

Simulation Problems

Q1. In the following problems, assume $I_{S,\text{nnpn}} = 5 \times 10^{-16} \text{ A}$, $\beta_{\text{nnpn}} = 100$, $V_{A,\text{nnpn}} = 5 \text{ V}$.

- Plot the input/output characteristic of the circuit shown in Fig.1 for $0 < V_{\text{in}} < 2.5 \text{ V}$. What value of V_{in} places the transistor at the edge of saturation?
- Repeat Problem 1 for the stage depicted in Fig.2. At what value of V_{in} does Q_1 carry a collector current of 1 mA ?

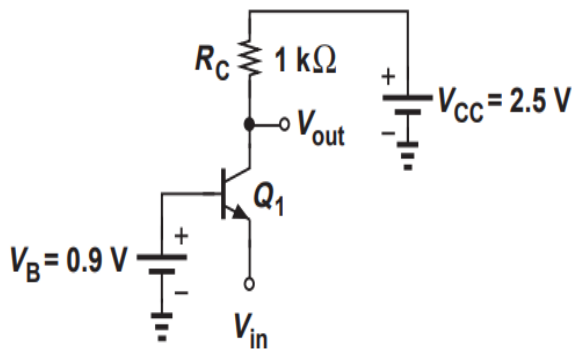


Fig.1

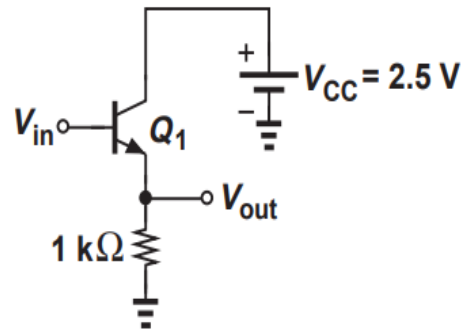


Fig.2