Assignment 1

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Download all python codes from

https://github.com/Adarsh541/EE3900/blob/main/EE3900_As1/codes/EE3900_As1.py

Download latex-tikz codes from

https://github.com/Adarsh541/EE3900/blob/main/EE3900_As1/EE3900_As1.tex

1 Problem(Vectors Q2.1)

The vertices of $\triangle$ABC are $\mathbf{A} = \begin{pmatrix}4\\6\end{pmatrix}$, $\mathbf{B} = \begin{pmatrix}1\\5\end{pmatrix}$ and $\mathbf{C} = \begin{pmatrix}7\\2\end{pmatrix}$. A line drawn to intersect sides AB and AC at D and E respectively, such that

$$\frac{AD}{AB} = \frac{AE}{AC} = \frac{1}{4} \tag{1.0.1}$$

Find

$$\frac{\text{area of } \triangle ADE}{\text{area of } \triangle ABC} \tag{1.0.2}$$

2 Solution

$$\text{Area of a } \triangle ABC = \frac{1}{2}\|\mathbf{AB} \times \mathbf{AC}\| \tag{2.0.1}$$

$$= \frac{1}{2}(AB \times AC)\,Sin(\phi) \tag{2.0.2}$$

where ϕ is angle between vectors **AB** and **AC**

$$\frac{\text{area of } \triangle ADE}{\text{area of } \triangle ABC} = \frac{(AD \times AE)\,Sin(\phi)}{(AB \times AC)\,Sin(\phi)} \tag{2.0.3}$$

$$= \frac{1}{16} \tag{2.0.4}$$

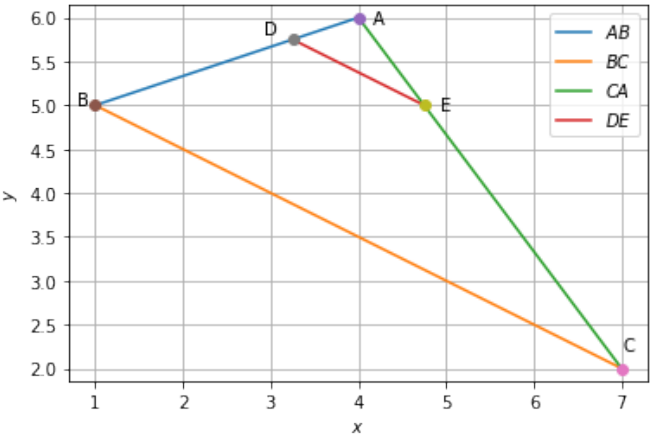

Fig. 0: Plot of the triangles