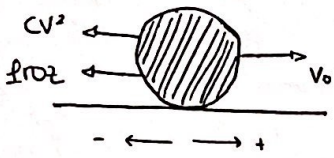
* EJERCICIO 21.

p te lo dice el problema anterior



EXAMEN !

$\Sigma F = m \cdot \vec{a}$

$m \cdot \frac{dv}{dt} = -cv^2 - f_{roz} = -(cv^2 + f_{roz})$

$\sqrt{\frac{c}{f_{roz}}} \cdot v = z$

$dv = dz \sqrt{\frac{f_{roz}}{c}}$

$m \cdot \frac{dv}{cv^2 + f_{roz}} = -dt \Rightarrow -dt = \frac{m}{f_{roz}} \cdot \frac{dv}{\frac{cv^2}{f_{roz}} + 1} = \frac{m}{f_{roz}} \frac{dv}{\left(\sqrt{\frac{c}{f_{roz}}} \cdot v\right)^2 + 1} = \frac{m}{f_{roz}} \cdot \frac{\sqrt{\frac{f_{roz}}{c}} \cdot dz}{z^2 + 1} =$

$= \frac{m}{\sqrt{f_{roz} \cdot c}} \cdot \frac{dz}{z^2 + 1}$

$\frac{\sqrt{\frac{f_{roz}}{c}}}{f_{roz}} = \frac{1}{f_{roz}\sqrt{\frac{c}{f_{roz}}}} = \frac{1}{\sqrt{f_{roz}} \cdot \sqrt{c}}$

$\frac{f_{roz}}{\sqrt{f_{roz}}} = \sqrt{f_{roz}}$

$\int \frac{1}{x^2+1} dx = \text{arctg}\, x$

$-\int dt = \frac{m}{\sqrt{f_{roz} \cdot c}} \int \frac{1}{z^2+1} dz \Rightarrow -t = \frac{m}{\sqrt{f_{roz} \cdot c}} \text{arctg}\left(\sqrt{\frac{c}{f_{roz}}} \cdot v\right) \Big]_{v_0}^{v(t)}$

$t = \frac{m}{\sqrt{f_{roz} \cdot c}} \text{arctg} \sqrt{\frac{c}{f_{roz}}} (v_0 - v(t))$ → RADIANES

$\begin{cases} m = 80kg \\ f_{roz} = 2N \\ c = 0'2N/(m/s)^2 \\ v_0 = 20m/s \end{cases}$

xq hemos quitado el - a t.

MAL !!

$t = \frac{m}{\sqrt{f_{roz} \cdot c}} \left[\text{arctg}\left(\sqrt{\frac{c}{f_{roz}}} v_0\right) - \text{arctg}\left(\sqrt{\frac{c}{f_{roz}}} v(t)\right)\right]$

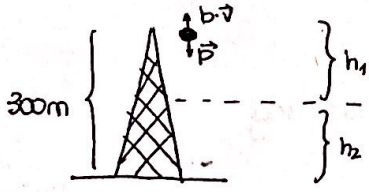
despejando de aquí

$v(t) = \sqrt{\frac{f_r}{c}} \cdot tg\left[\text{arctg}\left(\sqrt{\frac{c}{f_r}} v_0\right) - \frac{\sqrt{f_r \, c}}{m} t\right]$

HACER TODA ESTA CUENTA EN RADS Y...

- $t(v(t) = 15m/s) = 6'34seg$
- $t(v(t) = 10m/s) = 18'4seg$
- $t(v(t) = 5m/s) = 48'31seg$
- $t(v(t) = 0m/s) = 142'42seg.$

* EJERCICIO 23.



$m \cdot g = b \cdot v_{em} \Rightarrow v_{em} = \frac{m \cdot g}{b} = 13m/s$

$V \cdot \rho = \frac{4}{3}\pi r^3 \cdot \rho = \frac{4}{3}\pi \cdot (10'005)^3 \cdot 4500$ (m) (kg/m³)

$b = 4'8 \cdot 10^{-2}$

TRAMO 1

$y(t) = v_{em} \cdot t + (v_{y_0} - v_{em}) z (1 - e^{-t/z})$

$y(t = 4z) = 13 \cdot 4z + (0 - 13) z (1 - e^{-4}) \Rightarrow h_1 = 51'75m$

$z = \frac{m}{b} = 1'32seg$