

Topic List



ক্রেমারের সাহায্যে /নির্ণায়কের সাহায্যে সমীকরণের সমাধান।

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চলক নির্ণায়ক এবং সহগ নির্ণায়কের পরিচিত।

$$a_1x + b_1y + c_1z = d_1$$

$$a_2x + b_2y + c_2z = d_2$$

$$a_3x + b_3y + c_3z = d_3$$

$$x = \frac{D_x}{D}, y = \frac{D_y}{D}, z = \frac{D_z}{D}$$

$$D/\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$$

$$D_x = \begin{vmatrix} d_1 & b_1 & c_1 \\ d_2 & b_2 & c_2 \\ d_3 & b_3 & c_3 \end{vmatrix}$$

$$D_y = \begin{vmatrix} a_1 & d_1 & c_1 \\ a_2 & d_2 & c_2 \\ a_3 & d_3 & c_3 \end{vmatrix}$$

$$D_z = \begin{vmatrix} a_1 & b_1 & d_1 \\ a_2 & b_2 & d_2 \\ a_3 & b_3 & d_3 \end{vmatrix}$$

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$$x + 4y = 11, 4x - y = 10$$

$$D = \begin{vmatrix} 1 & 4 \\ 4 & -1 \end{vmatrix} = (-1 - 16) = -17$$

$$D_x = \begin{vmatrix} 11 & 4 \\ 10 & -1 \end{vmatrix} = (-11 - 40) = -51$$

$$D_y = \begin{vmatrix} 1 & 11 \\ 4 & 10 \end{vmatrix} = (10 - 44) = -34$$

$$x = \frac{D_x}{D} = \frac{-51}{-17} = 3$$

$$y = \frac{D_y}{D} = \frac{-34}{-17} = 2$$

$$\text{Ans: } (x, y) = (3, 2)$$

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$$x + y + z = 6, \quad x - y + 2z = 3, \quad 2x - 3y + z = 1$$

$$x = \frac{D_x}{D} = \frac{21}{7} = 3$$

$$D = \begin{vmatrix} 1 & 1 & 1 \\ 1 & -1 & 2 \\ 2 & -3 & 1 \end{vmatrix} = 1 \times \begin{vmatrix} -1 & 2 \\ -3 & 1 \end{vmatrix} - 1 \times \begin{vmatrix} 1 & 2 \\ 2 & 1 \end{vmatrix} + 1 \times \begin{vmatrix} 1 & -1 \\ 2 & -3 \end{vmatrix}$$

$$= (-1 + 6) - 1 \times (1 - 4) + 1 \times (-3 + 2)$$

$$= 5 + 3 - 1 = 7$$

$$y = \frac{D_y}{D} = ?$$

$$z = \frac{D_z}{D} = ?$$

$$D_y = \begin{vmatrix} 1 & 6 & 1 \\ 1 & 3 & 2 \\ 2 & 1 & 1 \end{vmatrix} = ?$$

$$D_x = \begin{vmatrix} 6 & 1 & 1 \\ 3 & -1 & 2 \\ 1 & -3 & 1 \end{vmatrix} = 6 \times \begin{vmatrix} -1 & 2 \\ -3 & 1 \end{vmatrix} - 1 \times \begin{vmatrix} 3 & 2 \\ 1 & 1 \end{vmatrix} + 1 \times \begin{vmatrix} 3 & -1 \\ 1 & -3 \end{vmatrix}$$

