

For

$$a_{31} = 1 - (1)1 = 0$$

$$a_{32} = 3 - (1)1 = 2$$

$$a_{33} = -3 - (1)(-2) = -1$$

$$a_{34} = -1 - (1)1 = -2$$

$$a_{35} = 2 - (1)3 = -1$$

$$a_{36} = 1 - (1)(-1) = 2$$

$$a_{37} = 1 - (1)4 = -19$$

To make $a_{41} = 0$

Row 4 - (a_{41}/a_{11}) Row 1; But $a_{41}/a_{11} = 5$

$$a_{41} = 5 - (5)1 = 0$$

$$a_{42} = 2 - (5)1 = -3$$

$$a_{43} = -3 - (5)(-2) = 7$$

$$a_{44} = -1 - (5)(1) = -6$$

$$a_{45} = 2 - (5)3 = -13$$

$$a_{46} = 1 - (5)(-1) = 6$$

$$a_{47} = -3 - (5)4 = -23$$

To make $a_{51} = 0$

Row 5 - (a_{51}/a_{11}) Row 1; But $a_{51}/a_{11} = -3$

$$a_{51} = -3 - (-3)1 = 0$$

$$a_{52} = -1 - (-3)1 = 2$$

$$a_{53} = 2 - (-3)(-2) = -4$$

$$a_{54} = 3 - (-3)1 = 6$$

$$a_{55} = 1 - (-3)3 = 10$$

$$a_{56} = 3 - (-3)(-1) = 0$$

$$a_{57} = 16 - (-3)4 = 28$$

To make $a_{61} = 0$

Row 6 - (a_{61}/a_{11}) Row 1; But $a_{61}/a_{11} = 1$

$$a_{61} = 4 - (1)1 = 0$$

$$a_{62} = 5 - (4)1 = -1$$

$$a_{63} = 1 - (11)(-3) = 7$$

$$a_{64} = -1 - (4)1 = -5$$

$$a_{65} = -3 - (4)3 = -15$$

$$a_{66} = -3 - (4)(-1) = 2$$

$$a_{67} = -27 - (4)4 = -43$$

1	1	-2	1	3	-1	4
0	-3	5	0	-5	-1	12
0	2	-1	-2	-1	2	-19
0	-3	9	-6	-13	6	-23
0	3	-4	6	-10	0	28
0	-1	9	-5	-15	2	-43

To make $a_{32} = 0$

Row 3 - (a_{32}/a_{22}) Row 2; But $a_{33}/a_{22} = -2/3$

$$a_{32} = 2 - (-2/3)(-3) = 0$$

$$= -1 - (-2/3)(5) = 7/3$$

$$= -2 - (-2/3)(0) = -2$$

$$= -1 - (-2/3)(-5) = -18/3$$

$$= 2 - (-2/3)(-1) = 4/3$$

$$= -19 - (-2/3)(12) = -11$$

To make $a_{42} = 0$

Row 4 - (a_{42}/a_{22}) Row 2; But $a_{42}/a_{22} = 1$

$$-3 - (1)(-3) = 0$$

$$9 - (1)(5) = 4$$

$$-6 - (1)(0) = -6$$

$$-13 - (1)(-3) = -10$$

$$= 6 - (1)(-1) = 7$$

$$= -23 - (1)12 = -35$$

To make $a_{52} = 0$

Row 5 - (a_{52}/a_{22}) Row 2; But $a_{52}/a_{22} = -2/3$

$$\text{For } a_{52} = 2 - (-2/3)(-3) = 0$$

$$= -9 - (-2/3)(15) = -2/3$$

$$= 6 - (-2/3)(10) = 6$$

$$= 10 - (-2/3)(-5) = 20/3$$

$$= 0 - (-2/3)(-1) = -2/3$$

$$= 28 - (-2/3)12 = 36$$

To make $a_{62} = 0$

Row 6 - (a_{62}/a_{22}) Row 2; But $a_{62}/a_{22} = 1/3$

$$\text{For } a_{62} = -1 - (1/3)(-3) = 0$$

$$= 9 - (1/3)(15) = 22/3$$

$$= -5 - (1/3)0 = -5$$

$$= -18 - (1/3)(-6) = -40/3$$

$$= 2 - (1/3)(-1) = 7/3$$

$$= -43 - (1/3)12 = -47$$

$$\left[\begin{array}{cccccc|c} 1 & 1 & 2 & 1 & 3 & -1 & 4 \\ 0 & -3 & 5 & 0 & -5 & -1 & 12 \\ 0 & 0 & 7/3 & -2 & -13/3 & 4/3 & -4 \\ 0 & 0 & 4 & -6 & -8 & 7 & -25 \\ 0 & 0 & -2/3 & 6 & 20/3 & -2/3 & 36 \\ 0 & 0 & 22/3 & -5 & -40/3 & 7/3 & -47 \end{array} \right]$$

