No. Jum'at

Date 14 Februari 2025.

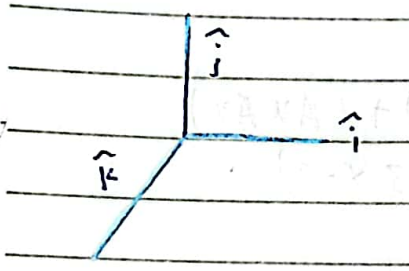
Kelistrikan dan Kemagnetan.

Vektor.

$\vec{X} = X_1\hat{i} + X_2\hat{j} + X_3\hat{k}$

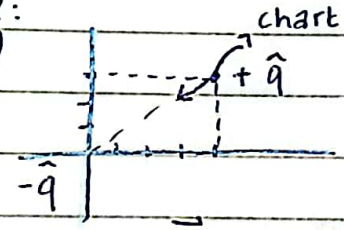
$\vec{V} = V_1\hat{i} + V_2\hat{j} + V_3\hat{k}$

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



$\hat{P} = \frac{\vec{P}}{|P|} = \frac{x_1\hat{i} + y\hat{j} + z\hat{k}}{\sqrt{x^2+y^2+z^2}}$

Ex:

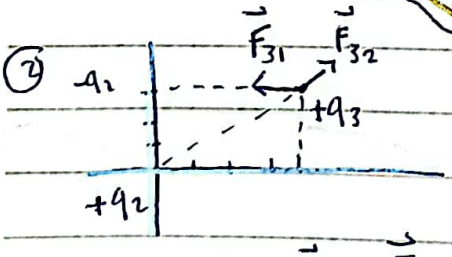
① 

$\vec{F}_{+q} = k\frac{q_1q_2}{r^2}r$

$= k\frac{q_1q_2}{3^2+4^2}\left(\frac{4\hat{i}-3\hat{j}}{5^2}\right)$

$\vec{F}_{-q} = k\frac{q_1q_2}{r^2}r$

$= k\frac{q_1q_2}{5^2}\left(\frac{4\hat{i}+3\hat{j}}{5^2}\right)$

② 

$\hat{r} = \frac{-4\hat{i}+0+0}{\sqrt{4^2+0+0}} = -\hat{i}$

$F_{q3} = \vec{F}_{31} + \vec{F}_{32}$

$= kq_3\left[\frac{q_1(-\hat{i})}{4^2} + \frac{q_2}{5^2}\left(\frac{4\hat{i}+3\hat{j}}{5}\right)\right]$

$V_1 = 4\hat{i} + 2\hat{j} + k$

$V_2 = 2\hat{i} + 3k$

$\vec{V}_1 \cdot V_2 =$

$A\cdot B = (A_i B_i) + (A_j B_j) (A_k B_k)$

$= (4\times2) + (2\times0) + (1\times3)$

$= 8+0+3$

$= 11.$

$\vec{a} = 3\hat{i} + 4\hat{j} - 3\hat{k}$

$\vec{b} = 2\hat{i} - 3\hat{j} + 2\hat{k}$

a) $\vec{a} \cdot \vec{a}$

b) $\vec{a} \times \vec{b}$

c) $\vec{a} \cdot \vec{b}$

Jawab:

a) $A \cdot A = (A_i \times A_i) + (A_j \times A_j) + (A_k A_k)$

$= (3 \times 3) + (4 \times 4) + (-3 \times -3)$

$= 9 + 16 + 9 = 34.$

b) $A \times B = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & 4 & -3 \\ 2 & -3 & 2 \end{vmatrix} =$

c) $A \cdot B = (A_i B_i) + (A_j B_j) + (A_k B_k)$

$= (3 \times 2) + (4 \times -3) + (-3 \times 2)$

$= 6 - 12 - 6$

$= -12$

$= \hat{i}(8+9) + \hat{j}(6+6) + \hat{k}(-9-8)$

$= 17\hat{i} + 12\hat{j} - 17\hat{k}$

$\vec{a} = 4\hat{i} - 5\hat{j} + k$

$\vec{b} = 2\hat{i} + 3\hat{j} - 2k$

$\vec{a} \times \vec{b} = \begin{vmatrix} i & j & k \\ 4 & -5 & 1 \\ 2 & 3 & -2 \end{vmatrix} = \hat{i}(10-3) + \hat{j}(-8+1) + \hat{k}(12-10)$

$= 13i - 6 + 2k$