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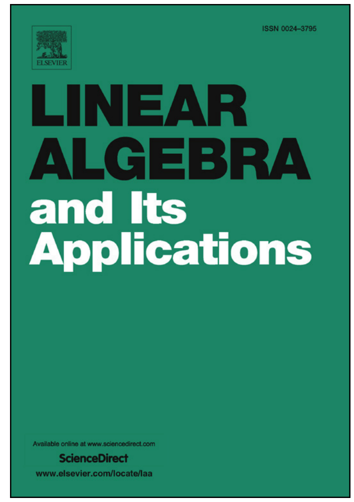

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Note on an upper bound for sum of the Laplacian eigenvalues of a graph

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Abstract

For a simple graph G with n vertices and m edges having Laplacian eigenvalues $\mu_1(G) \geq \mu_2(G) \geq \cdots \geq \mu_n(G)$, let $\mathcal{S}_k(G)$ be the sum of k largest Laplacian eigenvalues of G. In this note, we prove that if G is a connected graph of order $n \geq 2$ with m edges having clique number ω and vertex covering number τ, then

$$\mathcal{S}_k(G) \leq k(\tau + 1) + m - \frac{\omega(\omega - 1)}{2},$$

with equality if $k \leq \omega - 1$ and G is the graph obtained by joining $n - \omega$ pendant vertices with one of the vertices in K_ω. Our work improves a recent work of Ganie et al.

Keywords: sum of Laplacian eigenvalues, upper bound, clique number, vertex covering number
2000 MSC: 05C50, 05C30

1. Introduction

We consider finite, undirected and simple graphs throughout this note. Let G be a graph of order n with vertex set $V(G) = \{v_1, v_2, \ldots, v_n\}$ and edge set $E(G)$. We denote by $N_G(v_i)$ and $d_G(v_i)$ the neighborhood and the degree of vertex v_i in G, respectively. A vertex v_i is called isolated if $d_G(v_i) = 0$,

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