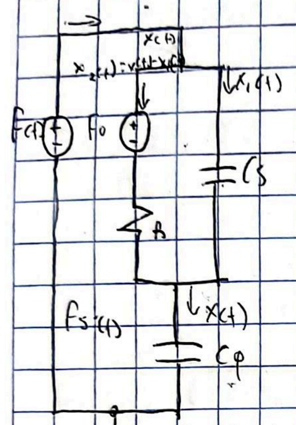
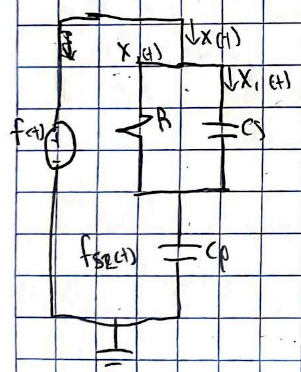
Circuito electrico exa



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

Funcion de transferencia

Analisis apagando F_0



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

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

$X_2 = \frac{f(t) - f_s(t)}{R}$

$$C_p \frac{d f_s(t)}{dt} = C_s \frac{d[F(t) - f_s(t)]}{dt} + \frac{F(t) - f_s(t)}{R}$$

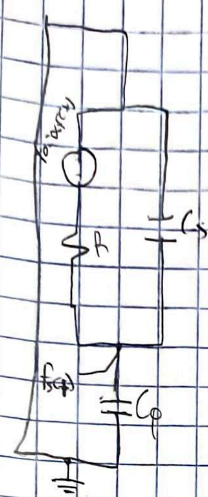
$$C_p S f_s(s) = C_s S [F(s) - F_s(s)] + \frac{F(s) - F_s(s)}{R}$$

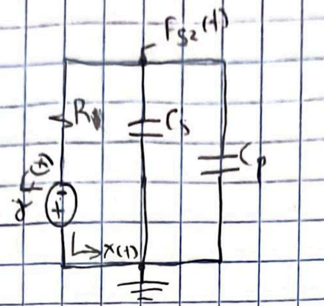
$$\left(C_p S + C_s S + \frac{1}{R}\right) f_s(s) = \left(C_s + \frac{1}{R}\right) F(s)$$

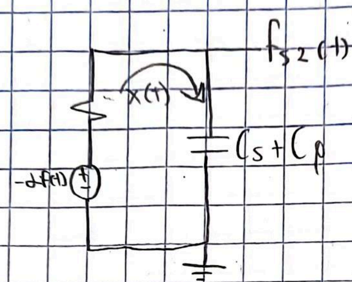
$$\frac{f_s(s)}{F(s)} = \frac{C_s R S + 1}{R(C_s + C_p) S + 1}$$

$$f_s(s) = \frac{(C_s R S + 1)\, F(s)}{R(C_s + C_p) S + 1}$$

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







$$-\alpha f(t) = R x(t) + \frac{1}{C_s + C_p} \int x(t)\,dt$$

$$f_s(t) = \frac{1}{C_s + C_p} \int x(t)\,dt$$

$$-\alpha f(s) = R x(s) + \frac{x(s)}{(C_s + C_p)s}$$

$$f_s(s) = \frac{x(s)}{(C_s + C_p)s}$$

$$f(s) = -\frac{R(C_s + C_p)s + 1}{\alpha (C_s + C_p)s} x(s)$$

$$\frac{f_s(s)}{f(s)} = -\frac{\frac{\cancel{x(s)}}{\cancel{(C_s + C_p)s}}}{\frac{R(C_s + C_p)s + 1}{\alpha \cancel{(C_s + C_p)s}} \cancel{x(s)}} = -\frac{\alpha}{R(C_s + C_p)s + 1}$$

$$f_{s2}(s) = -\frac{\alpha f(s)}{R(C_s + C_p)s + 1}$$

$$f_s(s) = f_{s1}(s) + f_{s2}(s)$$

$$f_s(s) = \frac{(C_s R s + 1) f(s) - \alpha f(s)}{R(C_p + C_s)s + 1}$$

$$\frac{f_s(s)}{f(s)} = \frac{C_s R s + 1 - \alpha}{R(C_p + C_s) + 1}$$

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

$$= 1 - (1 - \alpha) = \alpha$$

$$\lambda = R(C_s + C_p)s + 1$$

$$\lambda = \frac{1}{(C_s + C_p)R} - 1 \Rightarrow \lambda \pm \lambda < 0$$