29/2024
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Asmaradana R.A.P
2213022066
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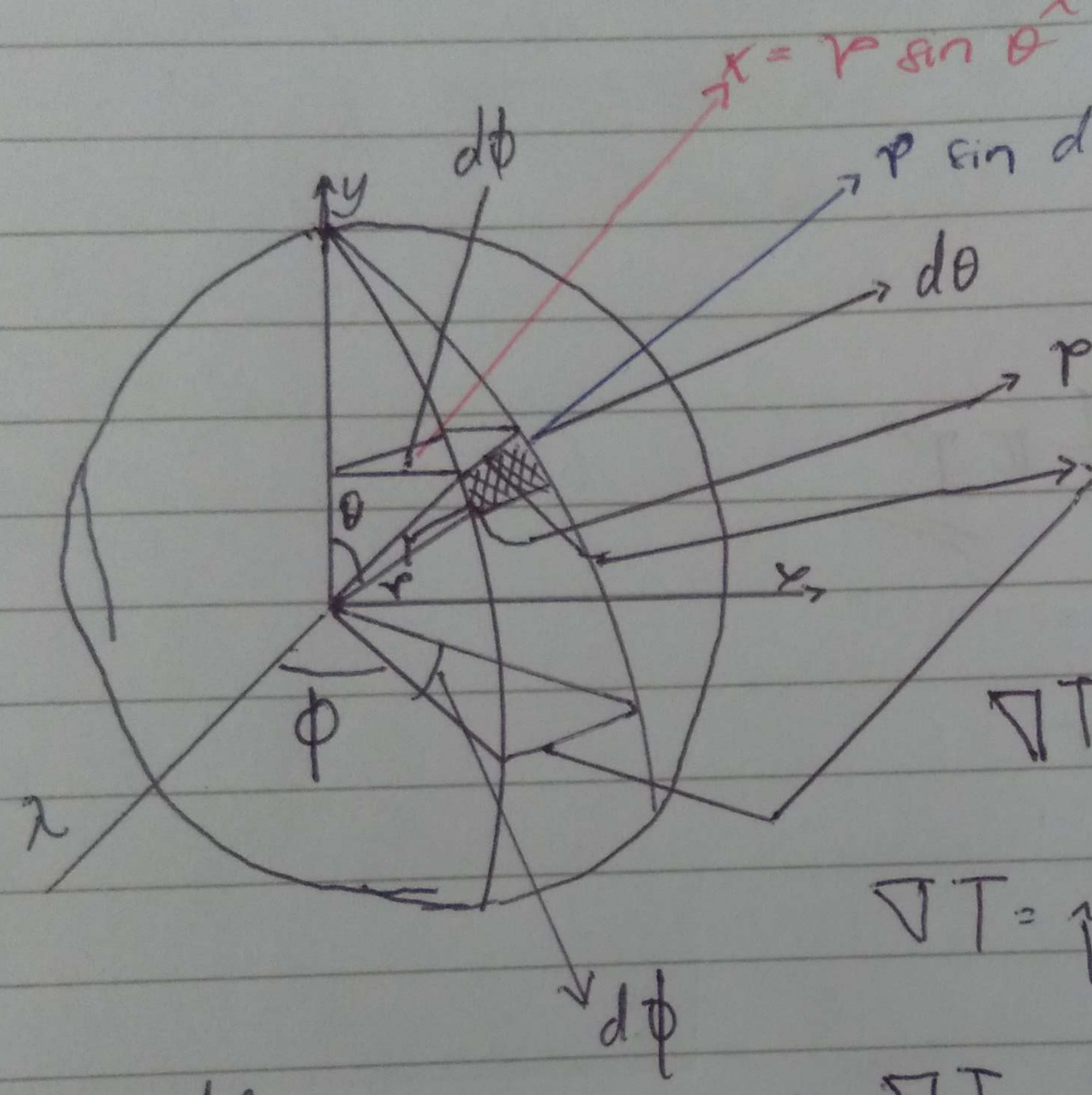
LISMA

Sistem koordinat

1) koordinat Bola.



