



Example

Problem Time!

An AC circuit with $R = 2 \Omega$, $C = 15 \text{ mF}$, and $L = 30 \text{ mH}$ is driven by a generator with voltage $V(t) = 2.5 \sin(8\pi t)$ Volts. Calculate the maximum current in the circuit, and the phase angle.

$$I_{\max} = V_{\text{gen,max}} / Z$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$Z = \sqrt{2^2 + \left(8\pi \times .030 - \frac{1}{8\pi \times .015}\right)^2} = 2.76 \Omega$$

$$I_{\max} = 2.5 / 2.76 = .91 \text{ Amps}$$

$$\tan(\phi) = \frac{X_L - X_C}{R} = \frac{(8\pi \times .030 - \frac{1}{8\pi \times .015})}{2} \Rightarrow \phi = -43.5^\circ$$

