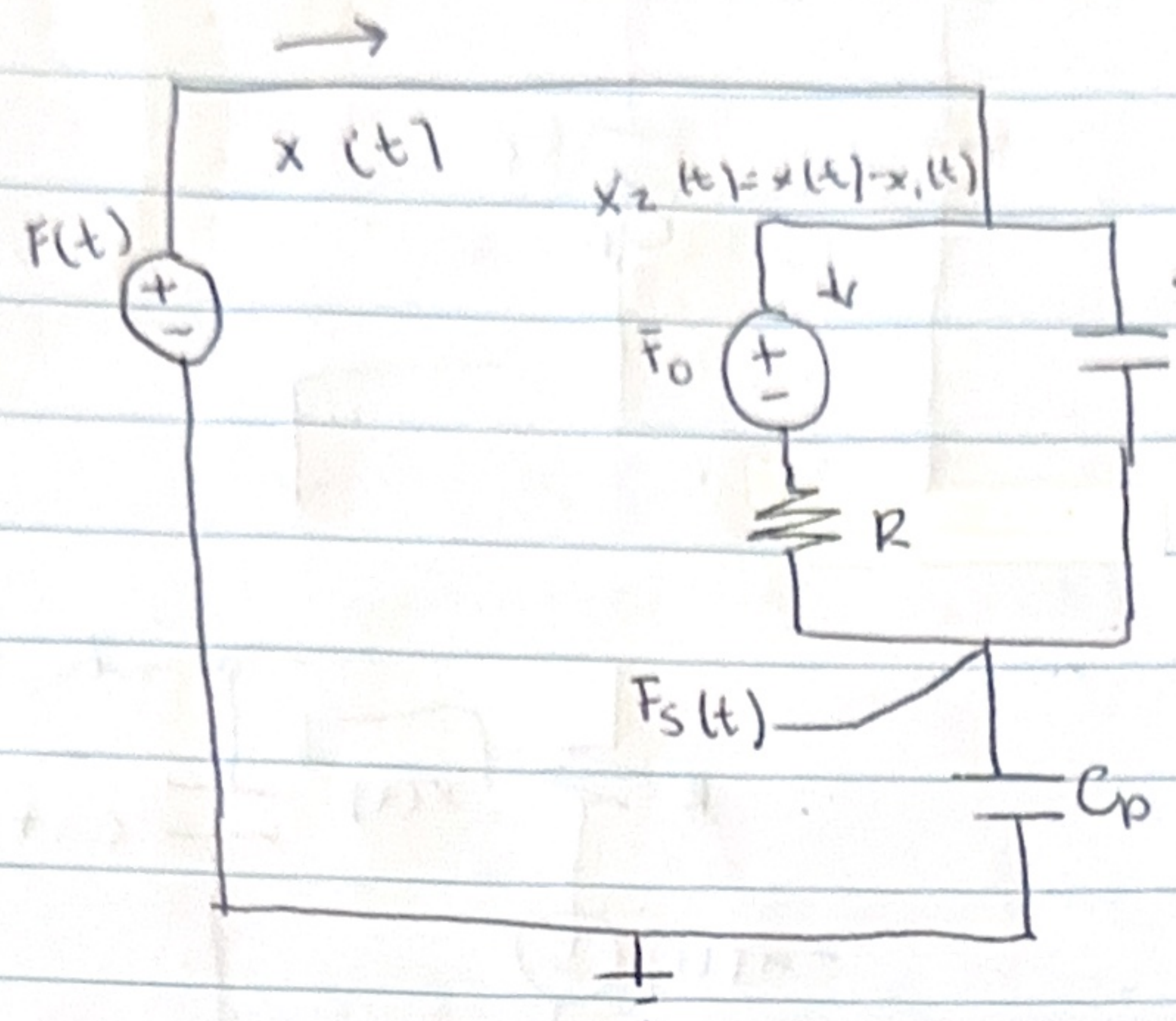
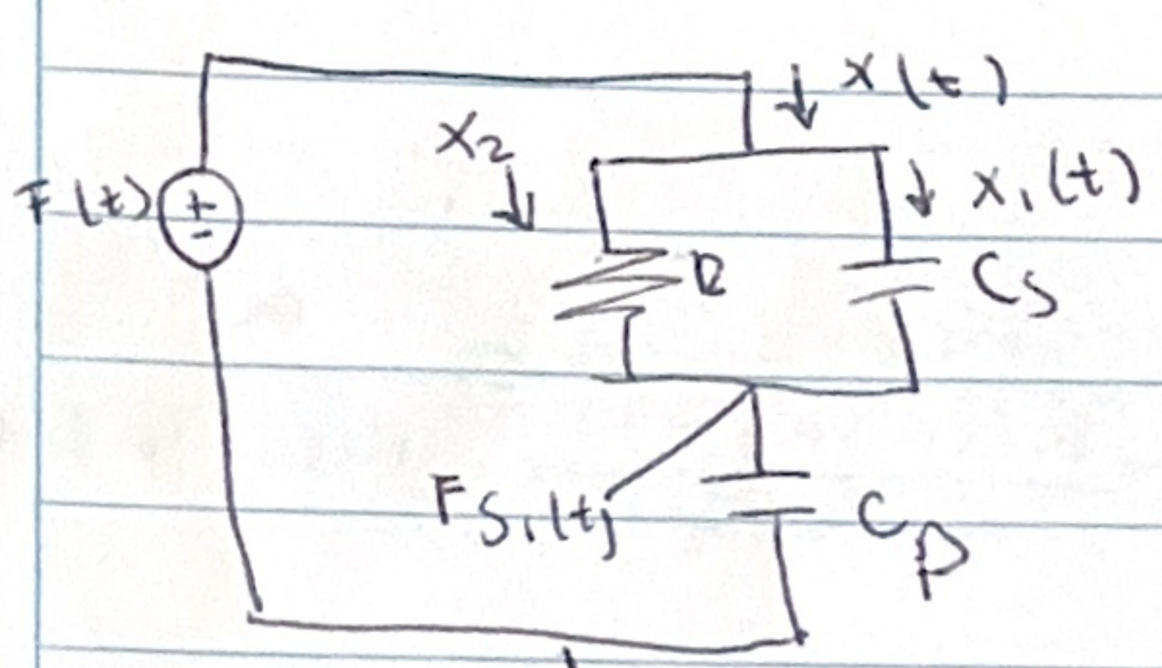


