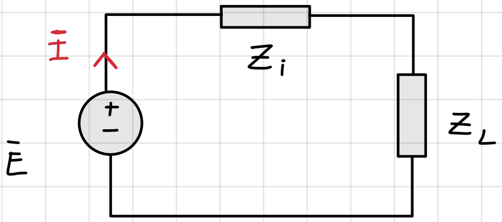


Q: Determinare $\dot{Z}_L = R_L + j X_L$ / potenza attiva da esso assorbita sia massima

$(\dot{z}_i = R_i + jX_i)$

Se $\dot{Z}_L = R_L + jX_L \rightarrow$ $\boxed{P_{\dot{Z}_L} = \frac{1}{2} R_L |I|^2}$ , siccome $I = \frac{\bar{E}}{Zeq} = \frac{\bar{E}}{\dot{z}_i + \dot{z}_L}$

$\dot{Z}_i + \dot{Z}_L = R_L + jX_L + R_i + jX_i = (R_L + R_i) + (X_i + X_L)j$

$$\Rightarrow |I|^2 = \frac{E^2}{(R_L+R_i)^2 (X_L+X_i)^2}$$

AFFINCHE' P sia massima $X_L + X_i = 0 \Rightarrow X_i = -X_L$

$$\Rightarrow \text{Se } X_i = -X_L \rightarrow P_{\dot{Z}_L} = \frac{1}{2} R_L \cdot \frac{E^2}{(R_L + R_i)^2} = \frac{1}{2} R_L \cdot E^2 \cdot (R_L + R_i)^{-2}$$

SICCOME $P_{Z_L}$ è funzione di $R_L$, deriviamo rispetto ad R

$$\rightarrow P'_{\dot{Z}_L} = \frac{1}{2} \frac{E^2}{(R_L + R_i)^2} + \left[ \frac{-\frac{1}{2} R_L \cdot 2 \cdot E^2 \cdot (R_L + R_i)}{(R_L + R_i)^4} \right]$$

$$= \frac{1}{2} E^2 \cdot \frac{(R_L + R_i)^{\cancel{2}} - 2 R_L \cancel{(R_L + R_i)}}{(R_L + R_i)^{\cancel{4}}} = 0$$

$\Rightarrow R_L + R_i - 2R_L = 0 \rightarrow R_i - R_L = 0 \rightarrow R_i = R_L$

$\Rightarrow$ Affinché la potenza sia massima, $R_i = R_L$ e $X_i = -X_L$

$\Rightarrow \dot{Z}_L = \dot{Z}_i^*$ Ans