No 18-03-2024
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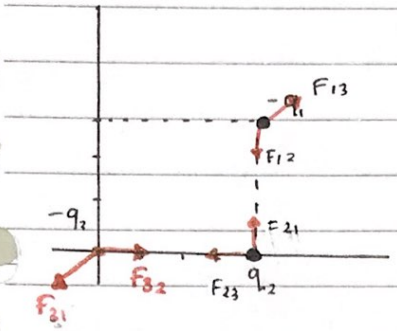
Contoh soal !



$F_{31} = K \frac{q_3 \cdot q_1}{r^2}$

$= K \cdot \frac{-4 \cdot 3}{5^2}$

$F_{12} = K \cdot \frac{q_1 \cdot q_2}{r^2}$

$= K \cdot \frac{0 \cdot 3}{3}$

$F_{32} = K \cdot \frac{q_3 \cdot q_2}{r^2}$

$= K \cdot \frac{q_3 \cdot q_2}{4^2}$

$F_{13} = K \cdot \frac{q_1 \cdot q_3}{r^2}$

$= K \cdot \frac{4 \cdot 3}{5}$

$F_{21} = K \cdot \frac{q_2 \cdot q_1}{r^2}$

$= K \cdot \frac{0i \cdot 3j}{3}$

$= j$

$F_{23} = K \cdot \frac{q_2 \cdot q_3}{r^2}$

$= K \cdot \frac{q_2 \cdot q_3}{4}$

$= (-i)$

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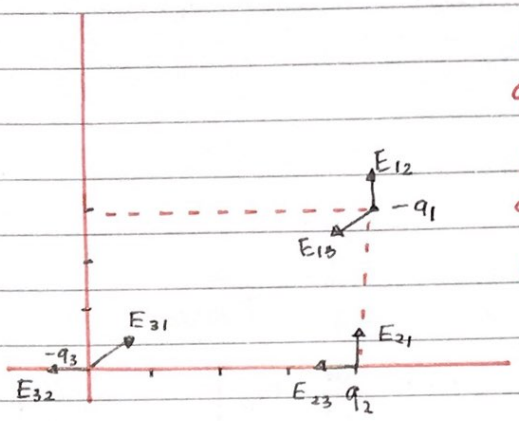
Medan



Karena sebenarnya q_2, maka q_3 menjauhi q_2. Sedangkan pada $-q_1$ mendekati negatif akan menuju positif akan menjauh.

$$\vec{E}_{32} = \frac{F}{q_3} = K \cdot \frac{q_3 \cdot q_2 / r^2}{q_3}$$

$$= K \cdot \frac{q_2}{r^2}$$

$$\vec{E}_{31} = K \frac{q}{5^2} \frac{(4i + 3j)}{5}$$

$$\vec{E}_{32} = K \frac{q_2}{4^2} \frac{q^2}{4^2} (-i\,i)$$

$$\vec{E}_{12} = K \frac{q}{q_1} \frac{K(q_1 \cdot q_2)/r^2}{q_1}$$

$$= -K \cdot \frac{q_1}{3^2} (j)$$

$$\vec{E}_{21} = \frac{F_{21}}{q_2} = K \frac{\frac{q_2 \cdot q_1}{3^2} \cdot j}{q_2} = K \frac{q_1}{3^2} (j)$$

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Muatan non Diskrip

* oleh Muatan Diskrip

* $E = K \frac{q}{r^2} \hat{r}$

$$= K \sum_{i=1}^{n} \frac{q_i}{r_i^2} r_{oi}$$

$$= K \left[\sum_{i=1}^{n} \frac{q_1}{r_1^2} \hat{r}_{oi} + \frac{q_2}{r_2^2} \hat{r}_{o2} + \dots \frac{q_n}{r_n^2} \hat{r}_{on} \right]$$

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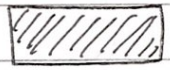
* $\vec{E} = K \int \frac{dq}{r^2} \hat{r}_o = K \int \frac{\lambda dx}{r^2} \hat{r}_o$ } z → Medan pada kawat jalur

