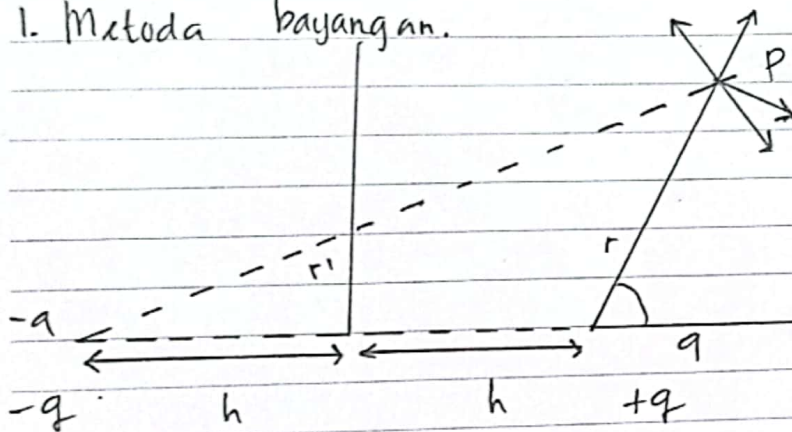


Bab 3 · Metoda Penentuan Potensial

1. Metoda bayangan.



pada bidang AB
dimana $r' = r$, maka
potensial $V = 0$

Gambar. batang konduktor dan muatan titik q

$$P = \frac{1}{4\pi\epsilon_0} \frac{q}{r} + \frac{-q}{4\pi\epsilon_0 r'}$$

$$V = \frac{q}{4\pi\epsilon_0} \left[\frac{1}{r} + \frac{1}{r'} \right]$$

$$r' = \left(r^2 + 4h^2 + 4hr \cos \theta \right)^{1/2}$$

$$\begin{aligned} \frac{dv}{dp} &= k \left[\frac{1}{r} - \frac{1}{(r^2 + 4h^2 + 4hr \cos \theta)^{1/2}} \right] \\ &= k \left[\frac{1}{r^2} - \frac{1}{2} \frac{(-1/2) (2r + 4hr \cos \theta)}{(r^2 + 4h^2 + 4hr \cos \theta)^{3/2}} \right] \end{aligned}$$

Energi dan muatan Distribusi Kontinyu.
Contoh Penerapannya.

$$W = \frac{1}{2} \int \rho V \, da$$

dimana:

$$W = \frac{1}{2} \sum_{i=1}^n q_i V_i$$

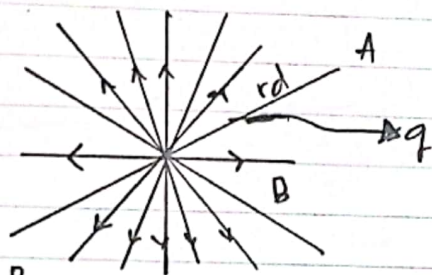
$$W = \frac{1}{2} \int \rho V \, dp$$

$$W = \frac{1}{2} \int \rho V \, ds$$

$$W = \frac{1}{2} \int \rho V \, dv$$

22/04
2024

Usaha dan Energi



$$W = \int_A^B \vec{F} \cdot d\vec{l}$$

$$= -q \int \vec{F} \cdot d\vec{l}$$

$$= -q \left[\int \frac{1}{4\pi\epsilon_0} \frac{q}{r^2} dr \right]$$

$$W = -q \left[-\frac{q}{4\pi\epsilon_0 r} \right]$$

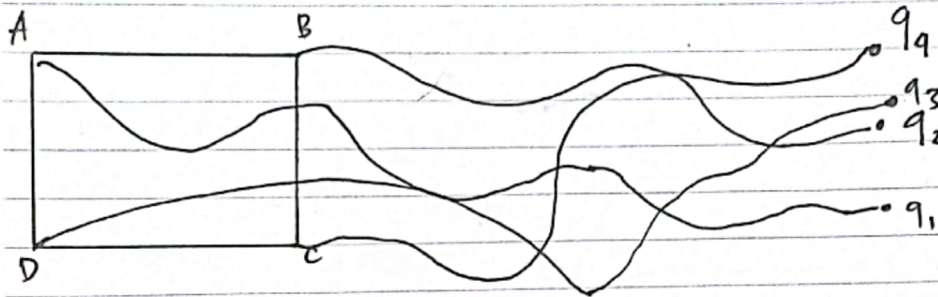
$$= Q [V]$$

$$W = Q \cdot V$$

Usaha & Energi

Contoh soal.

No 22 April
Date 2024



$$* W_1 = q_1 V_1 = 0$$

$$W_2 = q_2 V_2 = q_2 \left[k \frac{q_1}{r_1} \right]$$

$$* W_2 = q_2 V_2$$

$$* W_3 = q_3 V_3$$

$$= q_3 \left[k \frac{q_1}{r_1} + k \frac{q_2}{r_2} \right]$$

$$= q_3$$

$$* W_4 = q_4 V_4 = q_4 \left[k \frac{q_1}{r} + k \frac{q_2}{\sqrt{2}p} + k \frac{q_3}{p} \right]$$

Contoh: Permisalan

$$W_f = W_1 + W_2 + W_3 + \dots$$

$$= k \cdot \frac{q_1 \cdot q_2}{p} + k \cdot \frac{q_1 q_3}{p} + k \frac{q_2 \cdot q_3}{p} + \dots$$

$$W = \frac{1}{4\pi\epsilon_0} \sum_{i=1}^n = \sum_{i,j} \frac{q_i \cdot q_j}{r_{i,j}}$$