Exam 2 - Problem 2

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a When $n = 1$ and $A = (\alpha)$ then there will be no a_{01} or a_{10}^T to overwrite. The only step performed will be $\alpha_{11} := v_{11} = \alpha_{11} = a_{10}^T a_{01}$. This is equivalent to saying $\alpha_{11} := v_{11} = \alpha_{11}$, so the matrix is unchanged. this means that $\check{L} = (1)$ and $\check{U} = (\alpha)$. Because $\check{L}\check{U} = (1)(\alpha) = (\alpha) = A + \Delta A = A + 0$, this case is true.

b We know that for $n > 1$ we can partition $A, \check{L}$, and $\check{U}$ as:

$$A = \left(\begin{array}{c|c} A_{00} & a_{01} \\ a_{10}^T & \alpha_{11} \end{array}\right), \check{L} = \left(\begin{array}{c|c} \check{L}_{00} & 0 \\ \check{l}_{10}^T & 1 \end{array}\right), \check{U} = \left(\begin{array}{c|c} \check{U}_{00} & \check{u}_{01} \\ 0 & \check{v}_1 1 \end{array}\right)$$