No. kamis,

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▶ Ringkasan Pert 4 (upload) Mat. Gaya

1. Koordinat Cartesius (x, y, z)

$d\vec{r} : \hat{i}dx + \hat{j}dy + \hat{k}dz$

$d\tau : dx\,dy\,dz$

- gradien : $\nabla t = \hat{i}\frac{\partial t}{\partial x} + \hat{j}\frac{\partial t}{\partial y} + \hat{k}\frac{\partial t}{\partial z}$

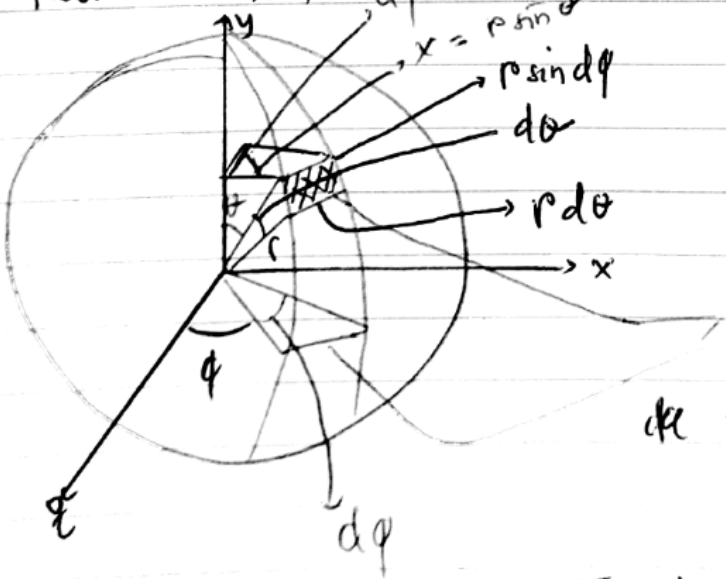
- Dwergensi : $\nabla \cdot \vec{v} = \frac{\partial v_x}{\partial x} + \frac{\partial v_y}{\partial y} + \frac{\partial v_z}{\partial z}$

- Rotasi : $\nabla \times \vec{v} = \hat{i}\left(\frac{\partial v_z}{\partial y} - \frac{\partial v_y}{\partial z}\right) + \hat{j}\left(\frac{\partial v_x}{\partial z} - \frac{\partial v_z}{\partial x}\right) + \hat{k}\left(\frac{\partial v_y}{\partial x} - \frac{\partial v_x}{\partial y}\right)$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ V_x & V_y & V_z \end{vmatrix}$$

Sistem koordinat:

2. Koordinat bola



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

$x = r\sin\theta$

$dA = dp \times d\ell$

$= r\,d\theta\, r\sin d\varphi$

$= r^2 \sin\theta\, d\theta\, d\varphi$

$d\tau = dp \cdot d\ell \cdot dz$

$= r^2 \sin\theta\, d\theta\, d\varphi\, dp$

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

$$\nabla T = \frac{\partial T}{\partial \rho}\hat{\rho} + \frac{1}{\rho}\frac{\partial T}{\partial \theta}\hat{\theta} + \frac{1}{\rho \sin\theta}\frac{\partial T}{\partial \varphi}\hat{\varphi}$$

$\nabla \cdot T$:

$\nabla \times T$:

