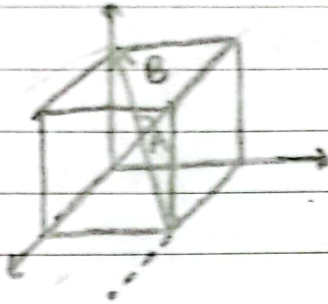


Hitung sudut antara diagonal

①



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

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

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

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

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

$$\hat{A} = \frac{\vec{A}}{|\vec{A}|} = \frac{\hat{i} + \hat{j} + 2\hat{k}}{\sqrt{\hat{i}^2 + \hat{j}^2 + 4\hat{k}^2}}$$

$$\cos \theta = \frac{2}{\sqrt{6} \cdot \sqrt{6}} = \frac{2}{6} = \frac{1}{3}$$

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

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

$$\vec{B} = yz\hat{i} + 3xy^2\hat{j} + 3xz\hat{k}$$

$$\vec{A} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3x^2y & 2yz & xy^2 \\ yz & 3xy^2 & 3xz \end{vmatrix}$$

$$= \hat{i}(6yz^2 - 3x^2yz) - \hat{j}(9x^3z - xy^2z^2) - \hat{k}(2yz^2 - 9x^3yz)$$

$$(3) \quad T = x^2 + 2xy + 3z + y$$

$$\nabla^2 T$$

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

$$\nabla T = (2x + 2y)\hat{i} + (2x)\hat{j} + (3)\hat{k}$$

$$\nabla^2 T = 2$$

$$(4) \quad \nabla \times (\nabla T)$$

$$\nabla \times (2x + 2y)\hat{i} + (2x)\hat{j} + (3)\hat{k}$$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ 2x+2y & 2x & 3 \end{vmatrix}$$

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

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