

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

Now ,

$$A - B = \begin{pmatrix} 2 \\ 2 \\ 3 \end{pmatrix} \quad (2.0.1)$$

$$C - B = \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix} \quad (2.0.2)$$

We know that ,

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

Then

$$\|A - B\| = \sqrt{17} \quad (2.0.4)$$

$$\|C - B\| = \sqrt{6} \quad (2.0.5)$$

$$(A - B)^T(C - B) = 10 \quad (2.0.6)$$

Substitute above values in (2.0.3) then ,

$$B = \cos^{-1} \left(\frac{10}{\sqrt{17} \sqrt{6}} \right) \quad (2.0.7)$$

$$B = 66.15 \quad (2.0.8)$$

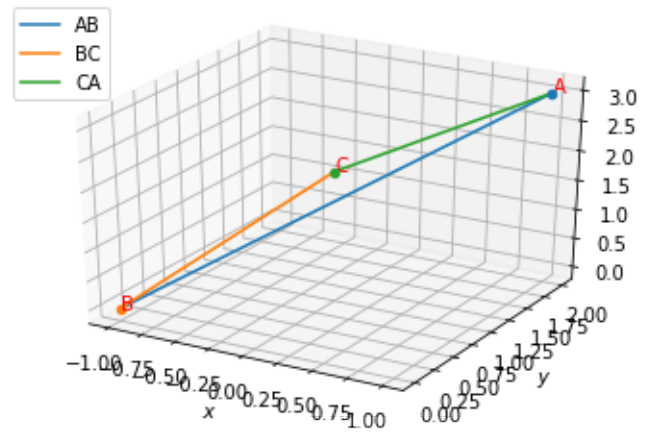


Fig. 0: $\triangle ABC$