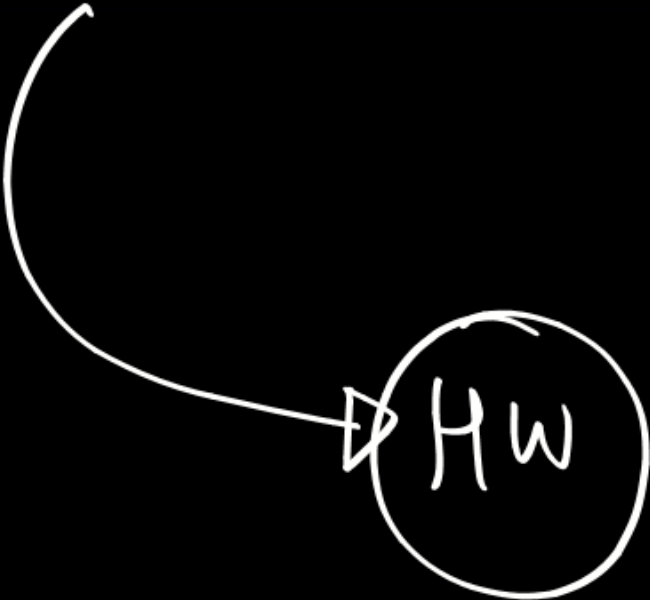
$$= 6 \times (-1 + 6) - 1 \times (3 - 2) + 1 \times (-9 + 1)$$

$$= 6 \times 5 - 1 + (-8) = 30 - 9 = 21$$

$$D_z = \begin{vmatrix} 1 & 1 & 6 \\ 1 & -1 & 3 \\ 2 & -3 & 1 \end{vmatrix} = ?$$

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$$x + 3y + 2z = 5, \quad 2x + y + 3z = 1, \quad 3x + 2y + z = 4 \quad (HW)$$

HW

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$$\frac{x}{5} - \frac{2y}{5} + z = 1,$$

$$x + \frac{y}{4} + \frac{3z}{4} = 1,$$

$$\frac{x}{3} - y + \frac{2z}{3} = 1$$

$$D = \begin{vmatrix} 1/5 & -2/5 & 1 \\ 1 & 1/4 & 3/4 \\ 1/3 & -1 & 2/3 \end{vmatrix} = ?$$

$$D_x = ?$$

$$x = \frac{D_x}{D}$$

$$D_y = ?$$

$$y = \frac{D_y}{D}$$

$$D_z = ?$$

$$z = \frac{D_z}{D}$$

Hw

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$A = \begin{bmatrix} 3 & 2 & 3 \\ 4 & 2 & 1 \\ 2 & 1 & -2 \end{bmatrix}, B = \begin{bmatrix} x \\ y \\ z \end{bmatrix}, D = \begin{bmatrix} 5 \\ 10 \\ 15 \end{bmatrix}$ হলে, নির্ণায়কের সাহায্যে $AB = D$ এর সমাধান কর।

$AB = D$

$\Rightarrow \begin{bmatrix} 3 & 2 & 3 \\ 4 & 2 & 1 \\ 2 & 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 10 \\ 15 \end{bmatrix}$

$\Rightarrow \begin{bmatrix} 3x + 2y + 3z \\ 4x + 2y + z \\ 2x + y - 2z \end{bmatrix} = \begin{bmatrix} 5 \\ 10 \\ 15 \end{bmatrix}$

$3x + 2y + 3z = 5$

$4x + 2y + z = 10$

$2x + y - 2z = 15$

$D = \begin{vmatrix} 3 & 2 & 3 \\ 4 & 2 & 1 \\ 2 & 1 & -2 \end{vmatrix} = ?$

$D_x = ?$

$D_y = ?$

$D_z = ?$

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ক্রমারসের *Special Case*

something $\rightarrow$ যেটা আছে
0

$$\frac{2}{0} = x$$

$$\Rightarrow 2 = x \cdot 0$$

$\rightarrow$ মান নেই

$\frac{0}{0} \rightarrow$ অনির্দিষ্ট
 $\rightarrow$ যেখানে

$$\frac{0}{0} = x$$

$$\Rightarrow 0 = x \cdot 0$$

$$x = \frac{D_x}{D}, y = \frac{D_y}{D}, z = \frac{D_z}{D}$$

(i) $D=0$, $\begin{Bmatrix} D_x \\ D_y \\ D_z \end{Bmatrix} \rightarrow$ Min 1টি $\neq 0$
 $\rightarrow$ কোন মান নেই

(ii) $D=0$, $\begin{Bmatrix} D_x \\ D_y \\ D_z \end{Bmatrix} = 0$
 $\rightarrow$ যেখানে

$x = \frac{0}{0}$ Not zero