Construction of triangle

AI24BTECH11006 - Bugada Roopansha

IIT Hyderabad

November 6, 2024

Question

Construct a right triangle when one side is 3.5 cm, and the sum of the other side and the hypotenuse is 5.5 cm.

Solution: Parameters

Segment	**Norm**	**Angles**
$\|\|AB\|\|$	3.5	$\angle C$
$\|\|BC\|\|$	Distance between B and C	$\angle A = 90°$
$\|\|AC\|\|$	Distance between C and A	$\angle B$

Table: Input parameters

Solution:

Given:

$$c = 3.5\,\text{cm}, \quad a + b = 5.5\,\text{cm}, \quad \angle A = 90^\circ$$

Using the cosine formula in $\triangle ABC$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\implies (5.5 - b)^2 = b^2 + c^2 - 2bc\cos A$$

Solution: Further Calculations

Expanding and solving the equation :

$$\implies b \approx 2.5cm$$

The coordinates of $\triangle ABC$ can then be expressed as:

$$C = b \begin{bmatrix} \sin A \\ \cos A \end{bmatrix}, \quad A = 0 \quad B = \begin{bmatrix} 0 \\ c \end{bmatrix}$$

C-Code

C-Code

C-Code

Python Code

Python Code

Python Code

Python Code

Diagram

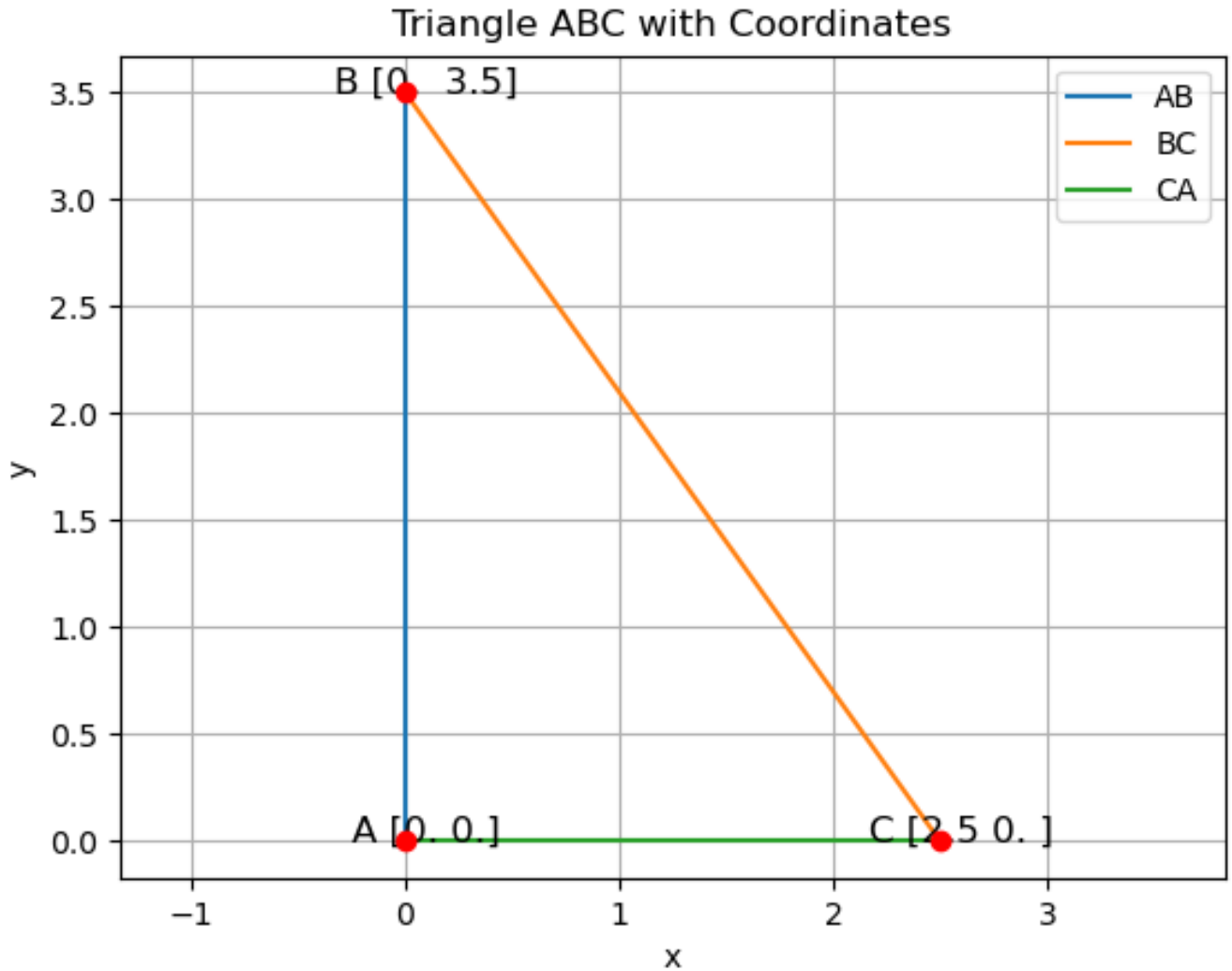

Figure: Right triangle with c= 3.5 cm , a+b= 5.5 cm and $\angle A = 90°$.