$\nabla T =$

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

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

$da = d\rho \times d\ell$
$= \rho d\theta \cdot r \sin\theta d\phi$
$= r^2 \sin\theta\, d\phi$

$\nabla . T = \ldots$

$\nabla \times T = \ldots$

$d\tau = d\rho \cdot d\ell \cdot dt$
$= r^2 \sin\theta\, d\phi\, dr$

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

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

$$= 2\pi r^2 \int_0^{\pi 0} \sin d\theta$$

$$= \square\left[-\cos\theta\right|_0^{\pi} = 4\pi r^2$$

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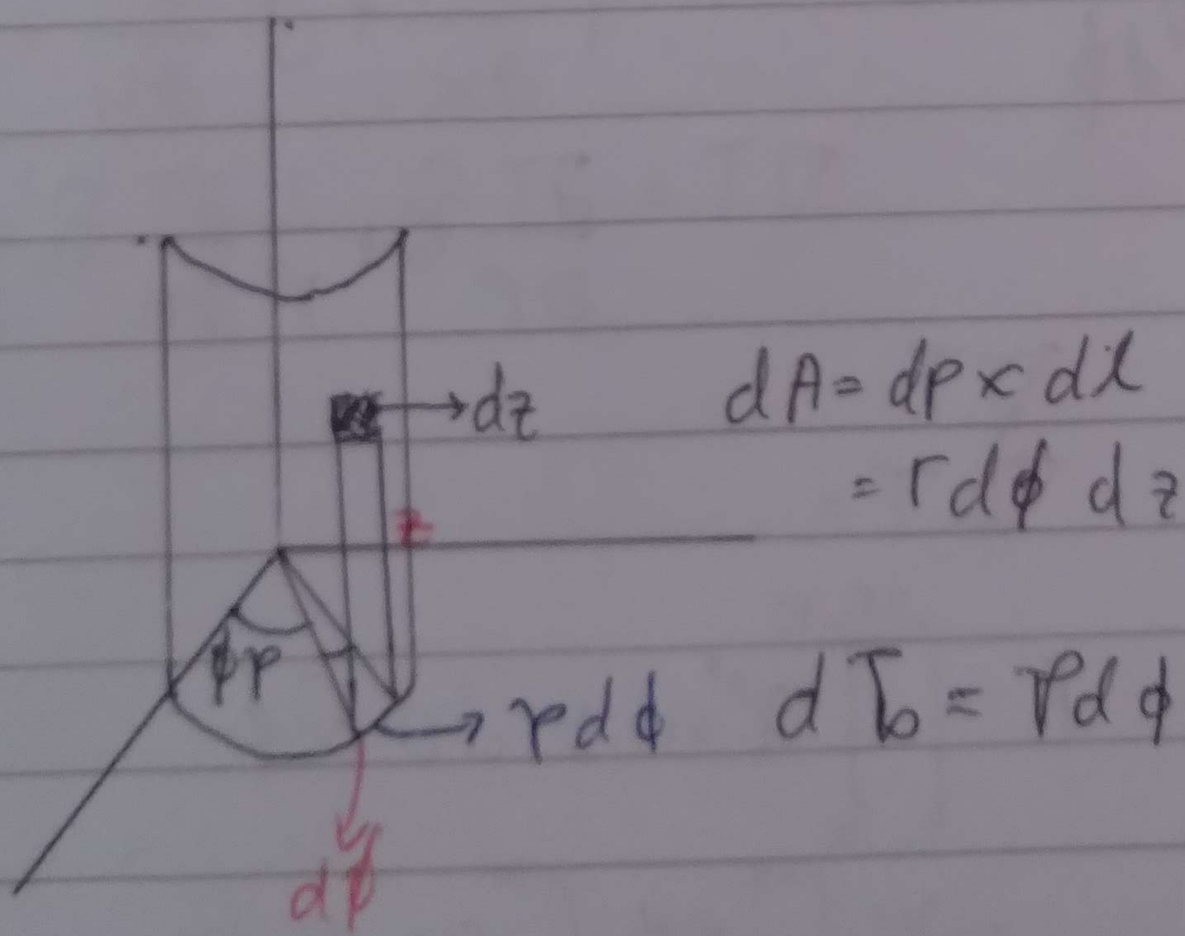
$$V = \int_0^{\pi}\int_0^{2\pi}\int_0^{r} \rho^2 \sin\theta \, d\theta \, d\phi \, d\rho$$

