Eigenvalues of normalized Laplacian matrix of graphs

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Abstract

Let $G$ be a graph with vertex set $V(G) = \{v_1, v_2, \ldots, v_n\}$ and edge set $E(G)$. Also let $d_i$ be the degree of vertex $v_i \in V(G)$. The normalized Laplacian matrix of the graph $G$ is denoted by $L(G) = (L_{ij})$ and is defined by

$$
L_{ij} = \begin{cases} 
1 & \text{if } i = j \text{ and } d_i \neq 0 \\
-\frac{1}{\sqrt{d_i d_j}} & \text{if } v_i v_j \in E(G) \\
0 & \text{otherwise.}
\end{cases}
$$

In this talk, we discuss some bounds on the largest normalized Laplacian eigenvalue of graph $G$ in terms of graph parameters. Moreover, we give the results on the normalized Laplacian eigenvalues of graph $G$. Finally, we present some results of the effect on the largest and the second smallest normalized Laplacian eigenvalues by grafting edges.

Key Words: Normalized Laplacian matrix, Normalized Laplacian eigenvalues, Triangulation, Maximal Planar graph, Covering number

References


