

Engineering Analysis 2A

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1 other

Polar vectors can use base axis as angle or take an angle relative to a previous point.

Left hand axis z-axis is facing away from you, right hand is facing towards. body is rotating with angular velocity $\vec{\omega} = [\omega_x, \omega_y, \omega_z]$. Find its velocity at the point $\vec{r} = [x, y, z]$.

The point is rotating along a circle with radius $\rho = r \sin \theta$.

IMAGE VECTOR LECTURE 3

2 3D Vectors and Operations

2.1 Cross Product

$|a \times b| = |a||b|\sin\theta$ where θ is the angle between a and b

Cross product of vectors is equivalent to cross product of matrices as you can write vectors as matrices.

2.2 Scalar Triple Product

A scalar triple product is a scalar quantity defined as $a \cdot (b \times c)$. It represents calculating the determinant.

$$a \cdot (b \times c) = (a_x i + a_y j + a_z k) \cdot \begin{vmatrix} i & j & k \\ b_x & b_y & b_z \\ c_x & c_y & c_z \end{vmatrix}$$