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16/ENAO2057

Assignment 3

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 2 & -1 & 1 & 2 & 1 & -3 \\ 1 & 3 & -3 & -1 & 2 & 1 \\ 5 & 2 & -1 & -1 & 2 & 1 \\ -3 & -1 & 2 & 3 & 1 & 3 \\ 4 & 3 & 1 & -6 & -3 & -2 \end{bmatrix} \begin{matrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{matrix} = \begin{bmatrix} 4 \\ 26 \\ -15 \\ -3 \\ 16 \\ -27 \end{bmatrix}$$

$$F_{21} = a_{21} / a_{11} = 2/1 = 2$$

$$F_{31} = a_{31} / a_{11} = 1$$

$$F_{41} = a_{41} / a_{11} = 5$$

$$F_{51} = a_{51} / a_{11} = -3$$

$$F_{61} = a_{61} / a_{11} = 4$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & (2+1) & -1(2+1) & 1-(2 \times -2) & 2(2+1) & 1-(2 \times -1) \\ 1-C(1+1) & 3-C(1+1) & -3(1 \times 2) & -1-(1+1) & 2-(1 \times 3) & 1-C(1 \times -1) \\ 5-C(5+1) & 2-C(5+1) & -1-(5 \times -2) & -1-(5+1) & 2-(5 \times 3) & 1-(5 \times -1) \\ -3(-3+1) & -1-(-3+1) & 2+(3 \times -2) & 3-(-3+1) & 1-(-3 \times 3) & 3-(-3 \times -1) \\ 4-C(4+1) & 3-C(4+1) & 1-(4 \times -2) & -6(4+1) & 1-(3+3) & -2(4 \times -1) \end{bmatrix} \begin{matrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{matrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 2 & -1 & -2 & -1 & 2 \\ 0 & -3 & 9 & -6 & -13 & 6 \\ 0 & 2 & -4 & 6 & 10 & 0 \\ 0 & 1 & 9 & -10 & -15 & 2 \end{bmatrix} \begin{matrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{matrix} = \begin{bmatrix} 4 \\ 12 \\ -19 \\ -23 \\ 28 \\ -43 \end{bmatrix}$$

$$F_{32}' = a_{32}' / a_{22}' = 2/-3$$

$$F_{42}' = a_{42}' / a_{22}' = 3/2 = 1$$

$$F_{52} = a_{52} / a_{22} = -2/3$$

$$F_{61} = a_{62}' / a_{22}' = -1/-3 = 1/3$$

$$\begin{array}{cccccc}
 1 & 1 & -2 & 1 & 3 & -1 \\
 0 & -3 & 5 & 0 & -5 & -1 \\
 0 & 2 - (-1/3 \times 3) & -11 - (-2/3 \times 5) & -2(-2/3 \times 0) & -1 - (-2/3 \times -5) & 2 + (-1/3 \times -1) \\
 0 & -3 - (1 \times 3) & 9 - (1 \times 5) & -6(1 \times 0) & -13 - (1 \times -5) & 8 - (-1/3 \times -1) \\
 0 & 2 - (-2/3 \times 3) & -4 - (-2/3 \times 5) & -6(-2/3 \times 0) & 10 - (-2/3 \times -5) & 6 - (-1/3 \times -1) \\
 0 & -1 - (1/3 \times 3) & 9 - (1/3 \times 5) & 10 - (1/3 \times 0) & -15 - (1/3 \times -5) & 2 - (1/3 \times -1)
 \end{array}$$

$$\begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 - (-2/3 \times 12) \\ -23 - (1 \times 12) \\ 28 - (-1/3 \times 12) \\ -43 - (1/3 \times 12) \end{bmatrix}$$

