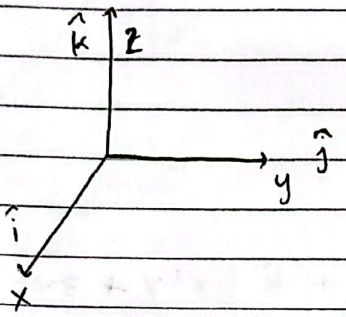
Nama = Ikha Aryanti
Kelas = 22 B
Npm = 2213022050

No. kamis
Date 22. 02. 2024

Kelistrikan Dan kemagnetan

Operator Dalam Fisika

1.) Analisis Vektor.



$\hat{A} = x\hat{i} + y\hat{j} + z\hat{k}$

$\hat{A} = \frac{\hat{A}}{|A|} = \frac{x\hat{i} + y\hat{j} + z\hat{k}}{\sqrt{x^2 + y^2 + z^2}}$

$\hat{A} = x^2y\hat{i} + 3yz\hat{j} + 2xy\hat{k}$

$\hat{B} = z\hat{i} + 2yx\hat{j} + 3xz\hat{k}$

~~$\hat{A} + \hat{B} = x^2y\hat{i} +$~~

~~$\hat{A} + \hat{B} = (x^2y)$~~.

$\hat{A} + \hat{B} = (x^2y + z)\hat{i} + (3y.z + 2y)\hat{j} + (2xy + 3xz)\hat{k}$

$\hat{A} \cdot \hat{B} = (x^2y\hat{i} + 3yz\hat{j} + 2xy\hat{k}) \cdot (z\hat{i} + 2y\hat{j} + 3xz\hat{k})$

$= x^2yz\,\hat{i}\cdot\hat{i} + x^2y2yx\,\hat{i}\cdot\hat{j} + x^2y3xz\,\hat{i}\cdot\hat{k} +$
$3yz^2\,\hat{i}\cdot\hat{j} + 3yz\,\hat{j}\,2yx\,\hat{i} + 3yz\,3xz\,\hat{j}\cdot\hat{k} +$
$2xyz\,\hat{i}\cdot\hat{k} + 2xy\,2yx\,\hat{i}\cdot\hat{k} + 2xy\,3xz\,\hat{k}\cdot\hat{k}$

$= x^2yz + 6xy^2z + 6x^2y^2$

$\hat{A} \times \hat{B} =$

$\hat{i}$	$\hat{j}$	$\hat{k}$
x^2y	$3yz$	$2xy$
z	$2yx$	$3yz$

$= \hat{i}(3yz.3xz - 2xy.2yx) - \hat{j}(x^2y\,3xz - 2xy.z) +$
$\hat{k}(x^2y.2xy - 3yz)$

$= (9xyz^2 - 4x^2y^2)\hat{i} - (3x^3yz - 2xyz)\hat{j} + (2x^3y^2 - 3yz)\hat{k}$

No.

Date . .

2. Operator Nabla (∇)

$$\nabla = \hat{i}\frac{\partial}{\partial x} + \hat{j}\frac{\partial}{\partial y} + \hat{k}\frac{\partial}{\partial z}$$

Gradien

$$T = x^2yz + 3y^2z$$

$$\nabla T = \hat{i}\,.\,\frac{\partial (x^2yz + 3y^2z)}{\partial x}$$

$$= \hat{i}(2xyz) + \hat{j}(x^2z + 6yz) + \hat{k}(x^2y + 3y^2)$$

Gradien

$$\vec{A} = 2x\hat{i} + 3y\hat{j} - 4z\hat{k}$$

$$\nabla . \vec{A} =$$

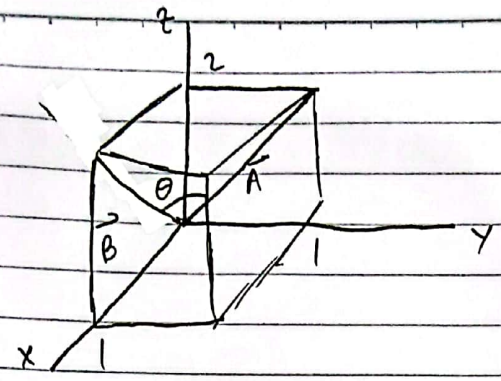
$$\nabla \times \vec{A} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ 2x & 3y & -4z \end{vmatrix}$$

$$= \left(\frac{\partial}{\partial y}.(-4z) - \frac{\partial}{\partial z}.(3y)\right)\hat{i} + \left(\frac{\partial}{\partial x}(-4z) - \frac{\partial}{\partial z}.2x\right)\hat{j}$$

$$+ \left(\frac{\partial}{\partial y}.3y - \frac{\partial}{\partial x}.2x\right)\hat{k}$$

No.

Date . .



$\vec{A} = 0\hat{i} + \hat{j} + 2\hat{k}$

$\vec{B} = \hat{i} + 0\hat{j} + 2\hat{k}$.

$\vec{A} \cdot \vec{B} = |\vec{A}|\,|\vec{B}| \cos\theta$

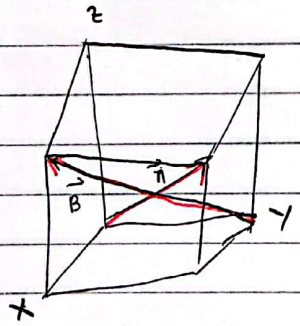
$4 = \sqrt{0^2 + 1^2 + 2^2}\ \sqrt{1^2 + 0^2 + 2^2}\ \cos\theta$

$4 = \sqrt{5}\ \sqrt{5}\ \cos\theta$

$\cos\theta = \frac{4}{5}$

$\theta = \text{Inv cos}\ \frac{4}{5}$

Sudut antara diagonal ruang



$\vec{A} = \hat{i} + \hat{j} + 2\hat{k}$

$\vec{B} = -\hat{i} - \hat{j} + 2\hat{k}$

$\vec{A} \cdot \vec{B} = |\vec{A}|\,|\vec{B}| \cos\theta$

$2 = \sqrt{6}\ \sqrt{6}\ \cos\theta$

$\cos\theta = \frac{2}{6}$

$\theta = \text{Inv cos}\ \frac{2}{6}$

$\theta = \text{Inv cos}\ \frac{1}{3}$