Spectra and Randić Spectra of Caterpillar Graphs and Applications to the Energy

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Abstract

Let H be an undirected simple graph with vertices $v_1, \ldots, v_k$ and $G_1, \ldots, G_k$ be a sequence formed with k disjoint graphs G_i, $i = 1, \ldots, k$. The H-generalized composition (or H-join) of this sequence is denoted by $H[G_1, \ldots, G_k]$. In this work, we characterize the caterpillar graphs as a H-generalized composition and we study their spectra and Randić spectra, respectively. As an application, we obtain an improved and tight upper bound for the Energy and the Randić energy of these interesting trees.