

# Assignment-2

AI24BTECH11027- R Sumanth

## I. VECTOR ARITHMETIC(CBSE)

**Question:**  $(-1, 2, 1)$ ,  $(1, -2, 5)$ ,  $(4, -7, 8)$  and  $(2, -3, 4)$  are the vertices of a parallelogram.

Variable	description	Value
<b>A</b>	Vertex <b>A</b>	$(-1, 2, 1)$
<b>B</b>	Vertex <b>B</b>	$(1, -2, 5)$
<b>C</b>	Vertex <b>C</b>	$(4, -7, 8)$
<b>D</b>	Vertex <b>D</b>	$(2, -3, 4)$

Table 1  
VARIABLES USED

**Solution:** property : opposite sides of parallelogram are equal.

**A** $(-1, 2, 1)$ , **B** $(1, -2, 5)$ , **C** $(4, -7, 8)$ , **D** $(2, -3, 4)$

$$AB = B - A = \begin{pmatrix} 1 - (-1) \\ -2 - 2 \\ 5 - 1 \end{pmatrix} = \begin{pmatrix} 2 \\ -4 \\ 4 \end{pmatrix} \quad (1)$$

$$BC = C - B = \begin{pmatrix} 4 - 1 \\ -7 - (-2) \\ 8 - 5 \end{pmatrix} = \begin{pmatrix} 3 \\ -5 \\ 3 \end{pmatrix} \quad (2)$$

$$CD = D - C = \begin{pmatrix} 2 - 4 \\ -3 - (-7) \\ 4 - 8 \end{pmatrix} = \begin{pmatrix} -2 \\ 4 \\ -4 \end{pmatrix} \quad (3)$$

$$DA = A - D = \begin{pmatrix} -1 - 2 \\ 2 - (-3) \\ 1 - 4 \end{pmatrix} = \begin{pmatrix} -3 \\ 5 \\ -3 \end{pmatrix} \quad (4)$$

Verify if  $AB$  is equal to  $CD$  and  $BC$  is equal to  $DA$ :

$$AB + CD = \begin{pmatrix} 2 \\ -4 \\ 4 \end{pmatrix} + \begin{pmatrix} -2 \\ 4 \\ -4 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \quad (5)$$

$$BC + DA = \begin{pmatrix} 3 \\ -5 \\ 3 \end{pmatrix} + \begin{pmatrix} -3 \\ 5 \\ -3 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \quad (6)$$

Since  $AB + CD = 0$  and  $BC + DA = 0$ , the quadrilateral formed by the points is a parallelogram.

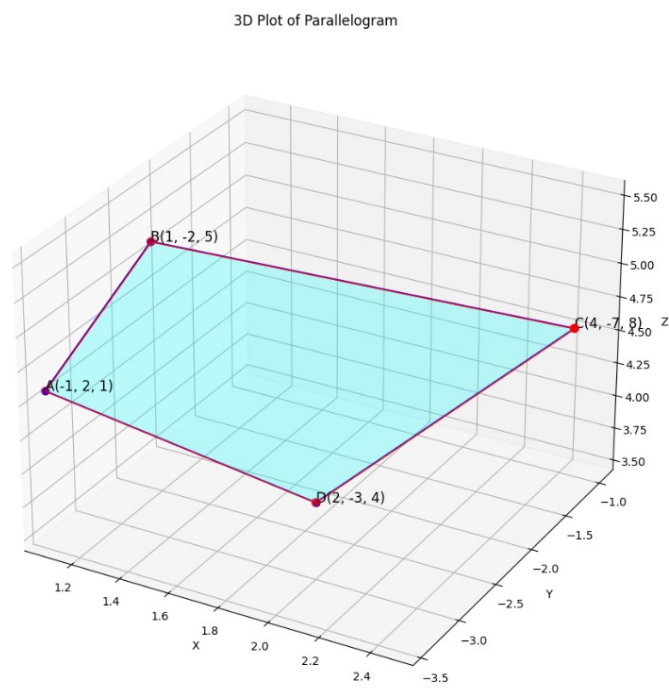


Fig. 1. Stem Plot of  $y(n)$