7.1

$$\left(\begin{array}{c|c|c} L_{00} & 0 & 0 \\ \hline \lambda_{10eL}^T & 1 & U_{12}e_F^T \\ \hline 0 & 0 & U_{22} \end{array}\right)\left(\begin{array}{c|c|c} P_{00} & 0 & 0 \\ \hline 0 & 0 & 0 \\ \hline 0 & 0 & \varepsilon_{22} \end{array}\right)\left(\begin{array}{c|c|c} L_{00} & 0 & \\ \hline \lambda_{10eL}^T & 1 & U_{12}e_F^T \\ \hline 0 & 0 & U_{22} \end{array}\right)\begin{pmatrix} x_0 \\ \hline x_1 \\ \hline x_2 \end{pmatrix} = \begin{pmatrix} 0 \\ \hline 0 \\ \hline 0 \end{pmatrix}$$

$$\left(\begin{array}{c|c|c} L_{00} & 0 & 0 \\ \hline \lambda_{10eL}^T & 1 & U_{12}e_F^T \\ \hline 0 & 0 & U_{22} \end{array}\right)^T \begin{pmatrix} x_0 \\ \hline x_1 \\ \hline x_2 \end{pmatrix} = \begin{pmatrix} 0 \\ \hline 1 \\ \hline 0 \end{pmatrix}$$

$$\left(\begin{array}{c|c|c} L_{00}^T & \lambda_{10eL} & 0 \\ \hline 0 & 1 & 0 \\ \hline 0 & U_{12}e_F & U_{22} \end{array}\right)\begin{pmatrix} x_0 \\ \hline x_1 \\ \hline x_2 \end{pmatrix} = \begin{pmatrix} 0 \\ \hline 1 \\ \hline 0 \end{pmatrix}$$

$$\begin{pmatrix} L_{00}^T x_0 + \lambda_{10eL} x_1 \\ \hline x_1 \\ \hline x_1 U_{12}e_F + U_{22} x_2 \end{pmatrix} = \begin{pmatrix} 0 \\ \hline 1 \\ \hline 0 \end{pmatrix}$$

$$1 \cdot U_{12}e_F + U_{22} x_2 = 0$$

$$U_{12}e_F + U_{22} x_2 = 0$$

$$L_{00}^T x_0 + 1 \cdot \lambda_{10eL} = 0$$

$$L_{00}^T x_0 + \lambda_{10eL} = 0$$

$$\left(\begin{array}{c|c|c} L_{00}D_{00} & 0 & 0 \\ \hline \chi_{10}e_1^T D_{00} & 0 & U_{12}e_1^T \xi_{22} \\ \hline 0 & 0 & U_{22}\xi_{22} \end{array}\right)\left(\begin{array}{c} 0 \\ \hline 1 \\ \hline 0 \end{array}\right) = \left(\begin{array}{c} 0 \\ \hline 0 \\ \hline 0 \end{array}\right)$$

- the cost for the total computations would be $2n-1$ because the diagonal elements have n elements and superdiagonals have $n-1$ so the we could sum both costs $n + n-1 = 2n-1$ or $O(n)$