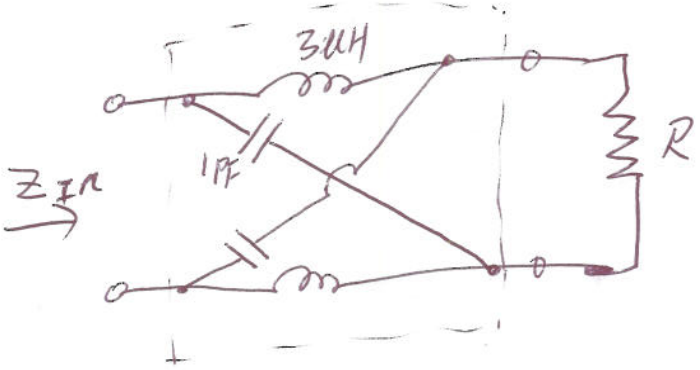
Midterm 2007 <1>



$$Z_{11} = Z_{22} = \frac{1}{2}\left[\frac{1}{sC} + sL\right]$$

$$Z_{12} = Z_{21} = \frac{1}{2}\left[\frac{1}{sC} - sL\right]$$

From the material in class. in Page 65.

$$Z_{11} I_1 + Z_{12} I_2 = E \quad \cdots ①$$

$$Z_{21} I_1 + Z_{22} I_2 + R I_2 = 0 \quad \cdots ②$$

$$② \Rightarrow I_2 = -\frac{Z_{21} I_1}{Z_{22} + R} \quad \cdots ③$$

put ③ into ①

$$Z_{11} \cdot I_1 - \frac{Z_{12} \cdot Z_{21}}{Z_{22} + R} \cdot I_1 = E$$

So $$Z_{in} = \frac{E}{I_1} = Z_{11} - \frac{Z_{12} \cdot Z_{21}}{Z_{22} + R} = \frac{Z_{22} + (\frac{L}{C})/R}{Z_{22} + R} \cdot R$$

a> when $Z_{in} = R$, $\Rightarrow \frac{Z_{22} + (\frac{L}{C})/R}{Z_{22} + R} = 1$ which means $Z_{22} = \infty$

$\frac{1}{sC} + sL \to \infty$, $\Rightarrow s \to \infty$ or $s \to 0$