ASSIGNMENT 6

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Download all python codes from

https://github.com/Y.Nagarani/ASSIGNMENT6/tree/main/CODES

and latex-tikz codes from

https://github.com/Y.Nagarani/ASSIGNMENT6/tree/main

1 Question No 2.5

In $\triangle ABC$, $A = \begin{pmatrix}1\\2\\3\end{pmatrix}$, $B = \begin{pmatrix}-1\\0\\0\end{pmatrix}$, $C = \begin{pmatrix}0\\1\\2\end{pmatrix}$. Find $\angle B$.

2 SOLUTION

Let,$\mathbf{A} = \begin{pmatrix}1\\2\\3\end{pmatrix}$, $\mathbf{B} = \begin{pmatrix}-1\\0\\0\end{pmatrix}$, $\mathbf{C} = \begin{pmatrix}0\\1\\2\end{pmatrix}$.

Now ,

$$\mathbf{A}-\mathbf{B} = \begin{pmatrix}2\\2\\3\end{pmatrix} \tag{2.0.1}$$

$$\mathbf{C}-\mathbf{B} = \begin{pmatrix}1\\1\\2\end{pmatrix} \tag{2.0.2}$$

We know that ,

$$\mathbf{B} = arccos\left(\frac{(\mathbf{A}-\mathbf{B})^T(\mathbf{C}-\mathbf{B})}{\|\mathbf{A}-\mathbf{B}\|\|\mathbf{C}-\mathbf{B}\|}\right) \tag{2.0.3}$$

Then

$$\|\mathbf{A}-\mathbf{B}\| = \sqrt{17} \tag{2.0.4}$$

$$\|\mathbf{C}-\mathbf{B}\| = \sqrt{6} \tag{2.0.5}$$

$$(\mathbf{A}-\mathbf{B})^{\mathbf{T}}(\mathbf{C}-\mathbf{B}) = 10 \tag{2.0.6}$$

Substitute above values in (2.0.3) then ,

$$\mathbf{B} = arccos\left(\frac{10}{\sqrt{17}\sqrt{6}}\right) \tag{2.0.7}$$

$$\mathbf{B} = 66.15 \tag{2.0.8}$$

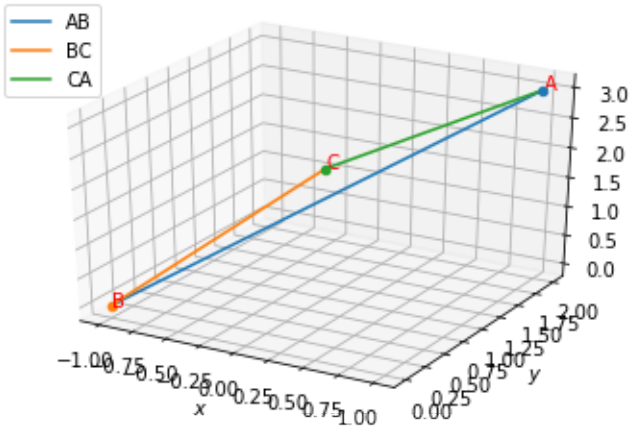

Fig. 0: $\triangle ABC$