

### ASSIGNMENT 3

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DEPARTMENT: CHEMICAL ENGINEERING

COURSE CODE: ENG 382

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

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

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

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

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

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

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

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 2 - \frac{2}{1}x_1 & -1x - \frac{2}{1}x_1 & 1 - \frac{2}{1}x - 2 & 2 - \frac{2}{1}x_1 & 1 - \frac{2}{1}x_3 & -3 - \frac{2}{1}x - 1 \\ 1 - \frac{1}{1}x_1 & 3 - \frac{1}{1}x_1 & -3 - \frac{1}{1}x - 2 & -1 - \frac{1}{1}x_1 & 2 - \frac{1}{1}x_3 & 1 - \frac{1}{1}x - 1 \\ 5 - \frac{5}{1}x_1 & 2 - \frac{5}{1}x_1 & -1 - \frac{5}{1}x - 2 & -1 - \frac{5}{1}x_1 & 2 - \frac{5}{1}x_3 & 1 - \frac{5}{1}x_1 \\ -3x - \frac{3}{1}x_1 & -1 - \frac{3}{1}x_1 & 2 - \frac{3}{1}x - 2 & 3 - \frac{3}{1}x_1 & 1 - \frac{3}{1}x_3 & 3 - \frac{3}{1}x - 1 \\ 4x - \frac{4}{1}x_1 & 3 - \frac{4}{1}x_1 & 1 - \frac{4}{1}x - 2 & -6 - \frac{4}{1}x_1 & -3 - \frac{4}{1}x_3 & -2 - \frac{4}{1}x - 1 \end{bmatrix}$$

$$\begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \\ y_5 \\ y_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 20 - \frac{2}{1}x_4 \\ -15 - \frac{1}{1}x_1 \\ -3 - \frac{5}{1}x_4 \\ 16 - \frac{3}{1}x_4 \\ -27 - \frac{4}{1}x_1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & 1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 2 & -1 & -2 & -1 & 2 \\ 0 & -3 & -9 & -6 & -13 & 6 \\ 0 & 2 & -3 & 6 & 10 & 0 \\ 0 & -1 & 9 & -10 & -15 & 2 \end{bmatrix} \quad \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \\ y_5 \\ y_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -19 \\ -23 \\ 28 \\ -43 \end{bmatrix}$$



$$\left[ \begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & T_1 \\ 0 & -3 & 5 & 0 & -5 & -1 & T_2 \\ 0 & 0 & 2.33 & -2 & -4.33 & 1.33 & T_3 \\ 0 & 0 & 4 & -6 & -8 & 6 & T_4 \\ 0 & 0 & -0.67 & 6 & 6.67 & -0.67 & T_5 \\ 0 & 0 & 4.33 & -10 & -13.33 & 2.33 & T_6 \end{array} \right] \begin{array}{c} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{array} \begin{array}{c} 4 \\ 12 \\ -11 \\ -35 \\ 36 \\ -47 \end{array}$$

$$\left[ \begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & T_1 \\ 0 & -3 & 5 & 0 & -5 & -1 & T_2 \\ 0 & 0 & 2.33 & -2 & -4.33 & 1.33 & T_3 \\ 0 & 0 & 0 & -2.57 & -0.57 & 4.71 & T_4 \\ 0 & 0 & 0 & 5.43 & 5.43 & -0.29 & T_5 \\ 0 & 0 & 0 & -3.71 & 0.29 & -1.55 & T_6 \end{array} \right] \begin{array}{c} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{array} \begin{array}{c} 4 \\ 12 \\ -11 \\ -16.14 \\ 32.86 \\ -12.43 \end{array}$$

$$\left[ \begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 3 & -1 & T_1 \\ 0 & -3 & 5 & 0 & -5 & -1 & T_2 \\ 0 & 0 & 2.33 & -2 & -4.33 & 1.33 & T_3 \\ 0 & 0 & 0 & -2.57 & -0.57 & 4.71 & T_4 \\ 0 & 0 & 0 & 0 & 4.22 & 9.67 & T_5 \\ 0 & 0 & 0 & 0 & 1.11 & -8.67 & T_6 \end{array} \right] \begin{array}{c} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{array} \begin{array}{c} 4 \\ 12 \\ -11 \\ -16.14 \\ -1.22 \\ 10.89 \end{array}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 2.33 & -2 & -4.33 & 1.33 \\ 0 & 0 & 0 & -2.57 & 0.57 & 4.91 \\ 0 & 0 & 0 & 0 & 4.22 & 9.67 \\ 0 & 0 & 0 & 0 & 0 & -11.21 \end{bmatrix} \begin{bmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{bmatrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -16.14 \\ -1.22 \\ -11.21 \end{bmatrix}$$

$$-11.21 T_6 = 11.21$$

$$T_6 = \underline{11.21}$$

$$-11.21 = -11.21$$

$$4.22 T_5 + 9.67 T_6 = -1.22$$

$$4.22 T_5 + 9.67(-1) = -1.22$$

$$T_5 = 8.45$$

$$4.22$$

$$T_5 = 2.002 \approx 2$$

$$-2.57 T_4 + 0.57 T_5 + 4.91 T_6 = -16.14$$

$$-2.57 T_4 + 1.14 - 4.91 = -16.14$$

$$-2.57 T_4 = -16.14 - 1.14 + 4.91$$

$$T_4 = 4.89$$

$$2.33 T_3 - 2 T_4 - 4.33 T_5 + 1.33 T_6 = -11$$

$$2.33 T_3 - 2(4.89) - 4.33(2) + 1.33(-1) = -11$$



$$2.33T_3 - 9.78 - 8.66 - 1.33 = -11$$

$$T_3 = 3.76$$

$$-3T_2 + 5T_3 - 5T_5 - T_6 = 12$$

$$-3T_2 + 18.8 - 10 + 1 = 12$$

$$T_2 = -0.73$$

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

$$T_1 - 0.73 - 7.52 + 4.89 + 6 + 1 = 4$$

$$T_1 = 4 - 3.64$$

$$T_1 = 0.36$$

$$T_1 = 0.36$$

$$T_4 = 4.89$$

$$T_2 = -0.73$$

$$T_5 = 2$$

$$T_3 = 3.76$$

$$T_6 = -1$$