A resistor (R) and an inductor (L) are in parallel. What is the effective impedance, Z_{eff} across these elements?

A. $R + L$
B. $R + i\omega L$
C. $1/(R + i\omega L)$
D. $\dfrac{1}{1/R - i/(\omega L)}$
E. Something else?

What is the total impedance of this circuit, Z_{total}?

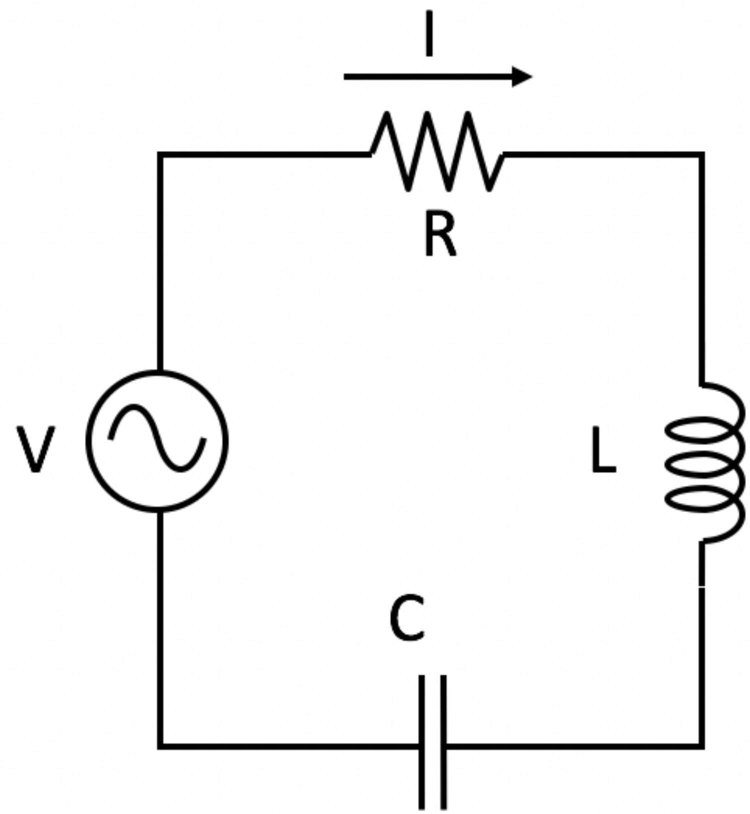
A. $R + i\left(\omega L + \frac{1}{\omega C}\right)$

B. $R + i\left(\omega L - \frac{1}{\omega C}\right)$

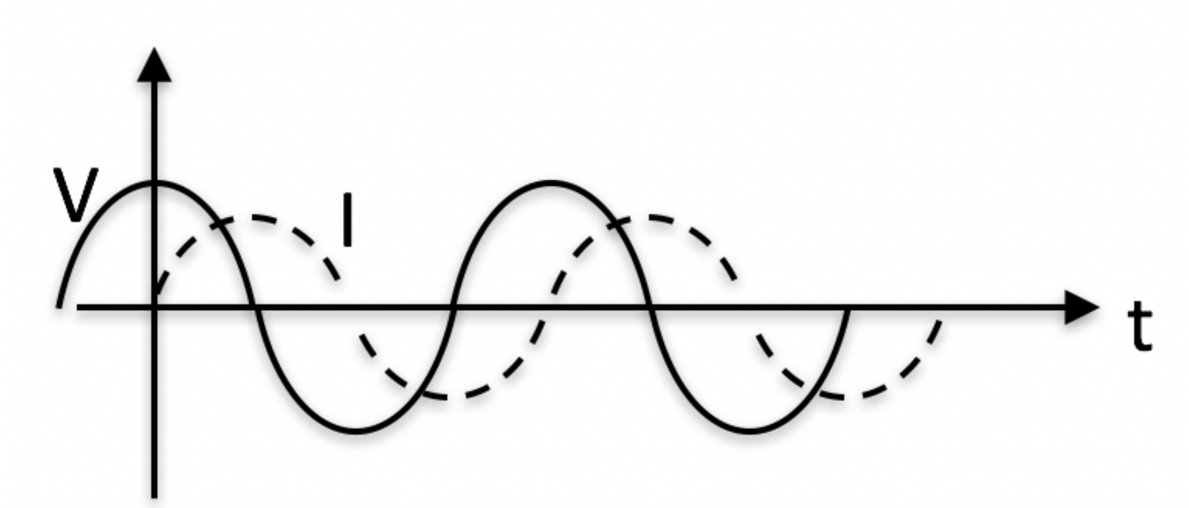
C. $\frac{1}{R} + \frac{1}{i\omega L} + i\omega C$

D. $\dfrac{1}{\frac{1}{R} + \frac{1}{i\omega L} + i\omega C}$

E. None of these



AC voltage V and current I vs time t are as shown:



The graph shows that..

A. I leads V (I peaks before V peaks)
B. I lags V (I peaks after V peaks)
C. Neither

Suppose you have a circuit driven by a voltage:

$$V(t) = V_0 \cos(\omega t)$$

You observe the resulting current is:

$$I(t) = I_0 \cos(\omega t - \pi/4)$$

Would you say the current is

A. leading

B. lagging

the voltage by 45 degrees?

Consider an RC circuit attached to a sinusoidally driven voltage source. If at $t = 0$ we turn on the source, $I(t=0) = \frac{V_0}{R}$. Then the current follows this solution,

$$I(t) = \frac{V_0}{\sqrt{R^2 + \frac{1}{\omega^2 C^2}}} \cos(\omega t + \phi) - \left(\frac{V_0}{R} - \frac{V_0 \cos\phi}{\sqrt{R^2 + \frac{1}{\omega^2 C^2}}} \right)$$

What happens to the long term current as $\omega \to 0$?

A. goes to zero

B. goes to $\frac{V_0}{R}$

C. goes to infinity

D. Something else

Consider an RC circuit attached to a sinusoidally driven voltage source. If at $t = 0$ we turn on the source, $I(t=0) = \frac{V_0}{R}$. Then the current follows this solution,

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What happens to the long term current as $\omega \to \infty$?

A. goes to zero

B. goes to $\dfrac{V_0}{R}$

C. goes to infinity

D. Something else