No. Kalisma

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Listrik & kemagnetan

1. $\vec{E} = \frac{1}{4\pi\varepsilon_0} \frac{q}{r^2} \hat{r}$

$= k \frac{q}{r^2} \hat{r}_0^2$ → oleh muatan diskrit

2. $\vec{E} = \frac{1}{4\pi\varepsilon_0} \int \frac{x \, dp}{r^2} \hat{r}_0^2$ → $q = x\, l$ → muatan tes distribusi pada penggaris

3. $\vec{E} = \frac{1}{4\pi\varepsilon_0} \iint 6 \frac{dq}{r^2} \hat{r}_0^2$ merupakan luas permukaan

4. $\vec{E} = \frac{1}{4\pi\varepsilon_0} \iiint \frac{\rho \, d6}{r^2} \hat{r}_0$

Contoh 1 :

$d\vec{E} = dE_y +$

$d\vec{E} = dE_y$

$dE_y = dE \cos\theta$

$\vec{E} = \frac{1}{4\pi\varepsilon_0} \int_{-L}^{L} \frac{x \, dl}{r^2} \cos\theta$

No.

Date

$$= \frac{z}{4\pi\varepsilon_0} \int_0^L \frac{x\,dx}{(x^2+z)^{2 \cdot \frac{1}{2}}}$$

$$= \frac{z}{4\pi\varepsilon_0} \int_0^L \frac{dx}{(x^2+z^2)^{3/2}} \quad \int \frac{dx}{(x^2+z^2)^{3/2}} = \frac{x}{z^2\sqrt{x^2+z^2}}$$

$$= \frac{2 \times z}{4\pi\varepsilon_0} \left(\frac{x}{z^2\sqrt{x^2+z^2}} \right) \Bigg|_0^L$$

$$= \frac{2\lambda z}{4\pi\varepsilon_0} \quad \frac{1}{z^2\sqrt{x^2+z^2}} - \frac{0}{z^2\sqrt{0+z^2}}$$

$$= \frac{2\lambda z}{4\pi\varepsilon_0} \left[\frac{L}{z^2\sqrt{L^2+z^2}} \right]$$

Contoh 2 :

$$\vec{E} = \frac{1}{4\pi\varepsilon_0} \int_0^L \frac{x\,dx}{(x_0-x)^2}$$ diputer & diturunkan

$$= \frac{1}{4\pi\varepsilon_0} \times \int_0^L (x_0-x)^{-2}\,dx$$

$$= \frac{1}{4\pi\varepsilon_0} \left((x_0-x)^{-1} \right) \Big|_0^L$$

$$= \frac{1}{4\pi\varepsilon_0} \left(\frac{1}{(x_0-x)} \right) \Big|_0^L$$

$$= \frac{1}{4\pi\varepsilon_0} \left(\frac{1}{(x_0-L)} - \frac{1}{(x_0-0)} \right)$$

untuk memperoleh ini, gunakan

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

$$= 1x^{-1} \Big|_0^2$$

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

$$= \frac{1}{4\pi \varepsilon_0} \left[\frac{x_0 - (x_0 - L)}{x_0 (x_0 - L)} \right]$$

liat rumus

$$= \frac{L}{x_0 (x_0 - L)}$$

Contoh 3 :

$$\vec{E} = \frac{1}{4\pi \varepsilon_0} \int_0^{2\pi R} \frac{z \lambda \, dl}{(z^2 + R^2)^{3/2}}$$

$$= \frac{z \lambda}{4\pi \varepsilon_0 (z^2 + R^2)^{3/2}} (l) \Big|_0^{2\pi R}$$

$$= \frac{z \lambda}{4\pi \varepsilon_0 (z^2 + R^2)^{3/2}} \int_0^{2\pi R} dl$$

$$= \frac{z \lambda}{4\pi \varepsilon_0 (z^2 + R^2)^{3/2}} \int_0^{2\pi R} dl$$

$$= \frac{z \lambda}{4\pi \varepsilon_0 (z^2 + R^2)^{3/2}} L \Big|_0^{2\pi R}$$

$$= \frac{z \lambda}{4\pi \varepsilon_0 (z^2 + R^2)^{3/2}} (2\pi R - R)$$

$$= \frac{z \lambda}{4\pi \varepsilon_0 (z^2 + R^2)^{3/2}} 2\pi R$$