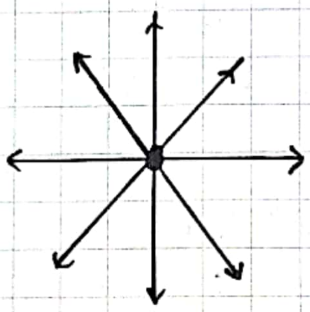
Hukum Guess

$\Delta V \neq dV$

$\oint \vec{E}\, da = \int_V (\nabla \cdot \vec{E})\, d.G$

$$\oint \vec{E}\, d\vec{a} = \oint \frac{g}{4\pi G p^2} p^2 \cancel{\sin} \sin\theta \, d\theta \, d\phi$$



g

$$= \frac{g}{4\pi G_0} \int_0^{\pi} \int_0^{2\pi} \sin\theta \, d\theta \, dp$$

$$= \frac{g(2\pi)}{4\pi G_0} \int_0^{\pi} \sin\theta \, d\theta$$

$$= \frac{4\pi g}{4\pi G_0}$$

$\oint \vec{E}\, d\vec{a} = \frac{g}{G_0}$

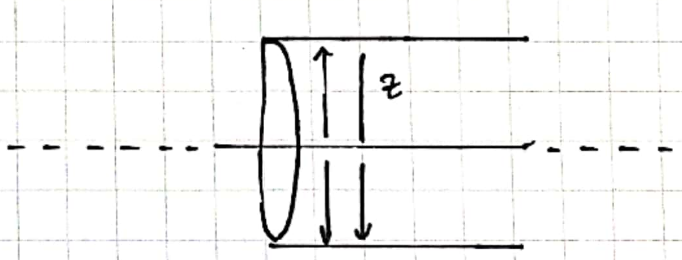
$\int_V (\nabla \cdot \vec{E})\, dG.$

$Q_{ml} = \rho \, dG$
$= \sigma \, da$
$= \lambda \, dp$

$$\iiint \nabla \cdot E \cdot dG = \iiint \frac{\rho \, dG}{G}$$

$$\nabla \cdot \vec{E} = \frac{\rho}{E_0}$$

Contoh:

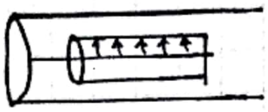


Permukaan Gauss

$\oint \vec{E} \cdot da = \frac{g}{E_0} \lambda . l \quad E(2\pi p . l) = \frac{M}{G}$

$\oint \vec{E}\, da = \frac{M}{G_0} \quad \vec{E} = \frac{\lambda}{2\pi G p} \hat{p}.$

$\oint \vec{E} \cdot da = \frac{Q}{\varepsilon_0}$



$\vec{E} = \frac{Q}{4\pi\varepsilon\rho^2}\hat{\rho}$

Hitung E Pada

a). $\rho < R$

b). $\rho > R$

$\oint \vec{E} \cdot da = \frac{Q r_0}{\varepsilon_0}$

$\vec{E}(4\pi\rho^2) = \frac{Q_{in}}{\varepsilon}$

Medan $< a = 0 \rightarrow \vec{E}$

$a < r < b$

↓

medan

$\oint \vec{E} \cdot da = \frac{Q}{\varepsilon_0}$

$E(4\pi r^2) = \frac{1}{\varepsilon_0}\iiint \rho \, d\tau$

$= \frac{1}{\varepsilon_0}\int_0^a\int_0^\pi\int_0^{2\pi} r^2 \sin\theta \, d\theta \, d\phi \, dr$

$\vec{E}(4\pi r^2) = \frac{4\pi}{\varepsilon_0}\int_0^a r^2 \, dr$

$= \frac{4\pi}{\varepsilon_0}\left(\frac{1}{3}r^3\right)_0^a$

$\vec{E}(4\pi r) = \frac{\frac{4}{3}\pi a^3}{\varepsilon_0}$, $\vec{E} = \frac{\rho a^3}{3\varepsilon_0 r^2}\hat{r}$

$\vec{E} \rightarrow r > b$

$\oint \vec{E} \cdot d\vec{a} = \frac{Q}{\varepsilon_0}$

$E \cdot (4\pi r^2) = \frac{1}{\varepsilon_0}\int_0^b\int_0^{2\pi}\int_0^\pi \sin\theta \, d\theta \, d\phi \, dr$

$r > b$

$E(4\pi r^2) = \frac{\rho}{\varepsilon_0} 4\pi \int_0^b r^2 \, dr$

$= \frac{\rho 4\pi}{\varepsilon_0}\left(\frac{1}{2}r^3\Big|_0^b\right)$

$= \frac{\rho 4\pi}{3\varepsilon_0}(b^3 - a^3)$

$= \frac{\rho}{3\varepsilon_0 r^2}(b^3 - a^3)$