

Vector triple Product -

The vector triple product is a mathematical operation involving three vectors "

It is defined as the cross product of one vector with the cross product of other two vectors.

Definition and Formula

Let three vectors \vec{A} , \vec{B} and \vec{C} the vector triple product is typically written as - $\vec{A} \times (\vec{B} \times \vec{C})$

This operation can be simplified using the BAC-CAB rule or Lagrange's Formulae -

$$\vec{A} \times (\vec{B} \times \vec{C}) = (\vec{A} \cdot \vec{C}) \cdot \vec{B} - (\vec{A} \cdot \vec{B}) \cdot \vec{C}$$

Key properties -

- (i) Resultant vector - The vector $\vec{A} \times (\vec{B} \times \vec{C})$ is coplanar with vectors \vec{B} and \vec{C} .
- (ii) Perpendicularity - The resultant vector is perpendicular to the vector \vec{A} .
- (iii) Non Associative - The vector triple product is not associative in general $\vec{A} \times (\vec{B} \times \vec{C}) \neq (\vec{A} \times \vec{B}) \times \vec{C}$