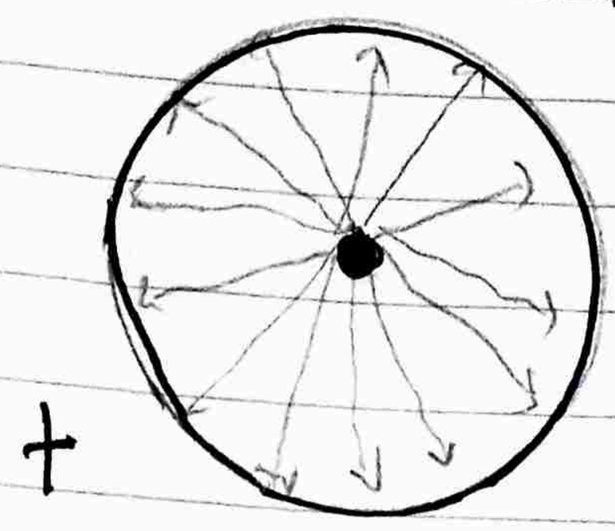
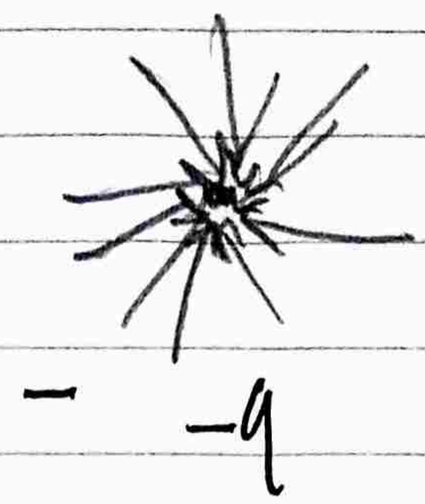
No. Senin

Date 18 . 03 . 2024

Kelistrikan dan Kemagnetan.

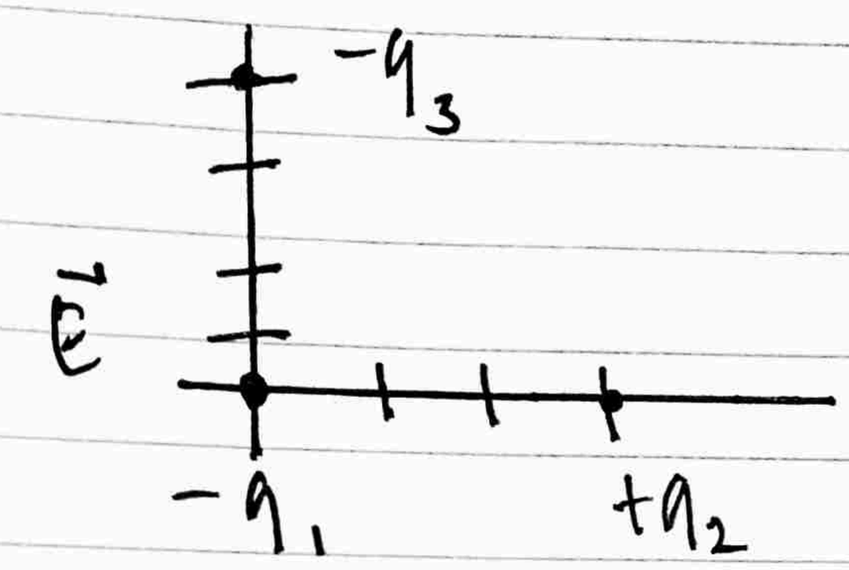
Medan Listrik ($\vec{E}$)





$$\vec{E} = \frac{\Sigma \vec{F}}{q_1} = \frac{F_{q_1}}{q_1} + \frac{F_{q_2}}{q_1}$$

$$\vec{E} = K\frac{q_3}{r_2} + K\frac{q_2}{r_2}$$



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

$= K\frac{q}{r^2}\hat{r}_0$ → Oleh muatan deskrit

2.) $\vec{E} = \frac{1}{4\pi\varepsilon_0}\int \frac{\lambda d\rho}{r^2}\hat{r}$ $= q = \lambda \ell$ muatan terdistribusi pada Penggaris.

