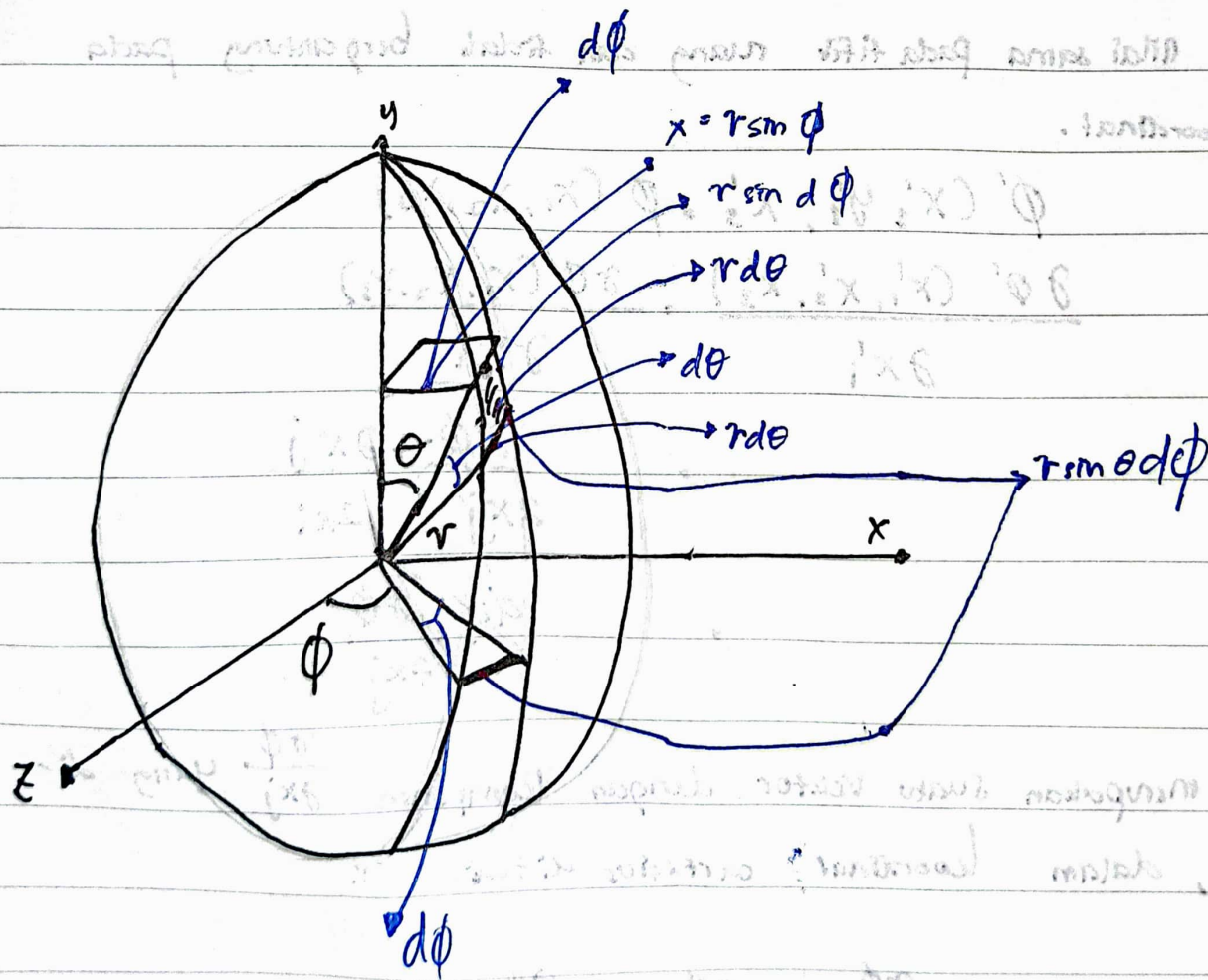


29 Feb 2024. Kamis

ha - isma - (Niken Nova Wenty 2213022059/22B)

Sistem Koordinat

① Koordinat Bola



elemen $P \times 1$

$$da = dp \times de$$

$$= r d\theta \cdot r \sin \theta d\phi$$

$$= r^2 \sin \theta d\theta d\phi$$

$$db \cdot dp \cdot dr \cdot d\theta$$

$$= r^2 \sin \theta d\theta d\phi dr$$

$$\nabla T = \hat{i} \frac{\partial T}{\partial x} + \hat{j} \frac{\partial T}{\partial y} + \hat{k} \frac{\partial T}{\partial z}$$

$$\nabla T = \frac{\partial T}{\partial r} \hat{r}_0 + \frac{1}{r} \frac{\partial T}{\partial \theta} \hat{\theta}_0 + \frac{1}{r \sin \theta} \frac{\partial T}{\partial \phi} \hat{\phi}_0$$

