Non-Neighbor Harmonic Polynomial of Subdivision Graphs

A. Rizwana¹ and G. Jeyakumar²

Abstract

In the fields of chemical graph theory, molecular topology, and mathematical chemistry, a topological index also known as a connectivity index is a type of a molecular descriptor that is calculated based on the molecular graph of a chemical compound. Topological indices are numerical parameters of a graph which characterize its topology and are usually graph invariant. Computation of topological indices is a recent research problem in mathematical and computational chemistry. The non-neighbor harmonic index of a graph $G$ is defined as $\overline{H}(G) = \sum_{uv \in E(G)} \left( \frac{2}{d(u) + d(v)} \right)$ where $\overline{d}(v) = n - 1 - d(v)$ denotes the number of non-neighbors of a vertex $v$ in $G$. We define the non-neighbor harmonic polynomial of a graph $G$ as $H(G, x) = \sum_{uv \in E(G)} (2x^{d(u)/2 + d(v)/2 - 1})$ where $\int_0^1 H(G, x) \, dx = \overline{H}(G)$. In the paper we compute the non-neighbor harmonic polynomial of subdivision graphs.

Keywords: Subdivision Graphs, Non-neighbors, Non-neighbor Harmonic Index, Non-neighbor Harmonic Polynomial.

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¹ Research Scholar, Part-time (Internal), Reg. No. 11826, Department of Mathematics, St. John’s College, Palayamkottai, Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India - 627 012.
² Research Supervisor, Associate Professor and Head, Department of Mathematics, St. John’s College, Palayamkottai, Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India - 627 012.