

TOBI OLANIYI - SHOLANKE

15/ENG06/053

MECHANICAL ENGINEERING

ENG382

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

$$-2T_1 - T_2 + T_3 + 2T_4 + T_5 - 3T_6 = 20$$

$$T_1 + 3T_2 - 3T_3 - T_4 + 2T_5 + T_6 = -15$$

$$5T_1 + 2T_2 - T_3 - T_4 + 2T_5 + T_6 = -3$$

$$-3T_1 - T_2 + 2T_3 + 3T_4 + T_5 + 3T_6 = 16$$

$$4T_1 + 3T_2 + T_3 - 6T_4 - 3T_5 - 2T_6 = -27$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 2 & -1 & 1 & 2 & 1 & -3 \\ 1 & 3 & -3 & -1 & 2 & 1 \\ 5 & 2 & -1 & -1 & 2 & 1 \\ -3 & -1 & 2 & 3 & 1 & 3 \\ 4 & 3 & 1 & -6 & -3 & -2 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 20 \\ -15 \\ -3 \\ 16 \\ -27 \end{bmatrix}$$

$$\begin{array}{l} 1 - \frac{2}{1} \times 1 \quad -1 - \frac{2}{1} \times 1 \quad 1 - \frac{2}{1} \times (-2) \quad 2 - \frac{2}{1} \times 1 \quad 1 - \frac{2}{1} \times 3 \quad -3 - \frac{2}{1} \times (-1) \quad 20 - \frac{2}{1} \times 4 \\ 1 - \frac{1}{1} \times 1 \quad 3 - \frac{1}{1} \times 1 \quad -3 - \frac{1}{1} \times (-2) \quad -1 - \frac{1}{1} \times 1 \quad 2 - \frac{1}{1} \times 3 \quad 1 - \frac{1}{1} \times (-1) \quad -15 - \frac{1}{1} \times 4 \\ 5 - \frac{5}{1} \times 1 \quad 2 - \frac{5}{1} \times 1 \quad -1 - \frac{5}{1} \times (-2) \quad -1 - \frac{5}{1} \times 1 \quad 2 - \frac{5}{1} \times 3 \quad 1 - \frac{5}{1} \times (-1) \quad -3 - \frac{5}{1} \times 4 \\ -3 - \frac{(-3)}{1} \times 1 \quad -1 - \frac{(-3)}{1} \times 1 \quad 3 - \frac{(-3)}{1} \times (-2) \quad 3 - \frac{(-3)}{1} \times 1 \quad 1 - \frac{(-3)}{1} \times 3 \quad 3 - \frac{(-3)}{1} \times (-1) \quad 16 - \frac{(-3)}{1} \times 4 \\ 4 - \frac{4}{1} \times 1 \quad 3 - \frac{4}{1} \times 1 \quad 1 - \frac{4}{1} \times (-2) \quad -6 - \frac{4}{1} \times 1 \quad -3 - \frac{4}{1} \times 3 \quad -2 - \frac{4}{1} \times (-1) \quad -27 - \frac{4}{1} \times 4 \end{array}$$

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

$$\bar{T}_6 = \frac{11.210}{-11.210} = -1$$

$$\bar{T}_5 = \frac{(1.222 - 9.667 \times \bar{T}_6)}{4.222} = \frac{1.222 - 9.667 \times (-1)}{4.222} = 2$$

$$\bar{T}_4 = \frac{(-16.142 + 0.571 \times \bar{T}_5 + 4.714 \times \bar{T}_6)}{-2.571} = \frac{-16.142 + 0.571 \times 2 + 4.714 \times (-1)}{-2.571} = 4$$

$$\bar{T}_4 = 4$$

$$\bar{T}_3 = \frac{(-11 + 2 \times \bar{T}_4 + 4.333 \times \bar{T}_5 - 1.333 \times \bar{T}_6)}{2.333} = \frac{-11 + 2 \times 4 + 4.333 \times 2 - 1.333 \times (-1)}{2.333} = 3$$

$$\bar{T}_3 = 3$$

$$\bar{T}_2 = \frac{12 - 5 \times \bar{T}_3 - 0 \times \bar{T}_4 + 5 \times \bar{T}_5 + 1 \times \bar{T}_6}{-3} = \frac{12 - 5 \times 3 - 0 + 5 \times 2 + 1 \times (-1)}{-3} = -2$$

$$\bar{T}_2 = -2$$

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

$$\bar{T}_1 = -1$$

$$\bar{T}_1 = -1$$

$$\bar{T}_2 = -2$$

$$\bar{T}_3 = 3$$

$$\bar{T}_4 = 4$$

$$\bar{T}_5 = 2$$

$$\bar{T}_6 = -1$$

1	1	2	1	3	-1	4
0	-3	5	0	-5	-1	12
0	$2 - \frac{2}{3}(-3)$	$-1 - \frac{2}{3}(-3)$	$-2 - \frac{2}{3}(0)$	$-1 - \frac{2}{3}(-5)$	$2 - \frac{2}{3}(-1)$	$-19 - \frac{2}{3}(12)$
0	$-3 - \frac{(-3)(-3)}{-3}$	$9 - \frac{(-3)(-3)}{-3}$	$-6 - \frac{(-3)(0)}{-3}$	$-13 - \frac{(-3)(-5)}{-3}$	$6 - \frac{(-3)(-1)}{-3}$	$-23 - \frac{(-3)(12)}{-3}$
0	$2 - \frac{2}{3}(-3)$	$-4 - \frac{2}{3}(-3)$	$6 - \frac{2}{3}(0)$	$10 - \frac{2}{3}(-5)$	$0 - \frac{2}{3}(-1)$	$28 - \frac{2}{3}(12)$
0	$-1 - \frac{(-1)}{3}(-3)$	$9 - \frac{(-1)}{3}(-3)$	$-10 - \frac{2}{3}(0)$	$-15 - \frac{2}{3}(-5)$	$2 - \frac{2}{3}(-1)$	$-43 - \frac{2}{3}(12)$

