WHAT IS THE REACTANCe OF THE LC COMBINATION?

\[
\frac{1}{Z_{LC}} = \frac{1}{Z_L} + \frac{1}{Z_C} = \frac{1}{j\omega L} - \frac{1}{j\omega C} = \frac{j}{(\omega C - \frac{1}{\omega L})}
\]

\[\Rightarrow Z_{LC} = \frac{j}{(\frac{1}{\omega L}) - \omega C}\]


\text{When } \omega = \frac{1}{\sqrt{LC}} \text{ ? } |Z_{LC}| \to \infty

THE VOLTAGE DROP ACROSS Z_{LC} IS \text{ V}_{\text{out}}

\[\Rightarrow \text{ V}_{\text{out}}\]

TUNED CIRCUIT, IF (L) OR (C) IS VARIABLE \Rightarrow TUNE RESONANT FREQUENCY.

WHAT IF (L) AND (C) ARE IN SERIES?

\[Z_{LC} = Z_L + Z_C = j\omega L - \frac{j}{\omega C} = j\left[\omega L - \frac{1}{\omega C}\right]\]

When \( \omega = \frac{1}{\sqrt{LC}} \) ? \( |Z_{LC}| \to \infty \)

\[\Rightarrow \text{ V}_{\text{in}} \quad 3L \quad \text{V}_{\text{out}} \quad \text{V}_{\text{out}} \quad \text{f}\]

\[\frac{2\pi}{\sqrt{LC}}\]