$$V_{out} = g_m V_i (R_{sc} \| r_o)$$

$$V_{out} = g_m (V_{in} - V_{out})(R_{sc} \| r_o)$$

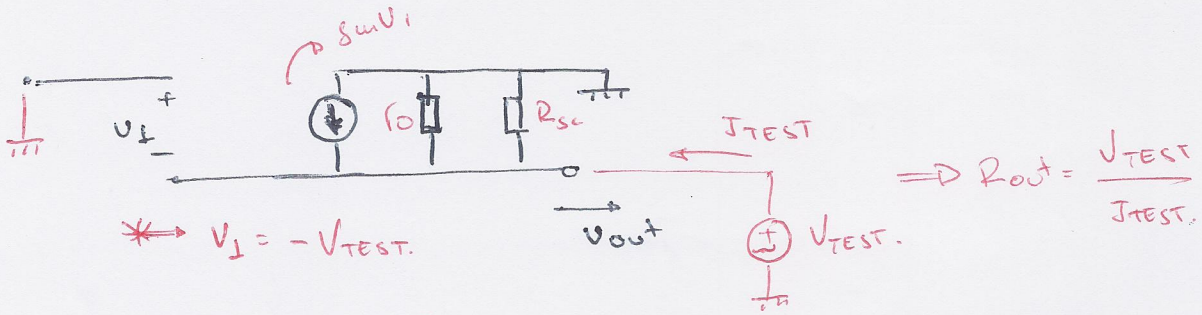
$$V_{out}\left[1 + g_m (R_{sc} \| r_o)\right] = g_m V_{in} (R_{sc} \| r_o)$$

$$A_v = \frac{V_{out}}{V_{in}} = \frac{g_m (R_{sc} \| r_o)}{1 + g_m (R_{sc} \| r_o)}$$

$$\boxed{A_v = \frac{(R_{sc} \| r_o)}{\frac{1}{g_m} + (R_{sc} \| r_o)}}$$

Idêntica à expressão anterior !!

Para calcular a resistência de saída do amplificador devemos atender a entrada, portanto:



$$\Rightarrow R_{out} = \frac{V_{TEST}}{I_{TEST}}$$

$$\ast\ast \Rightarrow V_i = -V_{TEST}$$

$$\ast\ast \Rightarrow I_{TEST} + g_m V_i = I_{r_o} + I_{R_{sc}}$$

$$I_{TEST} = -g_m V_i + I_{r_o} + I_{R_{sc}}$$

$$I_{TEST} = g_m V_{TEST} + \frac{V_{TEST}}{r_o} + \frac{V_{TEST}}{R_{sc}}$$

$$\frac{I_{TEST}}{V_{TEST}} = g_m + \frac{1}{r_o} + \frac{1}{R_{sc}}$$

$$\boxed{R_{out} = \frac{V_{TEST}}{I_{TEST}} = \left(\frac{1}{g_m} \| r_o \| R_{sc}\right)}$$