The augmented matrix is

$$A^{(1)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 2 & -1 & 1 & 2 & 1 & -3 & 20 \\ 1 & 3 & -3 & -1 & 2 & 1 & -15 \\ 5 & 2 & -1 & -1 & 2 & 1 & -3 \\ -3 & -1 & 2 & 3 & 1 & 3 & 16 \\ 4 & 3 & 1 & -6 & -3 & -2 & -27 \end{array}\right]$$

$$\tilde{A}^{(2)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & -1.5 & 2.5 & 0 & -2.5 & -0.5 & 6 \\ 0 & 2 & -1 & -2 & -1 & 2 & -19 \\ 0 & -0.6 & 1.8 & -1.2 & -2.6 & 1.2 & -4.6 \\ 0 & -0.667 & 1.333 & -2 & -3.333 & 0 & -9.333 \\ 0 & -0.25 & 2.25 & -2.5 & -3.75 & 0.5 & -10.75 \end{array}\right]$$

$\frac{E_2}{2} - E_1 \Rightarrow$, $E_3 - E_1 \Rightarrow$, $\frac{E_4}{5} - E_1 \Rightarrow$, $\frac{E_5}{-3} - E_1 \Rightarrow$, $\frac{E_6}{4} - E_1 \Rightarrow$

Divide through E_3 by 2 and swap (pivot with E_2

$$\tilde{A}^{(2)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & 1 & -0.5 & -1 & -0.5 & 1 & -9.5 \\ 0 & -1.5 & 2.5 & 0 & -2.5 & -0.5 & 6 \\ 0 & -0.6 & 1.8 & -1.2 & -2.6 & 1.2 & -4.6 \\ 0 & -0.667 & 1.333 & -2 & -3.333 & 0 & -9.333 \\ 0 & -0.25 & 2.25 & -2.5 & -3.75 & 0.5 & -10.75 \end{array}\right]$$

$$\tilde{A}^{(3)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & 1 & -0.5 & -1 & -0.5 & 1 & -9.5 \\ 0 & 0 & 1.167 & -1 & -2.167 & 0.667 & -5.5 \\ 0 & 0 & 2.5 & -3 & -4.833 & 3 & -17.167 \\ 0 & 0 & 1.4999 & -3.999 & -5.497 & 1 & -23.493 \\ 0 & 0 & 8.5 & -11 & -15.5 & 3 & -52.5 \end{array}\right]$$

$\frac{E_3}{1.5} + E_2 \Rightarrow$, $\frac{E_4}{0.6} + E_2 \Rightarrow$, $\frac{E_5}{0.667} + E_2 \Rightarrow$, $\frac{E_6}{0.25} + E_2 \Rightarrow$

Divide through E_4 by 2.5 and swap with E_3

$$\tilde{A}^{(3)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & 1 & -0.5 & -1 & -0.5 & 1 & -9.5 \\ 0 & 0 & 1 & -1.2 & -1.933 & 1.2 & -6.867 \\ 0 & 0 & 1.167 & -1 & -2.167 & 0.667 & -5.5 \\ 0 & 0 & 1.4999 & -3.999 & -5.497 & 1 & -23.493 \\ 0 & 0 & 8.5 & -11 & -15.5 & 3 & -52.5 \end{array}\right]$$

$$\tilde{A}^{(4)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & 1 & -0.5 & -1 & -0.5 & 1 & -9.5 \\ 0 & 0 & 1 & -1.2 & -1.933 & 1.2 & -6.867 \\ 0 & 0 & 0 & 0.343 & 0.076 & 0.628 & 2.154 \\ 0 & 0 & 0 & -1.468 & -1.734 & -0.533 & -8.805 \\ 0 & 0 & 0 & -0.094 & 0.109 & -0.847 & 0.691 \end{array}\right]$$

