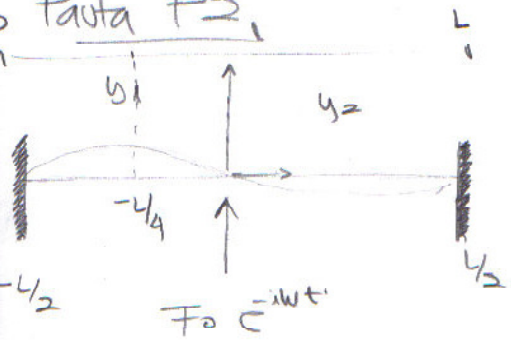
Control 3, FI21B

Prof: Claudio Romero

Pauta P2,




(1.0 pto)

$$\Rightarrow y_1 = (A \cdot \operatorname{Sen} kx + B \cdot \operatorname{Cos} kx)\, e^{-i\omega t}$$

$$y_2 = (C \cdot \operatorname{Sen} kx + D \cdot \operatorname{Cos} kx)\, e^{-i\omega t}$$

C. Bordes, extremos fijos

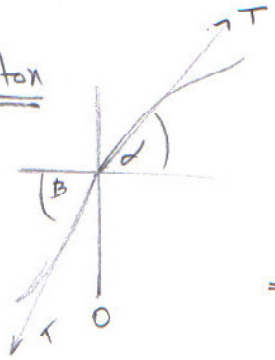
$$y_1(-L/2, t) = 0 \Rightarrow B = A \cdot \operatorname{tg}(kL/2) \quad (1)$$

$$y_2(L/2, t) = 0 \Rightarrow D = -C \operatorname{tg}(kL/2) \quad (2)$$

Continuidad

$$y_1(0,t) = y_2(0,t) \Rightarrow B = D \quad (3)$$

Newton




$$\Rightarrow T(\operatorname{Sen}\alpha - \operatorname{Sen}\beta) + F_0 \cdot e^{-i\omega t} = 0$$

[punto infinitesimal de la cuerda]

pequeñas oscila... $\Rightarrow \operatorname{Sen}\alpha \simeq \operatorname{tg}\alpha = \frac{\partial y_2}{\partial x}$

$\operatorname{Sen}\beta \simeq \operatorname{tg}\beta \simeq \frac{\partial y_1}{\partial x}$

$$\Rightarrow T\left(\frac{\partial y_2}{\partial x} - \frac{\partial y_1}{\partial x}\right)\Big|_{x=0} + F_0 \cdot e^{-i\omega t} = 0$$

$$Tk(C - A)\, e^{-i\omega t} + F_0 \cdot e^{-i\omega t} = 0$$

$$\Rightarrow C - A = \frac{-F_0}{Tk} = \frac{-D}{\operatorname{tg}(kL/2)} \overset{(1)\wedge(2)}{=} \frac{-B}{\operatorname{tg}(kL/2)} \overset{(3)}{=} \frac{-2B}{\operatorname{tg}(kL/2)} = \frac{-F_0}{Tk}$$

$$\Rightarrow B = \frac{F_0 \operatorname{tg}(kL/2)}{Tk\ 2} \overset{\omega = kc}{=} \boxed{\frac{F_0 \operatorname{tg}\left(\frac{\omega L}{c2}\right) \cdot c}{2\omega T} = B}$$

(4.0 pto)

$$\Rightarrow y_1 = \frac{B}{\operatorname{Sen}(kL/2)} \operatorname{Sen}(k(L/2 + x))\, e^{-i\omega t}$$

$y_1(0,t) = B \cdot e^{-i\omega t} \Rightarrow$ Amplitud $= B$ → (1.0 pto)

Para $L/4$, en nuestro sistema $x = -L/4$

$y_1(-L/4, t) = B \cdot \frac{\operatorname{Sen}(kL/4)}{\operatorname{Sen}(kL/2)} \Rightarrow$ Amplitud $= B\frac{\operatorname{Sen}(kL/4)}{\operatorname{Sen}(kL/2)}$ (1.0 pto)

//