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HL-index of a graph

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Abstract

Let G be a simple, connected graph with n vertices and eigenvalues $\lambda_1 > \lambda_2 \geq \ldots \geq \lambda_n$. If n is even, define $H = n/2$ and $L = H + 1$. If n is odd, define $H = L = (n + 1)/2$. Define the HL-index of G to be $R(G) = max(|\lambda_H|, |\lambda_L|)$. The eigenvalues λ_H and λ_L appear in chemical graph theory in the study of molecular stability. In this paper, bounds on HL-index for chemical and general graphs are studied. It is shown that there exist graphs with arbitrarily large HL-index.

Keywords: HL-index, graph spectrum, HOMO-LUMO map.

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HL-indeks grafa

Povzetek

Naj bo G enostaven povezan graf na n vozliščih, ki ima lastne vrednosti $\lambda_1 > \lambda_2 \geq \ldots \geq \lambda_n$. Če je n sod, definiramo $H = n/2$ *in* $L = H + 1$. Če je n lih, definiramo $H = L = (n + 1)/2$. HL-indeks grafa G je $R(G) = max(|\lambda H|, |\lambda L|)$. Lastni vrednosti λ_H in λ_L nastopata v kemijski teoriji grafov pri študiju stabilnosti molekul. V članku študiramo ocene za HL-indeks za kemijske in splošne grafe. Dokažemo, da obstajajo grafi s poljubno velikim HL-indeksom.

Ključne besede: HL-indeks, spekter grafa, HOMO-LUMO zemljevid.