Some topological indices of banana tree graphs

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A molecular graph is a simple graph whose vertices correspond to the atoms and the edges correspond to the bonds of some molecule. Chemical graph theory is a branch of mathematical chemistry that plays a vital role in the development of the chemical sciences. A topological index is a numerical value associated with chemical structures or a molecule that describes the relationship between a chemical structure and its various physical properties or biological activities. Topological indices of various types of graphs have been studied in the literature. In this study, we focus on Banana tree graphs. Banana tree graph $B(n, k)$ is the graph obtained by connecting one leaf of each of n copies of a k star graph with a single root vertex that is distinct from all the stars. Banana tree graphs were studied from different perspectives. Some degree-based topological indices of Banana tree graphs and their line graph was studied in the literature. Chromatic number, graph labeling methods such as graceful labeling, Harmonious, residual closeness domination set, and domination number of Banana trees were also discussed in the literature. M. Ghorbani, and M. A. Hosseinzadeh introduced an updated version of Zagreb indices using eccentricity. In this study, we derived formulas for the topological indices such as the Modified Zagreb index, Atomic Bond connectivity, Geometric Arithmetic index, Randić index, Fourth geometric arithmetic index, Fifth geometric arithmetic index, Sanskruti index, and the new version of Zagreb indices for $B(n, k)$.

Keywords: Banana Tree Graph, Topological indices, Zagreb index, Fifth Geometric Arithmetic index

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