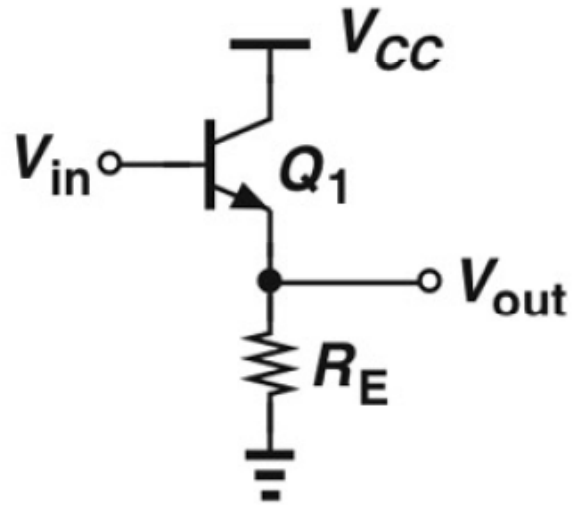
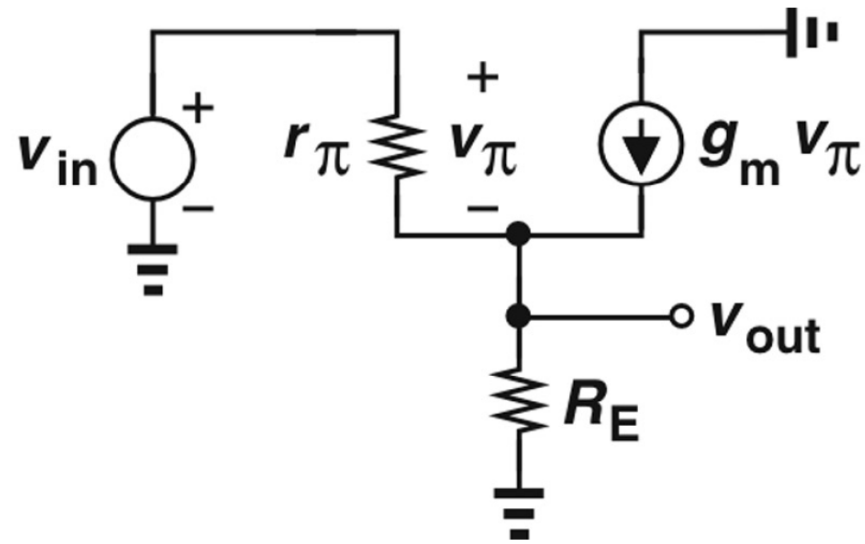


