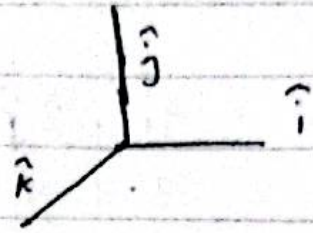


kalisma

Kelistrikan dan Kemagnetan.

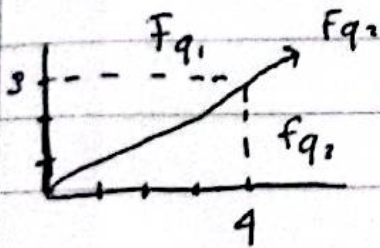
$$\vec{r} = x_1 \hat{i} + x_2 \hat{j} + x_3 \hat{k}$$

$$\vec{v} = v_1 \hat{i} + v_2 \hat{j} + v_3 \hat{k}$$



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

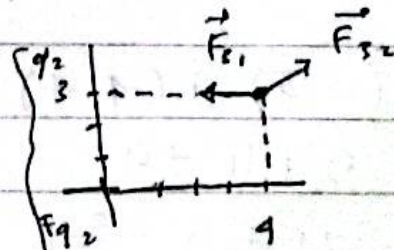
example



$$\vec{F}_q = k \frac{q_1 q_2}{r^2} \hat{r}$$

$$= k \frac{q_1 q_2}{\sqrt{3^2 + 4^2}} = \frac{(-4\hat{i} - 3\hat{j})}{5^2}$$

$$F_q = k \frac{q_1 q_2}{\sqrt{3^2 + 4^2}} \frac{(-4\hat{i} - 3\hat{j})}{5^2}$$



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

$$= k q_3 \left(\frac{q_1 \hat{i}}{4} + \frac{q_2}{5^2} \left(\frac{4\hat{i} + 3\hat{j}}{5} \right) \right)$$



PAPERLINE

$$\vec{v}_1 = 4\hat{i} + 2\hat{j} + \hat{k}$$

$$\vec{v}_2 = 2\hat{i} + 3\hat{k}$$

$$\begin{aligned}\vec{v}_1 \cdot \vec{v}_2 &= 4\hat{i} \cdot 2\hat{j} + \hat{k} \cdot 3\hat{k} \\ &= 8 \cdot 1 + 3 \cdot 1 \\ &= 8 + 3 = 11\end{aligned}$$

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

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

$$\begin{aligned}\text{a) } \vec{a} \cdot \vec{a} &= (3 \cdot 3) + (4 \cdot 4) + (3 \cdot 3) \\ &= 9 + 16 + 9 \\ &= 25 + 9 = 34\end{aligned}$$

$$\begin{aligned}\text{b) } \vec{a} \times \vec{b} &= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & 4 & -3 \\ 2 & -3 & 2 \end{vmatrix} = \hat{i} \begin{vmatrix} 4 & -3 \\ -3 & 2 \end{vmatrix} + \hat{j} \begin{vmatrix} 3 & -3 \\ 2 & 2 \end{vmatrix} + \hat{k} \begin{vmatrix} 3 & 4 \\ 2 & -3 \end{vmatrix} \\ &= \hat{i}(8-9) + \hat{j}(6+6) + \hat{k}(-9-8) \\ &= -\hat{i} + 12\hat{j} - 17\hat{k}\end{aligned}$$

$$\begin{aligned}\text{c) } \vec{a} \cdot \vec{b} &= (3 \cdot 2) - (4 \cdot 3) - (3 \cdot 2) \\ &= 6 - 12 - 6 \\ &= -12\end{aligned}$$

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

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

$$\vec{a} \times \vec{b} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 4 & -5 & 1 \\ 2 & 3 & -2 \end{vmatrix}$$