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Course: ENG 382

Assignment 3

$$\bar{I}_1 + \bar{I}_2 - 2\bar{I}_3 + \bar{I}_4 + 3\bar{I}_5 - \bar{I}_6 = 4$$
$$2\bar{I}_1 + \bar{I}_2 + \bar{I}_3 + 2\bar{I}_4 + \bar{I}_5 - 3\bar{I}_6 = 20$$
$$\bar{I}_1 + 3\bar{I}_2 - 3\bar{I}_3 - \bar{I}_4 + 2\bar{I}_5 + \bar{I}_6 = -15$$
$$5\bar{I}_1 + 2\bar{I}_2 - \bar{I}_3 - \bar{I}_4 + 2\bar{I}_5 + \bar{I}_6 = -3$$
$$-3\bar{I}_1 - \bar{I}_2 + 2\bar{I}_3 + 3\bar{I}_4 + \bar{I}_5 + 3\bar{I}_6 = 16$$
$$4\bar{I}_1 + 3\bar{I}_2 + \bar{I}_3 - 6\bar{I}_4 - 3\bar{I}_5 - 2\bar{I}_6 = -27$$

Solution

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 2 & -1 & 1 & 2 & 1 & -3 \\ 1 & 3 & -3 & -1 & 2 & 1 \\ 5 & 2 & -1 & -1 & 2 & 1 \\ -3 & -1 & 2 & 3 & 1 & 3 \\ 4 & 3 & 1 & 6 & -3 & -2 \end{bmatrix} \begin{bmatrix} \bar{I}_1 \\ \bar{I}_2 \\ \bar{I}_3 \\ \bar{I}_4 \\ \bar{I}_5 \\ \bar{I}_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 20 \\ -15 \\ -3 \\ 16 \\ -2 \end{bmatrix}$$

$\bar{I}_1 = 2, \bar{I}_2 = 1, \bar{I}_3 = 5, \bar{I}_4 = -3, \bar{I}_5 = 4$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 2-2(1) & -1-2(1) & 1-2(-2) & 2-2(1) & 1-2(3) & -3-2(-1) \\ 1-1(1) & 3-1(1) & -3-1(-2) & -1-1(1) & 2-1(3) & 1-1(-1) \\ 5-5(1) & 2-5(1) & -1-5(-2) & -1-5(1) & 2-5(3) & 1-3(-1) \\ 3+3(1) & -1+3(1) & 2+3(-2) & 3+3(1) & 1+3(3) & 3+3(-1) \\ 4-4(1) & 3-4(1 & 1-4(-2) & -6-4(1) & -3-4(3) & -2-4(-1) \end{bmatrix} \begin{bmatrix} \bar{I}_1 \\ \bar{I}_2 \\ \bar{I}_3 \\ \bar{I}_4 \\ \bar{I}_5 \\ \bar{I}_6 \end{bmatrix}$$

$$= \begin{bmatrix} 4 \\ 20-2(4) \\ -15-1(4) \\ -3-5(4) \\ 16+3(4) \\ -27-4(4) \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 2 & -1 & -2 & -1 & 2 \\ 0 & -3 & 9 & -6 & -13 & 6 \\ 0 & 2 & -4 & 6 & 10 & 0 \\ 0 & 1 & 9 & 10 & -5 & 2 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_0 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -19 \\ -23 \\ 128 \\ 42 \end{bmatrix}$$

$T_1 = -2/3, \; T_2 = -1, \; T_3 = -2/3, \; T_4 = 1/3$

$$\begin{bmatrix} 1 & 2 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 2+\frac{2}{3}(-3) & -1+\frac{2}{3}(5) & -2+\frac{2}{3}(0) & -1+\frac{2}{3}(-5) & 2+\frac{2}{3}(-1) \\ 0 & -3-1(-3) & 9-1(5) & -6-1(0) & -13+1(-5) & 6-1(-1) \\ 0 & 2+\frac{2}{3}(-3 & 4+\frac{2}{3}(5) & 6+\frac{2}{3}(0) & 10+\frac{2}{3}(-5) & 0+\frac{2}{3}(-1) \\ 0 & -1-\frac{1}{3}(-3) & 9-\frac{1}{3}(5) & 10+\frac{1}{3}(0) & -5+\frac{1}{3}(-5) & 2-\frac{2}{3}(-1) \end{bmatrix}$$

$$\begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -19 \\ -23-1(12) \\ 28 \quad \frac{2}{3}(12) \\ 42-\frac{1}{2}(12) \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 7/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 4 & -6 & -8 & 7 \\ 0 & 0 & -2/3 & 6 & 20/3 & -2/3 \\ 0 & 0 & 22/3 & -10 & -40/3 & 7/3 \end{bmatrix} \begin{bmatrix} \bar{I}_1 \\ \bar{I}_2 \\ \bar{I}_3 \\ \bar{I}_4 \\ \bar{I}_5 \\ \bar{I}_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -35 \\ 36 \\ 47 \end{bmatrix}$$

$\bar{I}_1 = 12/7$, $\bar{I}_2 = -2/7$, $\bar{I}_3 = 22/7$

$$\begin{bmatrix} 1 & 1 & 2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 7/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 0 & -18/7 & -4/7 & 33/7 \\ 0 & 0 & 0 & 88/7 & 38/7 & -1/7 \\ 0 & 0 & 0 & -26/7 & 2/7 & -13/7 \end{bmatrix} \begin{bmatrix} \bar{I}_1 \\ \\ \\ \\ \\ \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -113/7 \\ 284/7 \\ -87/7 \end{bmatrix}$$