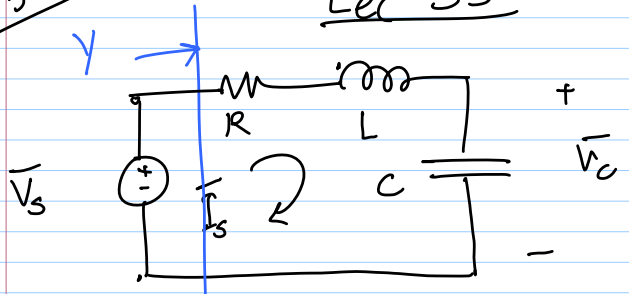
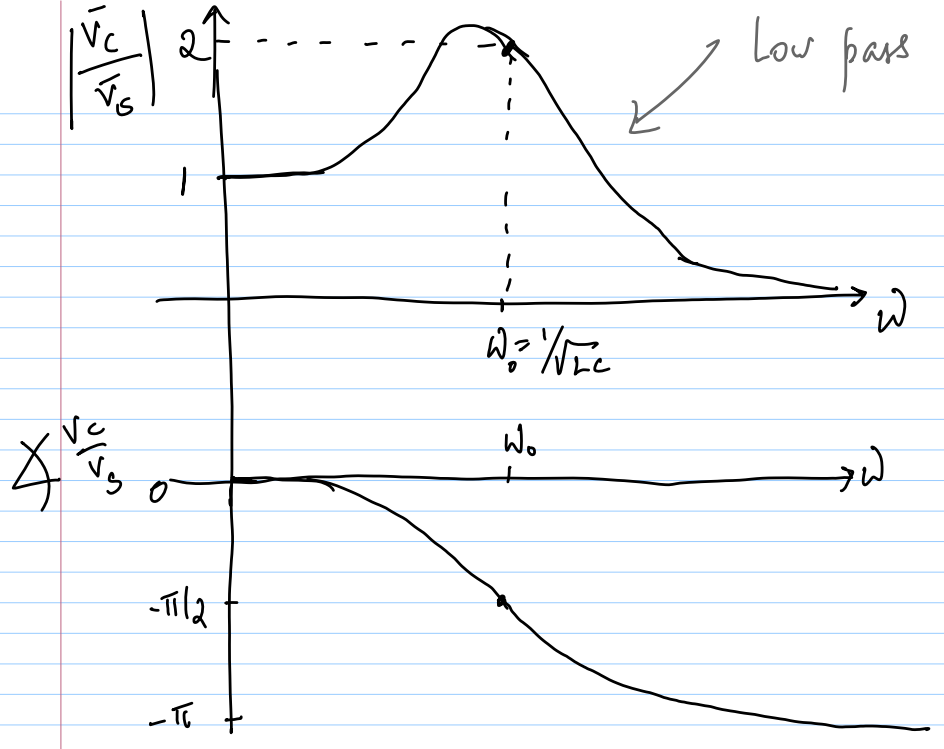


31-3-15

Lec 33



$$\frac{\bar{V}_o}{\bar{V}_s} = \frac{1/j\omega C}{R + j\omega L + 1/j\omega C} = \frac{1}{(1 - \omega^2 LC) + j\omega CR}$$

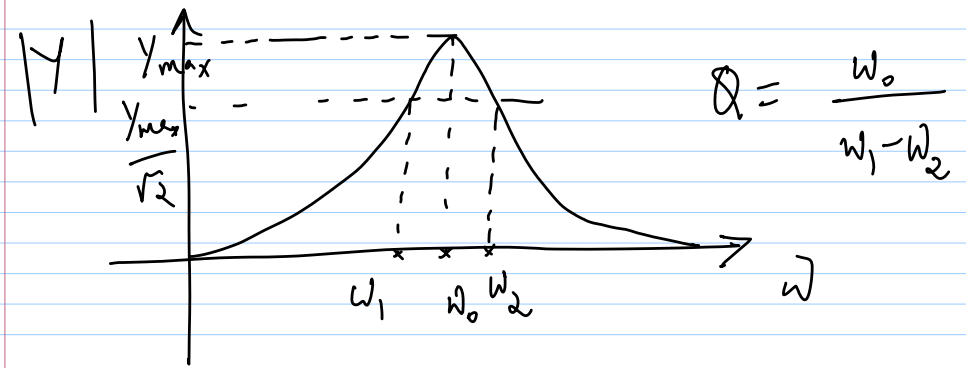
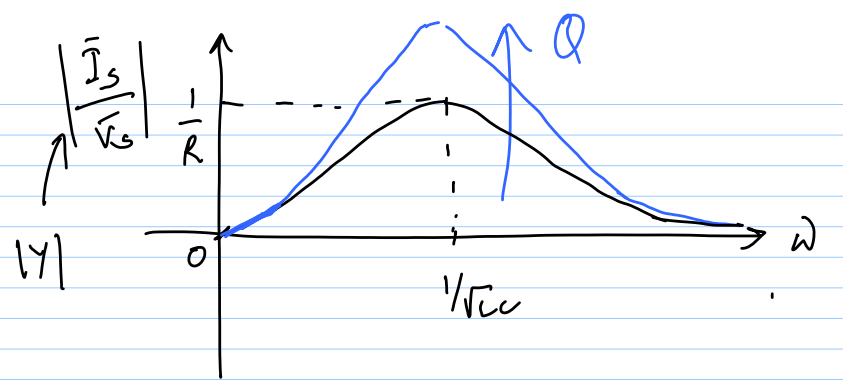


