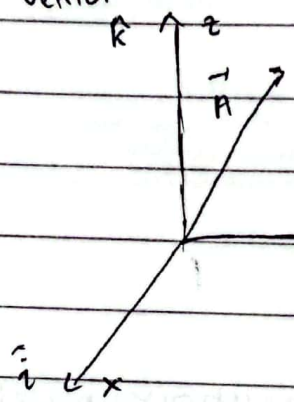
Fadila Aulia Ilmi
2213022052

No.: Date: 22/02/24

Kemagnetan dan Kelistrikan

Operator dalam Fisika

1. Analisis Vektor



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

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

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

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

$\vec{A} + \vec{B} = (x^2y + z)\hat{i} + (3yz + 2yx)\hat{j} + (2xy + 3x_2)\hat{k}$

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

$= (x^2yz +$

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

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

$= [(3yz \cdot 3xz)\hat{i} + (2xy \cdot z)\hat{j} + (x^2y \cdot 2yx)\hat{k}]$
$[(x^2y \cdot 3xz)\hat{j} - (2xy \cdot 2yx)\hat{i} - (3yz \cdot z)\hat{k}]$
$= [9xyz^2 - 4x^2y^2)\hat{i} + (2x^3y^2 - 3x^3yz)\hat{j} +$
$(x^3 + y^2 - 3yz^2)k$

$\hat{i} \cdot \hat{i} = k$

$\hat{i} \cdot \hat{j} = 0$

$\hat{i} \cdot \hat{k} = 0$

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Operator Nabla

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

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

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

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

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

$\nabla \vec{A} = \frac{\partial V}{\partial x} + \frac{\partial V}{\partial y} + \frac{\partial V}{\partial z}$

$= 2 + 3 - 4$

$= 1.$

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

$= \left[\left(\frac{\partial}{\partial y} \cdot 4z\right)i + \left(\frac{\partial}{\partial z} \cdot 2x\right)j + \left(\frac{\partial}{\partial x} \cdot 4z\right)k\right.$

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

deli

Talk less, do more.

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Fadilla Aulia (6nv
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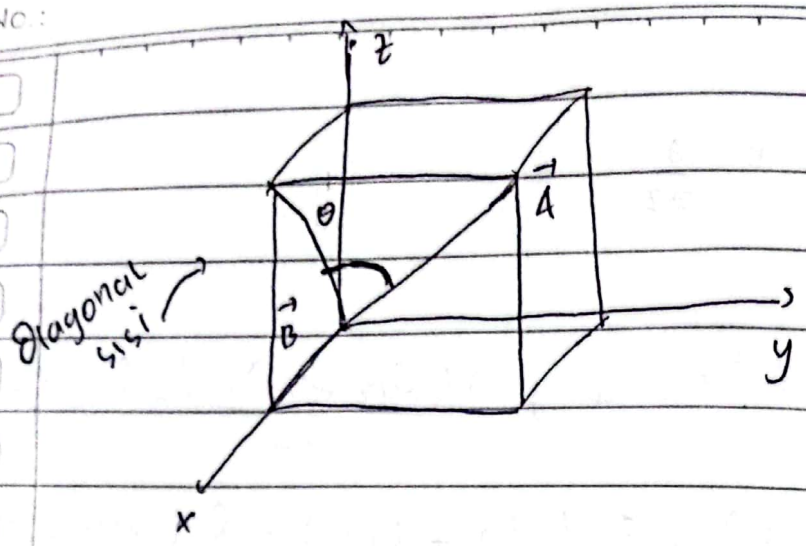
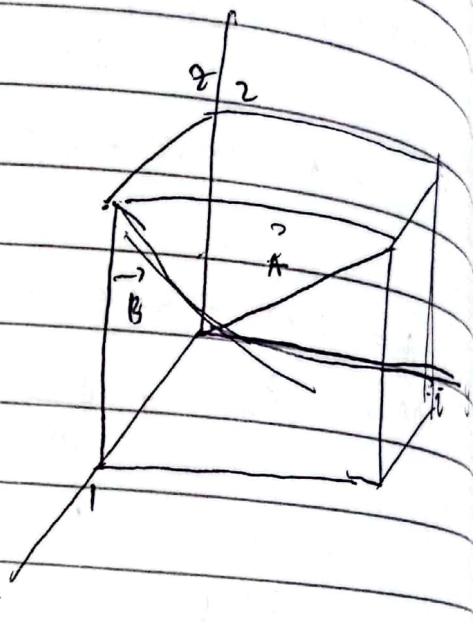


sudut antara diagonal ruang



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

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

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

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

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

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

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

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

$(1-1)\hat{i} + (1-1)\hat{j} + (4k) = \sqrt{6}\sqrt{6} \cos\theta$

$2 = 6\cos\theta$

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

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

Smile and the

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