In graph theory, a graph $\mathcal{G}$ on $n$ vertices labeled $1, \ldots, n$ can be represented by an $n \times n$ Laplacian matrix $L$ where the diagonal entries $\ell_{i,i}$ are each the degree of vertex $i$, and the off-diagonal entries $\ell_{i,j}$ are $-1$ if vertices $i$ and $j$ are adjacent and $0$ otherwise. The submatrix $L_i$ of $L$ is obtained by deleting the row and column of $L$ corresponding to vertex $i$ of $\mathcal{G}$. If $\lambda_n$ and $\lambda_{n-1}$ are the largest eigenvalues of $L$, and $\rho(L_i)$ is the largest eigenvalue of $L_i$, it follows from the interlacing theorem of eigenvalues that $\lambda_{n-1} \leq \rho(L_i) \leq \lambda_n$. In this talk, we will investigate the Laplacian matrices for graphs that contain cut vertices. By observing the values of $\rho(L_i)$ when $i$ represents a cut vertex, we will be able to classify such graphs $\mathcal{G}$ into two categories based on whether $\mathcal{G}$ contains a cut vertex $i$ such that $\rho(L_i) = \lambda_{n-1}$. We will also investigate the values of $\rho(L_i)$ for non-cut vertices and obtain some surprising results, especially when there exists a vertex such that $\rho(L_i) = \lambda_n$. (Received September 12, 2007)