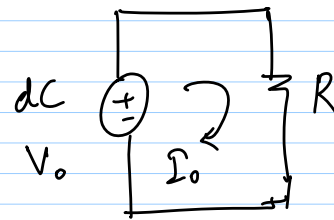
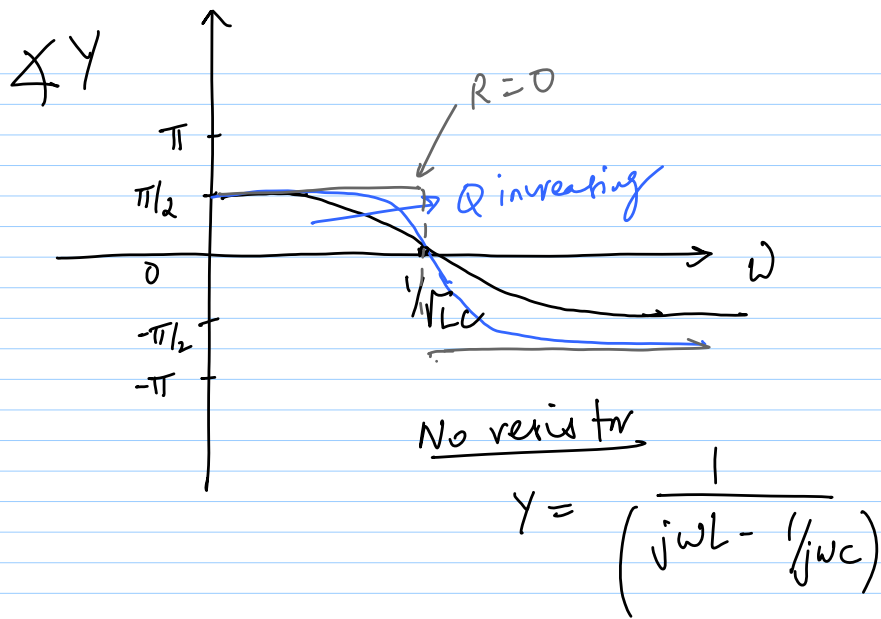
Q $\omega = 1/\sqrt{LC} \Rightarrow \left| \frac{\bar{V}_o}{\bar{V}_s} \right| = \frac{1}{\omega CR} = \frac{1}{R} \sqrt{\frac{L}{C}}$

e.g. $Q = 2$

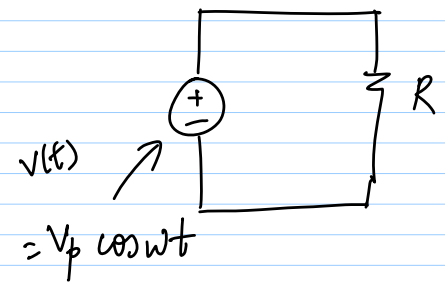
$$Y = \frac{I_s}{V_s} = \frac{1}{R + j\omega L + 1/j\omega C} = \frac{j\omega C}{1 - \omega^2 LC + j\omega CR}$$

$$Q = \frac{\omega_0}{\omega_1 - \omega_2}$$





$$\begin{aligned} \text{Power} &= \frac{V_0^2}{R} \\ &= I_0^2 R \\ &= V_0 I_0 \end{aligned}$$



$$\begin{aligned} &= V_p \cos \omega t \\ \text{instantaneous power} &= \frac{v^2(t)}{R} \\ &= \frac{V_p^2 \cos^2 \omega t}{R} \\ &= \frac{V_p^2}{2R} [1 + \cos 2\omega t] \end{aligned}$$

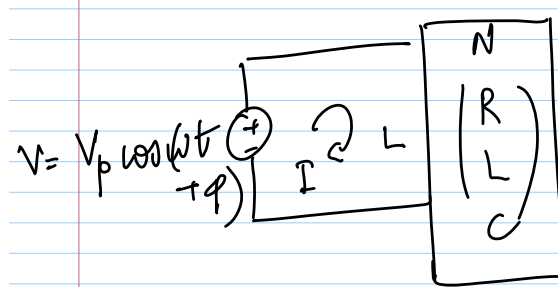
$$\text{average power} = \frac{V_p^2}{2R} = \frac{(V_p/\sqrt{2})^2}{R}$$

$\frac{V_p}{\sqrt{2}}$ = root mean squared voltage (rms voltage)

$$\text{mean squared value} = \frac{1}{T} \int_0^T v^2(t) dt$$

$$\text{rms value} = \sqrt{\frac{1}{T} \int_0^T v^2(t) dt}$$

AC power supply: 220V ← rms
 mains
 peak = $220\sqrt{2}$ V



$$\begin{aligned} I &= I_p \cos(\omega t + \theta) \\ \text{average power delivered to } N &= \frac{V_p I_p}{2} \cos(\phi - \theta) \end{aligned}$$