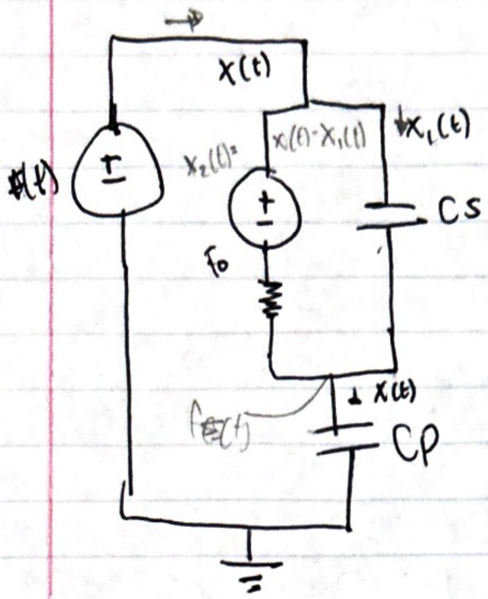
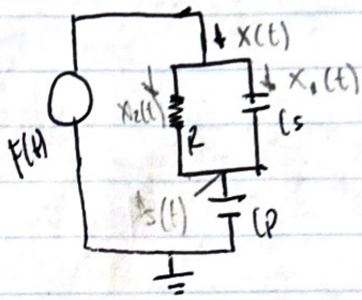
Circuito electrico



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

Función de transferencia

Analisis apagando Fo



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

$$X(t) = Cp\,\frac{d[Fs(t)]}{dt}$$

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

$$X_1 = Cs\,\frac{d[F(t) - Fs(t)]}{dt}$$

$$Cp\,\frac{d\,Fs(t)}{dt} = Cs\,\frac{d[F(t) - Fs(t)]}{dt} + \frac{F(t) - Fs(t)}{R}$$

$$Cp\,s\,Fs(s) = Cs\,s[F(s) - Fs(s)] + \frac{F(s) - Fs(s)}{R}$$

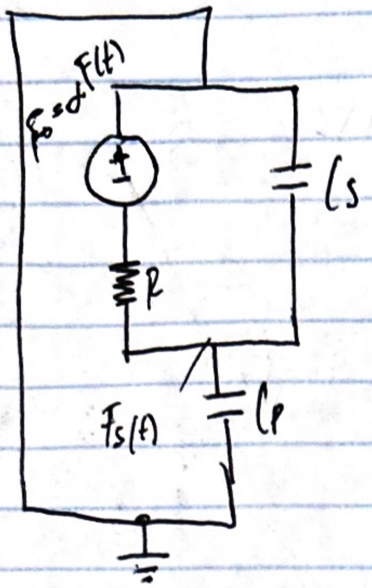
$$\left(Cps + Css + \frac{1}{R}\right)Fs(s) = \left(Css + \frac{1}{R}\right)F(s)$$

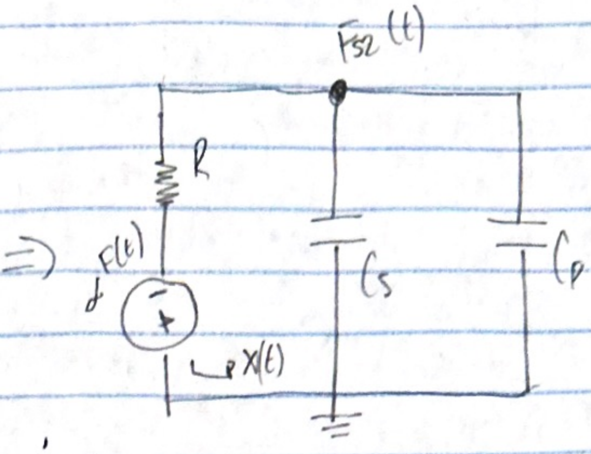
$$\left(\left(C_p S + C_s S + \frac{1}{R} \right) F_s(s) = \left(C_s S + \frac{1}{R} \right) F(s) \right) \div \left(C_p S + C_s S + \frac{1}{R} \right)$$

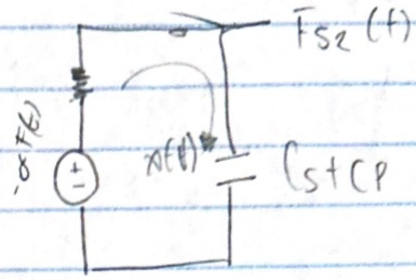
$$\left(F_s(s) = \frac{\left(C_s S + \frac{1}{R} \right) F(s)}{C_p S + C_s S + \frac{1}{R}} \right) \div F(s)$$

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

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







$$RX(t) + (C_s + C_p)X(t) = -\alpha F(t)$$

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

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

$$-\alpha F(s) = RS + \frac{1}{\quad}$$

$$F_S(s) = \frac{X(s)}{C_s S + C_P s}$$

$$-\alpha F(s) = RX(s) + \frac{X(s)}{C_s S + C_P s}$$

$$\frac{Fs(s)}{Fs} = \frac{\frac{x(s)}{CsS + CpS}}{\frac{Rx(s)}{1} + \frac{x(s)}{CsS + Cp(S)}}$$

$$\frac{Rx(s)(CsS + CpS) + Xs}{CsS + CpS}$$

$$\frac{Rx(s)CsS + Rx(s)CpS + X(s)}{CsS + CpS}$$

$$H(S) = \frac{\frac{X(s)}{CsS + CpS}}{\frac{Rx(s)CsS + Rx(s)CpS + X(s)}{\alpha(CsS + CpS)}} = \frac{\cancel{\frac{x(S)}{CsS + CpS}}}{\frac{RCsS + RCpS + 1}{\alpha(\cancel{CsS + CpS})} X(s)}$$

$$\Downarrow$$

$$Fs = -\frac{R(Cs + Cp)S + 1}{\alpha(Cs + Cp)s} X(s) \qquad F_{S2}(s) = -\frac{\alpha}{R(Cs + Cp)s + 1} F(s)$$

$$\frac{Fs(s)}{Fs} \frac{CsRs + 1 - \alpha}{R(Cp + Cs)s + 1}$$

Error en estado

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

$$e(s) = \lim_{s \to 0} \cancel{s} \cdot \frac{1}{\cancel{s}}\left[1 - \frac{CsRs+1-\delta}{R(Cs+CD)s+1}\right]$$

$$e(s) = \alpha$$

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

Estabilidad

$$R(CD+Cs)s+1=0$$

$$x = -\frac{1}{R(CD+CS)}$$