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LISMA

Resume

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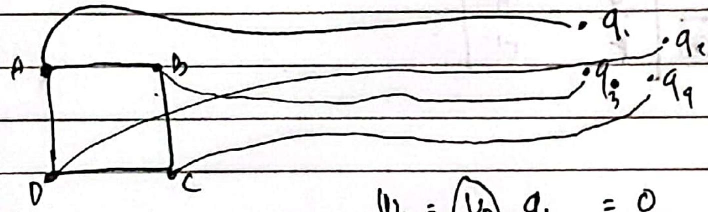
$W = q(V_b - V_a)$

$= V_p \cdot q$




$W_1 = V_p \cdot q_1 = 0$

$$W = \frac{1}{4\pi\varepsilon_0} \sum_{i=1}^{n} q_i \sum_{i \neq j} \frac{q_j}{r}$$

$$W = \frac{1}{2} \frac{1}{4\pi\varepsilon_0} \sum_{i=1}^{n} q_i \sum_{i \neq j}^{j>1} \frac{q_i}{r}$$

$$W = \frac{1}{2} \sum_{i=1}^{n} q_i \sum_{i \neq j} V_j$$

$$W = \frac{1}{2} V_p \cdot q$$

Untuk muatan diskrit

$$W = \frac{1}{2} \sum_{i=1}^{n} q_i \left[ \sum_{\substack{i=1 \\ j \neq j}} \frac{1}{4\pi\varepsilon_0} \frac{q_j}{R_{ij}} \right]$$

Untuk muatan kontinue

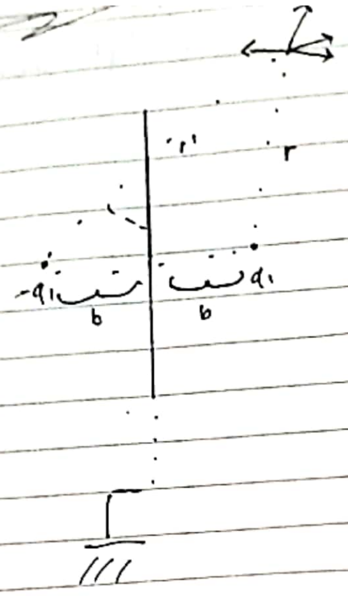
$$W = \frac{\varepsilon_0}{2} \int_V E^2 \, d\tau$$

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

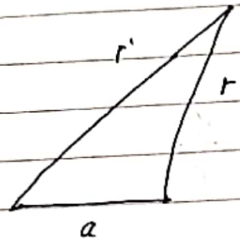
$$W = \frac{1}{2} \int \sigma V \, d\vec{a}$$

$$= 4\pi \int_0^R r^2 \, dr$$

$$W = \frac{1}{2} \iint \sigma V \, da$$




$$V_P = \frac{1}{4\pi\varepsilon_0}\left[\frac{q}{r} - \frac{q}{r'}\right]$$




$$r' = \left[r^2 + a^2 + 2ar\cos\theta\right]^{1/2}$$

$$\vec{E} = -\frac{\partial v}{\partial r} \rightarrow -\frac{1}{r}\frac{\partial v}{\partial r} \rightarrow -\frac{1}{r}\frac{q}{4\pi\varepsilon_0}\frac{\partial}{\partial r}\left(\frac{1}{r} + \frac{1}{(r^2+4h^2+4hr\cos\theta)^{1/2}}\right)$$

$$= \frac{-q}{4\pi\varepsilon_0}\frac{\partial}{\partial r}\left[\frac{1}{r} - \frac{1}{(r^2+4h^2+4hr\cos\theta)^{1/2}}\right]$$

$$= -\frac{1}{r^2} + \frac{\frac{1}{2}(r^2+4h^2+4hr\cos\theta)^{-1/2}(2r+4h\cos\theta)}{(r^2+4h^2+4hr\cos\theta)}$$

$$= -\frac{1}{r^2} + \frac{(r+2h\cos\theta)}{r+4h^2+4hr\cos\theta^{3/2}}$$

$$= \frac{q}{4\pi\varepsilon_0}\left[\frac{1}{r^2} - \frac{(r+2h\cos\theta)}{r^2+4h^2+4hr\cos\theta^{1/2}}\right]$$

$$= \frac{q}{4\pi\varepsilon_0 r}\left[\frac{2h\,\overset{\sin}{\cancel{\cos}}\,\theta}{r^2+4h^2+4hr\cos\theta)^{3/2}}\right] = \frac{q}{4\pi\varepsilon_0}\left[\frac{2h\sin\theta}{r'^3}\right]$$

Dipindai dengan CamScanner

$$E_\theta = -\frac{1}{r}\frac{\partial v}{\partial r}$$

$$= -\frac{1}{r}\frac{q}{4\pi\varepsilon_0}$$

$$= \frac{-q}{4\pi\varepsilon_0 r}\left[-\frac{1}{2}\frac{4hr\sin\theta}{(r^2+4h+4hr\cos\theta)^{3/2}}\right]$$

$$= \frac{q}{4\pi\varepsilon_0 r}\left[\frac{2hr\sin\theta}{r^{1\,3/2}}\right]$$