

ACA-BINTE TARIGATE EDWIN
15/ENG071005

ENG 381

ENGINEERING MATHEMATICS

ASSIGNMENT

i) $T_1 + T_2 - 2T_3 + T_4 + 3T_5 - T_6 = 4$
 $2T_1 - T_2 + T_3 + 2T_4 + T_5 - 3T_6 = 20$
 $T_1 + 3T_2 - 3T_3 - T_4 + 2T_5 + T_6 = -15$
 $3T_1 + 2T_2 - T_3 - T_4 + 2T_5 + T_6 = -3$
 $-3T_1 - T_2 + 2T_3 + 3T_4 + T_5 + 3T_6 = 16$
 $4T_1 - 3T_2 + T_3 - 6T_4 - 3T_5 - 2T_6 = -27$

Soln.

1	1	-2	1	3	-1	T_1		4
2	-1	1	2	-1	-3	T_2		20
1	3	-3	-1	2	1	T_3	=	-15
5	2	-1	-1	2	1	T_4		-3
-3	-1	2	-3	1	3	T_5		16
4	3	1	-6	-3	-2	T_6		-27

1	1	-2	1	3	-1	T_1		4
2-2x1	-2	3	1	1	-5	T_2		16
1-1x1	0	-3	0	2	-2	T_3		-11
5-5x1	0	2	-3	-1	8	T_4	=	-3
-3-3x1	0	4	-4	4	10	T_5		22
4-4x1	0	5	-5	1	-6	T_6		-31

1	1	-2	1	3	-1	T_1		4
0	-3	5	0	-5	-1	T_2		12
0	2	-1	-2	-1	-2	T_3	=	-19
0	-3	9	-6	-13	6	T_4		-23
0	2	-4	6	10	0	T_5		28
0	-1	9	-10	-15	2	T_6		-43

1	1	-2	1	3	-1	T_1	4
0	-3	5	0	-5	-1	T_2	12
0	$2 - \frac{2}{3}(-3)$	$-1 - \frac{2}{3}(5)$	$-2 - \frac{2}{3}(0)$	$-1 - \frac{2}{3}(-5)$	$2 - \frac{2}{3}(-1)$	T_3	$-14 - \frac{2}{3}$
0	$-3 - \frac{(-3)}{3}(-3)$	$4 - \frac{5}{3}(5)$	$-6 - \frac{2}{3}(0)$	$-13 - \frac{2}{3}(-5)$	$6 - \frac{2}{3}(-1)$	T_4	$-23 - \frac{2}{3}$
0	$2 - \frac{2}{3}(-3)$	$-4 - \frac{2}{3}(5)$	$6 - \frac{2}{3}(0)$	$16 - \frac{2}{3}(-5)$	$6 - \frac{2}{3}(-1)$	T_5	$+28 - \frac{2}{3}$
0	$-1 - \frac{1}{3}(-3)$	$4 - \frac{1}{3}(5)$	$-10 - \frac{1}{3}(0)$	$-15 - \frac{1}{3}(-5)$	$2 - \frac{1}{3}(-1)$	T_6	$-13 - \frac{1}{3}$

1	1	-2	1	3	-1	T_1	4
0	-3	5	0	-5	-1	T_2	12
0	0	$\frac{7}{3}$	-2	$-\frac{13}{3}$	$\frac{4}{3}$	T_3	-11
0	0	4	-6	-8	2	T_4	-35
0	0	$-\frac{2}{3}$	6	$\frac{20}{3}$	$\frac{2}{3}$	T_5	36
0	0	$\frac{2}{3}$	-10	$-\frac{49}{3}$	$\frac{7}{3}$	T_6	-47

1	1	-2	1	3	-1	T_1	4
0	-3	5	0	-5	-1	T_2	12
0	0	$\frac{7}{3}$	-2	$-\frac{13}{3}$	$\frac{4}{3}$	T_3	-11
0	0	$-\frac{4}{3}(\frac{7}{3})$	$-6 - \frac{4}{3}(-2)$	$-8 - \frac{4}{3}(-\frac{13}{3})$	$2 - \frac{4}{3}(\frac{4}{3})$	T_4	$-35 - \frac{4}{3}$
0	0	$-\frac{2}{3} - \frac{2}{3}(\frac{7}{3})$	$6 - \frac{2}{3}(-2)$	$\frac{20}{3} - \frac{2}{3}(-\frac{13}{3})$	$-\frac{2}{3} - \frac{2}{3}(\frac{4}{3})$	T_5	$36 - \frac{2}{3}$
0	0	$\frac{2}{3} - \frac{2}{3}(\frac{7}{3})$	$-10 - \frac{2}{3}(-2)$	$-\frac{49}{3} - \frac{2}{3}(-\frac{13}{3})$	$\frac{7}{3} - \frac{2}{3}(\frac{4}{3})$	T_6	$-47 - \frac{2}{3}$

