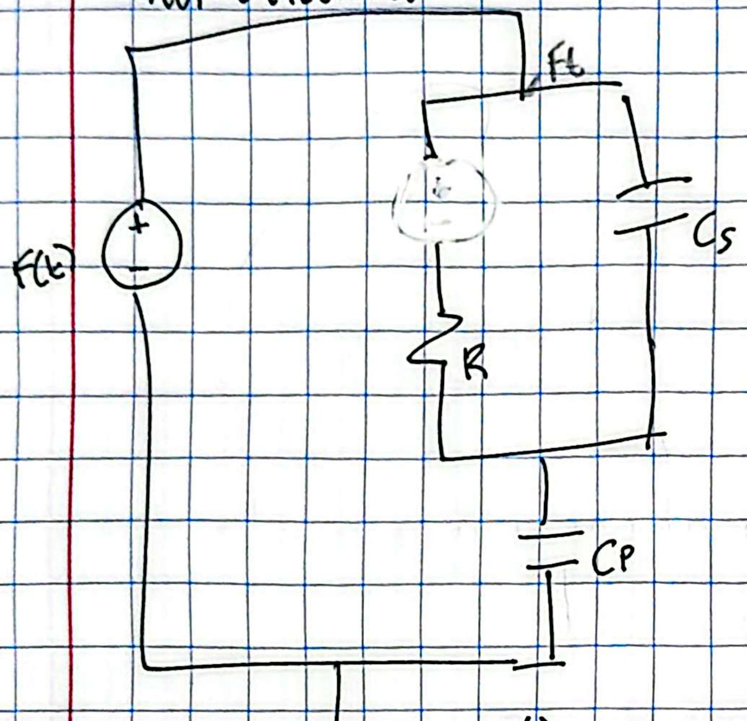
Avila

Circuito electrico



$$x(t) = x_1(t) + x_2(t)$$

Funcion de transferencia

Analisis apagando fo

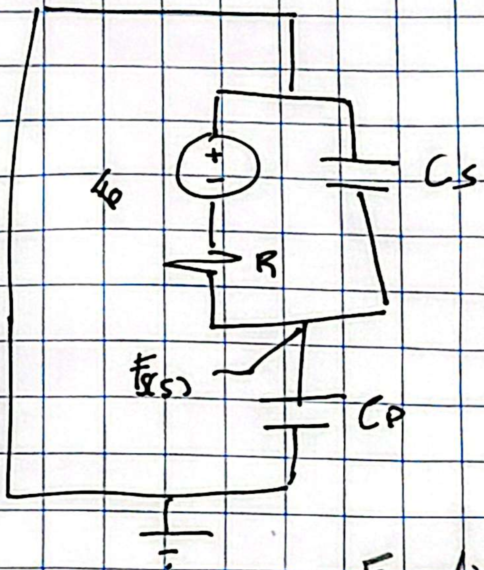
$$C_p \frac{dF_s(s)}{dt} = C_s \frac{d[f(t) - F_s(t)]}{dt} + \frac{F(t) - F_s(t)}{R}$$

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

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

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

$$F_{s1}(s) = \frac{(C_s R + 1)\,F(s)}{R(C_s + C_p)s + 1}$$



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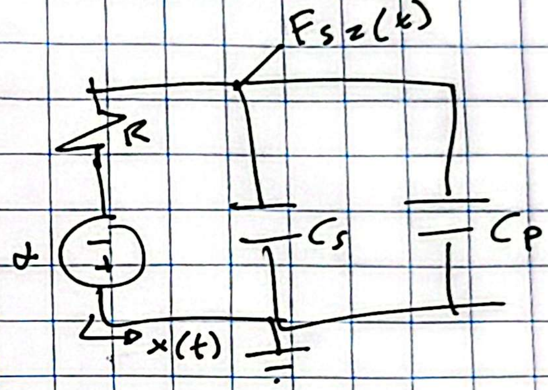

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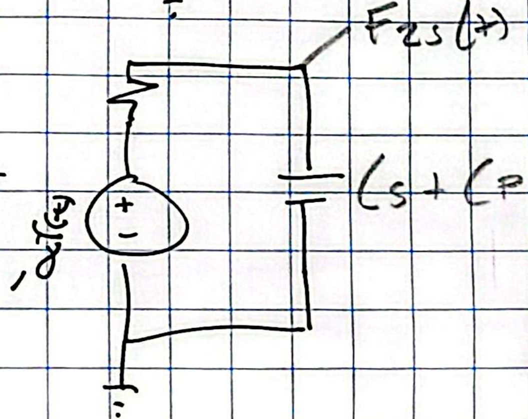

$$-\alpha f(t) = \frac{F_{2s}(t)}{R} + (C_s + C_p)\frac{d\left[F_{2s}(t)\right]}{dt}$$

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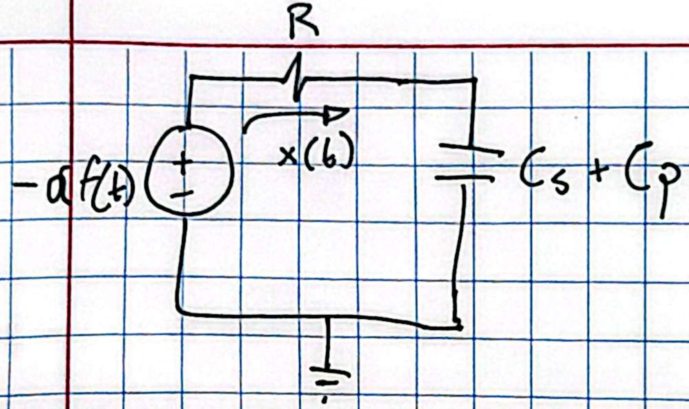


$$-\alpha F(s) = R\,I(s) + \frac{I(s)}{s(C_s + C_p)}$$

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

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

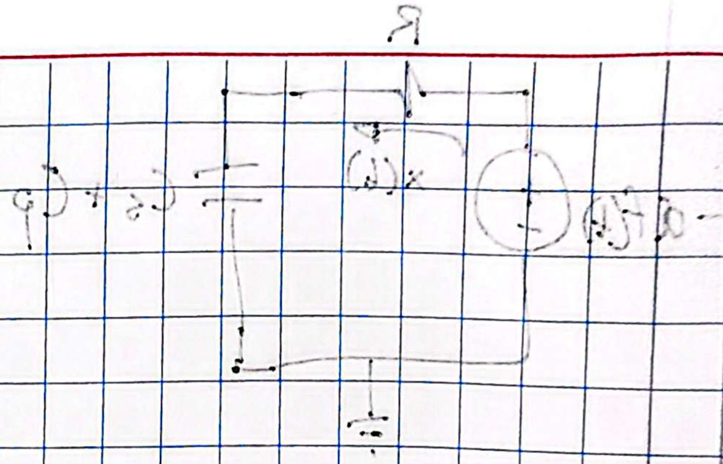
$$\frac{F_s(s)}{F(s)} = -\frac{\dfrac{\cancel{X(s)}}{(C_s + C_p)S}}{\dfrac{R((C_s + C_p)S + 1)}{\alpha (C_s + C_p)S}}$$

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

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

$$F_s(s) = F_{s1}(s) + F_{s2}(s)$$

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



Error estacionario

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

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

$$e(ss) = -\alpha$$

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

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

$$\lambda = -\frac{1}{R(C_p + C_s)} \qquad Re\,\lambda < 0$$

Respuesta estable