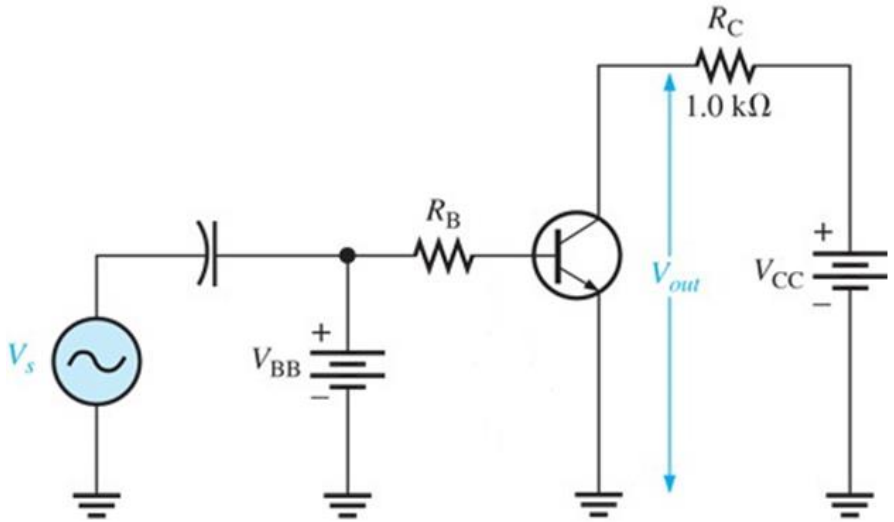
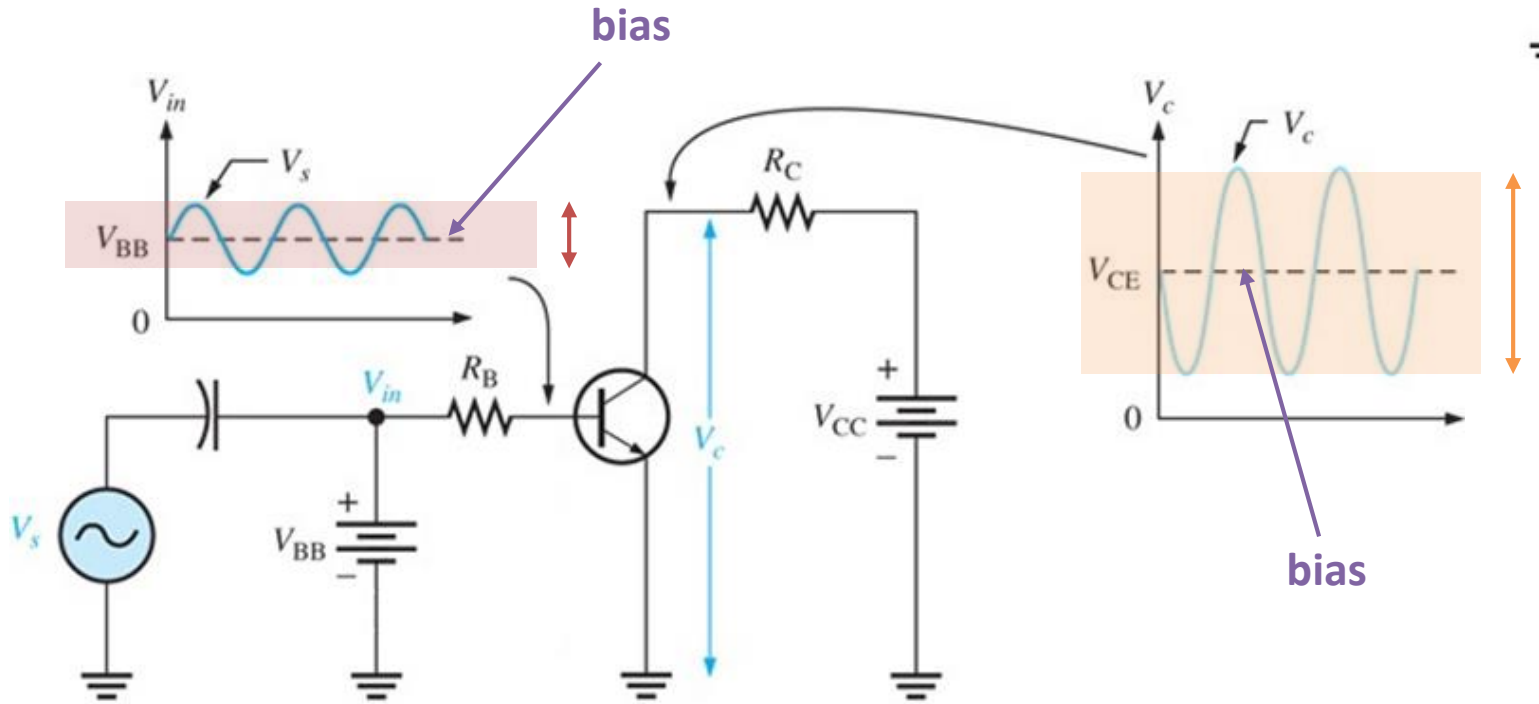
Large-Signal vs Small Signal Behavior

