

$$L_{31} \cdot u_{11} = 0 \Rightarrow L_{31} = 0$$

$$L_{31} \cdot u_{12} + L_{32} \cdot u_{22} = 3 \Rightarrow 0 \cdot u_{12} + L_{32} \cdot \left(-\frac{3}{2}\right) = 3$$

$$L_{32} = \frac{3 \cdot (-2)}{3} = -2$$

$$L_{31} \cdot u_{13} + L_{32} \cdot u_{23} + 1 \cdot u_{33} = -1$$

$$0 \cdot u_{13} - 2 \cdot 5 + 1 \cdot u_{33} = -1$$

$$-5 + 1 \cdot u_{33} = -1$$

$$u_{33} = -1 + 5 = 4$$

$$L = \begin{pmatrix} 1 & 0 & 0 \\ 1/2 & 1 & 0 \\ 0 & -2 & 1 \end{pmatrix}, \begin{pmatrix} y_1 \\ y_2 \\ y_3 \end{pmatrix} = \begin{pmatrix} 4 \\ 3 \\ 2 \end{pmatrix}$$

$$U = \begin{pmatrix} 2 & 3 & -1 \\ 0 & -3/2 & 5/2 \\ 0 & 0 & 4 \end{pmatrix}$$

$$\begin{cases} y_1 = 4 \\ 1/2 \cdot 4 + 1 \cdot y_2 = 3 \Rightarrow y_2 = 3 - 2 \\ y_2 = 1 \\ 0 - 2 \cdot 1 + 1 \cdot y_3 = 2 \\ y_3 = 2 + 2 = 4 \end{cases}$$

$$u_x = y$$

$$\begin{pmatrix} 2 & 3 & -1 \\ 0 & -3/2 & 5/2 \\ 0 & 0 & 4 \end{pmatrix} \cdot \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 4 \\ 1 \\ 4 \end{pmatrix}$$

$$4 \cdot x_3 = 4 \Rightarrow x_3 = \frac{4}{4} = 1$$

$$0 - \frac{3}{2} \cdot x_2 + \frac{5}{2} \cdot 1 = 1 \Rightarrow \frac{-3}{2} \cdot x_2 = 1 - \frac{5}{2} \Rightarrow$$

$$\frac{-3}{2} \cdot x_2 = \frac{2-5}{2} \Rightarrow x_2 = \frac{-3+3}{2} = x_2 = 1$$

$$2 \cdot x_1 + 3 \cdot 1 - 1 \cdot 1 = 4$$

$$2 \cdot x_1 + 3 - 1 = 4$$

$$x_1 = \frac{4-2}{2} = 1$$