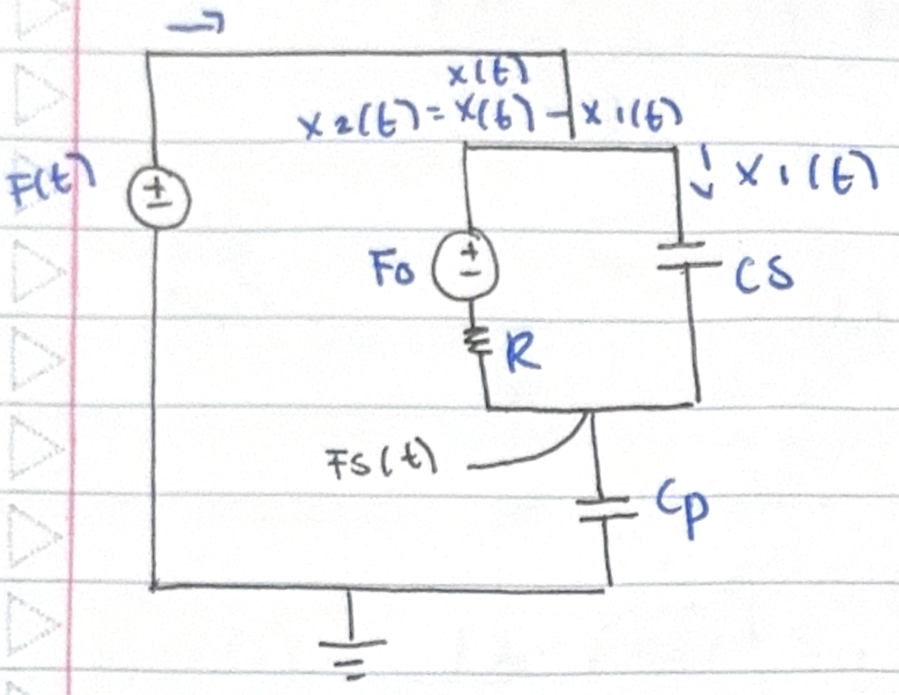
Anette Vidal

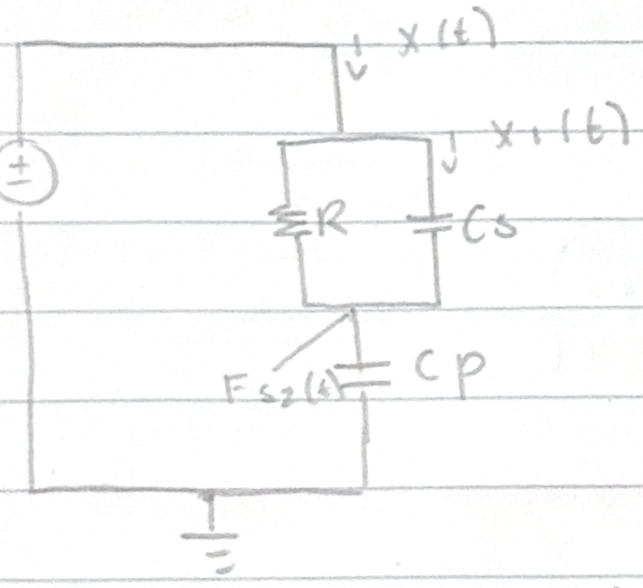
Cto. eléctrico



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

Función de transferencia

Análisis apagando F_o



por nodos

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

integrales

$$x(t) = \frac{d[Fs(t)]}{dt} C_p$$

$$x_2(t) = \frac{F(t) - Fs(t)}{R}$$

$$x_1(t) = C_s \frac{d[F(t) - Fs(t)]}{dt}$$

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

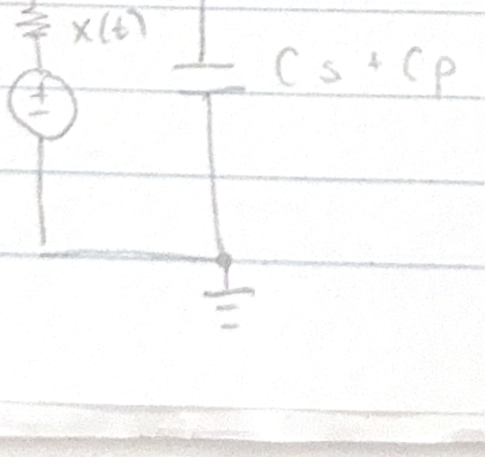
Transformada de Laplace

$$Cp\ S\,Fs(s) = Cs\ S\,[F(s) - Fs(s)] + F(s) - Fs(s)$$

$$1\,CpS + (CsS + \frac{1}{R})\,Fs(s) = (CsS + \frac{1}{R})\,F(s)$$

$$\frac{Fs(s)}{F(s)} = \frac{CsS + 1/R}{CsS + \frac{1}{R} + CpS} = \frac{CsSR + 1}{(CpR + CsR)S + 1}$$

$$\frac{\frac{CsSR + 1}{R}}{Cps + \frac{CsSR + 1}{R}} = \frac{CsS + 1}{\frac{CpSR + CsSR + 1}{R}}$$



$$Fs1(S) = \frac{(CsRS + 1)\,F(s)}{R(Cs + Cp)S + 1}$$

F. de transferencia

$$-\alpha F(t) = Rx(t) + \frac{1}{Cs + Cp}\int x(t)\,dt$$

$$Fs(t) = \frac{1}{Cs + Cp}\int x(t)\,dt$$

Transformada de Laplace

$$-\alpha F(s) = Rx(s) + \frac{X(s)}{(Cs + Cp)S}$$

$$Fo(s) = \frac{x(s)}{(Cs + Cp)S}$$

$$F(s) = -\frac{R(Cs+Cp)s+1}{\alpha(Cs+Cp)s}\,x(s)$$

$$\frac{Fs(s)}{F(s)} = \frac{\frac{x(s)}{(Cs+Cp)s}}{\frac{R(Cs+Cp)s+1}{\alpha(Cs+Cp)s}\,x(s)} = -\frac{\alpha}{R(Cs+Cp)s+1}$$

$$Fs_2(s) = -\frac{\alpha F(s)}{R(Cs+Cp)s+1}$$

$$Fs(s) = Fz_1(s) + Fs_2(s)$$

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

Error est.
. est. en lazo ab.

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

Error en estado estacionario

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

$$e(s) = \alpha$$

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

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

Estabalidad en lazo abierto

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

$$x = -\frac{1}{R(Cp+Cs)}$$