

Please use the following notation for your pentadiagonal matrix A and your upper and lower triangular matrices L and U . The following are examples for the 6 by 6 case.

$$A = \begin{pmatrix} c_1 & d_1 & e_1 & 0 & 0 & 0 \\ b_2 & c_2 & d_2 & e_2 & 0 & 0 \\ a_3 & b_3 & c_3 & d_3 & e_3 & 0 \\ 0 & a_4 & b_4 & c_4 & d_4 & e_4 \\ 0 & 0 & a_5 & b_5 & c_5 & d_5 \\ 0 & 0 & 0 & a_6 & b_6 & c_6 \end{pmatrix}$$

$$LU = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ \beta_2 & 1 & 0 & 0 & 0 & 0 \\ \alpha_3 & \beta_3 & 1 & 0 & 0 & 0 \\ 0 & \alpha_4 & \beta_4 & 1 & 0 & 0 \\ 0 & 0 & \alpha_5 & \beta_5 & 1 & 0 \\ 0 & 0 & 0 & \alpha_6 & \beta_6 & 1 \end{pmatrix} \begin{pmatrix} \gamma_1 & \delta_1 & \epsilon_1 & 0 & 0 & 0 \\ 0 & \gamma_2 & \delta_2 & \epsilon_2 & 0 & 0 \\ 0 & 0 & \gamma_3 & \delta_3 & \epsilon_3 & 0 \\ 0 & 0 & 0 & \gamma_4 & \delta_4 & \epsilon_4 \\ 0 & 0 & 0 & 0 & \gamma_5 & \delta_5 \\ 0 & 0 & 0 & 0 & 0 & \gamma_6 \end{pmatrix}$$

HINT: Go ahead and multiply out those matrices above and see the pattern for solving the 6 by 6 case. Then generalize it to the n by n case.

If you're not confident with your multiplication, you can always do the multiplication out in Maple. Although you have to make sure you typed in the matrices L and U correctly!