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

$$= 2 \cdot (2\pi) \int_0^{r} \rho^2 \, d\rho$$

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

2) koordinat silinder



$dA = dp \times dl$

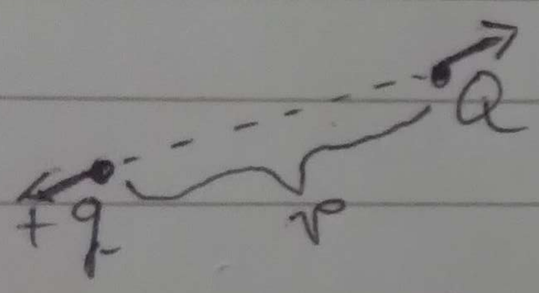
$= r\,d\phi\,dz$

$dV = r\,d\phi\,dz\,dr$

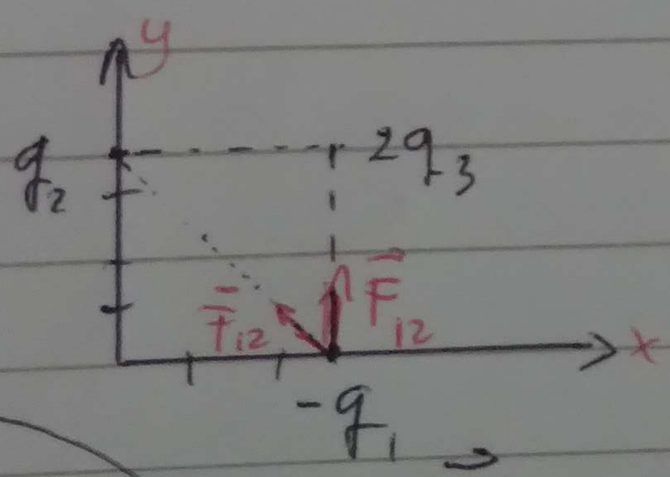
Listrik Statis
- Gaya Coulomb
- Medan Listrik
  - diskrit
  - non diskrit
- Potensial
  - disbrit
  - non disbrit
- Usaha dan energi

Coulomb, Gaussias, Statis

$Q = \pm N\bar{e}$



$a = \frac{F}{m}$ $\quad \vec{F} = \frac{1}{4\pi\epsilon_0} \frac{qQ}{r^2} \hat{r}_0$



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

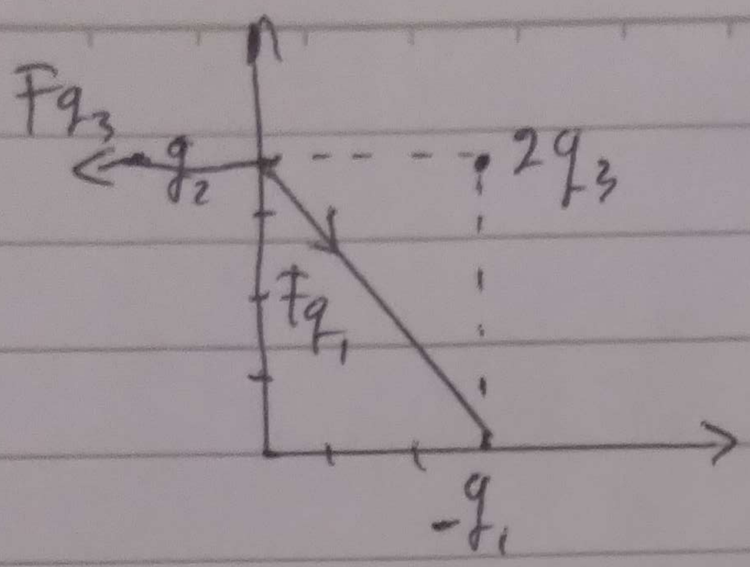
$\vec{F}_{12} = \frac{-3kq_1q_2}{125}\hat{i} + \frac{9kq_1q_2}{125}\hat{j}$ $\quad \vec{F}_{12} = k\frac{q_1(2q_3)}{4^2}\hat{j}$

$\vec{F}_{12} = k\frac{qq_2}{5^2}\left(\frac{-3\hat{i}+9\hat{j}}{5}\right)$ $\quad \hat{r}_0 = \frac{\vec{r}}{|r|}$

$\vec{F}_{total} = \frac{-3kq_1q_2}{125}\hat{i}$

$+\left(\frac{2kq_1q_2}{16} + \frac{9kq_1q_2}{125}\right)\hat{j}$ $\quad \vec{F} = kq_1\left[-\frac{3q_2}{125}\hat{i} + \left[\left(\frac{2q_3}{16} + \frac{9q_2}{125}\right)\hat{j}\right]\right]$

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



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

$$= \frac{3kq_2q_1}{125}\hat{i} - \frac{4kq_2q_1}{125}\hat{j}$$