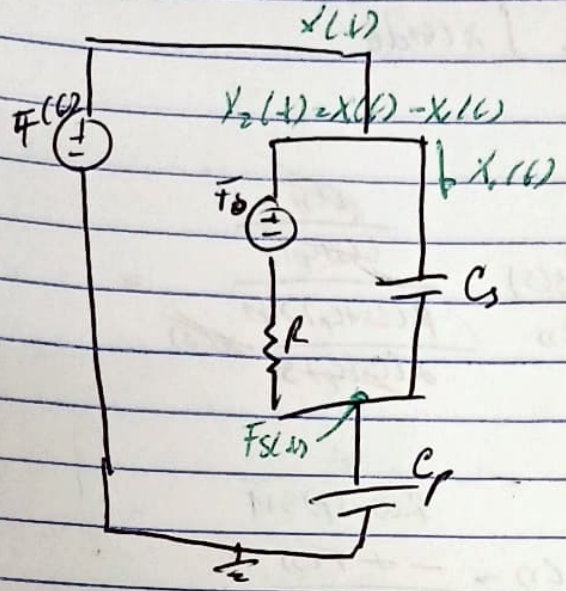
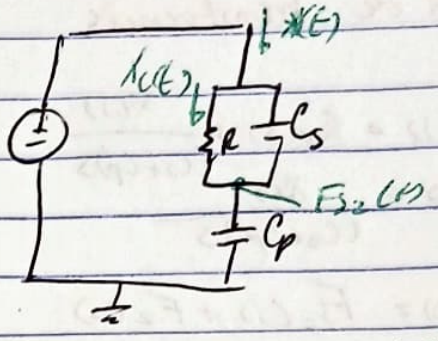
Practica 3



$X(t) = X_1(t) + X_2(t)$

Apagando Fo



$X(t) = X_1(t) + X_2(t)$

$X(t) = C_p \frac{d[F_s(t)]}{dt}$

$X_2(t) = \frac{F(t) - F_s(t)}{R}$

$X_1(t) = C_s \frac{d[F(t) - F_s(t)]}{dt}$

$$C_p \frac{dF_s(t)}{dt} = C_s \frac{d[F(t) - F_{s2}(t)]}{dt} + \frac{F(t) - F_s(t)}{R}$$

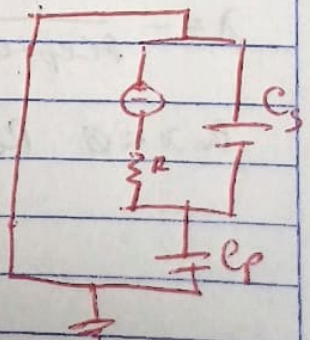
Laplace.

$$C_p S F_s(s) = C_s S [F(s) - F_s(s)] + \frac{F(s) - F_s(s)}{R}$$

$$\left(C_p S + C_s S + \frac{1}{R}\right) F_s(s) = \left(C_s S + \frac{1}{R}\right) F(s)$$

$$\frac{F_s(s)}{F(s)} = \frac{\left(C_s S + \frac{1}{R}\right)}{C_p S + C_s S + \frac{1}{R}} \qquad \frac{\left(C_p S + C_s S + \frac{1}{R}\right) F_s(s)}{F(s)} = \left(C_s S + \frac{1}{R}\right)$$

$$\frac{\left(C_s S + \frac{1}{R}\right)(R)}{(C_p S + C_s S)(R)} = \frac{C_s SR + 1}{C_p SR + C_s S + 1}$$



$$\begin{bmatrix} C_s+R, & 1-\alpha \\ R(C_s+C_p), & 1 \end{bmatrix}$$

Ecuaciones Principales

$$\rightarrow -\alpha F(t) \cdot R_x(t) + \frac{1}{C_s+C_p}\int x(t)dt$$

$$\leftarrow F_{s_2}(t) = \frac{1}{C_s+C_p}\int x(t)dt$$

Función de transferencia

$$-\alpha F(s) = R_x(s) + \frac{X(s)}{(C_s+C_p)s}$$

$$F_s(s) = \frac{X(s)}{(C_s+C_p)s}$$

$$\frac{F_s(s)}{F(s)} = \frac{\frac{X(s)}{(C_s+C_p)s}}{\frac{R(C_s+C_p)s+1}{\alpha(C_s+C_p)s}\,X(s)} = \frac{\alpha}{R(C_s+C_p)s+1}$$

$$F_s(s) = F_{s_2}(s) + F_2(s)$$

$$F_2(s) = \frac{(C_s Rs+1)(F(s)) - \alpha F(s)}{R(C_p+C_s)s+1}$$

$$F_{s_2}(s) = \frac{-\alpha F(s)}{R(C_s+C_p)s+1}$$

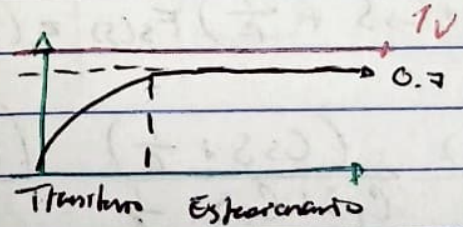
$$\frac{F_s(s)}{F(s)} = \frac{C_s Rs+1-\alpha}{R(C_p+C_s)s+1}$$

Error en estado estacionario

$$e(s) = \lim_{s\to 0} s\,F(s)\left[1 - \frac{F_s(s)}{F(s)}\right]$$

$$e(s) = \lim_{s\to 0} s\cdot\frac{1}{s}\left[1 - \frac{C_s Rs+1-\alpha}{R(C_p+C_s)s+1}\right]$$

$$e(s) = \alpha \quad e(t) = \alpha V$$



Estabilidad lazo abierto

$$R(C_p+C_s)s+1 = 0$$

$$\lambda = -\frac{1}{R(C_p+C_s)}$$

$Re\,\lambda < 0$ Respuesta estable