1.8.12

AI25BTECH11033–SNEHAMRUDULA

1.8.12: The perimeter of a triangle with vertices $(0,4)$, $(0,0)$ and $(3,0)$ is

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1) **Given:** Vertices of the triangle are

$$A = \begin{pmatrix}0\\4\end{pmatrix}, \quad B = \begin{pmatrix}0\\0\end{pmatrix}, \quad C = \begin{pmatrix}3\\0\end{pmatrix}$$

2) **Lengths of sides:**

$$AB = \|A - B\| = \left\|\begin{pmatrix}0\\4\end{pmatrix} - \begin{pmatrix}0\\0\end{pmatrix}\right\| = \left\|\begin{pmatrix}0\\4\end{pmatrix}\right\| = 4$$

$$BC = \|B - C\| = \left\|\begin{pmatrix}0\\0\end{pmatrix} - \begin{pmatrix}3\\0\end{pmatrix}\right\| = \left\|\begin{pmatrix}-3\\0\end{pmatrix}\right\| = 3$$

$$CA = \|C - A\| = \left\|\begin{pmatrix}3\\0\end{pmatrix} - \begin{pmatrix}0\\4\end{pmatrix}\right\| = \left\|\begin{pmatrix}3\\-4\end{pmatrix}\right\| = \sqrt{3^2 + (-4)^2} = 5$$

3) **Perimeter:**

$$P = AB + BC + CA = 4 + 3 + 5 = 12$$

4) **Conclusion:** The perimeter of the triangle is

$$\boxed{12}$$

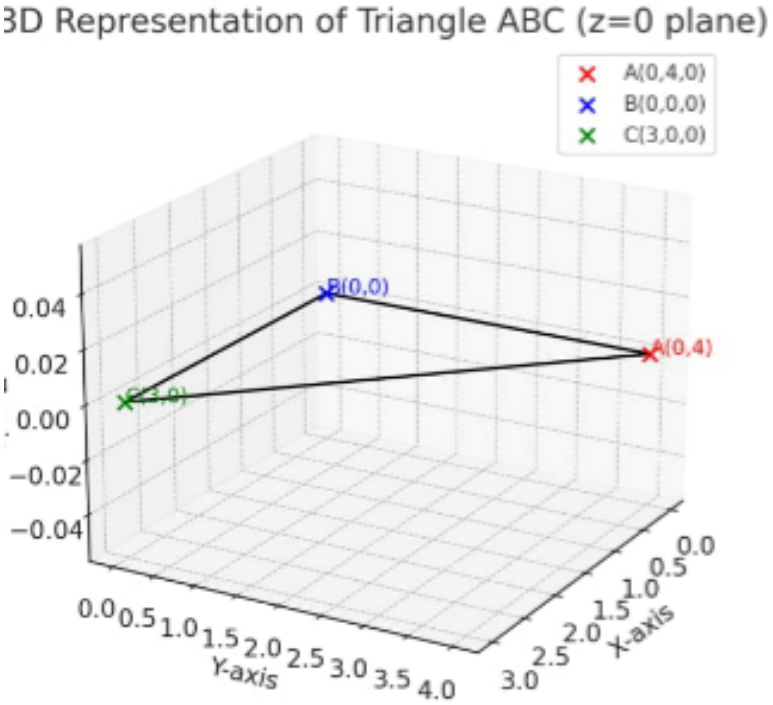
3D Representation of Triangle ABC (z=0 plane)
A(0,4,0)
B(0,0,0)
C(3,0,0)
B(0,0)
A(0,4)
C(3,0)
0.04
0.02
0.00
−0.02
−0.04
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Y-axis
0.0 0.5 1.0 1.5 2.0 2.5 3.0
X-axis

Fig. 4.1