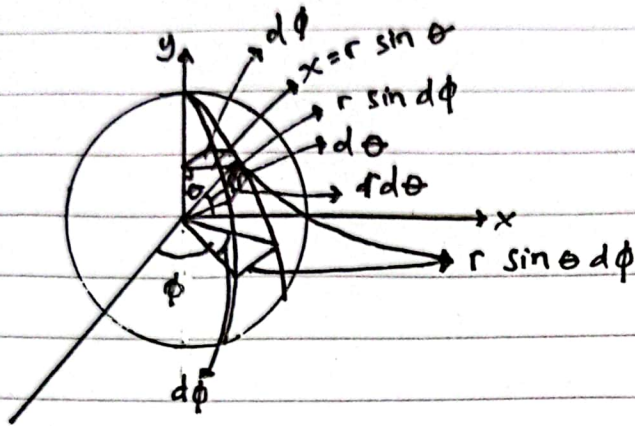


Kelistrikan dan
kemagnetan

Sistem Koordinat

① Koordinat bola



$$\sin \theta = \frac{x}{r}$$

$$x = r \sin \theta$$

$$\begin{aligned} da &= dp \times dl \\ &= r d\theta \cdot r \sin \theta d\phi \\ &= r^2 \sin \theta d\theta d\phi \end{aligned}$$

$$\begin{aligned} dt &= dp \cdot dl \cdot dt \\ &= r^2 \sin \theta d\theta d\phi dp \end{aligned}$$

$$\begin{aligned} \nabla T &= \hat{i} \frac{\partial T}{\partial x} + \hat{j} \frac{\partial T}{\partial y} + \hat{k} \frac{\partial T}{\partial z} \\ &= \frac{\partial T}{\partial \rho} \hat{\rho}_0 + \frac{1}{r} \frac{\partial T}{\partial \theta} \hat{\theta}_0 + \frac{1}{r \sin \theta} \frac{\partial T}{\partial \phi} \hat{\phi}_0 \end{aligned}$$

$$\nabla \cdot T =$$

$$\nabla \times T =$$

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Date

$$A = \int_0^{2\pi} \int_0^{\pi} r^2 \sin \theta \, d\theta \, d\phi$$

$$= r^2 \int_0^{2\pi} d\phi \int_0^{\pi} \sin \theta \, d\theta$$

$$= 2\pi r^2 \int_0^{\pi} \sin \theta \, d\theta$$

$$= [-\cos \theta]_0^{\pi} = 4\pi r^2$$

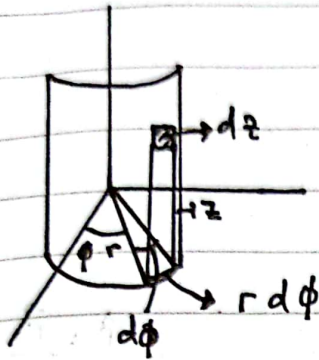
$$V = \int_0^{\pi} \int_0^{2\pi} \int_0^r r^2 \sin \theta \, d\theta \, d\phi \, dr$$

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

$$= 2(2\pi) \int_0^r r^2 \, dr$$

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

Koordinat Silinder



$$dA = dr \times dz$$

$$= r d\phi dz$$

$$dv = r d\phi dz dr$$

listrik Statis

→ Gaya Coulomb

→ Medan listrik

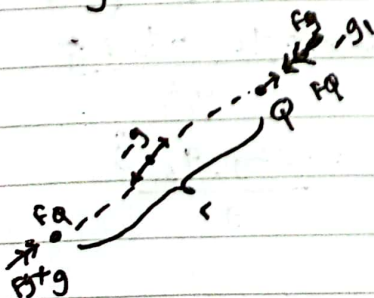
- diskrit
 - non diskrit
- ← Coulomb
Gausis
Statis

→ Potensial

- diskrit
- non diskrit

→ Usaha dan energi

Gaya Coulomb



$$q = \frac{F}{m}$$

$$F = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2} \hat{r}$$

