

Assignment 30

$$\bar{T}_1 + \bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4 \quad \text{--- (1)}$$

$$2\bar{T}_1 - \bar{T}_2 + \bar{T}_3 + 2\bar{T}_4 + \bar{T}_5 - 3\bar{T}_6 = 20 \quad \text{--- (2)}$$

$$\bar{T}_1 + 3\bar{T}_2 - 3\bar{T}_3 - \bar{T}_4 + 2\bar{T}_5 + \bar{T}_6 = -15 \quad \text{--- (3)}$$

$$-3\bar{T}_1 + 2\bar{T}_2 + 2\bar{T}_3 + 3\bar{T}_4 + \bar{T}_5 + \bar{T}_6 = -3 \quad \text{--- (4)}$$

$$4\bar{T}_1 + 3\bar{T}_2 + \bar{T}_3 - 6\bar{T}_4 - 3\bar{T}_5 - 2\bar{T}_6 = -27 \quad \text{--- (5)}$$

∴ Equation (1) becomes the pivot equation

$$2[1\bar{T}_1 + 1\bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4] = 2\bar{T}_1 + 2\bar{T}_2 - 4\bar{T}_3 + 2\bar{T}_4 + 6\bar{T}_5 - 2\bar{T}_6 = 8$$

$$1[1\bar{T}_1 + 1\bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4] = \bar{T}_1 + \bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4$$

$$5[1\bar{T}_1 + 1\bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4] = 5\bar{T}_1 + 5\bar{T}_2 - 10\bar{T}_3 + 5\bar{T}_4 + 15\bar{T}_5 - 5\bar{T}_6 = 20$$

$$-3[1\bar{T}_1 + 1\bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4] = -3\bar{T}_1 - 3\bar{T}_2 + 6\bar{T}_3 - 3\bar{T}_4 - 9\bar{T}_5 + 3\bar{T}_6 = -12$$

$$4[1\bar{T}_1 + 1\bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4] = 4\bar{T}_1 + 4\bar{T}_2 - 8\bar{T}_3 + 4\bar{T}_4 + 12\bar{T}_5 - 4\bar{T}_6 = 16$$

Subtracting equations,

$$2\bar{T}_1 + 2\bar{T}_2 - 4\bar{T}_3 + 2\bar{T}_4 + 6\bar{T}_5 - 2\bar{T}_6 = 8$$

$$-2\bar{T}_1 - \bar{T}_2 + \bar{T}_3 + 2\bar{T}_4 + \bar{T}_5 - 3\bar{T}_6 = 20$$

$$\Rightarrow 0 - 3\bar{T}_2 + 5\bar{T}_3 + 0 - 5\bar{T}_5 - \bar{T}_6 = 12 \quad \text{--- (2)'}$$

$$\bar{T}_1 + 3\bar{T}_2 - 3\bar{T}_3 - \bar{T}_4 + 2\bar{T}_5 + \bar{T}_6 = -15$$

$$-\bar{T}_1 + \bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4$$

$$\Rightarrow 0 + 2\bar{T}_2 - \bar{T}_3 - 2\bar{T}_4 - \bar{T}_5 + 2\bar{T}_6 = -19 \quad \text{--- (3)'}$$

$$\begin{array}{r}
 5\bar{1}_1 + 2\bar{1}_2 - \bar{1}_3 - \bar{1}_4 + 2\bar{1}_5 + \bar{1}_6 = -3 \\
 - \underline{5\bar{1}_1 + 5\bar{1}_2 - 10\bar{1}_3 + 5\bar{1}_4 + 15\bar{1}_5 - 5\bar{1}_6 = 20} \\
 0 - 3\bar{1}_2 + 9\bar{1}_3 - 6\bar{1}_4 - 13\bar{1}_5 + 6\bar{1}_6 = -23 \quad \dots (4)
 \end{array}$$

