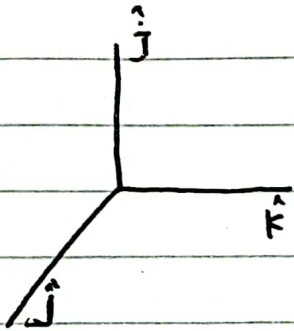


Kelistrikan dan Kemagnetan

Vektor :

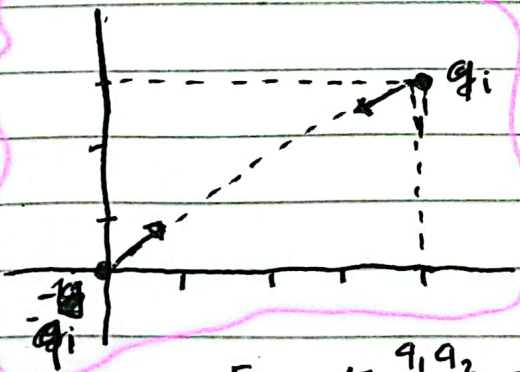
$$\vec{X} = x_1 \hat{i} + x_2 \hat{j} + x_3 \hat{k}$$

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



$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$$

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

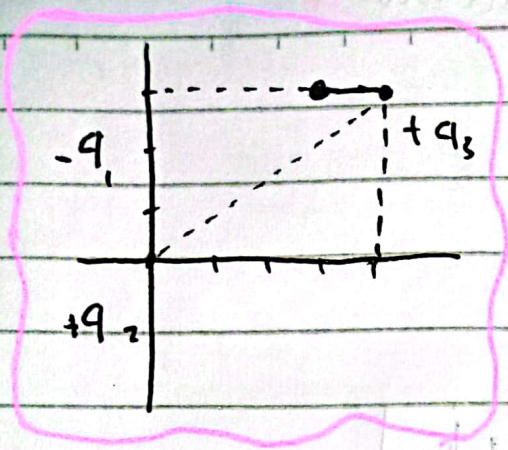


$$F_q = k \frac{q_1 q_2}{r^2} \hat{p}$$

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

$$F_{\hat{q}} = k \frac{q_1 q_2}{r^2} \hat{r}$$

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



$$\vec{F}_{23} = \vec{F}_{31} + \vec{F}_{32}$$

$$= k q_3 \left[\frac{q_1 \vec{r}_{13}}{r_{13}^3} + \frac{q_2 \vec{r}_{23}}{r_{23}^3} \right]$$

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

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

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

$$\vec{V}_1 \cdot \vec{V}_2 = (4 \times 2)\hat{i} + (2 \times 0)\hat{j} + (1 \times 3)\hat{k} = 11$$

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

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

Jawab

$$a. \vec{a} \cdot \vec{a} = (3\hat{i} + 4\hat{j} - 3\hat{k}) \cdot (3\hat{i} + 4\hat{j} - 3\hat{k}) = 9 + 16 + 9 = 34$$

$$b. \vec{a} \times \vec{b} = (3\hat{i} \times 2\hat{i})\hat{i} - (4 \times 3)\hat{j} - (3 \times 2)\hat{k}$$

$$\begin{aligned} 3. \vec{a} \cdot \vec{b} &= 6 - 12 - 6 \\ &= 6 - 18 \\ &= -12 \end{aligned}$$

$$2. \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & 4 & -3 \\ 2 & 3 & 2 \end{vmatrix}$$

$$\begin{aligned} &= \hat{i}(8-9) + \hat{j}(6+6) + \hat{k}(-9-8) \\ &= 1\hat{i} + 12\hat{j} - 17\hat{k} \end{aligned}$$