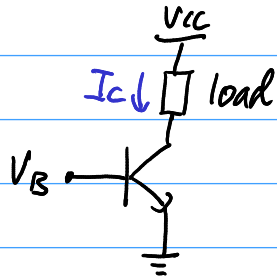


4.30 A bipolar current source is designed for 2 mA.
Find V_A s.t. $r_o = 10 \text{ k}\Omega$.

Example of a current source:



Here $I_C = 2 \text{ mA}$.

Using small signal model:

$$r_o = \frac{V_A}{I_C}$$

Want $r_o > 10 \text{ k}\Omega$.

$$\therefore \frac{V_A}{2 \times 10^{-3}} > 10 \times 10^3$$

$$V_A > 20 \text{ V.}$$

