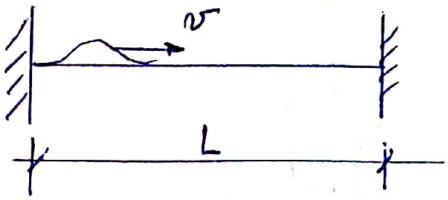
Problema 3. Ondas sobre cuerdas

$v = 50\ m/s$

$L = 5\ m$

$m = 0{,}06\ kg$

$F = ?$



$$v = \sqrt{\frac{F}{\mu}} \qquad \text{con } \mu = \frac{m}{L} \text{ densidad lineal}$$

$$v = \sqrt{\frac{F}{m/L}} = \sqrt{\frac{F \cdot L}{m}}$$

$$F = \frac{v^2 m}{L} = \frac{50^2 \times 0{,}06}{5} = 30\ N$$

Problema 4. Ondas sobre cuerdas

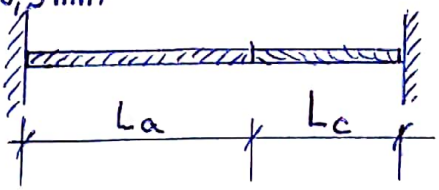
$L_a = 30\ m$ $\quad \rho_a = 7.860\ kg/m^3$

$L_c = 20\ m$ $\quad \rho_c = 8.920\ kg/m^3$

$d = 1\ mm \rightarrow r = 0{,}5\ mm$

$F = 150\ N$

$t = ?$



$$v = \sqrt{\frac{F}{\mu}}$$

La tensión F es la misma para ambos alambres pero el μ es distinto $\Rightarrow v_a \neq v_c$

$$\rho = \frac{m}{V} = \frac{m}{\pi r^2 L} = \frac{\mu}{\pi r^2}$$

$$\mu_a = \pi r^2 \rho_a \ ; \ \mu_c = \pi r^2 \rho_c$$

$$v_a = \sqrt{\frac{F}{\pi r^2 \rho_a}}$$

. El tiempo que tarda la onda en recorrer la distancia L_a será: $t_a = \frac{L_a}{v_a}$

L_c = será: $t_c = L_c / v_c$

$$t_a = \frac{L_a}{\sqrt{\frac{F}{\pi r^2 \rho_a}}} = \frac{30}{\sqrt{\frac{150}{\pi \times (0{,}5 \times 10^{-3})^2 \times 7.860}}} = 0{,}192 \text{ seg.}$$

$$t_c = \frac{L_c}{\sqrt{\frac{F}{\pi r^2 \rho_c}}} = \frac{20}{\sqrt{\frac{150}{\pi \times (0{,}5 \times 10^{-3})^2 \times 8920}}} = 0{,}137 \text{ seg.}$$

$$t_T = t_a + t_c = 0{,}192 + 0{,}137 = \underline{0{,}329 \text{ seg}} //$$