Randic and normalized Laplacian spectra of graphs obtained by a generalization of the join graph operation and applications

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Abstract

Let H be a graph on $1, 2, ...k$ vertices and consider a sequence $S = (G_1, G_2, \ldots, G_k)$ formed with k disjoint regular graphs, the H-join of S, denoted by $H(S)$, is a graph such that every vertex of G_i connects to every vertex of G_j whenever the vertex i connects to vertex j in H. In [D. M. Cardoso, M. Aguieiras, E. A. Martins, M. Robbiano, Spectra of graphs obtained by a generalization of the join graph operation, (manuscript submitted for publication)] a characterization of the spectrum and Laplacian spectrum of $H(S)$. Here, those results are extended to obtain the characterization of the Randić spectra of the H-join of S. Some additional consequences are explored, namely regarding the normalized Laplacian energy and the general Randić index.

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[1] D. M. Cardoso, I. Gutman, E. A. Martins, M. Robbiano, A generalization of Fiedler's lemma and some applications, Linear and Multilinear Algebra 59 (8) (2011): 929-942.

[2] D. M. Cardoso, M. Aguieiras, E. A. Martins, M. Robbiano, Spectra of graphs obtained by a generalization of the join graph operation, manuscript submitted for publication.