To make $a_{43} = 0$

Row 4 - (a_{43}/a_{33}) Row 3 ; But $a_{43}/a_{33} = 12/7$

$$\begin{aligned} \text{For } a_{43} &= 4 - (12/7)(7/3) = 0 \\ &= -6 - (12/7)(-2) = -18/7 \\ &= -8 - (12/7)(-13/3) = -4/7 \\ &= 7 - (12/7)(4/3) = 33/7 \\ &= -35 - (12/7)(-11) = -113/7 \end{aligned}$$

To make $a_{53} = 0$

Row 5 - (a_{53}/a_{33}) Row 3 ; But $a_{53}/a_{33} = -2/7$

$$\begin{aligned} \text{For } a_{53} &= -2/3 - (-2/7)(7/3) = 0 \\ &= 6 - (-2/7)(-2) = 38/7 \\ &= 20/3 - (-2/7)(-13/3) = 38/7 \\ &= -2/3 - (-2/7)(4/3) = -2/7 \\ &= 36 - (-2/7)(-11) = 230/7 \end{aligned}$$

To make $a_{63} = 0$

Row 6 - (a_{63}/a_{33}) Row 3 ; But $a_{63}/a_{33} = 22/7$

$$\begin{aligned} \text{For } a_{63} &= 22/3 - (22/7)(7/3) = 0 \\ &= -5 - (22/7)(-2) = 9/7 \\ &= -40/3 - (22/7)(-13/3) = 2/7 \\ &= 7/3 - (22/7)(4/3) = -13/7 \\ &= -47 - (22/7)(-11) = -87/7 \end{aligned}$$

$$\left[\begin{array}{cccccc|c} 1 & 1 & -3 & 1 & 5 & -1 & 4 \\ 0 & -3 & 5 & 0 & -5 & -1 & 12 \\ 0 & 0 & 7/3 & -2 & -13/3 & -13/3 & -11 \\ 0 & 0 & 0 & -18/7 & -4/7 & -4/7 & -113/7 \\ 0 & 0 & 0 & 38/7 & 38/7 & 38/7 & 230/7 \\ 0 & 0 & 0 & 9/7 & 2/7 & 2/7 & -87/7 \end{array} \right]$$

To make

$$a_{54} = 0$$

Row 5 - (a_{54}/a_{44}) Row 4; But $a_{54}/a_{44} = 19/9$

$$\text{For } a_{54} = 38/7 - (-19/9)(-11/7) = 0$$

$$= 38/7 - (-19/9)(-11/7) = 38/9$$

$$= -2/7 - (-19/9)(33/7) = 29/5$$

$$= 280/7 - (-19/9)(-113/7) = -11/9$$

To make $a_{64} = 0$

Row 6 - (a_{64}/a_{44}) Row 4; But $a_{64}/a_{44} = -1/2$

$$\text{For } a_{64} = 9/7 - (-1/2)(-18/7) = 0$$

$$= 2/7 - (-1/2)(-9/7) = 0$$

$$= -13/7 - (-1/2)(33/7) = 4/2$$

$$= -87/7 - (-1/2)(-113/7) = -41/2$$

$$\left[\begin{array}{cccccc|c} 1 & 1 & -2 & 1 & 5 & -1 & 4 \\ 0 & -3 & 5 & 0 & -5 & -1 & 12 \\ 0 & 0 & 7/5 & -2 & -13/5 & 4/5 & -4 \\ 0 & 0 & 0 & -18/7 & -4/7 & 23/7 & -113/7 \\ 0 & 0 & 0 & 0 & 38/9 & 29/5 & -11/9 \\ 0 & 0 & 0 & 0 & 0 & 1/2 & -41/2 \end{array} \right]$$

To make $a_{65} = 0$

Row 6 - (a_{65}/a_{55}) Row 5; But $a_{65}/a_{55} = 0$

$$\text{For } a_{65} = 0 - (0)(38/9) = 0$$

$$= 1/2 - (0)(29/5) = 1/2$$

$$= -41/2 - (0)(-11/9) = -41/2$$

$$\left[\begin{array}{ccccc|c} 1 & 1 & -2 & 1 & -1 & 4 \\ 0 & -3 & 5 & 0 & -1 & 12 \\ 0 & 0 & 7/3 & -2 & 4/3 & -11 \\ 0 & 0 & 0 & -11/7 & 33/7 & -113/7 \\ 0 & 0 & 0 & 0 & 21/3 & -11/9 \\ 0 & 0 & 0 & 0 & 1/2 & -41/2 \end{array} \right]$$

