On the sum of the two largest eigenvalues of the signless Laplacian matrix

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Let $G$ be a simple graph on $n$ vertices and $m$ edges. Consider $L(G) = D - A$ and $Q(G) = D + A$ as the Laplacian and the signless Laplacian of $G$, where $A$ is the adjacency matrix and $D$ is the diagonal matrix of the vertices degree of $G$. Brouwer conjectured that the sum of the $k$ largest Laplacian eigenvalues of $G$ is at most $m + \binom{k+1}{2}$. Haemers et. al. [1] proved that this result is valid for $k = 2$. In this paper, we investigate this problem for the signless Laplacian matrix when $k = 1$ and $k = 2$.

Keywords: largest eigenvalues, sum of eigenvalues, signless Laplacian matrix.

References