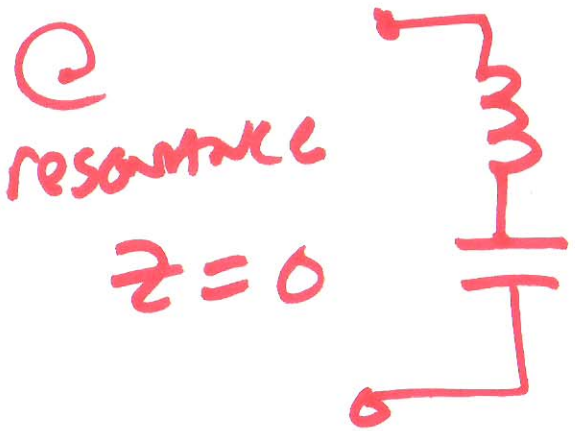
Lecture 11D

EE 220D

7/7/2014



@ resonance $Z = 0$

$$j\omega L + \frac{1}{j\omega C} = 0$$

$$\omega L - \frac{1}{\omega C} = 0$$

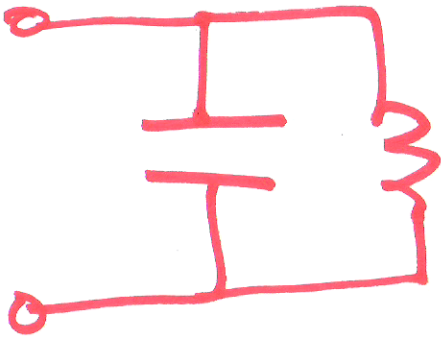
$$\omega^2 = \frac{1}{LC}$$

$$\leftarrow \omega_r = \frac{1}{\sqrt{LC}}$$

resonance freq

$$f = \frac{1}{2\pi\sqrt{LC}}$$

$\frac{1}{j} \cdot \frac{j}{j} = -j$



$z = ?$

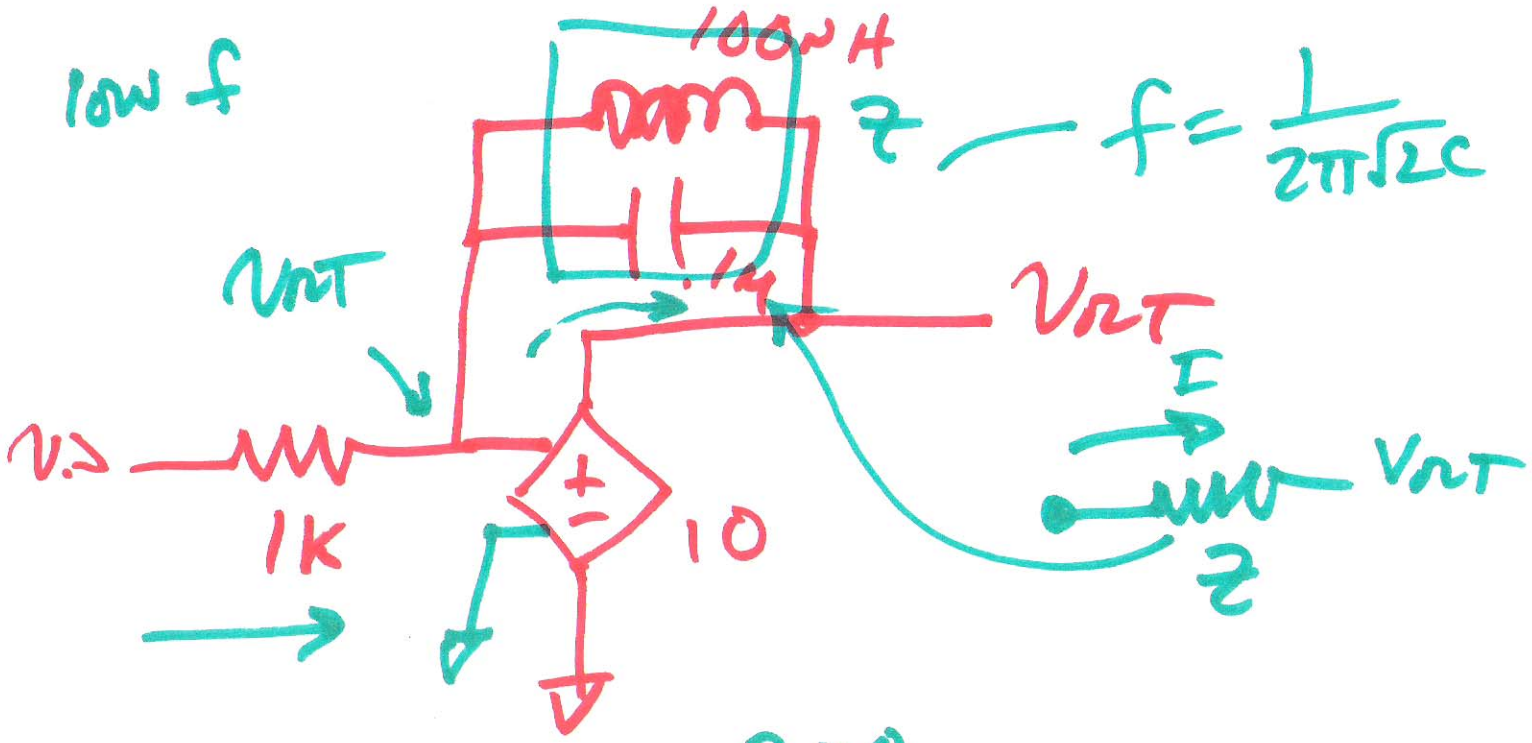
@ resonance

$$\Rightarrow \frac{\frac{1}{j\omega C} \cdot j\omega L}{\frac{1}{j\omega C} + j\omega L} = z$$

