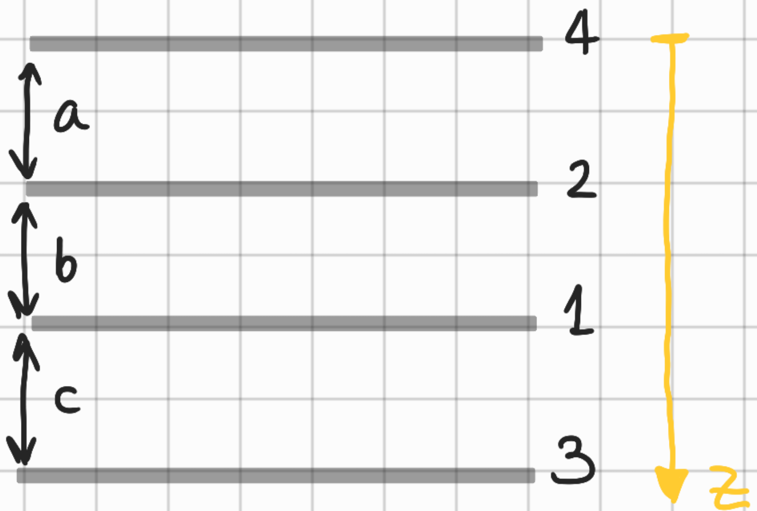
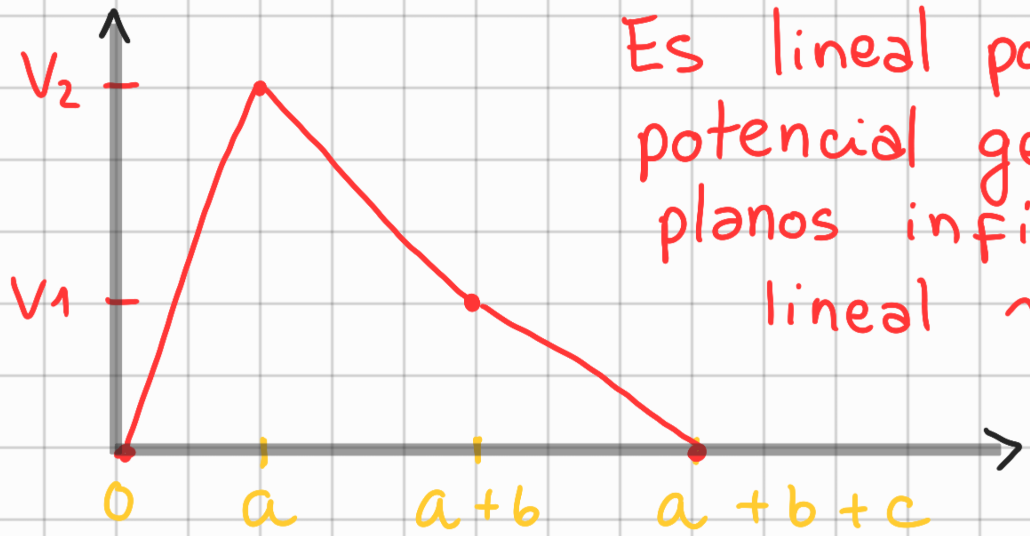


- $V_3 = 0$
- $V_4 = 0$
- $V_2 > V_1 > 0$



Es lineal porque el potencial generado por planos infinitos es lineal $\sim |z|$

Escribo el potencial

$$V(z) = \begin{cases} \alpha z + A & \text{①} \quad z < 0 \\ \gamma z + B & \text{②} \quad 0 < z < a \\ \eta z + C & \text{③} \quad a < z < a+b \\ \mu z + D & \text{④} \quad a+b < z < a+b+c \\ \lambda z + E & \text{⑤} \quad z > a+b+c \end{cases}$$