$$0T_1 + 0T_2 + 0T_3 + 0T_4 + 0T_5 + 1/2(T_6) = -4/2$$

$$T_6/2 = -14/2$$

$$T_6 = -41$$

$$0T_1 + 0T_2 + 0T_3 + 0T_4 + 38/9 T_5 + 21/6 T_6 = -11/9$$

$$\frac{38T_5}{9} + \frac{21}{3}(-41) = -11/9$$

$$\frac{38T_5}{9} = \frac{3556}{9}$$

$$T_5 = \frac{3556}{38} = 93.5789$$

$$0T_1 + 0T_2 + 0T_3 + (-18/7)T_4 + (-4/9)T_5 + (37/7)T_6 = -113/7$$

$$= \frac{18T_4}{7} - \frac{1016}{19} - \frac{1353}{7} = \frac{-113}{7}$$

$$\frac{-18T_4}{7} = \frac{8072}{133}$$

$$T_4 = -89.6842$$

$$0T_1 + 0T_2 + (7/3)T_3 + (-2)T_4 + (-13/3)T_5 + (4/3)T_6 = -11$$

$$\frac{7T_3}{3} - \left(2 \times \frac{1704}{19} \right) - \frac{13}{3} \times \frac{3556}{38} + \left(\frac{4}{3} \times -41 \right) = -11$$

$$\frac{7}{3}T_3 = -11 - \frac{3408}{19} + \frac{46228}{114} + \frac{164}{3}$$

$$T_3 = \frac{15374}{57} \times 3/7$$

$$T_3 = 115.6818$$

$$0T_1 + (-3)T_2 + (5)T_3 + (0)T_4 + (-5)T_5 + (-0)T_6 = 12$$

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

$$-3T_2 + \left(\frac{5 \times 46137}{399} \right) - \left(\frac{5 \times 3536}{38} \right) - (-41) = 12$$

$$-3T_2 = 12 - 41 - \frac{230685}{399} + \frac{17780}{38}$$

$$T_2 = \frac{-2646}{19} \div -3$$

$$T_2 = 46.434$$

$$T_1 + T_2 + (-2)T_3 + (0)T_4 + (3)T_5 + (-1)T_6 = 4$$

$$T_1 + \frac{882}{19} + \left(\frac{-2 \times 46137}{399} \right) + \left(\frac{-1704}{19} \right) + \left(\frac{3 \times 3556}{38} \right) + (-1 \times -41)$$

$$T_1 = 4 - 41 - \frac{882}{19} + \frac{92274}{399} + \frac{1704}{19} - \frac{10668}{8}$$

$$T_1 = -432105$$

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$$\begin{aligned} 1) \quad & \bar{T}_1 + \bar{T}_2 - 2\bar{T}_3 + \bar{T}_4 + 3\bar{T}_5 - \bar{T}_6 = 4 \\ & 2\bar{T}_1 - \bar{T}_2 + \bar{T}_3 + 2\bar{T}_4 + \bar{T}_5 - 3\bar{T}_6 = 20 \\ & \bar{T}_1 + 3\bar{T}_2 - 3\bar{T}_3 - \bar{T}_4 + 2\bar{T}_5 + \bar{T}_6 = -15 \\ & 3\bar{T}_1 + 2\bar{T}_2 - \bar{T}_3 - \bar{T}_4 + 2\bar{T}_5 + \bar{T}_6 = -3 \\ & -3\bar{T}_1 - \bar{T}_2 + 2\bar{T}_3 + 3\bar{T}_4 + \bar{T}_5 + 3\bar{T}_6 = 16 \\ & 4\bar{T}_1 + 3\bar{T}_2 + \bar{T}_3 - 6\bar{T}_4 - 3\bar{T}_5 - 2\bar{T}_6 = -27 \end{aligned}$$

$$\begin{bmatrix} 1 & 1 & -2 & 1 & 3 & -1 \\ 2 & -1 & 1 & 2 & 1 & -3 \\ 1 & 3 & -3 & -1 & 2 & 1 \\ 3 & 2 & -1 & -1 & 2 & 1 \\ -3 & -1 & 2 & 3 & 1 & 3 \\ 4 & 3 & 1 & -1 & -3 & -2 \end{bmatrix} \begin{pmatrix} \bar{T}_1 \\ \bar{T}_2 \\ \bar{T}_3 \\ \bar{T}_4 \\ \bar{T}_5 \\ \bar{T}_6 \end{pmatrix} = \begin{pmatrix} 4 \\ 20 \\ -15 \\ -3 \\ 16 \\ -27 \end{pmatrix}$$

To make $a_{21} = 0$
Row 2 - (a_{21}/a_{11}) Row 1 ; But $a_{21}/a_{11} = 2$

$$\text{For } a_{21}: 2 - (2)(1) = 0$$

$$a_{22} = -1 - (2)(1) = -3$$

$$a_{23} = 1 - (2)(-2) = 5$$

$$a_{24} = 2 - (2)(1) = 0$$

$$a_{25} = 1 - (2)(3) = -5$$

$$a_{26} = -3 - (2)(-1) = -1$$

$$a_{27} = 20 - (2)(4) = 12$$

To make $a_{31} = 0$

Row 3 - (a_{31}/a_{11}) Row 1 But $a_{31}/a_{11} = 1$