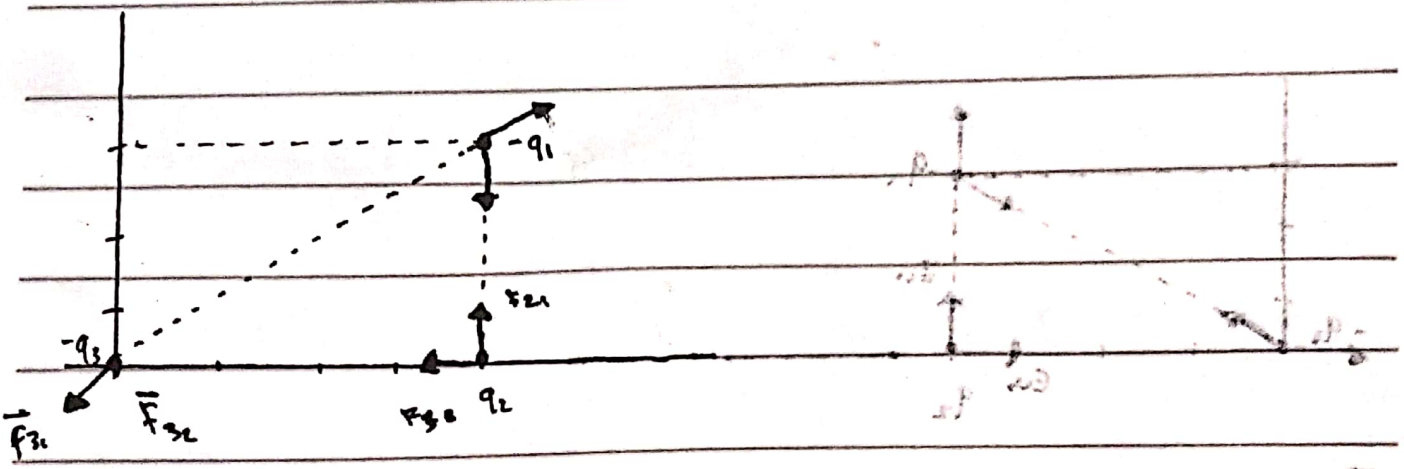
18-3-2024

DATE Kalisma



* $\vec{F}_{31} = \frac{1}{4\pi} \frac{q_3 q_1}{5^2} \left(\frac{-9\hat{i} - 8\hat{j}}{5} \right)$

* $\vec{F}_{32} = \frac{1}{4\pi} \frac{q_3 q_2}{4^2} \hat{j}$

* $\vec{F}_{12} = K \frac{q_1 . q_2}{3^2} \left(\frac{0\hat{i} + 3\hat{j}}{3} \right)$

* $\vec{F}_{12} = -K \frac{q_1 . q_2}{3^2}$

* $\vec{F}_{13} = K \frac{q_1 q_3}{5^2} \left(\frac{9\hat{i} + 3\hat{j}}{5} \right)$

* $F_{21} = K \frac{q_2 . q_1}{3^2} \hat{j}$

$F_{2k} = K \frac{q_2 q_3}{(1^2)} (1\hat{i})$

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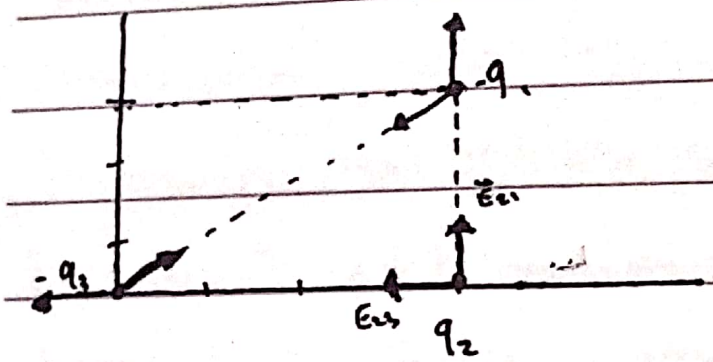
Medan Magnet.



$$\vec{E}_{32} = \frac{F}{q_3} = k\frac{q_3 q_2 / p^2}{q_3}$$

$$= k\frac{q_2}{p^2}$$

$$\vec{E}_{31} = k\frac{q}{s^2}\left(\frac{q\hat{i} + 3\hat{j}}{r}\right)$$

$$\vec{E}_{32} = k\frac{q_2}{q^2}(\hat{i})$$

* Muatan non diskrit
* Muatan diskrit

① $E = k\frac{q}{r^2}\hat{r}_0$

$$= k\sum_{i=1}^{n}\frac{q_i}{r_i^2}\hat{r}_{0i}$$

$$= k\left[\sum_{i=1}^{n}\frac{q_1}{r_1^2}\hat{r}_{0_1} + \frac{q_2}{p_2}\hat{p}_{02} + \cdots + k\frac{q_n}{p_n^2}\hat{p}_{0n}\right]$$