Lect. 17: BJT Emitter Follower



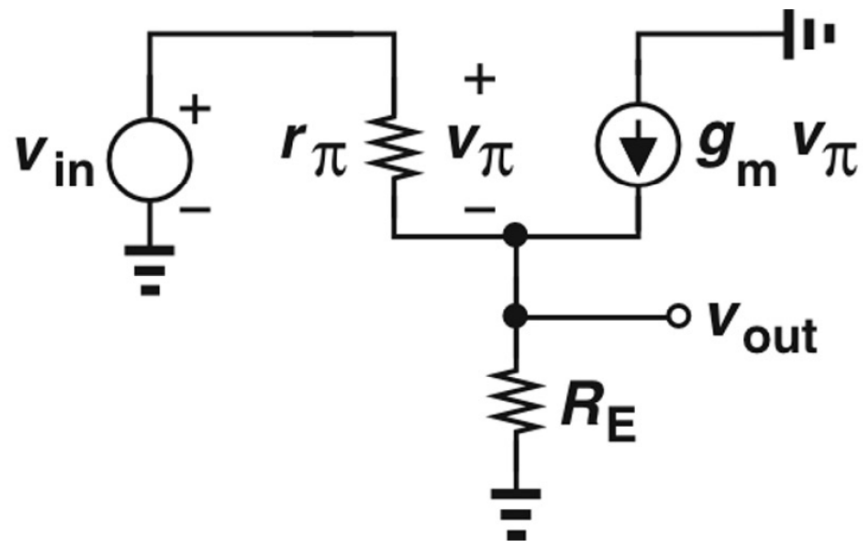
Small-signal Model



- R_{in} :
- R_{out} :
- Voltage Gain:
- Function

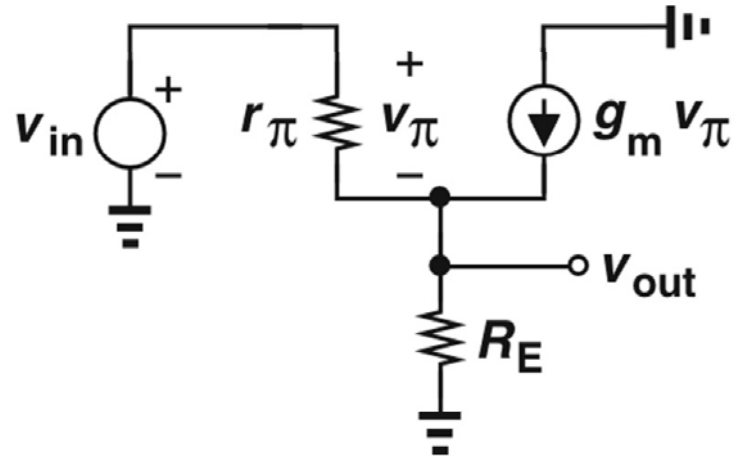
Lect. 17: BJT Emitter Follower

Input Resistance



$$R_{in} = r_{\pi} + (1 + \beta)R_E$$

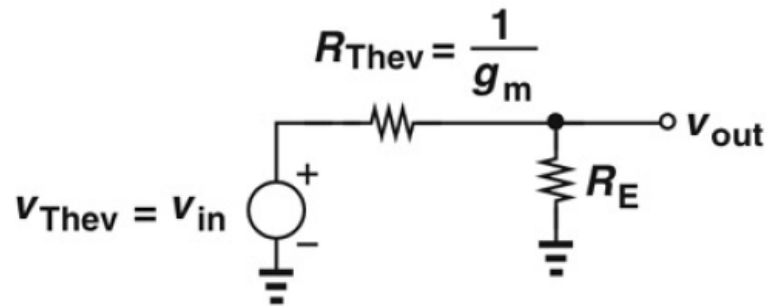
Lect. 17: BJT Emitter Follower



Voltage Gain

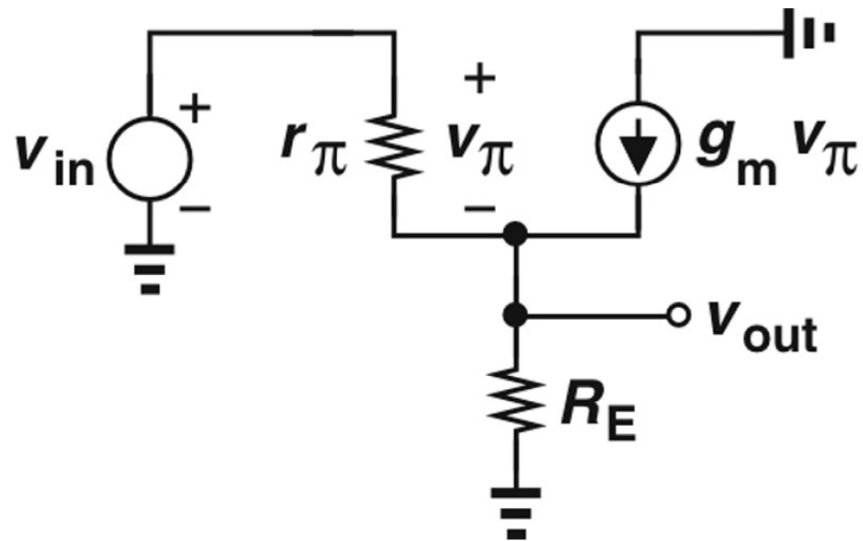
$$\frac{v_{out}}{v_{in}} = \frac{1}{1 + \frac{r_{\pi}}{\beta + 1} \cdot \frac{1}{R_E}} = \frac{R_E}{R_E + \frac{r_{\pi}}{\beta + 1}} \sim \frac{R_E}{R_E + \frac{1}{g_m}}$$

Thevenin equivalent circuit from output port ?



Lect. 17: BJT Emitter Follower

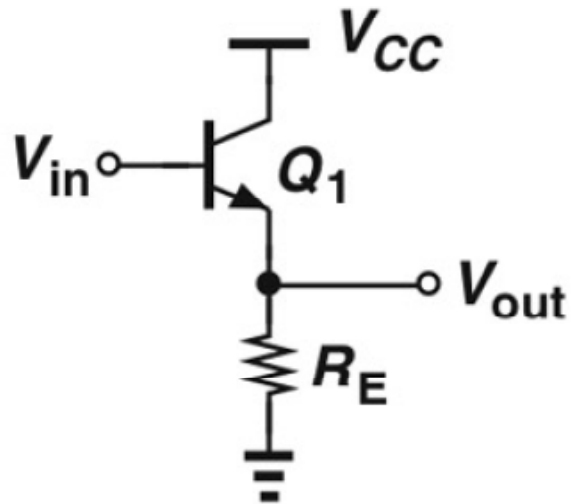
Output Resistance



$$R_{out} = \frac{r_{\pi}}{\beta + 1} \parallel R_E$$

Lect. 17: BJT Emitter Follower

Common-Collector or Emitter Follower



- R_{in} : Large

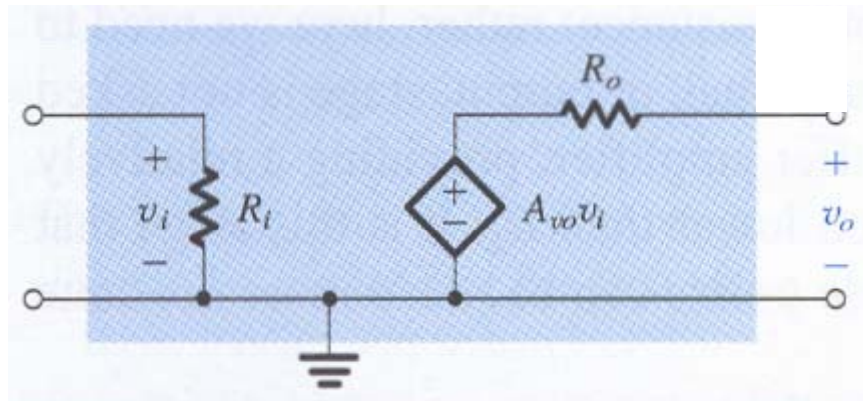
- R_{out} : Small

- Voltage Gain: Close to unity

→ Voltage Buffer

Lect. 17: BJT Emitter Follower

Voltage Amplifier



With R_L , R_o should be as small as possible

What if a given amplifier configuration does not have small R_o (for example CE)?

Use voltage buffer, or emitter follower!