$$\begin{array}{cccccc}
 1 & 1 & -2 & 1 & 3 & -1 \\
 0 & -3 & 5 & 0 & -5 & -1 \\
 0 & 0 & 7/3 & -2 & -13/3 & 4/3 \\
 0 & 0 & 4 & -6 & 8 & 7 \\
 0 & 0 & -2/3 & 6 & 20/3 & -2/3 \\
 0 & 0 & 22/3 & -10 & -40/3 & -7/3
 \end{array}
 \quad
 \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -35 \\ 26 \\ -47 \end{bmatrix}$$

$$F_{43} = \frac{a_{43}}{a_{33}} = \frac{4}{7/3} = 12$$

$$F_{53} = \frac{a_{53}}{a_{33}} = \frac{-2/3}{7/3} = -2/7$$

$$F_{63} = \frac{a_{63}}{a_{33}} = \frac{22/3}{7/3} = 22/7$$

$$\begin{array}{cccccc}
 1 & 1 & -2 & 1 & 3 & -1 \\
 0 & -3 & 5 & 0 & -5 & -1 \\
 0 & 0 & 7/3 & -2 & -13/3 & 4/3 \\
 0 & 0 & 4 - (12/7 \times 7/3) & -6 - (-2/7 \times -2) & 8 - (-2/7 \times -13/3) & 7 - (-2/7 \times 4/3) \\
 0 & 0 & -2/3 - (-2/7 \times 7/3) & 6 - (-2/7 \times -2) & 20/3 - (-2/7 \times -13/3) & -2/3 - (-2/7 \times 4/3) \\
 0 & 0 & 22/3 - (22/7 \times 7/3) & -10 - (22/7 \times -2) & -40/3 - (22/7 \times -13/3) & -7/3 - (22/7 \times 4/3)
 \end{array}$$

$$\begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -35 - (1/7 \times -11) \\ -36 - (-2/7 \times -11) \\ -47 - (22/7 \times -11) \end{bmatrix}$$

$$\begin{array}{cccccc|c}
 1 & 1 & -2 & 1 & 3 & -1 & T_1 \\
 0 & -5 & 5 & 0 & -5 & -1 & T_2 \\
 0 & 0 & 7/3 & -2 & -13/3 & 4/3 & T_3 \\
 0 & 0 & 0 & -18/7 & -4/7 & 33/7 & T_4 \\
 0 & 0 & 0 & 0 & 38/9 & 29/3 & T_5 \\
 0 & 0 & 0 & 0 & 10/9 - (5/9 \times 38/9) & -26/3 - [5/9 \times 29/3] & T_6
 \end{array}$$

$$\begin{bmatrix}
 4 \\
 12 \\
 -11 \\
 -133/7 \\
 -11/9 \\
 98/9 - [5/9 \times 38/9]
 \end{bmatrix}$$

$$\begin{array}{cccccc|c}
 1 & 1 & -2 & 1 & 3 & -1 & T_1 \\
 0 & -5 & 5 & 0 & -5 & -1 & T_2 \\
 0 & 0 & 7/3 & -2 & -13/3 & 4/3 & T_3 \\
 0 & 0 & 0 & -18/7 & -4/7 & 33/7 & T_4 \\
 0 & 0 & 0 & 0 & 38/9 & 29/3 & T_5 \\
 0 & 0 & 0 & 0 & 0 & -26/3 & T_6
 \end{array}
 =
 \begin{bmatrix}
 4 \\
 12 \\
 -11 \\
 -113/7 \\
 -11/9 \\
 213/19
 \end{bmatrix}$$

$$-213/19 \quad T_6 = 213/19$$

$$T_6 = \frac{213}{19} \times -19$$

$$T_6 = -1$$

$$\frac{38}{9} T_5 = \frac{38}{9} + \frac{29}{3} = -11/9$$

$$T_5 = -1/9 - 29/3 (-1)$$

$$= 76/9 + 9/38$$

$$T_5 = 2$$

$$-18 T_4 - 4/7 T_5 + 33/7 T_6 = -113/7$$

$$T_4 = \frac{-113}{7} + \frac{4}{7} (2) - \frac{33}{7} (-1) = -72/7 + 7/18$$

$$T_4 = 4$$