ECE3110 Homework #6 Fall 2005

(Due Friday, Oct. 14 by 6pm in homework locker)

1. A negative-feedback amplifier has a closed-loop gain A_f = 200 and an open-loop gain A= 10,000. What is the feedback factor β? Assuming that the feedback factor remains the same and a manufacturing error causes a reduction of A to 1,000, what closed-loop gain results?

2. Do Exercise 8.1 (a) through (e) for A=200.

3. Consider the noninverting op-amp circuit analyzed in (2). Let the open-loop gain A have a low-frequency value of 10,000 and a uniform -6-dB/octave rolloff at high frequencies with a 3-dB frequency of 200Hz. Find the low-frequency gain and the upper 3dB frequency of a closed-loop amplifier with R_1 = 1kΩ and R_2=19kΩ.

3. In a feedback amplifier for which A=100,000 and A_f = 100, what is the gain-desensitivity factor?

4. An amplifier has a dc gain of 1,000 V/V, a single high-frequency pole at 10kHz, and a single low-frequency pole at 150Hz. Negative feedback results in reducing the midband gain to 100V/V. What are the upper and lower 3-dB frequencies (in Hz) of the closed-loop gain?

5. A series-shunt feedback amplifier seen in Fig. 8.4(a) and using an ideal basic voltage amplifier operates with V_s= 200mV, V_f=95mV, and V_o=9V. What are the corresponding values of A and β? Include the correct units for each.

6. A shunt-series feedback amplifier seen in Fig. 8.4(b) and using an ideal basic current amplifier operates with I_s= 150μA, I_f=95μA, and I_o=9mA. What are the corresponding values of A and β? Include the correct units for each.

7. A series-series feedback amplifier seen in Fig. 8.4(c) and using an ideal transconductance amplifier operates with V_s= 200mV, V_f=95mV, and I_o=9mA. What are the corresponding values of A and β? Include the correct units for each.