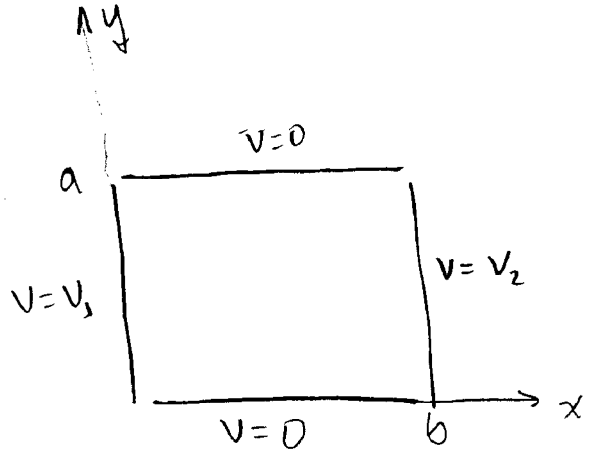

Problema bidimensional:

$$\nabla^2 \varphi = \frac{\partial^2 \varphi}{\partial x^2} + \frac{\partial^2 \varphi}{\partial y^2} = 0$$

Por separación de variables se obtiene la solución de la forma [2]:

$$\varphi(x,y) = \left(\tilde{A} e^{\alpha x} + \tilde{B} e^{-\alpha x}\right)\left(C e^{i\alpha y} + D e^{-i\alpha y}\right) + \tilde{a}\, x y + \tilde{b} x + c y$$

$\alpha \geq 0$

Condiciones de frontera:

$\varphi(x,a) = 0$; $\varphi(0,y) = V_1$

$\varphi(x,0) = 0$; $\varphi(b,y) = V_2$

Se sigue:

$$\varphi(x,0) = \left(\tilde{A} e^{\alpha x} + \tilde{B} e^{-\alpha x}\right)(C + D) + \tilde{b} x = 0$$

x y $e^{\pm \alpha x}$ son linealmente independientes en consecuencia:

$C + D = 0$ y $\tilde{b} = 0$

$\hookrightarrow D = -C$

Se sigue:

$$\phi(x,y) = \left(\tilde{A} e^{\alpha x} + \tilde{B} e^{-\alpha x}\right) C \left(e^{i\alpha y} - e^{-i\alpha y}\right) + \tilde{a} x y + c y$$

$$\phi(x,y) = \left(A e^{\alpha x} + B e^{-\alpha x}\right) \sin(\alpha y) + a x y + c y$$

; Aquí $A = \tilde{A} C (2i)$

$B = \tilde{B} C(-2i)$

Ahora:

$$\phi(x,a) = \left(A e^{\alpha x} + B e^{-\alpha x}\right) \sin(\alpha a) + \tilde{a} x b + c b = 0 \; ; \quad b \neq 0$$

lineal se tiene: $\sin(\alpha a) = 0$, $\tilde{a} = 0$, $c = 0$