

ACMOS ECE315 / ECE515

PRACTICE PROBLEMS 1

Q1 Explain why the structures shown in below Fig 1 cannot operate as current sources even though the transistors are in saturation.

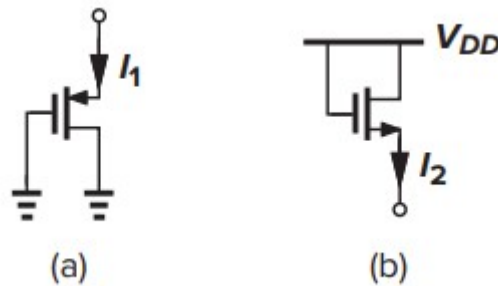


Fig. 1

Q2 Calculate I_{copy} in each of the circuits shown in given below Fig. 2. Assume all of the transistors operate in saturation.

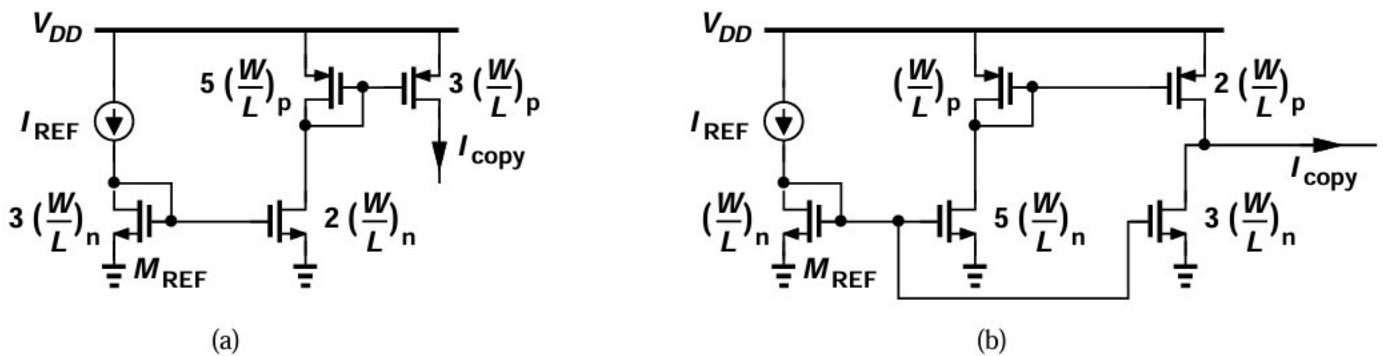


Fig. 2

Q3 Fig. 3 shows an arrangement where M1 and M2 serve as current sources for circuits 1 and 2. Design the circuit for a power budget of 3 mW.

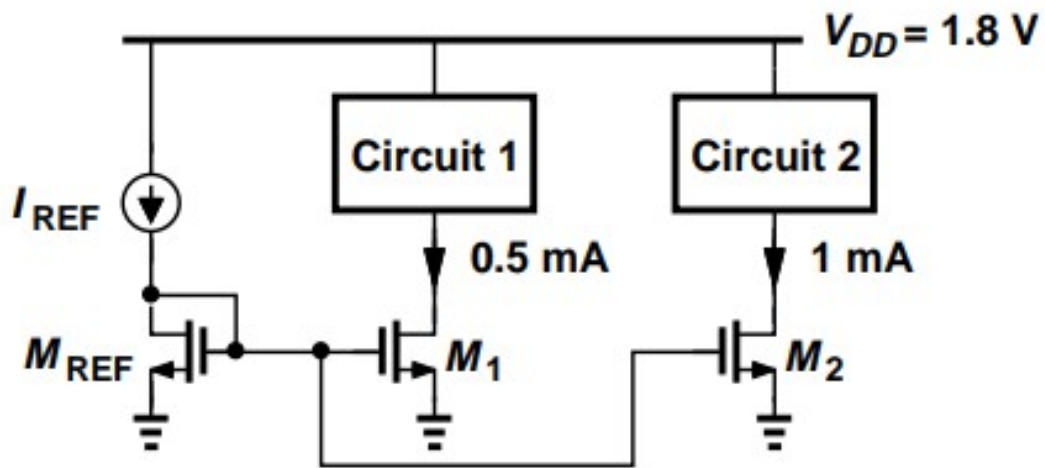


Fig. 3

Q4 We wish to design the circuit shown in Fig. 4 for a voltage gain of 3. If $(W/L)_1 = 20/0.18$, determine $(W/L)_2$. Assume $\lambda = 0$

Q5 The CS stage of Fig. 4 must achieve a voltage gain of 5. (a) If $(W/L)_2 = 2/0.18$, compute the required value of $(W/L)_1$. (b) What is the maximum allowable bias current if M_1 must operate in saturation?

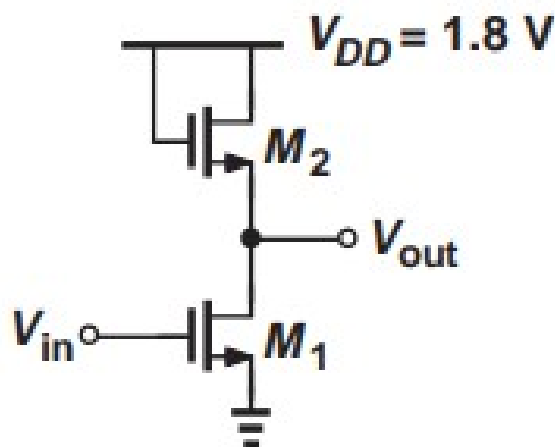


Fig. 4