

$$[A:b] = \left[\begin{array}{cccc|c} 4 & -8 & -4 & -7 & 7 \\ -5 & 2 & 5 & 2 & -15 \\ -9 & 2 & 7 & 3 & -32 \\ -2 & -8 & -7 & -4 & -26 \end{array} \right] \begin{array}{l} E_2 \leftarrow E_2 - \frac{-5}{4} E_1 \\ E_3 \leftarrow E_3 - \frac{-9}{4} E_1 \\ E_4 \leftarrow E_4 - \frac{-2}{4} E_1 \end{array} \quad \begin{array}{l} [E_2 + \frac{5}{4} E_1] \\ [E_3 + \frac{9}{4} E_1] \\ [E_4 + \frac{1}{2} E_1] \end{array}$$

$$[A^{(1)}:b^{(1)}] = \left[\begin{array}{cccc|c} 4 & -8 & -4 & -7 & 7 \\ 0 & -8 & 0 & -27/4 & -25/4 \\ 0 & -16 & -2 & -51/4 & -65/4 \\ 0 & -12 & -9 & -15/2 & -45/2 \end{array} \right] \begin{array}{l} E_3 \leftarrow E_3 - \frac{-16}{-8} E_2 \\ E_4 \leftarrow E_4 - \frac{-12}{-8} E_2 \end{array} \quad \begin{array}{l} [E_3 - 2E_2] \\ [E_4 - \frac{3}{2} E_2] \end{array}$$

$$[A^{(2)}:b^{(2)}] = \left[\begin{array}{cccc|c} 4 & -8 & -4 & -7 & 7 \\ 0 & -8 & 0 & -27/4 & -25/4 \\ 0 & 0 & -2 & 3/4 & -15/4 \\ 0 & 0 & -9 & 21/8 & -105/8 \end{array} \right] E_4 \leftarrow E_4 - \frac{-9}{-2} E_3 \quad [E_4 - \frac{9}{2} E_3]$$

$$[A^{(3)}:b^{(3)}] = \left[\begin{array}{cccc|c} 4 & -8 & -4 & -7 & 7 \\ 0 & -8 & 0 & -27/4 & -25/4 \\ 0 & 0 & -2 & 3/4 & -15/4 \\ 0 & 0 & 0 & -3/4 & 15/4 \end{array} \right] = [U:C]$$

$$A_{\text{Apr}} U = \begin{bmatrix} 4 & -8 & -4 & -7 \\ 0 & -8 & 0 & -27/4 \\ 0 & 0 & -2 & 3/4 \\ 0 & 0 & 0 & -3/4 \end{bmatrix}, \quad C = \begin{bmatrix} 7 \\ -25/4 \\ -15/4 \\ 15/4 \end{bmatrix}$$

$$\text{N\u00fcr} \quad \text{to} \quad U \vec{x} = \vec{c}$$

$$4x_1 - 8x_2 - 4x_3 - 7x_4 = 7$$

$$-8x_2 - \frac{27}{4}x_4 = -\frac{25}{4}$$

$$-2x_3 + \frac{3}{4}x_4 = -\frac{15}{4}$$

$$-\frac{3}{4}x_4 = \frac{15}{4}$$

$$\rightarrow \boxed{x_3 = 0}$$

$$-2x_3 + \frac{3}{4}(-5) = -\frac{15}{4}$$

$$\boxed{x_4 = -5}$$

$$\Rightarrow -8x_2 - \frac{27}{4}(-5) = -\frac{25}{4} \rightarrow \boxed{x_2 = 5}$$

$$\Rightarrow 4x_1 - 8 \cdot 5 - 4 \cdot 0 - 7 \cdot (-5) = 7 \rightarrow \boxed{x_1 = 3}$$