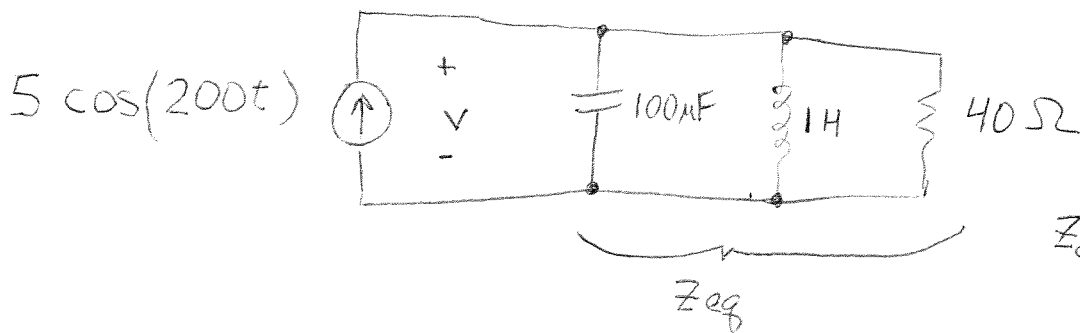




Quiz #6, Problem 9: find $|V|$



$$Z_C = \frac{1}{j\omega C} = \frac{1}{j200 \cdot 100 \mu} = -j50$$

$$Z_L = j\omega L = j200 \cdot 1 = j200$$

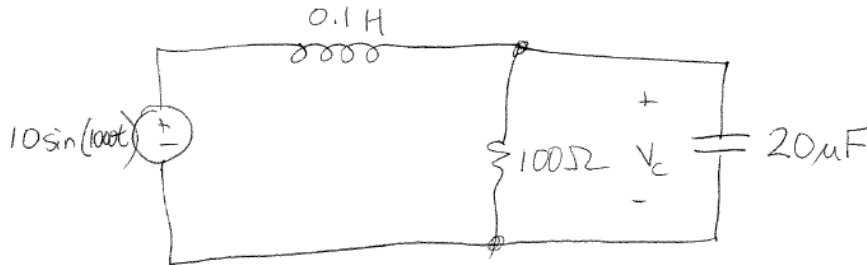
$$Z_{eq} = -j50 \parallel j200 \parallel 40$$

$$= \frac{1}{-\frac{1}{j50} + \frac{1}{j200} + \frac{1}{40}} = \frac{1}{j\left(\frac{1}{50} - \frac{1}{200}\right) + \frac{1}{40}}$$

$$= \frac{2000}{50 + j30} = \frac{2000}{58.31 \angle 30.96^\circ} = 34.3 \angle -30.96^\circ$$

$$V = I \cdot Z_{eq} = (5 \angle 0^\circ) \cdot (34.3 \angle -30.96^\circ) = 171.5 \angle -30.96^\circ \text{ volts}$$

Quiz #6, Problem 10: find $|V_c|$

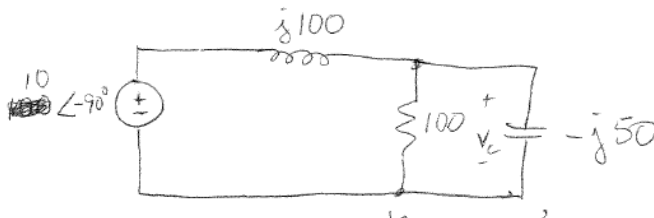


$$\omega = 1000 \text{ rad/sec}$$

$$Z_L = j\omega L = j(1000)(0.1) = j100 \Omega$$

$$Z_C = \frac{1}{j\omega C} = \frac{1}{j(1000)(20\mu)} = \frac{1}{j20 \times 10^{-3}} = -j50 \Omega$$

$$\sin x \rightarrow \cos(x - 90^\circ)$$



$$Z_{eq} = 100 \parallel -j50 = \frac{-j5000}{100 - j50} = \frac{5000 \angle -90^\circ}{111.8 \angle -26.6^\circ}$$

$$\begin{aligned} Z_{eq} &= 44.72 \angle -63.4^\circ \\ &= 20.02 - j40 \\ &\doteq 20 - j40 \end{aligned}$$

$$V_c = \frac{Z_{eq}}{j100 + Z_{eq}} \cdot 10 \angle -90^\circ$$

$$= \frac{44.72 \angle -63.4^\circ}{20 + j60} \cdot 10 \angle -90^\circ = \frac{(44.72 \times 10) \angle -153.4^\circ}{63.25 \angle 71.57^\circ}$$

$$= 7.07 \angle -225^\circ \text{ volts}$$