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Bounds on the Laplacian Vertex PI Energy

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Abstract : A topological index is a number related to graph which is invariant under graph isomorphism. In theoretical chemistry, molecular structure descriptors (also called topological indices) are used for modeling physicochemical, pharmacologic, toxicologic, biological and other properties of chemical compounds. Let G be a graph with n vertices and m edges. For a given edge uv, the quantity nu(e) denotes the number of vertices closer to u than v, the quantity nv(e) is defined analogously. The vertex PI index defined as the sum of the nu(e) and nv(e). Here the sum is taken over all edges of G. The energy of a graph is defined as the sum of the eigenvalues of adjacency matrix of G and the Laplacian energy of a graph is defined as the sum of the absolute value of difference of laplacian eigenvalues and average degree of G. In theoretical chemistry, the π-electron energy of a conjugated carbon molecule, computed using the Hückel theory, coincides with the energy. Hence results on graph energy assume special significance. The Laplacian matrix of a graph G weighted by the vertex PI weighting is the Laplacian vertex PI matrix and the Laplacian vertex PI eigenvalues of a connected graph G are the eigenvalues of its Laplacian vertex PI matrix. In this study, Laplacian vertex PI energy of a graph is defined of G. We also give some bounds for the Laplacian vertex PI energy of graphs in terms of vertex PI index, the sum of the squares of entries in the Laplacian vertex PI matrix and the absolute value of the determinant of the Laplacian vertex PI matrix.

Keywords : energy, Laplacian energy, laplacian vertex PI eigenvalues, Laplacian vertex PI energy, vertex PI index
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