Complex power

using rms values : $S = VI^* = P + jQ = Z\,|I|^2 = (R + jX)\,|I|^2 = Y^*\,|V|^2 = (G - jB)\,|V|^2$

$|S| = |V||I| = |Z||I|^2 = |Y||V|^2$

L: $S = jQ = jX|I|^2 = j\omega L|I|^2$
C: $S = jQ = -jB|V|^2 = -j\omega C|V|^2$
R: $S = P = R|I|^2 = G|V|^2$

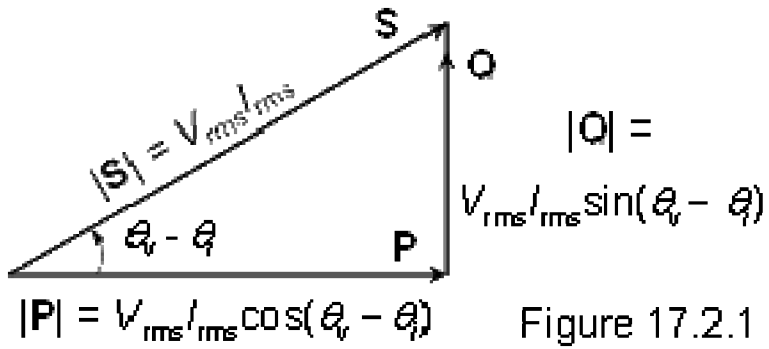

Figure 17.2.1

power factor: $\cos(\theta_v - \theta_i)$ lagging or leading (current with respect to voltage)

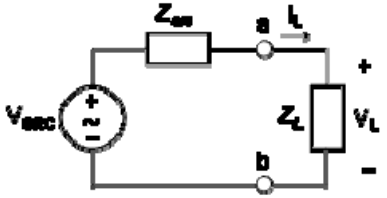

Figure 17.4.7

Maximum power transfer: $Z_L = Z_{src}^*$