$$x(t) = x_1(t) + x_2(t)$$

Función de transferencia

Análisis apagado F_o



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

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

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

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

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

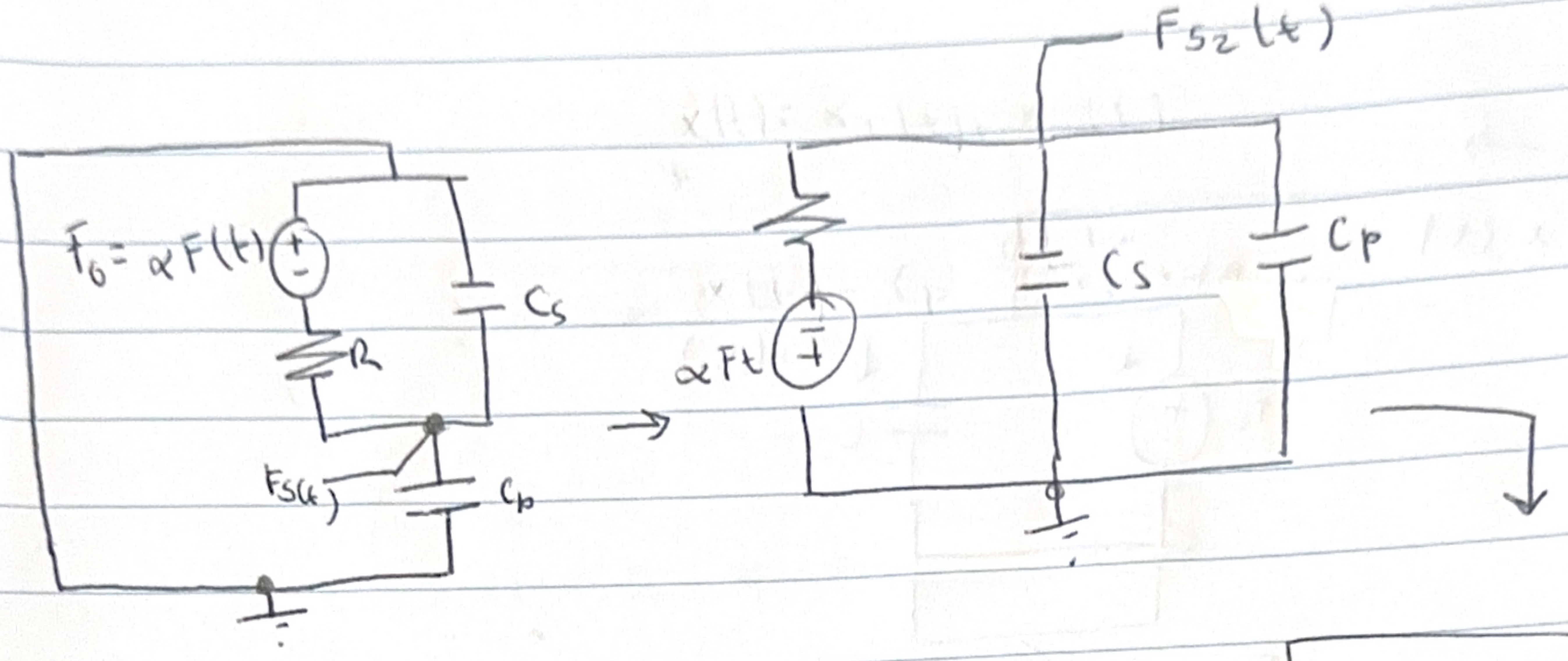
$$C_p S F_s(S) = C_s S[F(S) - F_s(S)] + \frac{F(S) - F_s(S)}{R}$$

