

ELECTROMAGNETICS

Introduction to electrodynamics

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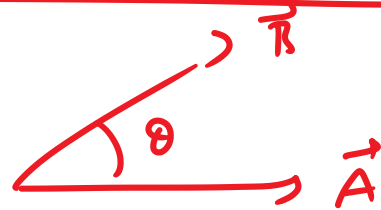
SOCRATES

I cannot teach anybody anything;
I can only make them think.

- Maxwell
- Michael Faraday
- Fleming
- Ewinstan
- Weber
- Tesla
- Ampere
- Gauss
- Biot & Savart
- Lenz
- Ohm
- Lorentz
- ~~Walter~~
-

$$\vec{A} \cdot \vec{B} = AB \cos \theta$$

$$= \vec{B} \cdot \vec{A}$$



$$\vec{A} \times \vec{B} = AB \sin \theta \hat{n}$$

$$= -\vec{B} \times \vec{A}$$

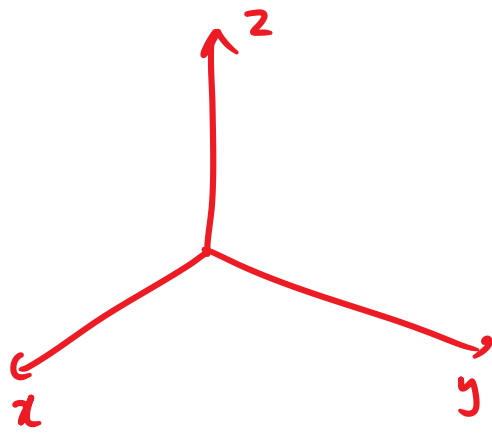
$$a(\vec{A} + \vec{B}) = a\vec{A} + a\vec{B}$$

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

$$\vec{A} \times (\vec{B} \times \vec{C})$$

CARTESIAN coordinate System

RENE DESCARTES (1596-1650)



Right handed
System

$$\vec{A} = \hat{i} A_x + \hat{j} A_y + \hat{k} A_z$$

$$= \hat{x} A_x + \hat{y} A_y + \hat{z} A_z$$

$$\vec{A} \cdot \vec{B} = A_x B_x + A_y B_y + A_z B_z$$

$$\vec{A} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ A_x & A_y & A_z \\ B_x & B_y & B_z \end{vmatrix}$$

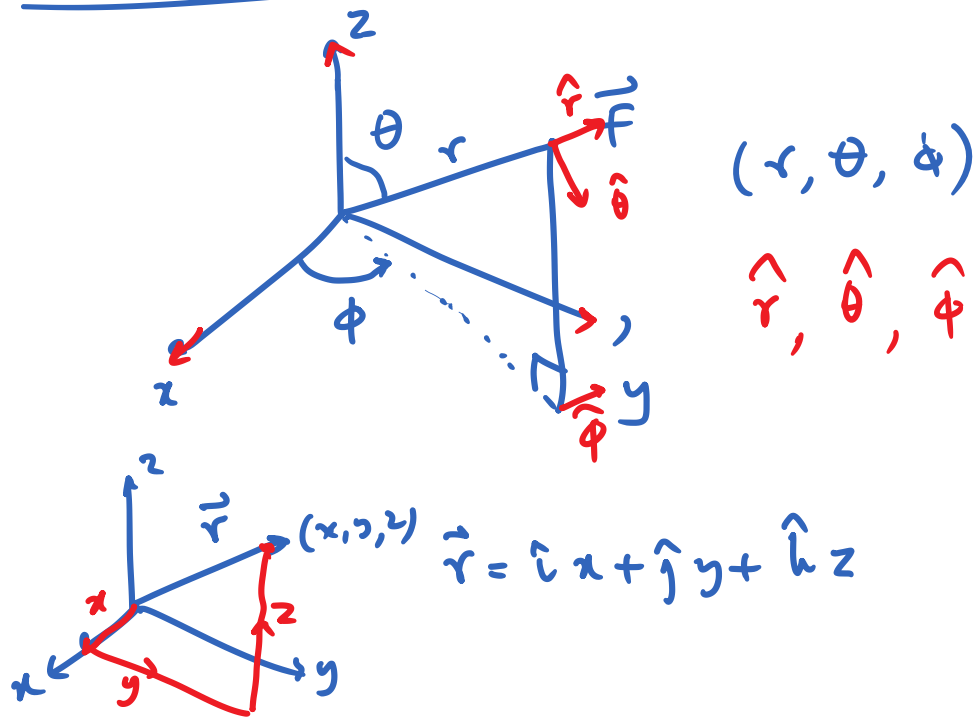
$$A_x = \vec{A} \cdot \hat{i} = \hat{i} \cdot \vec{A}$$

$$A_y = \vec{A} \cdot \hat{j} = \hat{j} \cdot \vec{A}$$

$$A_z = \vec{A} \cdot \hat{k} = \hat{k} \cdot \vec{A}$$

- Spherical Polar Coordinate system
- Cylindrical Coordinate system

Spherical Polar Coordinate System



VECTOR CALCULUS

