

Assignment 7

V.Nagajyothi

Download all python codes from

<https://github.com/nagajyothi/ASSIGNMENT7/Assignment7.py>

and latex-tikz codes from

<https://github.com/nagajyothi/ASSIGNMENT7/main.tex>

1 QUESTION No.VECTORS-2.7

Find the area of triangle having the points $\mathbf{A} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$, $\mathbf{B} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$, and $\mathbf{C} = \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix}$ as it's vertices

2 SOLUTION

The area of a triangle using the vector product is obtained as

$$\frac{1}{2} \|(\mathbf{B} - \mathbf{A}) \times (\mathbf{C} - \mathbf{A})\| \quad (2.0.1)$$

$$\mathbf{B} - \mathbf{A} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} - \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \\ 2 \end{pmatrix} \quad (2.0.2)$$

$$\mathbf{C} - \mathbf{A} = \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix} - \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix} \quad (2.0.3)$$

$$\frac{1}{2} \|(\mathbf{B} - \mathbf{A}) \times (\mathbf{C} - \mathbf{A})\| \quad (2.0.4)$$

$$\frac{1}{2} \left\| \begin{pmatrix} 0 \\ 1 \\ 2 \end{pmatrix} \times \begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix} \right\| \quad (2.0.5)$$

$$= 1 \quad (2.0.6)$$