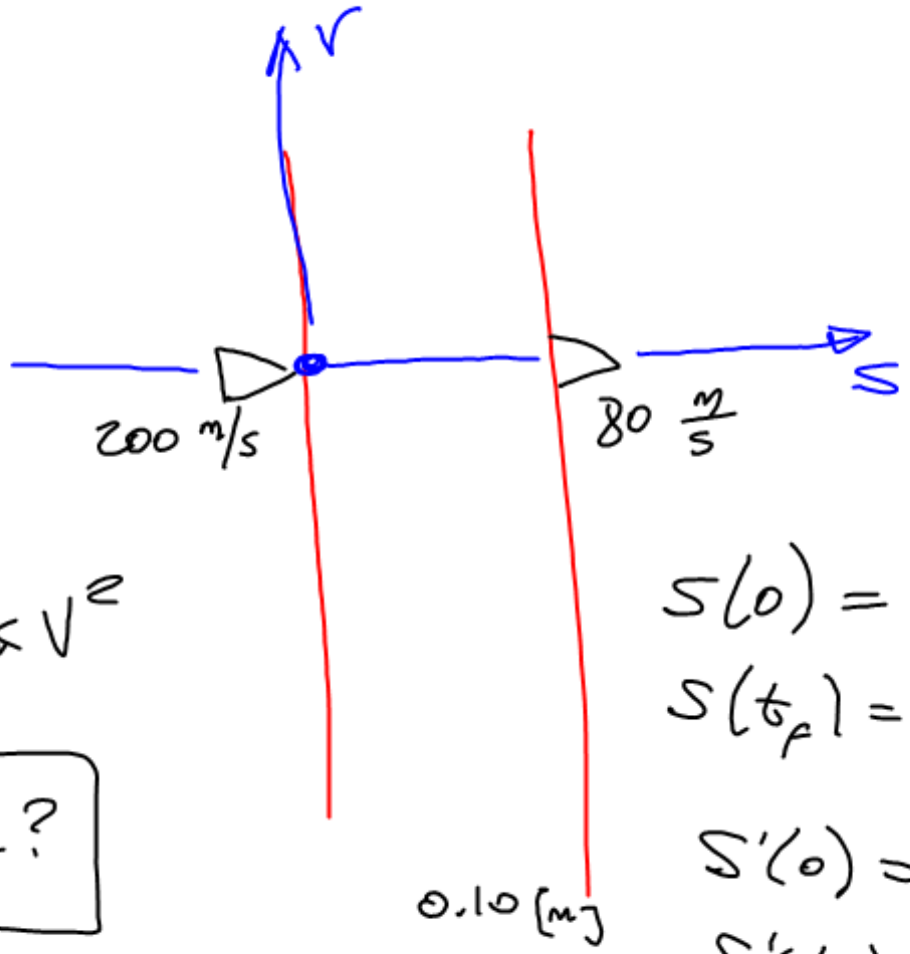

FDO(1) NL

$$\frac{dV}{dt} = -kV^2$$

$t_f = ?$

$S(0) = 0$

$S(t_f) = 0.10\ [m]$

$S'(0) = V(0) = 200\ \left[\frac{m}{s}\right]$

$S'(t_f) = V(t_f) \Rightarrow 80\left[\frac{m}{s}\right]$

$$\frac{dV}{dt} + kV^2 = 0$$

MVS

$M = kV^2 \quad N = 1$

$P = k \quad Q = V^2 \quad R = 1 \quad S = 1$

$$\frac{dV}{V^2} + k\,dt = 0$$

SG

$$\int \frac{dV}{V^2} + k\int dt = C_1$$

$$\int V^{-2}\,dV + kt = C_1$$

$$\frac{V^{-1}}{-1} + kt = C_1$$

$$-\frac{1}{V} = C_1 - kt$$

$$V = \frac{1}{kt - C_1}$$

SOLUCIÓN GENERAL.

