1.1.8.17

EE24BTECH11024 - G.Abhimanyu Koushik

Question:

The perimeter of triangle with vertices $\begin{pmatrix}0\\4\end{pmatrix}$,$\begin{pmatrix}0\\0\end{pmatrix}$ and $\begin{pmatrix}3\\0\end{pmatrix}$ is

Solution:

Symbol	Value	Description
A	$\begin{pmatrix}0\\4\end{pmatrix}$	First vertex
B	$\begin{pmatrix}3\\0\end{pmatrix}$	Second vertex
O	$\begin{pmatrix}0\\0\end{pmatrix}$	Third vertex

TABLE 0: Variables Used

Distance between A and B, d_1 is

$$\mathbf{A}-\mathbf{B}=\begin{pmatrix}0\\4\end{pmatrix}-\begin{pmatrix}3\\0\end{pmatrix}=\begin{pmatrix}-3\\4\end{pmatrix} \tag{0.1}$$

$$\left(A-B\right)^{T}\left(A-B\right)=25 \tag{0.2}$$

$$d_1=\|\mathbf{A}-\mathbf{B}\|=5 \tag{0.3}$$

Distance between A and O, d_2 is

$$\mathbf{A}-\mathbf{O}=\begin{pmatrix}0\\4\end{pmatrix}-\begin{pmatrix}0\\0\end{pmatrix}=\begin{pmatrix}0\\4\end{pmatrix} \tag{0.4}$$

$$\left(A-O\right)^{T}\left(A-O\right)=16 \tag{0.5}$$

$$d_2=\|\mathbf{A}-\mathbf{O}\|=4 \tag{0.6}$$

Distance between O and B, d_3 is

$$\mathbf{O}-\mathbf{B}=\begin{pmatrix}0\\0\end{pmatrix}-\begin{pmatrix}3\\0\end{pmatrix}=\begin{pmatrix}-3\\0\end{pmatrix} \tag{0.7}$$

$$\left(O-B\right)^{T}\left(O-B\right)=9 \tag{0.8}$$

$$d_3=\|\mathbf{O}-\mathbf{B}\|=3 \tag{0.9}$$

Perimeter of the triangle is

$$d_1+d_2+d_3=12 \tag{0.10}$$

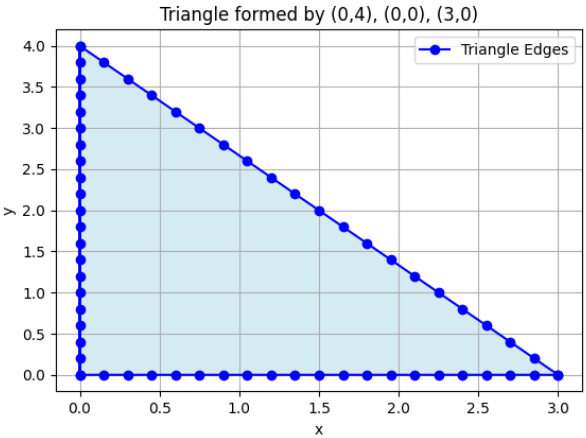

Fig. 0.1: Plot of the triangle