

Matrix Theory EE5609 - Assignment 3

Find if a triangle is isosceles triangle.

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Abstract—This document provides a solution for finding if a triangle is isosceles given two equal altitudes of the triangle

$$2 \times \|(B - A)\| = 2 \times \|(C - A)\| \quad (5)$$

$$\|(B - A)\| = \|(C - A)\| \quad (6)$$

Therefore, the sides AB and AC of the $\triangle ABC$ are of the same magnitude. Hence $\triangle ABC$ is an isosceles triangle with equal sides AB and AC.

I. PROBLEM STATEMENT

BE and CF are two equal altitudes of a triangle ABC. Prove that the triangle ABC is isosceles.

II. SOLUTION

Given that BE and CF are two equal altitudes of a triangle ABC.

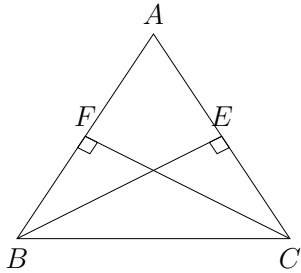


Fig. 1: Triangle with equal altitudes on two sides

Given that ,

$$\|(B - E)\| = \|(C - F)\| \quad (1)$$

$$\|(B - A)\| + \|(A - E)\| = \|(C - A)\| + \|(A - F)\| \quad (2)$$

$$\|(B - A)\| + \|(A - B)\| + \|(B - E)\| = \|(C - A)\| + \|(A - C)\| + \|(C - F)\| \quad (3)$$

$$\|(B - A)\| + \|(A - B)\| = \|(C - A)\| + \|(A - C)\| \quad (4)$$