

Topic
Matrix calculation

$$6I_1 - 2I_2 = 28 \quad \text{----- Equ}^n \text{ (1)}$$

$$2I_1 - 3I_2 = 7 \quad \text{----- Equ}^n \text{ (2)}$$

Matrix $\begin{vmatrix} 6 & -2 \\ 2 & -3 \end{vmatrix} = \begin{vmatrix} 28 \\ 7 \end{vmatrix} \rightarrow \begin{vmatrix} a & b \\ c & d \end{vmatrix} = \begin{vmatrix} x \\ y \end{vmatrix}$ Determinant, $D = a.d - b.c$

$$D_x = \begin{vmatrix} x & b \\ y & d \end{vmatrix} \quad \text{Determinant, } D_x = x.d - b.y \quad x = D_x/D = (x.d - b.y) \div (a.d - b.c)$$

$$D_y = \begin{vmatrix} a & x \\ c & y \end{vmatrix} \quad \text{Determinant, } D_y = a.y - x.c \quad y = D_y/D = (a.y - x.c) \div (a.d - b.c)$$

$$6I_1 - 2I_2 = 28 \quad \text{----- Equ}^n \text{ (1)}$$

$$2I_1 - 3I_2 = 7 \quad \text{----- Equ}^n \text{ (2)}$$

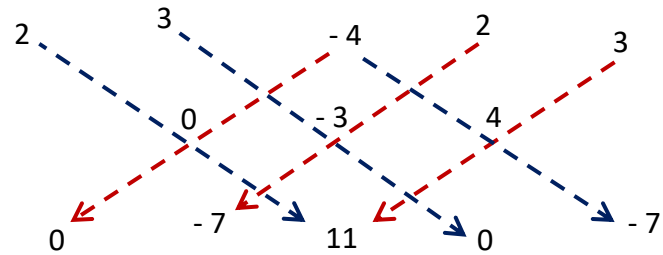
$$I_1 = \frac{\begin{vmatrix} 28 & -2 \\ 7 & -3 \end{vmatrix}}{\begin{vmatrix} 6 & -2 \\ 2 & -3 \end{vmatrix}} = \frac{-84 + 14}{-18 + 4} = 5A$$

$$I_2 = \frac{\begin{vmatrix} 6 & 28 \\ 2 & 7 \end{vmatrix}}{\begin{vmatrix} 6 & -2 \\ 2 & -3 \end{vmatrix}} = \frac{42 - 56}{-18 + 4} = 1A$$

$$\begin{array}{l}
 2x + 3y - 4z = 6 \dots\dots\dots(1) \\
 4x - 3z = -11 \dots\dots\dots(2) \\
 -7y + 11z = 0 \dots\dots\dots(3)
 \end{array}
 \longrightarrow
 \begin{array}{c}
 \left. \begin{array}{ccc} 2 & 3 & -4 \\ 4 & 0 & -3 \\ 0 & -7 & 11 \end{array} \right\} = \left| \begin{array}{c} 6 \\ -11 \\ 0 \end{array} \right|
 \end{array}$$

Determinant, D =

$$\begin{array}{ccccc}
 \left. \begin{array}{ccc} 2 & 3 & -4 \\ 4 & 0 & -3 \\ 0 & -7 & 11 \end{array} \right\} & \left. \begin{array}{cc} 2 & 3 \\ 4 & 0 \\ 0 & -7 \end{array} \right\} \\
 2 & 3 & -4 & 2 & 3 \\
 4 & 0 & -3 & 4 & 0 \\
 0 & -7 & 11 & 0 & -7
 \end{array}$$



$$\begin{aligned}
 D &= (2 \cdot 0 \cdot 11) + (3 \cdot -3 \cdot 0) + (-4 \cdot 4 \cdot -7) - (3 \cdot 4 \cdot 11) - (2 \cdot -3 \cdot -7) - (-4 \cdot 0 \cdot 0) \\
 &= 0 + 0 + 112 - 132 - 42 - 0 \\
 &= -62
 \end{aligned}$$

Alternatively,

$$\begin{aligned}
 D &= \left(2 \begin{vmatrix} 0 & -3 \\ -7 & 11 \end{vmatrix} \right) - \left(3 \begin{vmatrix} 4 & -3 \\ 0 & 11 \end{vmatrix} \right) + \left(-4 \begin{vmatrix} 4 & 0 \\ 0 & -7 \end{vmatrix} \right) \\
 &= 2\{(0 \cdot 11) - (-3 \cdot -7)\} - 3\{(4 \cdot 11) - (-3 \cdot 0)\} + (-4)\{(4 \cdot -7) - (0 \cdot 0)\} \\
 &= (2) \cdot (-21) - (3) \cdot (44) + (-4) \cdot (-28) \\
 &= -42 - 132 + 112 \\
 &= -62
 \end{aligned}$$