$$\nabla \cdot T = \dots$$

$$\nabla \times T = \dots$$

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

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

$$= 2\pi r^2 \int_0^\pi \sin \theta d\theta$$

$$= \pi \left[\cos \theta \right]_0^\pi = 4\pi r^2$$

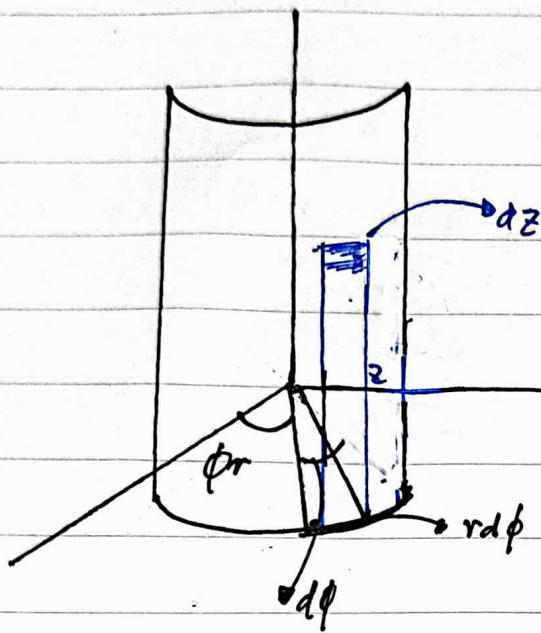
$$V = \int_0^\pi \int_0^{2\pi} \int_0^r r^2 \sin \theta d\theta d\phi dr$$

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

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

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

② Koordinat Sferis



$$dV = dr \times r d\theta \times r \sin\theta d\phi$$

$$= r^2 \sin\theta dr d\theta d\phi$$

$$dV = r^2 \sin\theta dr d\theta d\phi$$

- Listrik Statis -

- Gaya Coulomb

- Medan Listrik

- Diskrit

- Non diskrit

- Coulomb

- Gauss (Gauss)

- Statis

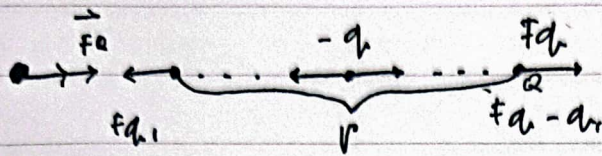
- Potensial

- Diskrit

- Non diskrit

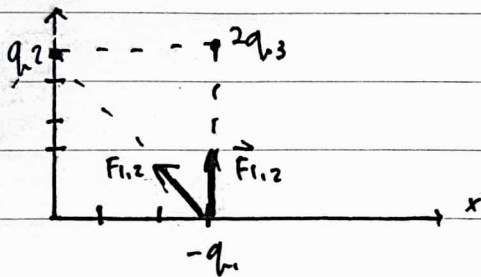
- Usaha dan Energi

$$Q = + N \bar{r}$$



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

$$\vec{F} = \frac{1}{4\pi\epsilon} \frac{qQ}{r^2} \hat{r}$$



$$\vec{F}_{q_1} = F_{1,2} = k \frac{q_1(2q_3)}{r^2} \hat{r}$$

$$\vec{F}_{1,2} = k \frac{q_1 q_2}{r^2} \left(\frac{-3\hat{i} + q\hat{j}}{5} \right)$$

$$F = \frac{1}{4\pi\epsilon}$$

$$\vec{r} = \frac{\vec{r}}{|\vec{r}|}$$

$$\vec{F} = kq_1 \left[-\frac{3q_2}{12r} \hat{i} + \left(\frac{2q_3}{16} + \frac{q_2}{12r} \right) \hat{j} \right]$$

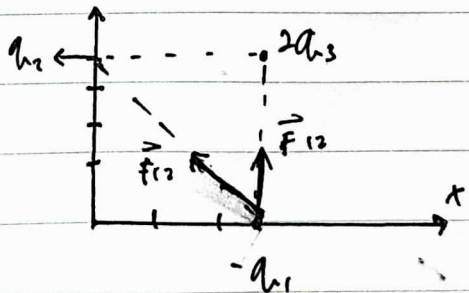
$$|\vec{F}| = kq_1 \sqrt{0^2 + \square^2}$$

$$\vec{F}_{1,3} = k \frac{q_1(2q_3)}{r^2} \hat{j}$$

$$F_{1,2} = k \frac{q_1 q_2}{r^2} \left(\frac{-3\hat{i} + q\hat{j}}{5} \right)$$

$$\vec{F}_{1,2} = \frac{-3kq_1 q_2}{12r} \hat{i} + \frac{4kq_1 q_2}{12r} \hat{j}$$

$$\vec{F}_{\text{total}} = \frac{-3kq_1 q_2}{12r} \hat{i} + \left(\frac{2kq_1 q_2}{16} + \frac{qkq_1 q_2}{12r} \right) \hat{j}$$



$$\vec{F}_{21} = k \frac{q_2 q_1}{r^2} \left(\frac{3\hat{i} - 4\hat{j}}{r} \right)$$

$$= \frac{3k q_2 q_1 \hat{i}}{12r} - \frac{4k q_2 q_1 \hat{j}}{12r}$$

$$\vec{F}_{23} = -k \frac{q_2 2q_3 \hat{i}}{3^2}$$

$$= -2k \frac{q_2 q_3 \hat{i}}{9}$$