Challenge Problem

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***Abstract*—This document solves the isosceles triangle problem.**

Download all the codes from

https://github.com/Adarsh1310/EE5609/tree/master/Challenge_Problem_3

1 Problem

Prove that sides opposite to equal angles of a triangle are equal.

2 Solution

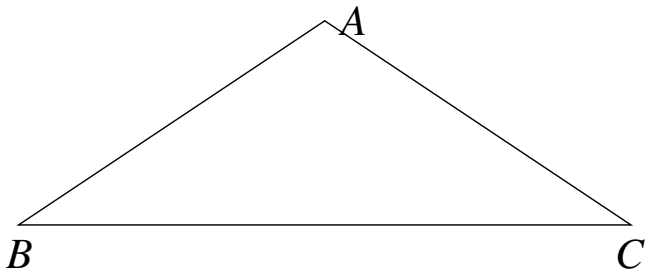

Fig. 2: Triangle

Let's assume the direction vector of side AB=**a**,BC=**b** and AC=**c**.In the above triangle we are assuming $\angle ACB = \angle ABC = \theta$. Now to prove that side AB and AC are equal:-

$$\mathbf{ab} = \|a\| \|b\| \cos\theta$$

(Dot Product of side AB with respect to base) (2.0.1)

$$\mathbf{cb} = \|c\| \|b\| \cos\theta$$

(Dot Product of side AC with respect to base) (2.0.2)

For the RHS of two side to be equal $\|a\|$ should be equal to $\|c\|$ and hence we can say that sides opposite to equal angle are equal.