1154-05-744 **Carolyn Reinhart*** (`reinh196@iastate.edu`). *The normalized distance Laplacian.*

The distance matrix $\mathcal{D}(G)$ of a graph G is the matrix containing the pairwise distances between vertices. The transmission of a vertex v_i in G is the sum of the distances from v_i to all other vertices and we let $T(G)$ be the diagonal matrix of transmissions of the vertices of the graph. The new matrix the normalized distance Laplacian, denoted $\mathcal{D}^{\mathcal{L}}(G)$, is defined such that $\mathcal{D}^{\mathcal{L}}(G) = I - T(G)^{-1/2}\mathcal{D}(G)T(G)^{-1/2}$. This is analogous to the normalized Laplacian matrix, defined such that $\mathcal{L}(G) = I - D(G)^{-1/2}A(G)D(G)^{-1/2}$ where $D(G)$ is the diagonal matrix of degrees of the vertices of the graph and $A(G)$ is the adjacency matrix. Two non-isomorphic graphs G and H are M-cospectral if $M(G)$ and $M(H)$ have the same multiset of eigenvalues. New results to be presented include bounds on the spectral radius of $\mathcal{D}^{\mathcal{L}}$ and connections with the normalized Laplacian matrix. Methods for determining eigenvalues of $\mathcal{D}^{\mathcal{L}}$ will be discussed, including the use of twin vertices. Finally, examples of $\mathcal{D}^{\mathcal{L}}$-cospectrality will be presented and compared to instances of cospectrality for other well known matrices. (Received September 10, 2019)