1	1	-2	1	3	-1	4
0	-3	5	0	-5	-1	12
0	0	$\frac{7}{3}$	2	$-13/3$	$4/3$	-11
0	0	4	-6	-8	7	35
0	0	$-\frac{2}{3}$	6	$\frac{20}{3}$	$-\frac{2}{3}$	36
0	0	$\frac{22}{3}$	-10	$-\frac{40}{3}$	$\frac{7}{3}$	-47

1	1	-2	1	3	-1	4
0	-3	5	0	5	-1	12
0	0	$\frac{7}{3}$	-2	$-4.33$	$1.33$	-11
0	0	$4 - \frac{4}{2.333}$	$-6 - \frac{4}{2.333}(-2)$	$-8 - \frac{4}{2.333}(4.33)$	$7 - \frac{4}{2.333}(1.33)$	-11
0	0	$-\frac{2}{3} - \frac{2}{7.3}$	$6 - \frac{(-0.667)}{2.333}(-2)$	$6 - \frac{(-0.667)}{2.333}(-4.33)$	$-0.667 - \frac{(-0.667)}{2.333}(1.33)$	-11
0	0	$7.3 - \frac{7.3}{2.3}$	$-10 - \frac{7.33}{2.333}(-2)$	$-13.33 - \frac{7.33}{2.333}(-4.33)$	$2.333 - \frac{(7.33)}{2.333}(1.33)$	-11

4

12

-11

$-35 - \frac{4}{2.3}(-11)$

$36 - \frac{(-0.667)}{2.3}(-11)$

$2.3$

$-47 - \frac{(7.3)}{2.33}(-11)$

1	1	-2	1	3	-1	4
0	-3	5	0	-5	-1	12
0	0	2.333	-2	-4.33	1.333	-11
0	0	0	-2.571	-0.571	4.714	-16.142
0	0	0	5.428	5.428	-0.285	32.857
0	0	0	-3.714	0.285	-1.857	-12.428

$$\begin{bmatrix}
 1 & 1 & -2 & 1 & 3 & -1 \\
 0 & -3 & 5 & 0 & -5 & -1 \\
 0 & 0 & 2.33 & -2 & -4.33 & 1.33 \\
 0 & 0 & 0 & -2.571 & -0.571 & 4.714 \\
 0 & 0 & 0 & 5.43 - \frac{5.43}{-2.571}(-2.571) & 5.428 - \frac{5.43}{-2.571}(-0.571) & -0.285 - \frac{5.428}{-2.571}(4.714) \\
 0 & 0 & 0 & -3.71 - \frac{(-3.71)}{-2.571}(-2.571) & 0.285 - \frac{(-3.71)}{-2.571}(-0.571) & -1.857 - \frac{(-3.71)}{-2.571}(4.714)
 \end{bmatrix}$$

$$\begin{bmatrix}
 4 \\
 12 \\
 -11 \\
 -16.142 \\
 32.857 - \frac{5.428}{-2.571}(-16.142) \\
 -12.428 - \frac{(-3.71)}{-2.571}(4.714)
 \end{bmatrix}$$

$$\begin{bmatrix}
 1 & 1 & -2 & 1 & 3 & -1 & 4 \\
 0 & -3 & 5 & 0 & -5 & -1 & 12 \\
 0 & 0 & 2.333 & -2 & -4.33 & 1.33 & -11 \\
 0 & 0 & 0 & -2.571 & -0.571 & 4.714 & -16.142 \\
 0 & 0 & 0 & 0 & 4.22 & 9.667 & -1.222 \\
 0 & 0 & 0 & 0 & 1.11 & -8.667 & 10.889
 \end{bmatrix}$$

$$\begin{bmatrix}
 1 & 1 & -2 & 1 & 3 & -1 & 4 \\
 0 & -3 & 5 & 0 & -5 & -1 & 12 \\
 0 & 0 & 2.333 & -2 & -4.33 & 1.33 & -11 \\
 0 & 0 & 0 & -2.571 & -0.571 & 4.714 & -16.142 \\
 0 & 0 & 0 & 0 & 4.22 & 9.667 & -1.222 \\
 0 & 0 & 0 & 0 & 1.11 - \frac{1.11}{4.22}(4.22) & -8.667 - \frac{1.11}{4.22}(9.667) & 10.889 - \frac{1.11}{4.22}(-1.222)
 \end{bmatrix}$$

$$\begin{bmatrix}
 1 & 1 & -2 & 1 & 3 & -1 \\
 0 & -3 & 5 & 0 & -5 & -1 \\
 0 & 0 & 2.33 & -2 & -4.33 & 1.33 \\
 0 & 0 & 0 & -2.571 & -0.571 & 4.714 \\
 0 & 0 & 0 & 0 & 4.22 & 9.667 \\
 0 & 0 & 0 & 0 & 0 & -11.21
 \end{bmatrix}
 \begin{bmatrix}
 \bar{r}_1 \\
 \bar{r}_2 \\
 \bar{r}_3 \\
 \bar{r}_4 \\
 \bar{r}_5 \\
 \bar{r}_6
 \end{bmatrix}
 =
 \begin{bmatrix}
 4 \\
 12 \\
 -11 \\
 -16.142 \\
 -1.222 \\
 11.210
 \end{bmatrix}$$