$$\begin{array}{r}
 -3\bar{1}_1 - \bar{1}_2 + 2\bar{1}_3 + 3\bar{1}_4 + \bar{1}_5 + 8\bar{1}_6 = 16 \\
 - \underline{3\bar{1}_1 - 3\bar{1}_2 + 6\bar{1}_3 - 3\bar{1}_4 - 9\bar{1}_5 + 3\bar{1}_6 = -12} \\
 0 + 2\bar{1}_2 - 4\bar{1}_3 + 6\bar{1}_4 + 10\bar{1}_5 - 0\bar{1}_6 = 28 \quad \dots (5)
 \end{array}$$

$$\begin{array}{r}
 4\bar{1}_1 + 3\bar{1}_2 + \bar{1}_3 - 6\bar{1}_4 - 3\bar{1}_5 - 2\bar{1}_6 = -27 \\
 - \underline{4\bar{1}_1 + 4\bar{1}_2 - 8\bar{1}_3 + 4\bar{1}_4 + 12\bar{1}_5 - 4\bar{1}_6 = 16} \\
 0 - \bar{1}_2 + 1\bar{1}_3 - 10\bar{1}_4 - 15\bar{1}_5 + 2\bar{1}_6 = -43 \quad \dots (6)
 \end{array}$$

Equation (2)' then becomes the pivot equation

$$\begin{array}{r}
 2 \mid -3 \left[-\bar{1}_2 + 5\bar{1}_3 - 0\bar{1}_4 - 5\bar{1}_5 - \bar{1}_6 = 12 \right] \\
 = 2\bar{1}_2 - 10/3\bar{1}_3 + 10/3\bar{1}_5 + 2/3\bar{1}_6 = -8
 \end{array}$$

$$\begin{array}{r}
 -3 \mid -3 \left[-3\bar{1}_2 + 5\bar{1}_3 - 5\bar{1}_5 - \bar{1}_6 = 12 \right] = -3\bar{1}_2 + 5\bar{1}_3 - 5\bar{1}_5 - \bar{1}_6 = 12
 \end{array}$$

$$\begin{array}{r}
 2 \mid -3 \left[-3\bar{1}_2 + 5\bar{1}_3 - 5\bar{1}_5 - \bar{1}_6 = 12 \right] = \bar{1}_2 - 10/3\bar{1}_3 + 10/3\bar{1}_5 + 2/3\bar{1}_6 = -8
 \end{array}$$

$$\begin{array}{r}
 -1 \mid -3 \left[-3\bar{1}_2 + 5\bar{1}_3 - 5\bar{1}_5 - \bar{1}_6 = 12 \right] = -\bar{1}_2 + 5/3\bar{1}_3 - 5/3\bar{1}_5 - 1/3\bar{1}_6 = 4
 \end{array}$$

Subtracting equations

$$\begin{array}{r}
 2\bar{1}_2 - \bar{1}_3 - 2\bar{1}_4 - \bar{1}_5 + 2\bar{1}_6 = -19 \\
 - \underline{2\bar{1}_2 - 10/3\bar{1}_3 + 0 + 10/3\bar{1}_5 + 2/3\bar{1}_6 = -8} \\
 0 + 7/3\bar{1}_3 - 2\bar{1}_4 - 13/3\bar{1}_5 + 4/3\bar{1}_6 = -8 \quad \dots (3)''
 \end{array}$$

$$\begin{array}{r}
 -3\bar{1}_2 + 9\bar{1}_3 - 6\bar{1}_4 - 13\bar{1}_5 + 6\bar{1}_6 = 23 \\
 - \underline{-3\bar{1}_2 + 5\bar{1}_3 - 5\bar{1}_5 - \bar{1}_6 = 12} \\
 4\bar{1}_3 - 6\bar{1}_4 - 8\bar{1}_5 + 7\bar{1}_6 = -35 \quad \dots (4)'
 \end{array}$$