3.) $\vec{E} = \frac{1}{4\pi\varepsilon_0}\iint \frac{\sigma dq}{\rho^2}\hat{r}$.

4.) $\vec{E} = \frac{1}{4\pi\varepsilon_0}\iiint \frac{\rho_b}{\rho^2}\tilde{r}$

▨ Luas Permukaan.

No.

Date . .

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

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

$$= \frac{2\lambda z}{4\pi\varepsilon_0}\left[\frac{x}{z^2\sqrt{z^2+x^2}}\right]_0^L$$

$$= \frac{2\lambda}{4\pi\varepsilon_0}\left[\frac{x}{z\sqrt{z^2+x^2}}\right]_0^L$$

$$= \frac{2\lambda}{4\pi\varepsilon_0}\left[\frac{L}{z\sqrt{z^2+L^2}} - \frac{0}{z\sqrt{z^2-0}}\right]$$

$$= \frac{1}{4\pi\varepsilon_0}\,\frac{2\lambda L}{z\sqrt{z^2+L^2}}$$

No.

Date . .

$$k\lambda \int_0^L (x_0 - x)^{-2}\, dx = k\lambda \left[\frac{1}{1} (x_0 - x)^{-1} \right]_0^L$$

$$k\lambda \left[-\frac{1}{x_0 - x} \right]_0^L = k\lambda \left[-\frac{1}{x_0 - L} - \left(-\frac{1}{x_0 - 0} \right) \right]$$

$$k\lambda \left\{ \frac{1}{x_0 - L} - \frac{1}{x_0} \right\}$$

$r \tan \theta \, dx$

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

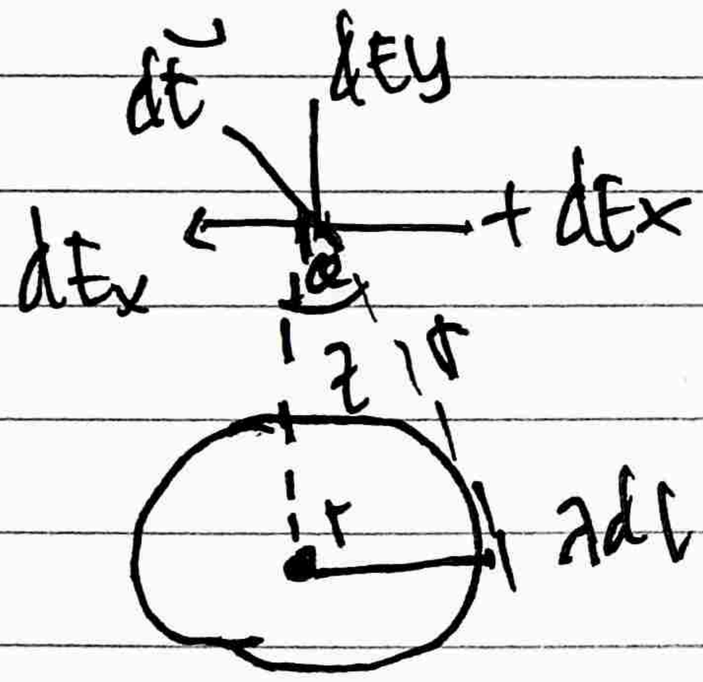
$$\tan\theta = \frac{x}{z} \rightarrow x = z\tan\theta$$

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

$x = z \tan\theta$

$x = -\infty, \theta = -\frac{\pi}{2}$

$x = \infty, \theta = \frac{\pi}{2}$.



$$\vec{E}y = \frac{1}{4\pi\varepsilon_0} \int_0^{2\pi r} \frac{\lambda\, dl}{r'^2} \cos\theta$$

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

$$= \frac{1}{4\pi\varepsilon_0} \int_0^{2\pi r} \frac{dl}{(z^2 + r^2)^{3/2}}$$

No.

Date . .

$$= \frac{\lambda z}{4\pi\varepsilon_0 (z^2+r^2)^{3/2}} \int_0^{2\pi r} dl \longrightarrow \int dl \cdot \int l^0 dl.$$

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

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