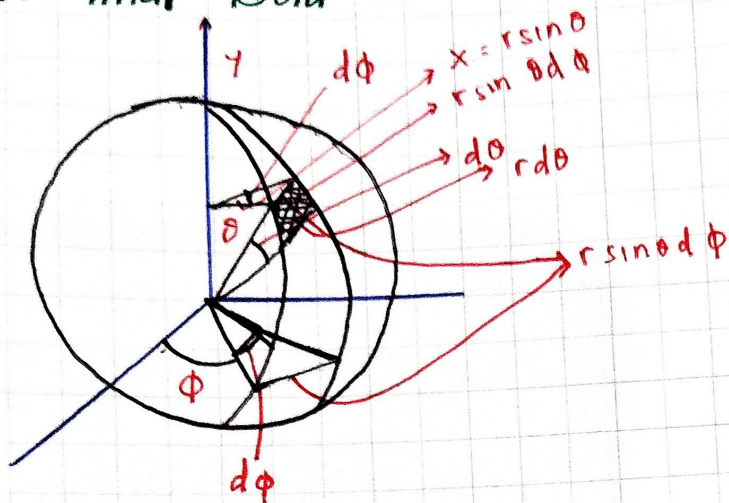


Sistem Koordinat

23/2
29

Koordinat Bola



$$da = dp \times dl$$

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

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

$$db = dp \cdot dl \cdot dr$$

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

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

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

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

luas

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

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

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

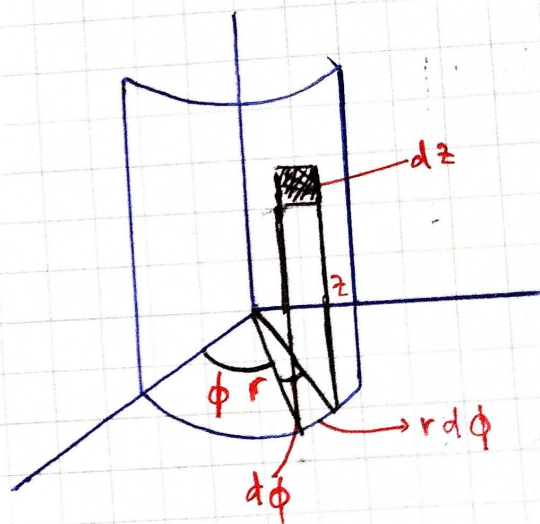
$$= 2\pi r^2 \left[-\cos\theta \right]_0^\pi = 4\pi r^2$$

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

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

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

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



$$dA = dp \times dl$$

$$= r d\phi dz$$

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

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NPM : 2213022034

[Signature]

Listrik Statis

- Gaya Coulomb
- Medan listrik
 - ~ diskrit
 - ~ non diskrit
- Potensial
 - ~ diskrit
 - ~ non diskrit

← Coulomb
← Gauss
← statis

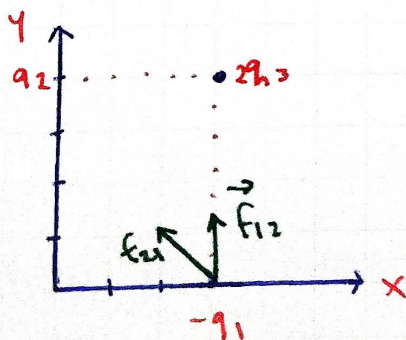
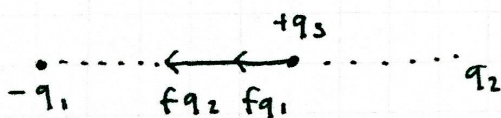
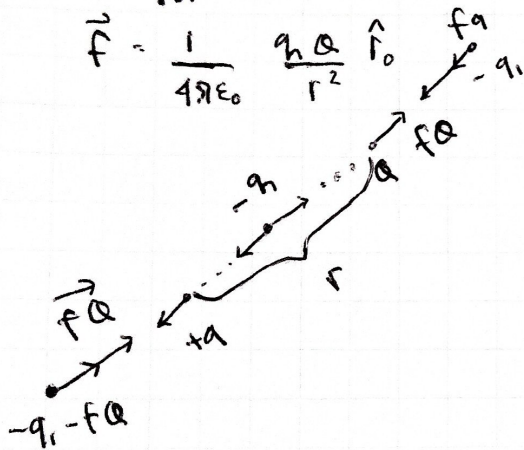
• Usaha dan Energi

• Muatan

$$Q = INe$$

$$q = \frac{f}{N}$$

$$\vec{f} = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2} \hat{r}_0$$



$$\vec{f}_{q1} =$$

$$\vec{f}_{12} = k \frac{q_1 (2q_3)}{4^2} \hat{j}$$

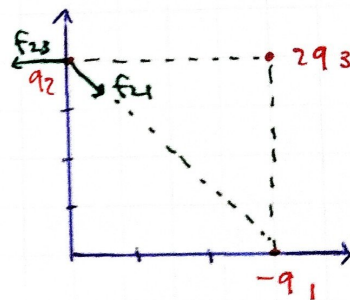
$$\vec{f}_{12} = k \frac{q_1 q_2}{5^2} \left(\frac{-3\hat{i} + 4\hat{j}}{5} \right)$$

$$k = \frac{1}{4\pi\epsilon_0}$$

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

$$\vec{f} = k q_1 \left[\frac{-3q_2}{125} + \left(\frac{2q_3}{16} + \frac{q_2}{125} \right) \hat{j} \right]$$

$$|\vec{f}| = k q_1 \sqrt{\left(\frac{-3q_2}{125} \right)^2 + \left(\left(\frac{2q_3}{16} + \frac{q_2}{125} \right) \hat{j} \right)^2}$$



$$\vec{f}_{21} = k \frac{q_2 q_1}{5^2} \left(\frac{3\hat{i} - 4\hat{j}}{5} \right)$$

$$= \frac{3k q_2 q_1}{125} \hat{i} - \frac{4k q_2 q_1}{125} \hat{j}$$

$$\vec{f}_{23} = -k \frac{q_2 (2q_3)}{3^3} \hat{j}$$

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

$$\vec{f}_{12} = \frac{-3k q_1 q_2}{125} \hat{i} + \frac{4k q_1 q_2}{125} \hat{j}$$

$$\vec{f}_{\text{total}} = \frac{-3k q_1 q_2}{125} \hat{i} + \left(\frac{2k q_1 q_3}{16} + \frac{4k q_1 q_2}{125} \right) \hat{j}$$