

Adebayo Kassim Picking Methods for Matrices

PICK DIRECT METHOD

$$2x + y = 13$$

$$3x - 2y = -5$$

$$\text{First step, } 2x + y - 13 = 0$$

$$3x - 2y + 5 = 0$$

Next steps, pick the first two column coefficient i.e

$$\begin{vmatrix} 2 & 1 \\ 3 & -2 \end{vmatrix} \text{ then, leave one first column coefficient i.e } \begin{vmatrix} 2 \\ 3 \end{vmatrix}$$

Then, pick the next two column coefficients i.e 2nd and 3rd column coefficients

$$\begin{vmatrix} 1 & -13 \\ -2 & 5 \end{vmatrix} \text{ leave the 2nd}$$

Column coefficient $\begin{vmatrix} 1 \\ -2 \end{vmatrix}$ then, pick the third and first

$$\text{Column coefficient i.e. } \begin{vmatrix} 13 & 2 \\ 5 & 3 \end{vmatrix}$$

$$\Delta = \begin{vmatrix} 2 & 1 \\ 3 & -2 \end{vmatrix} = -4 - 3 = -7$$

$$\Delta_1 = \begin{vmatrix} 1 & -13 \\ -2 & 5 \end{vmatrix} = 5 - 26 = -21$$

$$\Delta_2 = \begin{vmatrix} -13 & 2 \\ 5 & 3 \end{vmatrix} = -39 - 10 = -49$$

$$x = \frac{\Delta_1}{\Delta} = \frac{-21}{-7} = 3$$

$$y = \frac{\Delta_2}{\Delta} = \frac{-49}{-7} = 7$$

$$x = 3, y = 7$$

<https://www.amazon.com/dp/B07QGY9Y3N>

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THREE EQUATIONS AND THREE UNKNOWN

$$2x + y + 3z = 16$$

$$x + 2y - z = -2$$

$$3x + y + 2z = 14$$

PICK DIRECT METHOD

$$\text{First step, } 2x + y + 3z - 16 = 0$$

$$x + 2y - z + 2 = 0$$

$$3x + y + 2z - 14 = 0$$

Net steps, pick the first three column coefficients i.e. 1st, 2nd and 3rd leave the first column

$$\begin{vmatrix} 2 & 1 & 3 \\ 1 & 2 & -1 \\ 3 & 1 & 2 \end{vmatrix}$$

Coefficient i.e. $\begin{vmatrix} 2 \\ 1 \\ 3 \end{vmatrix}$ then, pick the next three columns

Coefficient i.e 2nd, 3rd and 4th column coefficients

$$\begin{vmatrix} 1 & 3 & -16 \\ 2 & -1 & 2 \\ 1 & 2 & -14 \end{vmatrix} \text{ leave the 2nd column coefficients i.e. } \begin{vmatrix} 1 \\ 2 \\ 1 \end{vmatrix}$$

Then, pick the next three column coefficients i.e 3rd, 4th & 1st column coefficients

$$\begin{vmatrix} 3 & -16 & 2 \\ -1 & 2 & 1 \\ 2 & -14 & 3 \end{vmatrix} \text{ leave the third column coefficients } \begin{vmatrix} 1 \\ 2 \\ 1 \end{vmatrix}$$

Then, pick the next three column coefficients i.e. 3rd, 4th & 1st column coefficient

$$\begin{vmatrix} 3 & -16 & 2 \\ -1 & 2 & 1 \\ 2 & -14 & 3 \end{vmatrix} \text{ leave the third column coefficients } \begin{vmatrix} 3 \\ -1 \\ 2 \end{vmatrix} \text{ then pick the next three}$$

$$\text{column coefficients i.e. 4th 1st \& 2nd column coefficients } \begin{vmatrix} -16 & 2 & 1 \\ 2 & 1 & 2 \\ -14 & 3 & 1 \end{vmatrix}$$

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

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

$$= 2(5) - 1(5) + 3(-5)$$

$$= 10 - 5 - 15 = -10$$

$$\Delta_1 = \begin{vmatrix} 1 & 3 & -16 \\ 2 & -1 & 2 \\ 1 & 2 & -14 \end{vmatrix} = 1 \begin{vmatrix} -1 & 2 \\ 2 & -14 \end{vmatrix} - 3 \begin{vmatrix} 2 & 2 \\ 1 & -14 \end{vmatrix} - 16 \begin{vmatrix} 2 & -1 \\ 1 & 2 \end{vmatrix}$$

$$= 1(14 - 4) - 3(-28 - 2) - 16(4 - (-1))$$

$$= 1(10) - 3(-30) - 16(5)$$

$$= 10 + 90 - 80$$

$$= 20$$

$$\Delta_2 = \begin{vmatrix} 3 & -16 & 2 \\ -1 & 2 & 1 \\ 2 & -14 & 3 \end{vmatrix} = 3 \begin{vmatrix} 2 & 1 \\ -14 & 3 \end{vmatrix} - (-16) \begin{vmatrix} -1 & 1 \\ 2 & 3 \end{vmatrix} + 2 \begin{vmatrix} -1 & 2 \\ 2 & -14 \end{vmatrix}$$

$$= 3(6 + 14) + 16(-3 - 2) + 2(14 - 4)$$

$$= 3(20) + 16(-5) + 2(10)$$

$$= 60 - 80 + 20$$

$$= 0$$

$$\Delta_3 = \begin{vmatrix} -16 & 2 & 1 \\ 2 & 1 & 2 \\ -14 & 3 & 1 \end{vmatrix} = -16 \begin{vmatrix} 1 & 2 \\ 3 & 1 \end{vmatrix} - 2 \begin{vmatrix} 2 & 2 \\ -14 & 1 \end{vmatrix} + 1 \begin{vmatrix} 2 & 1 \\ -14 & 3 \end{vmatrix}$$

$$= -16(1-6) - 2(2+28) + 1(6+14)$$

$$= -16(-5) - 2(30) + 1(20)$$

$$= +80 - 60 + 20$$

$$= 40$$

$$x = \frac{\Delta_1}{\Delta} = \frac{-20}{-10} = 2$$

$$y = \frac{\Delta_2}{\Delta} = \frac{0}{-10} = 0$$

$$z = \frac{\Delta_3}{\Delta} = \frac{-40}{-10} = 4$$

$$x = 2, y = 0, z = 4$$

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