$\frac{E_4}{1.167} - E_3 \Rightarrow$

$\frac{E_5}{1.4999} - E_3 \Rightarrow$

$\frac{E_6}{8.5} - E_3 \Rightarrow$

Divide through by 0.343

$$\tilde{A}^{(4)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & 1 & -0.5 & -1 & -0.5 & 1 & -9.5 \\ 0 & 0 & 1 & -1.2 & -1.933 & 1.2 & -6.867 \\ 0 & 0 & 0 & 1 & 0.222 & -1.831 & 6.280 \\ 0 & 0 & 0 & -1.468 & -1.734 & -0.533 & -8.805 \\ 0 & 0 & 0 & -0.094 & 0.109 & -0.847 & 0.691 \end{array}\right]$$

$$\tilde{A}^{(5)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & 1 & -0.5 & -1 & -0.5 & 1 & -9.5 \\ 0 & 0 & 1 & -1.2 & -1.933 & 1.2 & -6.867 \\ 0 & 0 & 0 & 1 & 0.222 & -1.831 & 6.280 \\ 0 & 0 & 0 & 0 & 0.959 & 2.194 & -0.282 \\ 0 & 0 & 0 & 0 & -1.382 & 10.842 & -13.631 \end{array}\right]$$

$\frac{E_5}{-1.468} - E_4$

$\frac{E_6}{-0.094} - E_4$

$$\left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & 1 & -0.5 & -1 & -0.5 & 1 & -9.5 \\ 0 & 0 & 1 & -1.2 & -1.933 & 1.2 & -6.867 \\ 0 & 0 & 0 & 1 & 0.222 & -1.831 & 6.280 \\ 0 & 0 & 0 & 0 & 1 & 2.288 & -0.294 \\ 0 & 0 & 0 & 0 & -1.382 & 10.842 & -13.63 \end{array}\right]$$

$$A^{(6)} = \left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & 4 \\ 0 & 1 & -0.5 & -1 & -0.5 & 1 & -9.5 \\ 0 & 0 & 1 & -1.2 & -1.933 & 1.2 & -6.867 \\ 0 & 0 & 0 & 1 & 0.222 & -1.831 & 6.280 \\ 0 & 0 & 0 & 0 & 1 & 2.288 & -0.294 \\ 0 & 0 & 0 & 0 & 0 & -10.133 & 10.157 \end{array}\right]$$

$\frac{E_6}{-1.382} - E_5$

Backward substitution

$A^{(6)}$ from E_6: $-10.133\,T_6 = 10.157$

$T_6 = -1.002 \approx -1$

from E_5: $T_5 + 2.288\,T_6 = -0.294$

$T_5 = -0.294 - 2.288(-1.002)$

$T_5 = 1.999 \approx 2$

From E_4: $T_4 + 0.222\,T_5 - 1.831\,T_6 = 6.280$

$T_4 = -0.222(1.999) + 1.831(-1.002) + 6.280$

$T_4 = 4.002 \approx 4$

from E_3: $T_3 - 1.2\,T_4 - 1.933\,T_5 + 1.2\,T_6 = -6.867$

$T_3 = +1.2(4.002) + 1.933(1.999) - 1.2(-1.002) - 6.867$

$T_3 = 3.002 \approx 3$

from E_2: $T_2 - 0.5\,T_3 - T_4 - 0.5\,T_5 + T_6 = -9.5$

$T_2 = 0.5(3.002) + 4.002 + 0.5(1.999) - (-1.002) - 9.5$

$T_2 = -1.996 \approx -2$

from E_1: $T_1 + T_2 - 2\,T_3 + T_4 + 3\,T_5 - T_6 = 4$

$T_1 = 4 - (-1.996) + 2(3.002) - 4.002 - 3(1.999) + (-1.002)$

$T_1 = 0.999 \approx 1$

$T_1 = 1 \quad T_2 = -2 \quad T_3 = 3 \quad T_4 = 4 \quad T_5 = 2 \quad T_6 = -1$