A NEW UPPER BOUND ON THE LARGEST NORMALIZED LAPLACIAN EIGENVALUE

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Abstract. Let $\mathcal{G}$ be a simple undirected connected graph on $n$ vertices. Suppose that the vertices of $\mathcal{G}$ are labelled $1, 2, \ldots, n$. Let $d_i$ be the degree of the vertex $i$. The Randić matrix of $\mathcal{G}$, denoted by $R$, is the $n \times n$ matrix whose $(i, j)$ entry is $\frac{1}{\sqrt{d_id_j}}$ if the vertices $i$ and $j$ are adjacent and 0 otherwise. The normalized Laplacian matrix of $\mathcal{G}$ is $L = I - R$, where $I$ is the $n \times n$ identity matrix. In this paper, by using an upper bound on the maximum modulus of the subdominant Randić eigenvalues of $\mathcal{G}$, we obtain an upper bound on the largest eigenvalue of $L$. We also obtain an upper bound on the largest modulus of the negative Randić eigenvalues and, from this bound, we improve the previous upper bound on the largest eigenvalue of $L$.


Keywords and phrases: normalized Laplacian matrix, Randić matrix, upper bound, largest eigenvalue, subdominant eigenvalue.

REFERENCES