$$A = \int_0^{2\pi}\int_0^{\pi} \rho^2 \sin\theta \, d\theta \, d\varphi$$

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

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

$$= 2\pi \left[-\cos\theta\right]_0^{\pi}$$

$$= 4\pi r^2$$

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

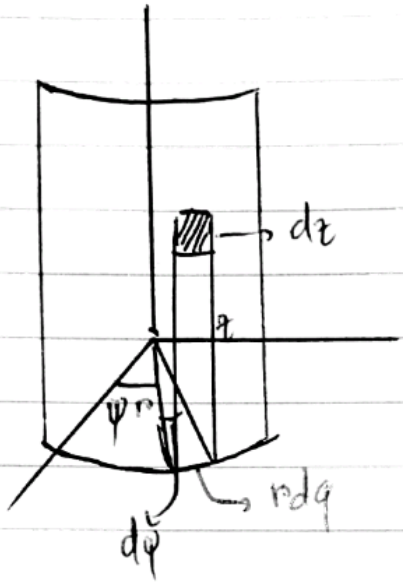
$$= \int_0^{\pi} \sin\theta \, d\theta \int_0^{2\pi} d\varphi \int_0^{\rho} r \, dr$$

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

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

$$\left[-\cos\theta\right]_0^{\pi}$$
$$= -\left[\cos\pi - \cos\theta\right]$$
$$= -\left[-1-1\right]$$
$$= -(-2)$$
$$= 2$$

3. Koordinat silinder



$dA = dp \times dl$

$= r\,dq$

$d\vec{b} = r\,dq\,dz\,dr$

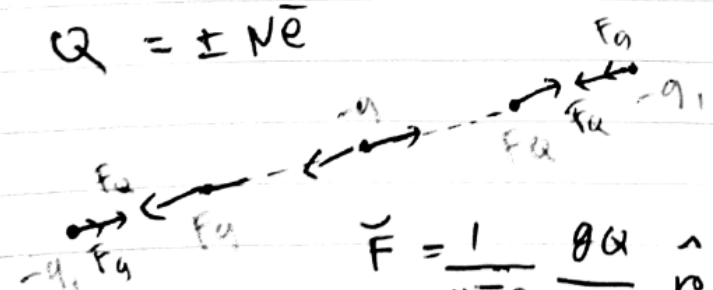
▶ **Listrik Statis** → foto kopi, TV tabung, print

- Gaya Coulomb
- Medan listrik
  - diskrit
  - Non diskrit ← coulomb, gaussius, stokes
- Potensial
  - Diskrit
  - non Distrit
- Usaha dan energi

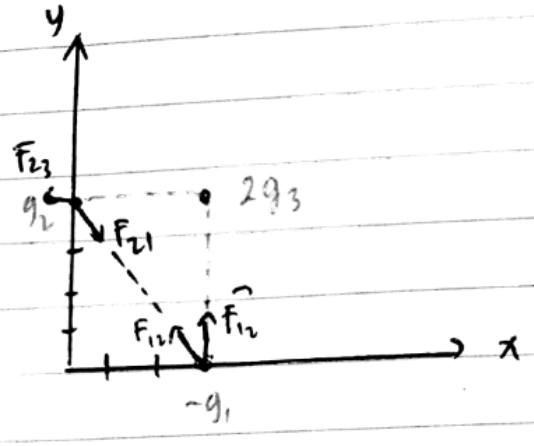
atom memiliki kekurangan elektron.

atom kelebihan elektron.

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



$$\vec{F} = \frac{1}{4\pi\varepsilon_0}\frac{qQ}{r^2}\hat{r}$$



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

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

$$\sqrt{3^2 + 4^2} = \sqrt{25} = 5$$

$\vec{F}_{q_1} =$

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

$$F_{12} = k\frac{qq_2}{5^2}\left(\frac{-3\hat{i}+4\hat{j}}{5}\right)$$

$$\vec{F}_{12} = \frac{-3kq_1q_2}{125}\hat{i} + \frac{4kq_1q_2}{125}\hat{j}$$

$$\vec{F}_{total} = \frac{3kq_1q_3}{125}\hat{i} + \left(\frac{2kq_1q_3}{16} + \frac{4kq_1q_2}{125}\right)\hat{j}$$

$$\vec{F}_{21} = k\frac{q_2q_1}{5^2}\left(\frac{3\hat{i}-4\hat{j}}{5}\right)$$

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

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

$$= -2k\frac{q_2q_3}{9}\hat{i}$$