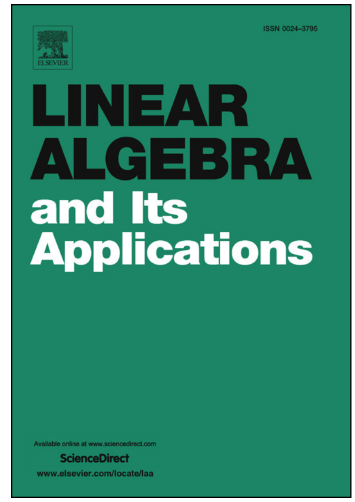

The distance spectrum of complements of trees

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THE DISTANCE SPECTRUM OF COMPLEMENTS OF TREES

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Abstract. Let G be a connected graph of order n and $D(G)$ be its distance matrix. In this paper, we characterize the unique graphs whose distance spectral radius attains the maximum and minimum among all complements of trees. Furthermore, we determine the unique graphs whose least distance eigenvalues attains the maximum and minimum among all complements of trees.

1. Introduction

Let G be a simple graph with vertex set $V(G) = \{v_1, v_2, \ldots, v_n\}$ and edge set $E(G)$, where $|V(G)| = n$, $|E(G)| = m$. Also let $d_i(G)$ (or d_i) be the degree of the vertex $v_i \in V(G)$. We always assume that the graph under consideration is connected when the problem is concerned with the distance. We denote C_n the n-cycle and P_n the path with n vertices. P_1 is interpreted as an isolated vertex. We denote $K_{a,b}$ the complete bipartite graph on vertex sets of sizes a and b. Thus $K_{1,n-1}$ is a tree, in fact the only tree with n vertices and disconnected complement. The tree $T_{a,b}$ is the tree obtained by appending a pendent edges to one vertex of P_2 and b pendent edges to the other. Thus $T_{a,b}$ has order $a+b+2$. We denote by $S_{a_1,a_2,\ldots,a_k}$ the tree with a unique vertex of degree greater than 2 whose removal leaves k disjoint paths, namely $P_{a_1},\ P_{a_2}, \ldots, P_{a_k}$. Thus $S_{a_1,a_2,\ldots,a_k}$ has order $1 + a_1 + \cdots a_k$. We will use the notation Q_n for $S_{n-3,1,1}$. The tree R_n is depicted in Figure 1.

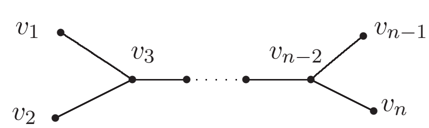

Fig. 1 The tree R_n.

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