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*Research Article*

# Various Uses of Topological Invariants in Jahangir Graph $J_{\beta,\alpha}$

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Topological indices are analytical indicators of a graph's topology. Graph theory has diverse applications in chemistry and conducts research on molecular structures, and its popularity has steadily increased since then. Many physicochemical attributes of a molecular substance can be identified using topological indices. Topological indices based on these chemical molecular structures can assist researchers in better understanding the physical properties, chemical reactivity, and biological activity. It is a way to fulfill the lack of experiments and give a theoretical basis for the manufacture of many chemical products. The objective of this research is to discuss bidistance degree-based topological invariants in the Jahangir graph.

## 1. Introduction

Chemical graph theory is a field of mathematical chemistry that uses graph theory to model chemical events numerically. In the computational and theoretical aspects of chemistry, topological indices play a critical role in estimating mechanical characteristics [1–7]. In chemistry, a lot of algebraic polynomials are helpful [8, 9]. Graph theory analyses the different properties of graphs [10]. The topological indices in graphs exhibit the graphical structure as well as a variety of other aspects. They frequently rely on the distances between the vertices, the degrees of the vertices, or the network portrayed by a matrix. Many networks' topological indices are crucial in computer-aided modeling, mathematical chemistry, and medicinal research.

Weiner [11] effectively brought the theory of topological indices based on graph distance in chemistry in 1947. To correlate aspects of aromatic aldehydes with the geometries of their molecular graphs, he proposed a distance-based topological index known as the wiener index.

Weiner was the first to provide a topological index assessment for graph $G$ in 1947 [12, 13]. He created the first index, the Weiner index, and since then, many further indices have been discovered. Few of them are discussed in the investigation of physicochemical properties of various substances in G. A-index demonstrates a high degree of predictability [14]. Kulli invented the K-Banhatti and K-hyper-Banhatti indices in 2016 [15]. In 2017, Kulli proposed new further topological indices, the modified K-Banhatti index and the harmonic K-Banhatti index [16]. The Banhatti indices are to some extent inspired by the Zagreb indices given by Gutman in 1972.

Baig et al. examine Revan and hyper-Revan indices for octahedral networks [17], [18]. Recently, Zhao et al. discussed the B-indices, R-index, and hyper-R-index for the very important structure of silicon carbide isomer [19]. As hydrocarbons are the main part of organic chemistry, Kulli et al. studied the multiplicative version of these indices in chemistry [20]. Revan polynomials are also introduced to get more information about the molecular structure of benzene [21]. Due to great importance of the Revan index, different