$$f = \frac{1}{2\pi\sqrt{LC}} \qquad z = \frac{\frac{L}{C}}{\frac{1}{j\omega C} + j\omega L}$$

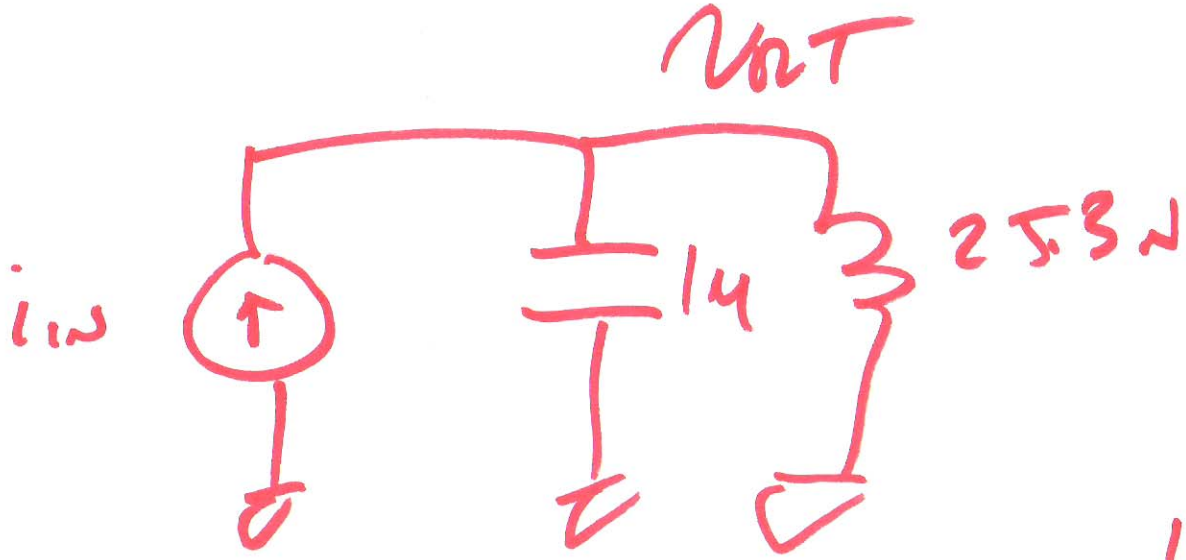
$$\omega = \frac{1}{\sqrt{LC}} \qquad z = \frac{j\omega L}{1 + (j\omega)^2 LC}$$

$$\infty = z = \frac{j\omega L}{1 - 1}$$



$Z \neq 0$

$$\frac{V_s - V_{RT}}{1k} = I \cdot Z = -V_{RT}$$



$$v_{RT} = i_{IN} \cdot \frac{\frac{1}{jwC} \cdot jwL}{\frac{1}{jwC} + jwL}$$

$$= 1mA \cdot \frac{\frac{L}{C} \cdot jwC}{1 + (jw)^2 LC}$$

$$= \frac{1mA(6.28 \cdot 10^4 \times 25.3\Omega)}{1 + (-1)}$$