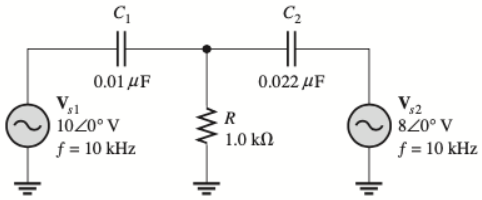
APORTACIONES PRODUCTO UNIDAD #2

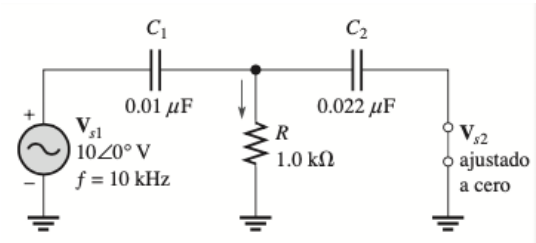
EJERCICIOS:

1. Determine la corriente en *R* para la figura 19-1 con el teorema de superposición. Suponga que las impedancias internas de la fuente son de cero.



$$X_{C1} = \frac{1}{2\pi f C_1} = \frac{1}{2\pi(10kHz)(0.01\mu F)} = 1.59k\Omega$$

$$X_{C2} = \frac{1}{2\pi f C_2} = \frac{1}{2\pi(10kHz)(0.022\mu F)} = 723\ \Omega$$



$$Z = X_{C1} + \frac{RX_{C2}}{R + X_{C2}} = 1.59 < -90°k\Omega + \frac{(1.0 < 0°k\Omega)(723 < -90°\Omega)}{1k\Omega - j723\Omega}$$

$$Z = 1.59 < -90°k\Omega + 588 < -54.1°\Omega$$

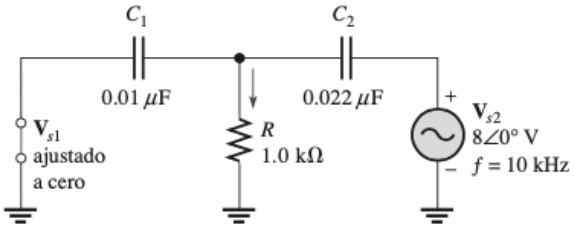
$$Z = -j1.59k\Omega + 345\Omega - \text{j}476\Omega = 345\Omega - \text{j}2.07\text{k}\Omega$$

- *A la forma polar* $Z = 2.10 < -80.5°k\Omega$

La corriente total producida es V_{S1}

$$I1 = \frac{V_{s1}}{Z} = \frac{10 < 0°V}{2.10 < -80.5°k\Omega} = 4.76 < 80.5°\ mA$$

$$I_{R1} = \left(\frac{X_{C2} < -90°}{R - jX_{C2}}\right) I_{S1} = \left(\frac{723 < -90°\Omega}{1.0k\Omega - j723\Omega}\right) 76 < 80.5°\ mA$$
$$= (0.585 < -54.9°\Omega)(4.76 < 80.5°\ mA) = 2.80 < 25.6°\ mA$$



- La impedancia es:

$$Z = X_{C2} + \frac{RX_{C1}}{R + X_{C1}} = 723 < -90°\Omega + \frac{(1.0 < 0°k\Omega)(1.59 < -90°k\Omega)}{1k\Omega - j1.59k\Omega}$$

$$Z = 723 < -90°\Omega + 847 < -32.2°\Omega$$

$$Z = -j723\Omega + 717\Omega - j451\Omega = 717\Omega - j1174\Omega$$

$$A\ la\ forma\ polar\ Z = 1376 < -58.6\Omega$$

- *La corriente total producida es* V_{S2}

$$I2 = \frac{V_{s2}}{Z} = \frac{8 < 0°V}{1376 < -58.6°\Omega} = 5.81 < 58.6°\ mA$$

$$I_{R2} = \left(\frac{X_{C1} < -90°}{R - jX_{C1}}\right) I_{S2} = \left(\frac{1.59 < -90°k\Omega}{1.0k\Omega - j1.59k\Omega}\right) 5.81 < 58.6°\ mA = 4.91 < 26.4°\ mA$$

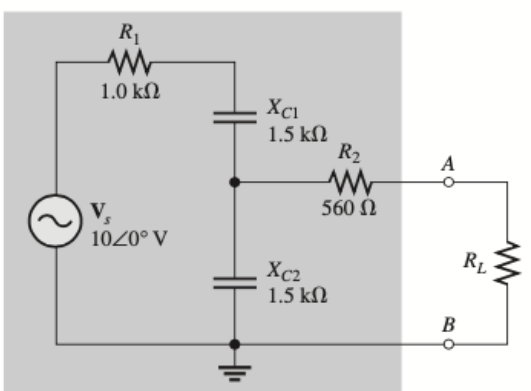
Transformar a la forma rectangular =

$$I_{R1} = 2.80 < 25.6°\ mA = 2.53\ mA + j1.21\ mA$$

$$I_{R2} = 4.91 < 26.4°\ mA = 4.40\ mA + j2.18\ mA$$

$$I_R = I_{R1} + I_{R2} = 6.93\ mA + j3.39\ mA = 7.71 < 26.1°\ mA$$

2. Determine el voltaje de Thevenin para el circuito ubicado dentro del cuadro sombreado visto desde las terminales *A* y *B*.



$$V_{AB} = V_{C2} = \left(\frac{X_{C2} < -90°}{R_1 - jX_{C1} - jX_{C2}}\right) V_s = \left(\frac{1.5 < -90°k}{1k - j3k}\right) 10 < 0°V$$

$$V_{AB} = \left(\frac{1.5 < -90°k}{3.16 < -71.6°k}\right) 10 < 0°V = 4.75 < -18.4°\, V$$

$$V_{th} = V_{AB} = 4.75 < -18.4°V$$