1	1	-2	1	3	-1	T_1	4
0	-3	5	0	-5	-1	T_2	12
0	0	$-\frac{1}{3}$	-2	$-\frac{13}{3}$	$\frac{4}{3}$	T_3	-11
0	0	0	$-\frac{18}{7}$	$-\frac{4}{7}$	$\frac{33}{7}$	T_4	$-\frac{113}{7}$
0	0	0	$\frac{38}{7}$	$\frac{38}{7}$	$-\frac{2}{7}$	T_5	$\frac{236}{7}$
0	0	0	$-\frac{26}{7}$	$\frac{2}{7}$	$-\frac{13}{7}$	T_6	$-\frac{83}{7}$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 0 & -18/7 & -4/7 & 33/7 \\ 0 & 0 & 0 & \frac{38}{7} - \frac{33}{7} \left(-\frac{18}{7}\right) & \frac{38}{7} - \frac{33}{7} \left(-\frac{4}{7}\right) & -\frac{7}{7} - \frac{33}{7} \left(\frac{33}{7}\right) \\ 0 & 0 & 0 & -\frac{26}{7} - \frac{(28/2)}{7} \left(-\frac{18}{7}\right) & \frac{2}{7} - \frac{26}{7} \left(-\frac{4}{7}\right) & -\frac{13}{7} - \frac{26}{7} \left(\frac{33}{7}\right) \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -\frac{113}{7} \\ -\frac{280}{7} - \frac{33}{7} \left(\frac{113}{7}\right) \\ \frac{98}{7} - \frac{101}{7} \left(-\frac{11}{7}\right) \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 0 & -18/7 & -4/7 & 33/7 \\ 0 & 0 & 0 & 0 & 38/9 & 29/3 \\ 0 & 0 & 0 & 0 & 10/9 & -26/3 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -\frac{113}{7} \\ -\frac{11}{9} \\ \frac{98}{9} \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 0 & -18/7 & -4/7 & 33/7 \\ 0 & 0 & 0 & 0 & 38/9 & 29/3 \\ 0 & 0 & 0 & 0 & \frac{10}{9} - \frac{18}{9} \left(\frac{38}{9}\right) & -\frac{26}{3} - \frac{101}{9} \left(\frac{29}{3}\right) \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -\frac{113}{7} \\ -\frac{11}{9} \\ \frac{98}{9} - \frac{101}{9} \left(-\frac{11}{9}\right) \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 0 & -18/7 & -4/7 & 33/7 \\ 0 & 0 & 0 & 0 & 38/9 & 29/3 \\ 0 & 0 & 0 & 0 & 0 & -\frac{213}{19} \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -\frac{113}{7} \\ -\frac{11}{9} \\ \frac{213}{14} \end{bmatrix}$$

$$T_1 + T_2 - 2T_3 + T_4 + 3T_5 - T_6 = 4 \quad \text{--- (1)}$$

$$-3T_2 + 5T_3 - 5T_5 - T_6 = 12 \quad \text{--- (2)}$$

$$7/3 T_3 - 2T_4 - 13/3 T_5 + 1/3 T_6 = -11 \quad \text{--- (3)}$$

$$-18/7 T_4 - 4/7 T_5 - 33/7 T_6 = -113/7 \quad \text{--- (4)}$$

$$38/9 T_5 + 29/3 T_6 = -11/9 \quad \text{--- (5)}$$

$$-213/19 T_6 = -213/11 \quad \text{--- (6)}$$

Using Back Substitution

$$-213/19 T_6 = -213/11$$

$$T_6 = (-213/19) \div (-213/11)$$

$$T_6 = -1$$

$$T_5 (38/9) + 29/3 (-1) = -11/9$$

$$38/9 T_5 = -11/9 + 29/3$$

$$T_5 = -96/9 \times 9/38$$

$$T_5 = 2$$

$$T_4 (-18/7) - 4/7 (2) + 33/7 (-1) = -113/7$$

$$T_4 (-18/7) = -113/7 + 8/7 + 33/7$$

$$T_4 = -72/7 \times 7/18$$

$$T_4 = 4$$

$$T_3 (7/3) - 2(4) - 13/3 (2) + 1/3 (-1) = -11$$

$$T_3 (7/3) = 8 - 26/3 - 1/3 = -11$$

$$T_3 (7/3) = -11 + 8 + 26/3 + 1/3$$

$$T_3 = 7/1 \times 3/7$$

$$T_3 = 3$$

$$3T_2 + 5(3) + 6 - 5(2) - (-1) = 12$$

$$-3T_2 + 15 - 10 + 1 = 12$$

$$T_2 = \frac{12 + 15 + 10 - 1}{3}$$

$$T_2 = -2$$

$$T_1 + T_2 - 2T_3 + T_4 + 3T_5 - T_6 = 4$$

$$T_1 + (-2) - 2(3) + 4 + 3(2) - (-1) = 4$$

$$T_1 = 4 + 2 + 6 - 4 - 6 - 1$$

$$T_1 = 1$$

Therefore,

$$T_1 = 1$$

$$T_2 = -2$$

$$T_3 = 3$$

$$T_4 = 4$$

$$T_5 = 2$$

$$T_6 = -1$$

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