$$\begin{array}{r}
 2\overline{1}_2 - 4\overline{1}_3 + 6\overline{1}_4 + 10\overline{1}_5 - 0\overline{1}_6 = 28 \\
 - 2\overline{1}_2 - 10\overline{1}_3 + 10\overline{1}_5 + 2\overline{1}_6 = -8 \\
 \hline
 -2\overline{1}_3 + 6\overline{1}_4 + 20\overline{1}_5 - 2\overline{1}_6 = 36 \quad \dots (5)''
 \end{array}$$

$$\begin{array}{r}
 -\overline{1}_2 + 9\overline{1}_3 - 10\overline{1}_4 - 15\overline{1}_5 + 2\overline{1}_6 = -43 \\
 - -\overline{1}_2 + 5\overline{1}_3 + 0\overline{1}_4 - 5\overline{1}_5 - 1\overline{1}_6 = 4 \\
 \hline
 0 + 22\overline{1}_3 - 10\overline{1}_4 - \frac{40}{3}\overline{1}_5 + \frac{7}{3}\overline{1}_6 = -47 \quad \dots (6)''
 \end{array}$$

Equation (3)'' then becomes the pivot equation

$$\begin{array}{r}
 12\overline{1}_7 [7\overline{1}_3 - 2\overline{1}_4 - 13\overline{1}_5 + 4\overline{1}_6 = -11] \\
 = 4\overline{1}_3 - 24\overline{1}_4 - 52\overline{1}_5 + 16\overline{1}_6 = -132\overline{1}_7
 \end{array}$$

$$\begin{array}{r}
 -2\overline{1}_7 [7\overline{1}_3 - 2\overline{1}_4 - 13\overline{1}_5 + 4\overline{1}_6 = -11] \\
 = -2\overline{1}_3 + 4\overline{1}_4 + 26\overline{1}_5 - 8\overline{1}_6 = \frac{22}{7}
 \end{array}$$

$$\begin{array}{r}
 22\overline{1}_7 [7\overline{1}_3 - 2\overline{1}_4 - 13\overline{1}_5 + 4\overline{1}_6 = 11] \\
 = 22\overline{1}_3 - 44\overline{1}_4 - 286\overline{1}_5 + 88\overline{1}_6 = \frac{242}{7}
 \end{array}$$

Substituting equation,

$$\begin{array}{r}
 4\overline{1}_3 - 6\overline{1}_4 - 8\overline{1}_5 + 7\overline{1}_6 = -35 \\
 - 4\overline{1}_3 - 24\overline{1}_4 - 52\overline{1}_5 + 16\overline{1}_6 = -132\overline{1}_7 \\
 \hline
 0 - 2.5714\overline{1}_4 - 0.5714\overline{1}_5 + 4.0714\overline{1}_6 = -16.1429 \\
 \dots (4)'''
 \end{array}$$

$$\begin{array}{r}
 2\overline{1}_3 + 6\overline{1}_4 + 20\overline{1}_5 - 2\overline{1}_6 = 36 \\
 - 2\overline{1}_3 + 4\overline{1}_4 + 26\overline{1}_5 - 8\overline{1}_6 = \frac{22}{7} \\
 \hline
 0 + 5.42857\overline{1}_4 + 5.42857\overline{1}_5 - 0.28571\overline{1}_6 = 82.85714 \quad \dots (5)''
 \end{array}$$

$$\begin{array}{r}
 22\overline{1}_3 - 10\overline{1}_4 - 40\overline{1}_5 + 7\overline{1}_6 = -47 \\
 - 22\overline{1}_3 - 44\overline{1}_4 - 286\overline{1}_5 + 88\overline{1}_6 = -242\overline{1}_7 \\
 \hline
 0 - 3.7143\overline{1}_4 + 0.28571\overline{1}_5 - 1.85714\overline{1}_6 = -12.4286 \quad \dots (6)''
 \end{array}$$