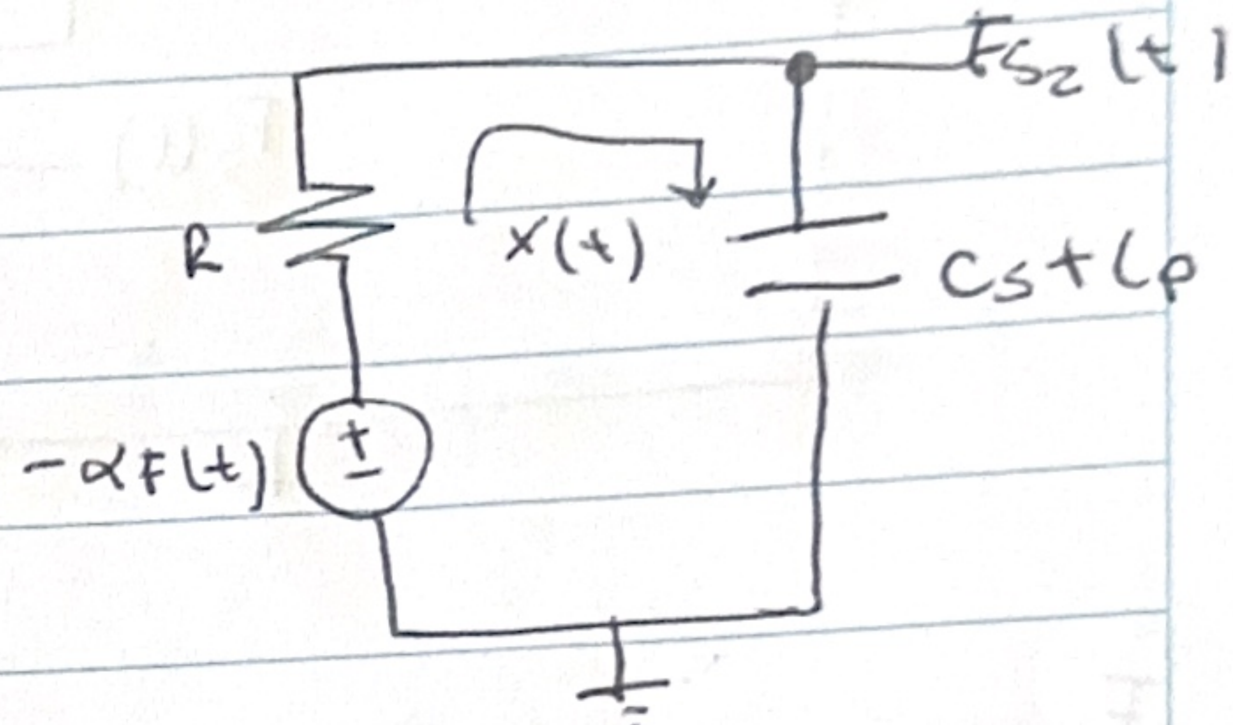
$$(C_p S + C_s S + \frac{1}{R}) F_s(S) = (C_s S + \frac{1}{R}) F(S)$$

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

$$\frac{F_s(S)}{F(S)} = \frac{C_s R S + 1}{R(C_s + C_p)S + 1} \qquad F_{s_1}(S) = \frac{(C_s R + 1) F_s}{R(C_s + C_p)S + 1}$$

Error estacionario
Estabilidad en lazo abierto





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

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

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

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

Error en estado estacionario

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

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

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

Estabilidad en lazo abierto

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

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

$R_e \quad \lambda < \emptyset$

El sistema es estable

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

$1[10\mu\;(\;\;)-\;.25)$

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

$(10\mu)(100)S+1-0.25$

$1m\;S+.75$

$100(10\mu+100\mu)S+1$

$0.011+1$