

CROSS PRODUCT

Cross product of 2 vectors \vec{a} and \vec{b} is defined only in 3D space and is defined as:

$$\vec{c} = \vec{a} \times \vec{b}$$

\vec{c} is perpendicular to both \vec{a} and \vec{b} and its direction is given by right hand rule:

- Align index finger along \vec{a}
- Align middle finger along \vec{b}
- Thumb gives the direction of $\vec{a} \times \vec{b}$

Writing standard basis vectors \hat{x} , \hat{y} , \hat{z} as cross products of each other.

$$\begin{aligned}\hat{z} &= \hat{x} \times \hat{y} \\ \hat{x} &= \hat{y} \times \hat{z} \\ \hat{y} &= \hat{z} \times \hat{x}\end{aligned}$$

Note that the cross product of 2 \hat{a} , \hat{b} unit vectors would result unit vector, only if \hat{a} , \hat{b} were also perpendicular.