$$P_L = I^2 \cdot R_L = \left\{ \frac{E_g}{(R_g + jX_g) + R_L} \right\}^2 \cdot R_L = \left\{ \frac{E_g}{(R_g + R_L) + jX_g} \right\}^2 \cdot R_L$$

분모 유리화 $\rightarrow$ $P_L = \dfrac{E_g^2 \{(R_g + R_L) - jX_g\} \cdot R_L}{(R_g + R_L)^2 + X_g^2}$

최대 전달조건 $\dfrac{dP_L}{dR_L} = 0$ 일때

$$\frac{dP_L}{dR_L} = \frac{E_g^2 \{(R_g + R_L) - jX_g\} \cdot \{(R_g + R_L)^2 + X_g^2\} - E_g^2 \{(R_g + R_L) - jX_g\} \cdot R_L \cdot 2(R_g + R_L)}{\{(R_g + R_L)^2 + X_g^2\}^2} = 0$$

$$(R_g + R_L)^2 + X_g^2 - 2R_L(R_g + R_L) = 0$$

이것을 풀면 $R_L = \sqrt{R_g^2 + X_g^2}$

이때 $Z_g = R_g + jX_g = \sqrt{R_g^2 + X_g^2}$ 이므로

$\therefore$ $R_L = Z_g$ 일때 최대 전력 전달 조건