1) Bias current is stablished through V_{BB} and supplied by V_{cc}
2) AC signal is coupled through the capacitor and superimposed to the DC signal
3) AC behavior will be determine by the circuit configuration and the DC bias





- Large-Signal – stablishes the DC operating point of the circuit
- Small-Signal – determines de circuit behavior around the DC operating point

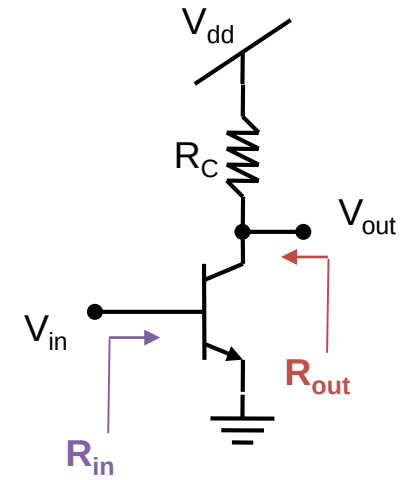
Common-Source Amplifier

Source terminal connected at the common node! ⟹ $R_{in} = r_\pi$

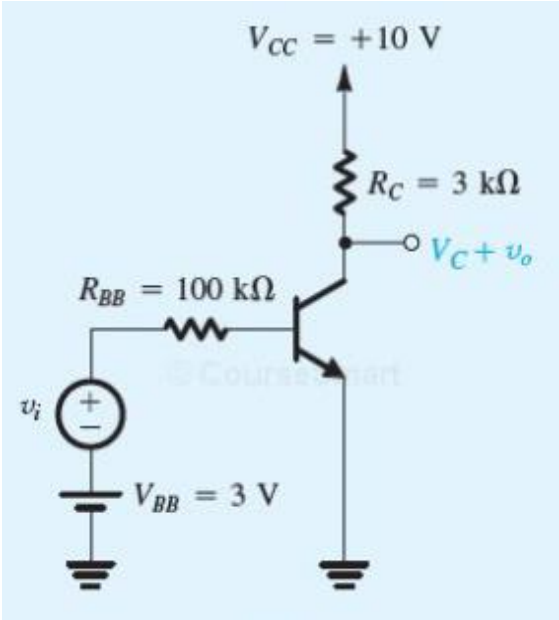
$R_{out} = R_c // r_0$

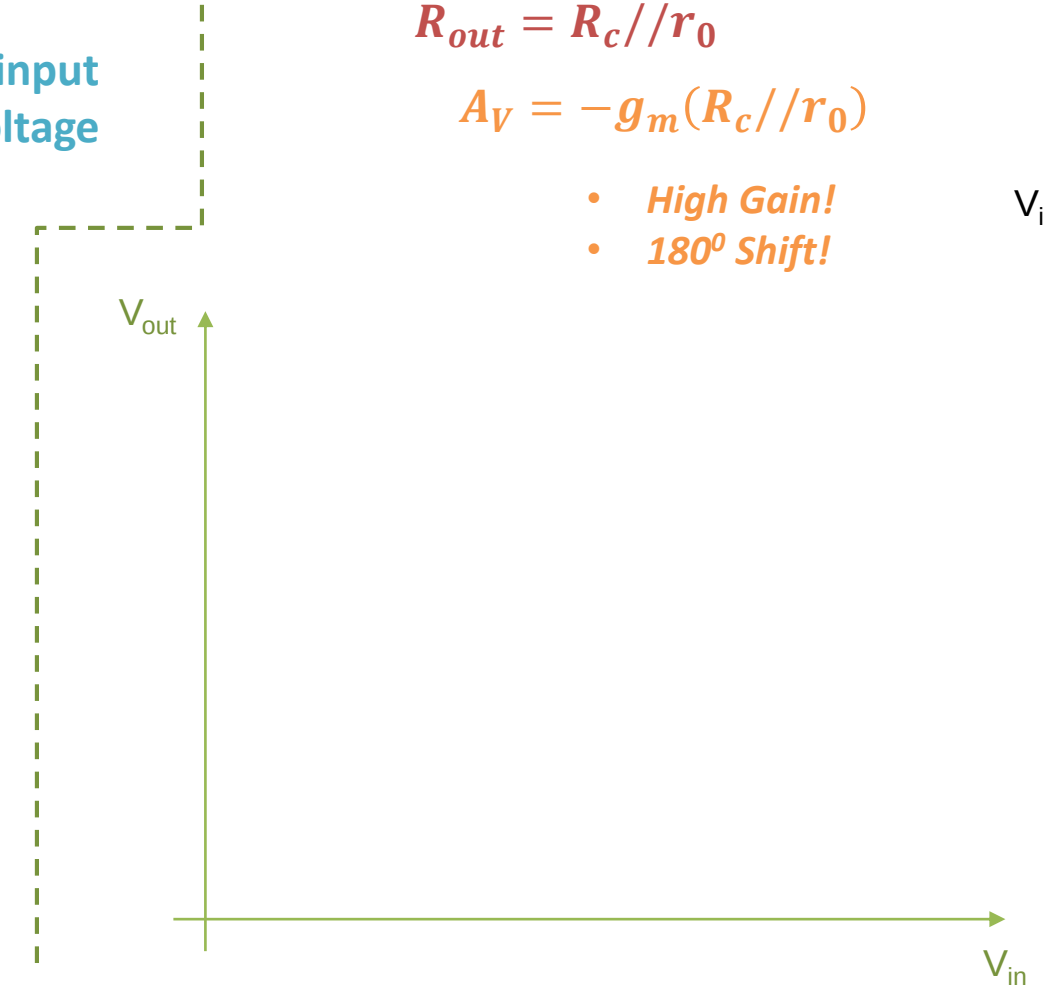
