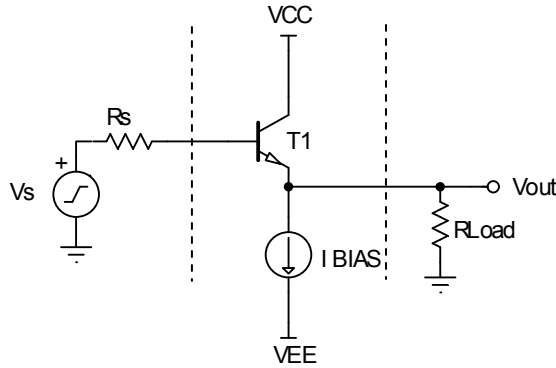


Transistor Amplifiers

Small Signal Modeling Examples

4. Common Collector (CC) Amplifier (Emitter Follower)



DC Bias

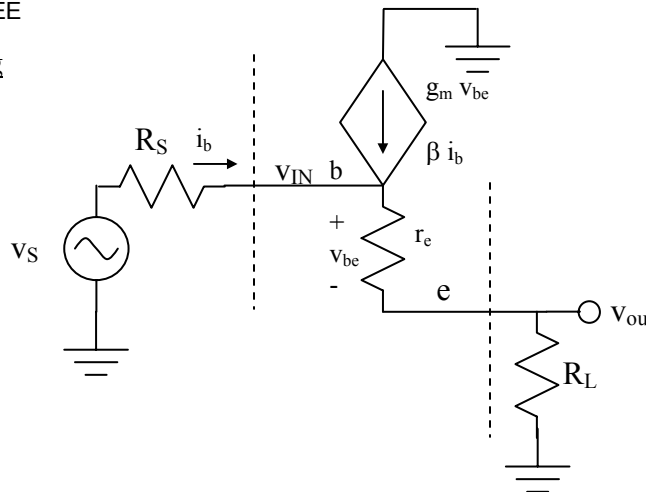
$$V_E = V_B - 0.7 = V_{OUT (BIAS)}$$

$$I_E = I_{BIAS}$$

$$I_C \approx I_E$$

Small Signal Modeling

(Using T-Model)



Small Signal (ac) Parameters

$$g_m = I_C (BIAS) / V_T$$

$$r_e = \beta / (\beta + 1) (1/g_m)$$

$$\approx 1 / g_m$$

Voltage Gain (Av)

$$v_{out} = v_{in} [R_L / (r_e + R_L)]$$

$$A_v = v_{out} / v_{in}$$

$$= R_L / (r_e + R_L)$$

$$A_v \approx 1, \text{ if } R_L \gg r_e$$

Input & Output Impedance (Rin, Rout)

$$R_{in} = (\beta + 1) (r_e + R_L)$$

$$R_{out} = r_e + R_S / (\beta + 1)$$

- Notes:
- (1) Voltage gain approximately unity.
 - (2) High R_{in} , Low R_{out} .
 - (3) Used as a voltage buffer.