

ON THE PRODUCT OF GEOMETRIC-ARITHMETIC, SOMBOR AND FIRST ZAGREB INDICES

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Abstract: Assume Ω is a connected and simple graph with edge set $E(\Omega)$ and vertex set $V(\Omega)$. In chemical graph theory, the Geometric-Arithmetic index, Sombor index, and first Zagreb index of graph are three well-defined and studied topological indices. In the present study, we introduce the new graph invariant, we call it as $GSM(\Omega)$ index, this new graph invariant is the product of Geometric-Arithmetic index, Sombor index, and first Zagreb index. Furthermore we discuss the effect on $GSM(\Omega)$ of inserting and deleting an edge into a graph Ω . In addition, we investigate the connections between the $GSM(G)$ index and various well-studied topological indices.

Keywords and Phrases: Topological indices, maximum and minimum degree, degree (of vertex).

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1. Introduction

Let $\Omega = (V, E)$ be a simple graph of order n size m , with vertex set $V(\Omega)$ and edge set $E(\Omega)$. The Δ and δ stand for the maximum and minimum degrees of Ω , respectively. The δ_1 represents the minimum non-pendent vertex degree of the graph Ω . Additionally, p stands for the number of pendent vertices in Ω . The degree $d_\Omega(j)$ of a vertex j is the number of vertices adjacent to $j \in V(\Omega)$. The