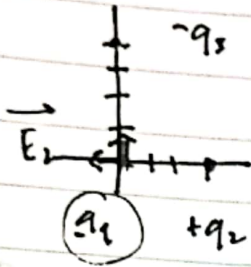


Catatan Pak Wadis

## Medan Listrik ( $\vec{E}$ )



$$\vec{E} = \frac{\sum F}{q_1}$$

$$= \frac{F_{q_2} \times F_{q_1}}{q_1}$$

$$= k \frac{q_2}{r^2} \times k \frac{q_1}{r^2}$$

$$(1) \quad \vec{E} = \frac{1}{4\pi\epsilon_0} \cdot \frac{q}{r^2} \hat{r}_0$$

$$= (k) \frac{q}{r^2} \hat{r}_0 \rightarrow \text{oleh muatan listrik}$$

Muatan listrik  $\rightarrow$  muatan yang tidak terpisah  $\rightarrow$  coloumb

(2)

$$(2) \quad \vec{E} = \frac{1}{4\pi\epsilon_0} \int \frac{x \, dq}{r^2} \rightarrow q = \text{muatan terdistribusi pada penggaris}$$

$$(3) \quad \vec{E} = \frac{1}{4\pi\epsilon_0} \iint \frac{\sigma \, da}{r^2} \hat{r}_0$$

$$(4) \quad \vec{E} = \frac{1}{4\pi\epsilon_0} \iiint \frac{\rho \, d\tau}{r^2} \hat{r}_0$$

Penyelesaian contoh soal.

$$\vec{E} = \frac{2\lambda z}{4\pi\epsilon_0} \int_0^L \frac{dx}{(x^2 + z^2)^{3/2}}$$

$$\int \frac{dx}{(x^2 + z^2)^{3/2}} = \frac{x}{z^2 \sqrt{x^2 + z^2}}$$

$$= \frac{2\lambda z}{4\pi\epsilon_0} \left( \frac{x}{z^2 \sqrt{x^2 + z^2}} \right) \Big|_0^L = \frac{2\lambda z}{4\pi\epsilon_0} \left[ \frac{L}{z^2 \sqrt{L^2 + z^2}} - \frac{0}{z^2 \sqrt{0 + z^2}} \right]$$

$$= \frac{2\lambda z}{4\pi\epsilon_0} \left[ \frac{L}{z^2 \sqrt{L^2 + z^2}} \right]$$

Penyelesaian contoh 2

$$\vec{E} = \frac{1}{4\pi\epsilon_0} \int_0^L \frac{x dx}{(x_0 - x)^2}$$

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

$$= |x^{-1}|$$

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