Tutorial questions

1. Describe an equivalent circuit of the MOS cascode circuit in Figure 1 and find the trans-conductance, i.e. the ratio between the output current and input voltage.
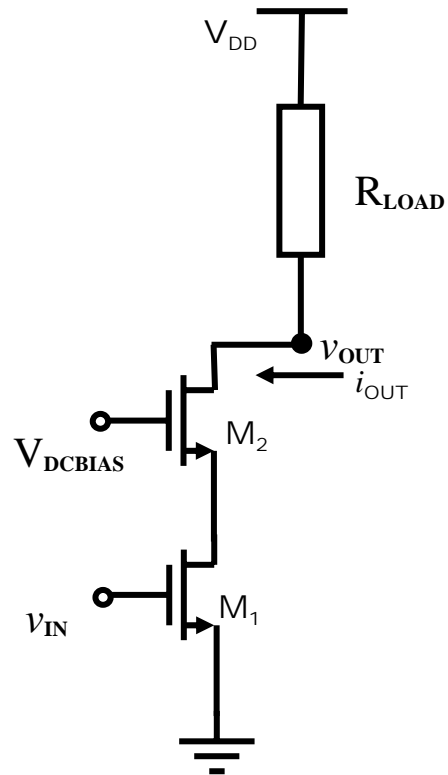

Figure 1.

2. State a voltage gain of common source amplifier with an active load as in Figure 2, with a representation of a small signal equivalent circuit.
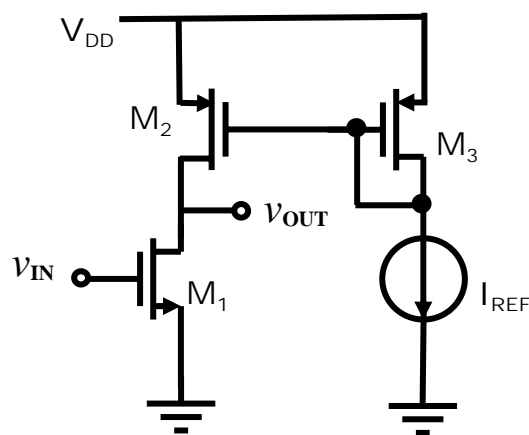

Figure 2

3. A CMOS differential pair with the current mirror load is shown in Figure 3.
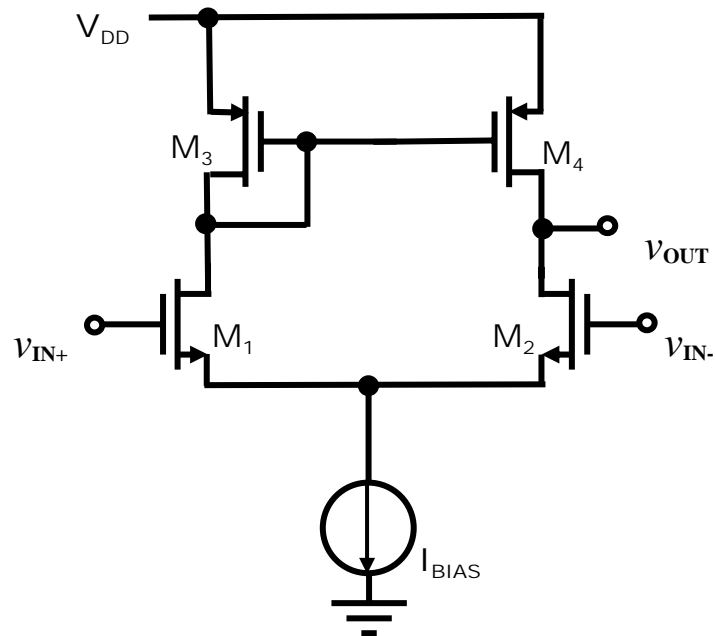

Figure 3.

   3-1. Describe the circuit operation as a differential amplifier by representing an equivalent circuit.

   3-2. State the output resistance.

4. Find the output resistance of a MOSFET. Assume the transistor operates in the active region with $I_D = 5\mu A$ and $V_A = 50V$. Neglect the body effect.