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THE ALGEBRAIC CONNECTIVITY OF TWO TREES CONNECTED BY AN EDGE OF INFINITE WEIGHT*

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Abstract. Let T_1 and T_2 be two weighted trees with algebraic connectivities $\mu(T_1)$ and $\mu(T_2)$, respectively. A vertex on one of the trees is connected to a vertex on the other by an edge of weight w to obtain a new tree $\hat{T}_w$. By interlacing properties of eigenvalues of symmetric matrices it is known that $\mu(\hat{T}_w) \leq \min\{\mu(T_1), \mu(T_2)\} =: m$. It is determined precisely when $\mu(\hat{T}_w) \to m$ as $w \to \infty$. Finally, a possible interpretation is given of this result to the theory of electrical circuits and Kirchoff's laws.

Key words. Weighted tree, Laplacian matrix, Algebraic connectivity, Electrical circuit.

AMS subject classifications. 5C50, 15A48

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