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DISTANCE SPECTRAL RADIUS OF TREES WITH FIXED MAXIMUM DEGREE*

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Abstract. Distance energy is a newly introduced molecular graph-based analog of the total π-electron energy, and it is defined as the sum of the absolute eigenvalues of the molecular distance matrix. For trees and unicyclic graphs, distance energy is equal to the doubled value of the distance spectral radius. In this paper, we introduce a general transformation that increases the distance spectral radius and provide an alternative proof that the path P_n has the maximal distance spectral radius among trees on n vertices. Among the trees with a fixed maximum degree Δ, we prove that the broom $B_{n,\Delta}$ (consisting of a star $S_{\Delta+1}$ and a path of length $n-\Delta-1$ attached to an arbitrary pendent vertex of the star) is the unique tree that maximizes the distance spectral radius, and conjecture the structure of a tree which minimizes the distance spectral radius. As a first step towards this conjecture, we characterize the starlike trees with the minimum distance spectral radius.

Key words. Distance matrix, Distance spectral radius, Broom graph, Maximum degree.

AMS subject classifications. 05C05, 05C12.

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