On Laplacian eigenvalues of graphs

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Abstract

Let $G = (V, E)$ be a simple graph. Denote by $D(G)$ the diagonal matrix of its vertex degrees and by $A(G)$ its adjacency matrix. Then the Laplacian matrix of G is $L(G) = D(G) - A(G)$. Denote the spectrum of $L(G)$ by $S(L(G)) = (\mu_1, \mu_2, \ldots, \mu_n)$, where we assume the eigenvalues to be arranged in nonincreasing order: $\mu_1 \geq \mu_2 \geq \cdots \geq \mu_{n-1} \geq \mu_n = 0$. Let a be the algebraic connectivity of graph G. Then $a = \mu_{n-1}$. Among all eigenvalues of the Laplacian matrix of a graph, the most studied is the second smallest, called the algebraic connectivity (a(G)) of a graph [5]. In this talk we show some results on $\mu_1(G)$ and $a(G)$ of graph G. We obtain some integer and real Laplacian eigenvalues of graphs. Moreover, we discuss several relations between Laplacian eigenvalues and graph parameters. Finally, we give some conjectures on the Laplacian eigenvalues of graphs.

Keywords: Graph, Largest Laplacian eigenvalue, Algebraic connectivity, Diameter, Minimum degree
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