochemical properties of compounds. This has also urged several researchers in the field of combinatorial chemistry to work on other degree-based topological indices, thus reducing the time and cost of conducting experiments [2].