$A_V = -g_m(R_c // r_0)$

- *High Gain!*
- *180⁰ Shift!*



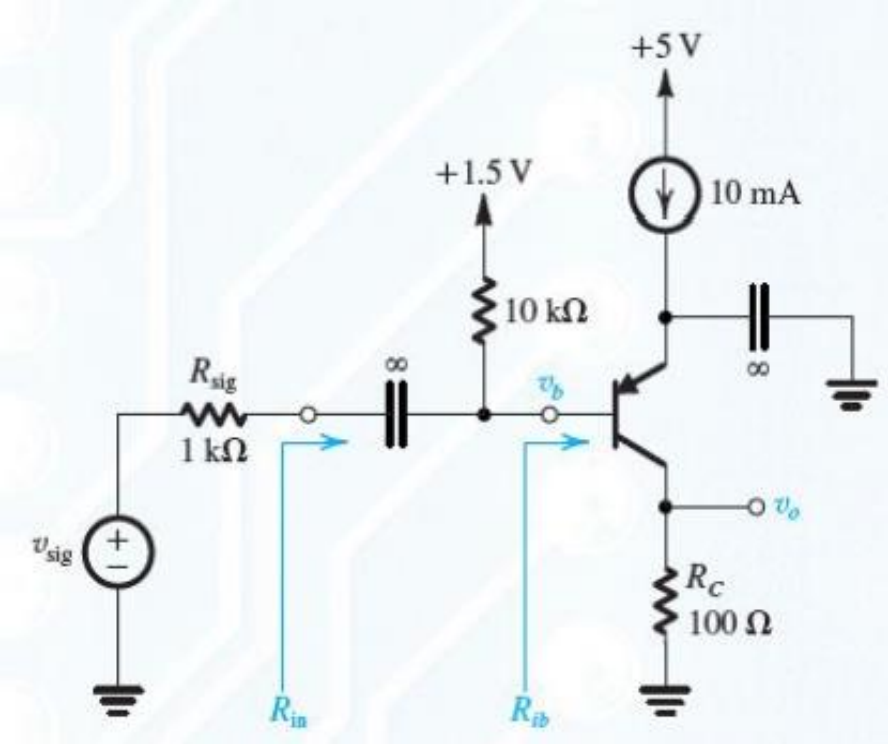
Assuming β=200 and V_{BE}=0.7V find the input resistances R_{in} (seen by v_s) and the overall voltage gain v_o/v_s.





Problem 6.101

Assuming β = 200, what is the dc voltage at the collector. Find the input resistances R_{ib} and R_{in} and the overall voltage gain v_o/v_{sig}.



Problem 6.107

Assuming β is very large and the transistor is operating in active mode, find the collector bias current I_C. Using the small-signal model analyze the circuit to determine v_{01}/v_i and v_{02}/v_i.