$$V(t) = \frac{1}{kt - C_1}$$

$$V(0) \Rightarrow 200 = \frac{1}{k(0) - C_1}$$

$$\Rightarrow 200 = \frac{1}{-C_1}$$

$$-C_1 = \frac{1}{200}$$

$$C_1 = -\frac{1}{200}$$

$$V(t) = \frac{1}{kt + \frac{1}{200}}$$

MUS

EDO(1) NL

$$\frac{ds(t)}{dt} = \frac{1}{kt + \left(\frac{1}{200}\right)}$$

$$\frac{ds}{dt} = \frac{1}{kt + \left(\frac{1}{200}\right)}$$

$$ds - \frac{dt}{kt + \left(\frac{1}{200}\right)} = 0$$

$$\int ds - \frac{1}{k}\int \frac{k\,dt}{kt + \left(\frac{1}{200}\right)} = C_2$$

5g

$$s - \frac{1}{k} L\left(kt + \frac{1}{200}\right) = C_2$$

$s(0) = 0$

$$0 - \frac{1}{k} L\left(k(0) + \frac{1}{200}\right) = C_2$$

$$-L\left(\frac{1}{200}\right) = kC_2$$

$$\frac{L(200)}{k} = C_2$$

5p

$$s(t) = \frac{L(200)}{k} + \frac{1}{k} L\left(kt + \frac{1}{200}\right)$$

$$s(t) = 0.5784 + \frac{1}{9.16} L\left(9.16t + 0.005\right)$$

$$s(t_{20}) = 0.5784 + \frac{1}{9.16} L\left(9.16(0.00491) + 0.005\right)$$

$s(t_{20}) = 0.5784 +$

0.04997356
0.05

$s(t_{20}) = 25.13$

$$s(t) = \frac{L(200)}{k} + \frac{1}{k} L\left(kt + \frac{1}{200}\right)$$

$$t_f \Rightarrow \frac{1}{10} = \frac{L(200)}{k} + \frac{1}{k} L\left(k t_f + \frac{1}{200}\right)$$

$$\frac{k}{10} = L\left(200\left(k t_f + \frac{1}{200}\right)\right)$$

$$200 k t_f + 1 = e^{\frac{k}{10}}$$

$$200 k t_f = e^{\frac{k}{10}} - 1$$

$$\boxed{t_f = \frac{e^{\frac{k}{10}} - 1}{200k}}$$

$$V(t) = \frac{1}{kt + \frac{1}{200}} \qquad t_f = \frac{e^{\frac{k}{10}} - 1}{200k}$$

$$V(t_f) = 80 = \frac{1}{k\left(\frac{e^{\frac{k}{10}} - 1}{200k}\right) + \frac{1}{200}}$$

$$80 = \frac{1}{\frac{e^{\frac{k}{10}}}{200} - \frac{1}{200} + \frac{1}{200}}$$

$$80 = \frac{1}{\frac{e^{\frac{k}{10}}}{200}}$$

$$80 = \frac{200}{e^{\frac{k}{10}}}$$

$$e^{\frac{k}{10}} = \frac{200}{80}$$

$$\frac{k}{10} = L\left(\frac{200}{80}\right)$$

$$\boxed{k = 10L\left(\frac{200}{80}\right)}$$

$$V(t) = \frac{1}{9.16t + 0,005}$$

$$20 = \frac{1}{9.16t + 0.005}$$

$$20(9.16t + 0.005) = 1$$

$$183.2t + 0,1 = 1$$

9.1629

$$t_f = \frac{e^{L\left(\frac{200}{80}\right)} - 1}{200\left(10L\left(\frac{200}{80}\right)\right)} \Rightarrow t_f = \frac{\frac{200}{80} - 1}{2000L\left(\frac{200}{80}\right)}$$

$$t_f = \frac{\frac{200 - 80}{80}}{2000L\left(\frac{200}{80}\right)} \Rightarrow \frac{\frac{120}{80}}{2000L\left(\frac{200}{80}\right)} \Rightarrow 0.000\,8195$$

$$183,1t = 0.9$$

$$t = \frac{0.9}{183.1} = 0.00491$$

$$t_{20}$$