*  $\vec{E} = K \iint \frac{\sigma dq}{r^2} \hat{r}_o$ Luasan

*  $\vec{E} = K \iiint \frac{\tau dr}{r^2} \hat{r}_o$ Volume

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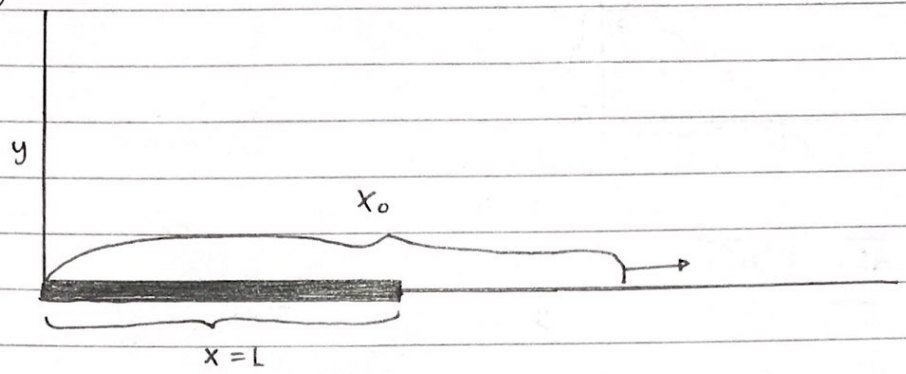
Latihan Soal

(1)



$E_p = ?$

$$\vec{E} = K \int_0^L \frac{dq}{r^2}$$

$$= K \int_0^L \frac{\lambda \, dx}{r^2}$$

$$= K \int_0^L \frac{dx}{(x_0 - x)^2}$$

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

$$E = K\lambda \left(\frac{1}{(x_0 - x)} \right)_0^L$$

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

$$= K\lambda \left(\frac{1}{x_0 - L} - \frac{1}{x_0} \right)$$

$$= K\lambda \left(\frac{1}{x_0 - L} - \frac{1}{x_0} \right)$$

$$= K\lambda \left(\frac{x_0 - (x_0 - L)}{x_0 (x_0 - L)} \right)$$

$$K\lambda \left(\frac{L}{x (x_0 - L)} \right)$$

$$K\lambda \frac{L}{x_0 (x_0 - L)}$$

Note!

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

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

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

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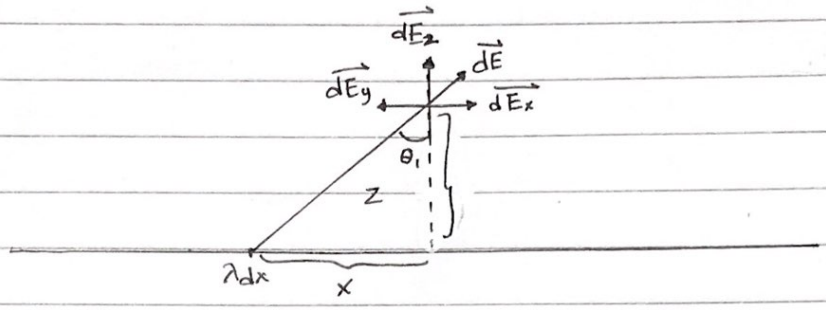
2.



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

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

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

$$\vec{E} = K \int_{-u}^{u} \frac{\lambda\, dx}{r^2} \cos\theta \qquad dq = \lambda\, dx$$

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

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

$$\text{tangen } \theta = \frac{x}{z}$$

$$x = z \operatorname{tg}\theta$$

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

$x = -u \quad \theta = -\frac{\pi}{2}$

$x = u \quad \theta = \frac{\pi}{2}$

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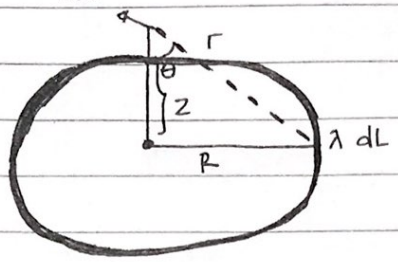
3) $\vec{dE}$



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

$$= K \lambda z \int_0^{2\pi R} \frac{dL}{(R^2+z)^{3/2}}$$

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

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