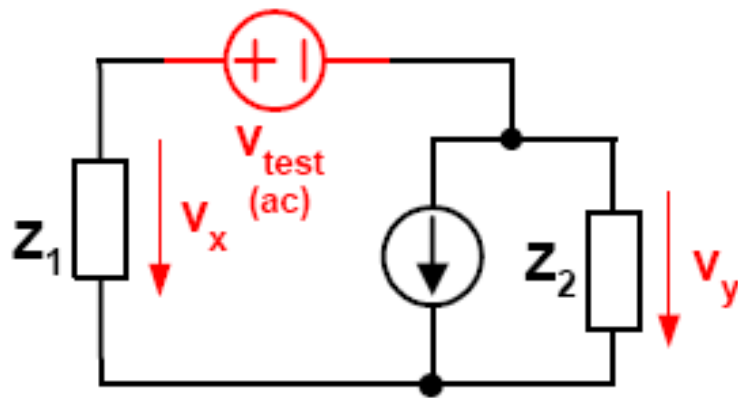
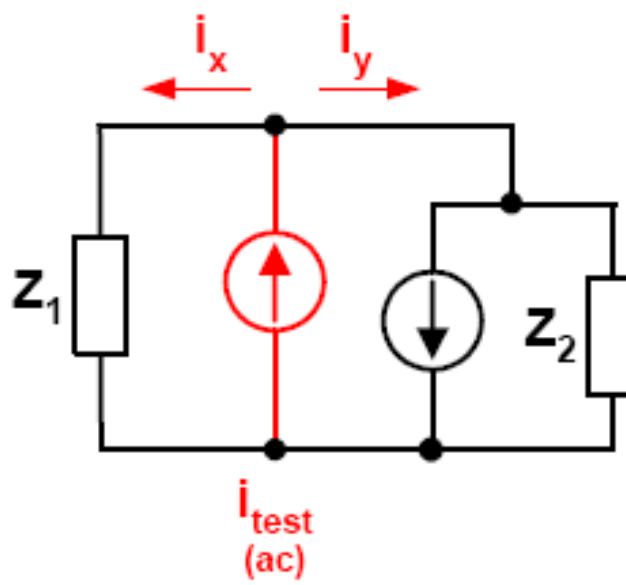


True Loop Gain: $T = g_m \cdot \frac{Z_1 Z_2}{Z_1 + Z_2} \quad (1)$



$$\frac{v_y}{v_x} \equiv T_v = g_m \cdot Z_2 + \frac{Z_2}{Z_1} \quad (2)$$



$$\frac{i_y}{i_x} \equiv T_i = g_m \cdot Z_1 + \frac{Z_1}{Z_2} \quad (3)$$

Expressing (2) in terms of (1):

$$T_v = \left(1 + \frac{Z_2}{Z_1}\right) T + \frac{Z_2}{Z_1} \quad (4)$$

Expressing (3) in terms of (1):

$$T_i = \left(1 + \frac{Z_1}{Z_2}\right) T + \frac{Z_1}{Z_2} \quad (5)$$

Solving (4) and (5):

$$\frac{T_v - T}{T + 1} = \frac{T + 1}{T_i - T}$$

\Rightarrow

$$T = \frac{T_i T_v - 1}{2 + T_i + T_v}$$