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ELECT/ELECT

ENG 382

Assignment 2

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

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

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

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

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

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

Answer

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

$$F_1 = 2$$

$$F_2 = 1$$

$$F_3 = 5$$

$$F_4 = -3$$

$$F_5 = 4$$

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

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		128
0	-1	9	10	-15	2	T_6		43

$$F_1 = -2/3$$

$$F_2 = -1$$

$$F_3 = -2/3$$

$$F_4 = 1/3$$

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

1	1	-2	1	3	-1	T_1		4
0	-3	5	0	-5	-1	T_2		12
0	0	$7/3$	-2	$-13/3$	$4/3$	T_3	=	-11
0	0	4	-6	-8	7	T_4		-35
0	0	$-2/3$	6	$20/3$	$-2/3$	T_5		36
0	0	$22/3$	-10	$-40/3$	$7/3$	T_6		47

$$F_1 = 12/7, F_2 = -2/7, F_3 = 22/7$$

1	1	-2	1	3	-1	T_1		4
0	-3	5	0	-5	-1	T_2		12
0	0	$7/3$	-2	$-13/3$	$4/3$	T_3	=	-11
0	0	$4 - 12/7(7/3)$	$-6 - 12/7(-2)$	$-8 - 12/7(-13/3)$	$7 - 12/7(4/3)$	T_4		$-35 - 12/7(-11)$
0	0	$-2/3 + 2/7(7/3)$	$6 + 2/7(-2)$	$20/3 + 2/7(-13/3)$	$-2/3 + 2/7(4/3)$	T_5		$36 + 2/7(-11)$
0	0	$22/3 - 22/7(7/3)$	$-10 - 22/7(-2)$	$-40/3 - 22/7(-13/3)$	$7/3 - 22/7(4/3)$	T_6		$-47 - 22/7(-11)$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 7/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 0 & -18/7 & -4/7 & 33/7 \\ 0 & 0 & 0 & 38/7 & 38/7 & -2/7 \\ 0 & 0 & 0 & -26/7 & 2/7 & -13/7 \end{bmatrix} \begin{matrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{matrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -113/7 \\ 230/7 \\ -87/7 \end{bmatrix}$$

$$F_1 = -19/9, F_2 = 13/9$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 7/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 0 & -18/7 & -4/7 & 33/7 \\ 0 & 0 & 0 & 38/7 + 19/7(-18/7) & 38/7 + 19/7(-4/7) & -2/7 + 19/7(33/7) \\ 0 & 0 & 0 & -26/7 - 13/7(-18/7) & 2/7 - 13/7(-4/7) & -13/7 - 13/7(33/7) \end{bmatrix} \begin{matrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{matrix} = \begin{bmatrix} 4 \\ 12 \\ -11 \\ -113/7 \\ 230/7 + 19/7(-113/7) \\ -87/7 - 13/7(-113/7) \end{bmatrix}$$

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

$$F_1 = 5/19$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & 7/3 & -2 & -13/3 & 4/3 \\ 0 & 0 & 0 & -18/7 & -4/7 & 33/7 \\ 0 & 0 & 0 & 0 & 38/9 & 29/3 \\ 0 & 0 & 0 & 0 & 10/9 - 5/19(38/9) & -26/3 - 5/19(29/3) \end{bmatrix} \begin{matrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{matrix} = \begin{bmatrix} 4 \\ 12 \\ -13 \\ -113/7 \\ -11/9 \\ 98/9 - 5/19(-11/9) \end{bmatrix}$$

$$\begin{array}{c|c|c} \begin{pmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 0 & -3 & 5 & 0 & -5 & -1 \\ 0 & 0 & \frac{7}{3} & -2 & -\frac{13}{3} & \frac{4}{3} \\ 0 & 0 & 0 & -\frac{18}{7} & -\frac{4}{7} & -\frac{33}{7} \\ 0 & 0 & 0 & 0 & \frac{38}{9} & \frac{29}{3} \\ 0 & 0 & 0 & 0 & 0 & -\frac{213}{19} \end{pmatrix} & \begin{pmatrix} T_1 \\ T_2 \\ T_3 \\ T_4 \\ T_5 \\ T_6 \end{pmatrix} & \begin{pmatrix} 4 \\ 12 \\ -11 \\ -11\frac{3}{7} \\ -11\frac{1}{9} \\ 21\frac{3}{19} \end{pmatrix} \end{array}$$

$$\frac{-213}{19} T_6 = 21\frac{3}{19}$$

$$T_6 = \frac{213}{19} \times \frac{-19}{213} = -1$$

$$\frac{38}{9} T_5 + \frac{29}{3} T_6 = -11$$

$$T_5 = \left(\frac{11}{9} + \frac{29}{3} \right) \times \frac{9}{38} = 2$$

$$T_4 = \left(-11\frac{3}{7} + 8\frac{1}{7} + \frac{33}{7} \right) \times \frac{-7}{18} = 4$$

$$T_3 = \left(-11 + 8 + \frac{26}{3} + \frac{4}{3} \right) \times \frac{3}{7} = 3$$

$$T_2 = \frac{12 - 15 + 6 - 1}{-3}$$

$$= -2$$

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

$$\therefore T_1 = 1$$

$$T_2 = -2$$

$$T_3 = 3$$

$$T_4 = 4$$

$$T_5 = 2$$

$$T_6 = -1$$