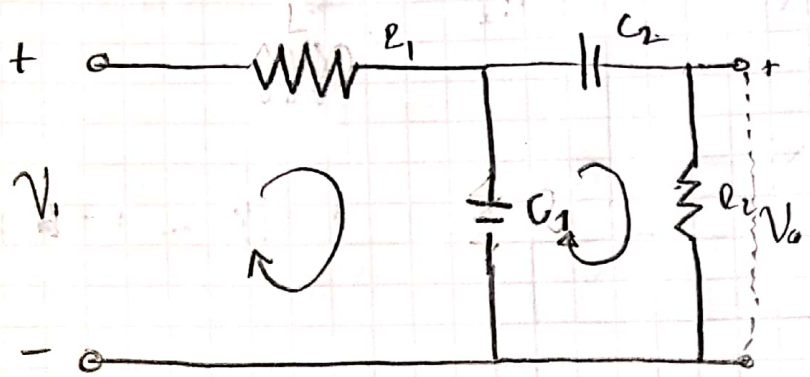
Taller

Hallar la función característica.

$V_c = \frac{1}{C} q(t)$, $V_c(\omega) = \frac{1}{C} Q(\omega)$

$V_R(t) = R i(t)$; $V_R(\omega) = j\omega R\, Q(\omega)$



$$V_1(t) = V_{R_1} i_2(t) + V_{C_1} i_1(t) - V_{C_1} i_2(t) \quad ①$$

$$V_{C_1} i_2(t) - V_{C_1} i_1(t) + V_{C_2} i_2(t) + V_{R_2} i_2(t) = 0 \quad ②$$

$$V_{R_2} i_2(t) = V_0(t)$$

① $V(\omega) = Q_1(\omega)\left[j\omega R_1 + \frac{1}{C_1}\right] - \frac{1}{C_1} Q_2(\omega)$

② $0 = Q_2(\omega)\left[\frac{1}{C_1} + \frac{1}{C_2} + j\omega R_2\right] - \frac{1}{C_1} Q_1(\omega)$

③ $Q_2(\omega)\, j\omega R_2 = V_0(\omega)$

∴ ① $Q_1(\omega) = \dfrac{V_1(\omega) + \frac{1}{C_1} Q_2(\omega)}{j\omega R_1 + \frac{1}{C_1}}$

② $Q_1(\omega) = Q_2(\omega)\left[\frac{1}{C_1} + \frac{1}{C_2} + j\omega R_2\right] C_1$ → igualamos 1 & 2.

$$\frac{V_1(\omega) + \frac{1}{C_1} Q_2(\omega)}{j\omega R_1 + \frac{1}{C_1}} = Q_2(\omega)\left[\frac{1}{C_1} + \frac{1}{C_2} + j\omega R_2\right] C_1$$

Día Mes Año

$= V_1(\omega) + \frac{1}{C_1} Q_2(\omega) = Q_2\omega\left[\frac{1}{C_1} + \frac{1}{C_2} + j\omega R_2\right] C_1 * \left(j\omega R_1 + \frac{1}{C_1}\right.$

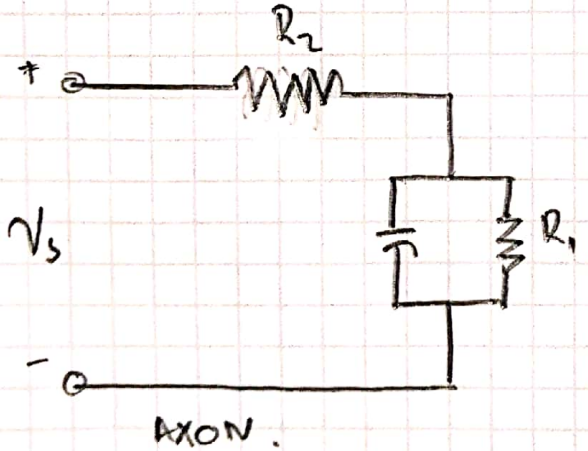
$V_1(\omega) = Q_2(\omega)\left[j\omega R_1 - \omega_2 R_1 R_2 C - \frac{1}{C_1}\right]$

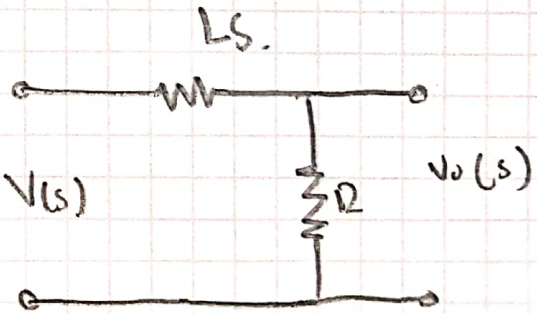
$Q_2(\omega) = \frac{V_1(\omega)}{j\omega R_1 - \omega_2 R_1 R_2 C - \frac{1}{C}}$ ..④ ⟶ igualando 3 & 4.

$$\frac{V_o(\omega)}{j\omega R_1} = \frac{V_1(\omega)}{j\omega R_1 - \omega_2 R_1 R_2 C - \frac{1}{C}}$$

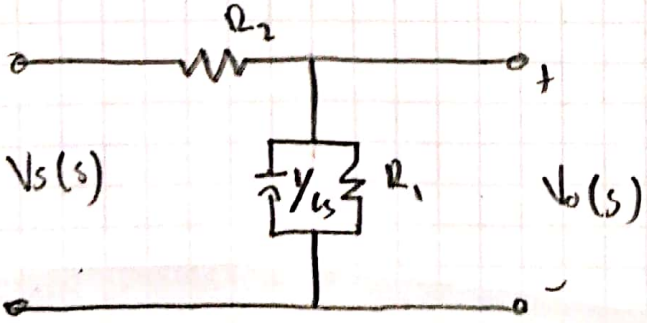
$$\therefore H(\omega) = \frac{V_o(\omega)}{V_1(\omega)} = \frac{j\omega R_1}{j\omega R_1 - \omega_2 R_1 R_2 C - \frac{1}{C}}$$

2)

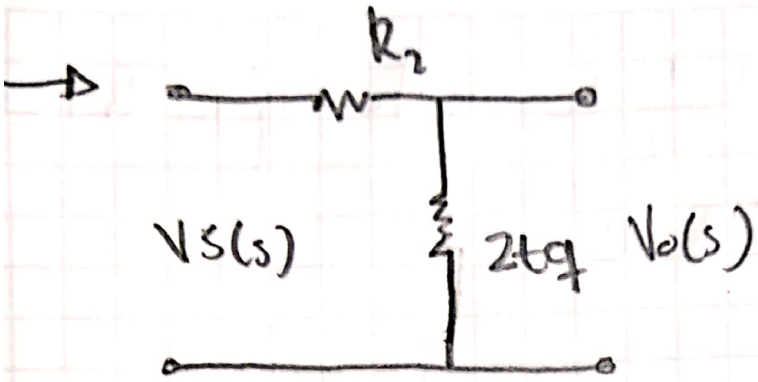




$$\frac{V_o(s)}{V_s(\omega)} = \frac{R}{R + LS}$$



$Zeq = ZR \,||\, Zc = R_1/(Cs \cdot R_1 + 1)$



$$H(\omega) = \frac{V_o(s)}{V_s(s)} = \frac{R_1}{R_1 + R_2(Cs\,R_1 + 1)}$$