Equation (4)^{III} is then the pivot equation

$$\begin{aligned} -2.1111[-2.5714T_4 - 0.5714T_5 + 4.7142T_6] &= -16.1429 \\ &= -25.42857T_4 - 0.5714T_5 + 4.7142T_6 = -16.1429 \\ &= 5.42857T_4 + 1.2063T_5 - 9.9521T_6 = 34.0793 \end{aligned}$$

$$\begin{aligned} 1.44446[-2.5714T_4 - 0.5714T_5 + 4.7142T_6] &= 16.1429 \\ &= -3.71429T_4 - 0.82536T_5 + 6.80947T_6 = 23.3177 \end{aligned}$$

Subtracting equations

$$\begin{aligned} 5.42857T_4 + 5.42857T_5 - 0.28571T_6 &= 32.85714 \\ - [5.42857T_4 + 1.2063T_5 - 9.9321T_6] &= 34.0793 \\ \hline 0T_4 + 4.2223T_5 + 9.66639T_6 &= -1.2222 \end{aligned}$$

$$\begin{aligned} -3.71429T_4 + 0.28371T_5 - 1.85714T_6 &= -12.4286 \\ - [-3.71429T_4 - 0.82536T_5 + 6.80947T_6] &= 23.3177 \\ \hline 0T_4 + 1.1111T_5 - 8.6667T_6 &= 10.8889 \end{aligned}$$

Equation 5^{III} then becomes the pivot equation

$$\begin{aligned} 0.2632[4.2223T_5 + 9.66639T_6] &= -1.2222 \\ &= 1.1111T_5 + 2.5442T_6 = -0.32168 \end{aligned}$$

$$\Rightarrow 1.1111T_5 - 8.6667T_6 = 10.889$$

$$-1.1111T_5 + 2.5442T_6 = -0.32168$$

$$= 02 - 11.2109T_6 = 11.2108$$

$$\begin{aligned} T_6 &= \frac{11.2108}{-11.2109} = -0.99997 \approx -1.0 \end{aligned}$$

$$T_6 = -1.0$$

$$1.1111\overline{1}_5 = 8.6667(-1) = 10.889$$

$$\overline{1}_5 = \frac{10.889 - 8.667}{1.1111}$$

$$\overline{1}_5 = \underline{2}$$

$$-3.71429\overline{1}_4 + 0.285714(2) - 1.85714(-1) = -12.4286$$

$$\overline{1}_4 = \frac{-12.4286 - 0.571428 - 1.85724}{-3.71429}$$

$$= \underline{4}$$

$$4\overline{1}_3 - 6\overline{1}_4 - 8\overline{1}_5 + 7\overline{1}_6 = -35$$

$$4\overline{1}_3 - 6(4) - 8(2) + 7(6) = -35$$

$$4\overline{1}_3 - 24 - 16 - 7 = -35$$

$$\overline{1}_3 = \frac{-35 + 47}{4} = \underline{3}$$

$$\overline{1}_3 = \underline{3}$$

$$2\overline{1}_2 - 2\overline{1}_4 - \overline{1}_5 + 2\overline{1}_6 = -19$$

$$2\overline{1}_2 - (8) - 2(4) - (2) + 2(-1) = -19$$

$$\overline{1}_2 = \frac{-19 + 15}{2} = \underline{-2}$$

$$\overline{1}_1 + \overline{1}_2 - 2\overline{1}_3 + \overline{1}_4 + 3\overline{1}_5 - \overline{1}_6 = 4$$

$$(1) + (-2) - 2(3) + (4) + 3(2) - (-1) = 4$$

$$\overline{1}_1 - 2 - 6 + 4 + 6 + 1 = 4$$

$$\overline{1}_1 = 4 - 3 = \underline{1}$$

$$\overline{1}_1 = 1, \overline{1}_2 = -2, \overline{1}_3 = 3, \overline{1}_4 = 4, \overline{1}_5 = 2,$$

$$\overline{1}_6 = -1$$