Name:
Student ID:

Analog Electronics

Homework # 3

Due date: 29/5/2020

Problem 1:

Assuming that the op amp in Figure 1 has infinite input resistance and zero output resistance, what is β? If A = 900, what is the closed-loop voltage gain? What is the amount of feedback (in dB)? For Vs = 1.5 V, find Vo and Vi. If A decreases by 15%, what is the corresponding percentage decrease in A_f ?

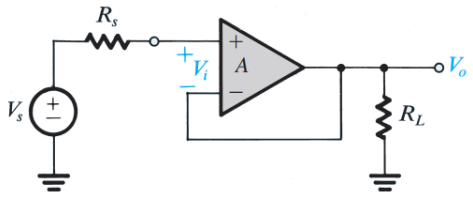

Figure 1

Problem 2:

A capacitively coupled amplifier has a midband gain of 900 V/V, a single high-frequency pole at 20 kHz, and a single low-frequency pole at 200 Hz. Negative feedback is employed so that the midband gain is reduced to 20. What are the upper and lower 3-dB frequencies of the closed-loop gain?

Problem 3:

For the feedback transconductance amplifier of Figure 2 derive expressions for $A, \beta, A\beta, A_f, R_o$, and R_{of}. Evaluate A_f and R_{of} for the case of $g_{m1} = g_{m2} = 5\ mA/V$, $R_D = 30\ k\Omega, r_{o2} = 30\ k\Omega, R_F = 200\ \Omega$, and $R_L = 1.5\ k\Omega$. For simplicity, neglect r_{o1} and take r_{o2} into account only when calculating output resistances

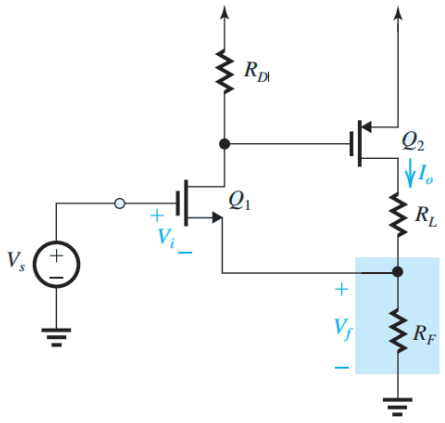

Figure 2

Hint: Refer to example 11.7 in the textbook