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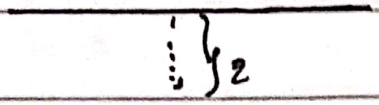
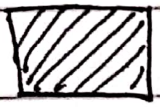
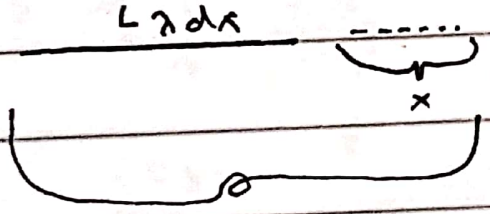
② 

$\vec{E} = k \int \frac{dq}{r^2} \hat{r}_0 = k \int \frac{\lambda dx}{r^2} \hat{r}_0$ → medan pada kawat jauh

③  $\vec{E} = k \iint \frac{\lambda dq}{r^2} \hat{r}_0$ → luasan

④ $\vec{E} = k \iiint \frac{\rho dr}{r^2} \hat{r}_0$ → volume

Contoh:



$\vec{E}_P = ?$

$\vec{E} = k \int_0^L \frac{\lambda dx}{(x_0 - x)^2} = k\lambda \int \frac{dx}{(x_0 - x)^2}$

$\int \frac{dx}{x^2} = \int_0^1 x^{-2}\, dx$

$= x^{-1} \Big|_0^L$

$= \frac{1}{x} \Big|_0^L$

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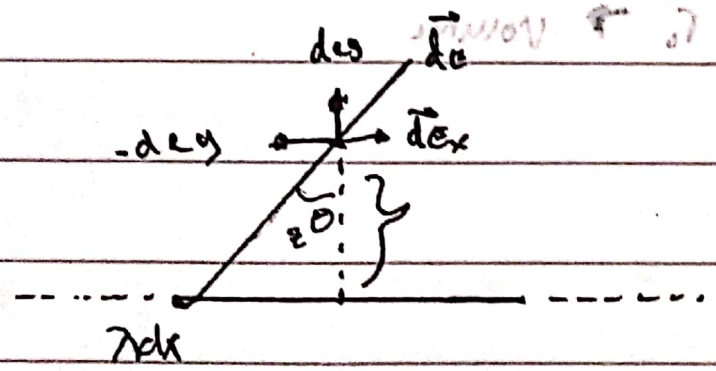
$$= k\int_0^L (x_0 - x)^{-2}\, dx$$

$$= k\lambda \left[\frac{1}{(x_0 - x)} \right]_0^L$$

$$= k\lambda \left[\frac{1}{(x_0 - L)} - \frac{1}{(x_0 - 0)} \right]$$

$$= k\lambda \left[\frac{x_0 - (x_0 - L)}{x_0 (x_0 - L)} = \frac{L}{x_0 (x_0 - L)} \right.$$

②



$$\vec{dE} = \vec{dE_y} + \vec{dE_x}$$

$$\vec{dE} = \vec{dE_y}$$

$$dE_y = dE \cos\theta$$

$$E = k\int_{-\infty}^{\infty} \frac{\lambda dx}{r^2} \cos\theta$$

misal : $\cos\theta = \frac{z}{r}$

$$r = \frac{z}{\cos\theta}$$

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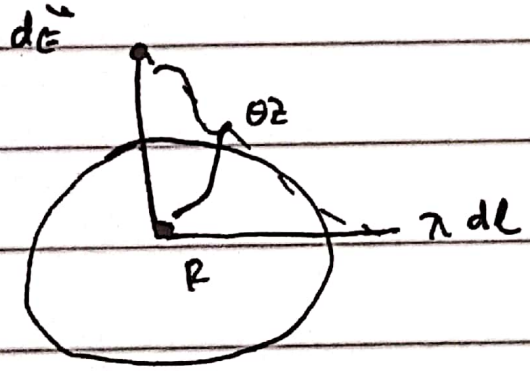
$$dx = \frac{z}{\cos^2\theta}$$

$x = -\infty$

$\theta = -\frac{\pi}{2}$

$x = \infty$

$\theta = \frac{\pi}{2}$



$$\frac{z}{r} = r = (z^2 + R^2)^{\frac{1}{2}}$$

$$r^2 = (z^2 + R)^{\frac{1}{2}\cdot 2}$$

$$\vec{E} = \int_0^{\lambda R} \frac{\lambda\, dl}{(R^2+z^2)} \cdot \cos\theta$$

$$\therefore k\lambda z \int_0^{\pi R} \frac{dl}{(R^2+z^2)^{3/2}}$$