- $V(z=0) = V(z=a+b+c) = 0$

$\Rightarrow$ Planteo continuidad

$$\alpha z + A = 0 \text{ en } z=0 \Rightarrow \boxed{A=0}$$

$$\gamma z + B = 0 \text{ en } z=0 \Rightarrow \boxed{B=0}$$

Ahora me quedan 8 incógnitas

$V(z=a) = V_2$

$$\gamma . a = V_2 \Rightarrow \boxed{\gamma = V_2/a}$$

$$\eta . a + C = V_2$$

$V(z=a+b) = V_1$

$$\eta . (a+b) + C = V_1$$

junto con la anterior

$$V_2 - \eta . a = V_1 - \eta(a+b)$$

$$V_2 - V_1 = \eta(a-a-b)$$

$$V_1 - V_2 = \eta b$$

$$\boxed{\frac{V_1 - V_2}{b} = \eta}$$

$$C = V_2 - \eta \cdot a$$

$$\boxed{C = V_2 + (V_2 - V_1) \cdot \frac{a}{b}}$$

Además en $z = a + b$:

$$\mu (a+b) + D = V_1$$

En $z = a + b + c$

$$\mu (a + b + c) + D = 0$$

$$\Rightarrow D = -\mu (a + b + c)$$

$$y \quad \mu = \frac{V_1 - D}{(a+b)}$$

$$\Rightarrow D = \frac{(D - V_1)(a+b+c)}{(a+b)}$$

$$D = \frac{D(a+b+c)}{(a+b)} - \frac{V_1 (a+b+c)}{(a+b)}$$

$$D\left(1-\frac{(a+b+c)}{(a+b)}\right) = -\frac{V_1\,(a+b+c)}{(a+b)}$$

$$\boxed{D = \frac{-\dfrac{V_1\,(a+b+c)}{(a+b)}}{\left(1-\dfrac{(a+b+c)}{(a+b)}\right)}}$$

$$\boxed{\mu = \frac{V_1/(a+b)}{\left(1-\dfrac{a+b+c}{a+b}\right)}} = -\frac{V_1}{c}$$

La última...

$$\lambda(a+b+c) + E = 0$$

7 quedaron determinadas

y hay 3 libres y una sóla ec. restante

$\Rightarrow$ Si calculo el campo $\bar{E} = -\bar{\nabla} V$

$$\bar{E}(z) = \begin{cases} -\alpha \hat{z} & 1 \\ -\gamma \hat{z} & 2 \\ -\eta \hat{z} & 3 \\ -\mu \hat{z} & 4 \\ -\lambda \hat{z} & 5 \end{cases}$$

Viendo los saltos en el campo $\vec{E}$

- $(\bar{E}_4 - \bar{E}_3) \cdot \hat{z} = \dfrac{\sigma_1}{\varepsilon_0}$

$$\frac{\sigma_1}{\varepsilon_0} = \left[-\mu + \eta \right] = \left[\frac{V_1}{c} + \frac{V_1 - V_2}{b} \right]$$

$$\Rightarrow \boxed{\sigma_1 = \varepsilon_0 \left[V_1 \cdot \left(\frac{1}{c} + \frac{1}{b} \right) - \frac{V_2}{b} \right]}$$

- $(\bar{E}_3 - \bar{E}_2) \cdot \hat{z} = \sigma_2 / \varepsilon_0$

$$\frac{\sigma_2}{\varepsilon_0} = \left[-\eta + \gamma\right] = \left[\frac{V_2 - V_1}{b} + \frac{V_2}{a}\right]$$

$$\boxed{\sigma_2 = \varepsilon_0 \left[V_2\left(\frac{1}{b} + \frac{1}{a}\right) - V_1/b\right]}$$

$\Rightarrow$ Ahora planteo los coef.

$$\begin{cases} Q_1 = C_{11} V_1 + C_{12} V_2 \\ Q_2 = C_{21} V_1 + C_{22} . V_2 \end{cases}$$

$Q_1 = \sigma_1 . \text{Área}$ // $Q_2 = \sigma_2 . \text{Área}$

- $C_{11} = \left.\frac{dQ_1}{dV_1}\right|_{V_2 = cte} = A . \varepsilon_0 \left(\frac{1}{c} + \frac{1}{b}\right)$

- $C_{22} = \left.\frac{dQ_2}{dV_2}\right|_{V_1 = cte} = A . \varepsilon_0 \left(\frac{1}{b} + \frac{1}{a}\right)$

- $C_{12} = C_{21} = \left.\frac{dQ_1}{dV_2}\right|_{V_1} = \left.\frac{dQ_2}{dV_1}\right|_{V_2} = -\frac{A \varepsilon_0}{b}$