Maximum Laplacian energy of certain threshold graphs

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ABSTRACT

The concept of *Laplacian energy* of a graph G has been defined ([1], [2]) in 2006 as the sum of the absolute values of the differences between the eigenvalues of the Laplacian matrix and the average degree of the vertices of G. That is, if G is a connected graph with n vertices and m edges, the Laplacian energy of G is then

$$LE(G) = \sum_{i=1}^{n} \left| \mu_i - \frac{2m}{n} \right| ,$$

where $\mu_1, \mu_2, \cdots, \mu_n$ is the decreasing sequence of Laplacian eigenvalues of G. A *threshold* graph is a graph free of P_4, C_4 and $2K_2$. Equivalently, it is the graph that can be obtained by a recursive process which starts with an isolated vertex and where, at each step, either a new isolated vertex or a vertex adjacent to all previous vertices is added (a dominating vertex). In this work we deal only with connected threshold graphs.

We consider particular families of threshold graphs and investigate the graph that maximize the Laplacian energy in each one.

Referências

[1] I. Gutman, B. Zhou, Laplacian energy of a graph, Lin. Algebra Appl. 414 (2006) 29-37.

[2] B. Zhou, I. Gutman, On Laplacian energy of graphs, MATCH Commun. Math. Comput. Chem. 57 (2007) 211-220.