

303H Spring 2009 – Homework 5 Due Th 03/12/09

1. a) In PSpice set up the NMOS cascade current mirror of Figure 6.58, p. 649, using the AMI 1.2u transistors with $W=L$. Place a DC voltage source at the output (for V_o). In the same schematic also set up the normal NMOS current mirror (use the same figure but without the upper two transistors). Do a DC run by varying V_o ; plot the two output current versus V_o and compare. Do this for $10\mu A \leq I_{ref} \leq 10mA$ in 3 steps (by a secondary = nested DC sweep).
 b) Repeat a) for PMOS current mirrors.
2. For the following circuit from Homework 4, set it up in PSpice using E components (with very large gains, say 10^6) for the op-amps. Do a frequency response for the two cases

a) $Z_0=0, Z_1(s)=Z_2(s)=Z_3(s)=Z_5(s)=R, Z_4(s)=1/(Cs)$

b) $Z_0=0, Z_1=Z_3=Z_5=R, Z_2(s)=Z_4(s)=1/(Cs)$

Do this for $0 < \omega < 1GHz$ in decade sweeps and plot in DBs.

Use $10 \leq R \leq 10,000$ and $10^{-9} \leq C \leq 1$ as parameters with two parametric values in each case (= 4 parametric runs). Discuss why these are expected.

Recall that $Z_{in}(s) = Z_0(s) + (Z_1(s) \cdot Z_3(s) \cdot Z_5(s)) / (Z_2(s) \cdot Z_4(s))$

