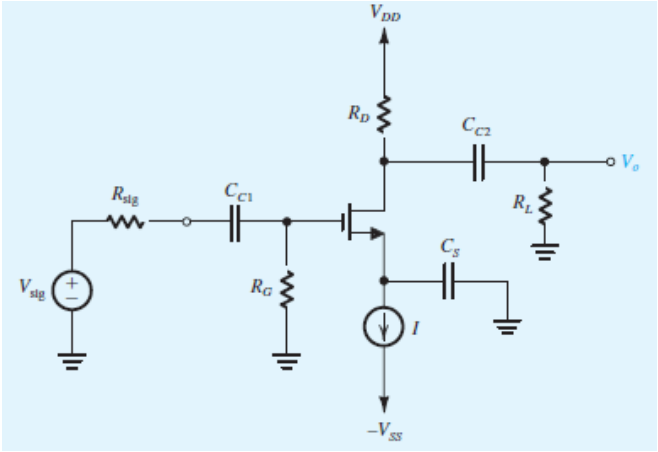
EHB 335E HW#2

Due: 11 October 2017 @9:00 am – **No late homework will be accepted.**

1) Draw the magnitude and phase Bode diagrams of the following transfer function. Compare your results with MATLAB simulations.

$$H(s) = \frac{4(20+s)(20000+s)}{(200+s)(2000+s)}$$

2) By using the short-circuit time constant method, determine the lower corner frequency (−3 dB frequency) of the amplifier below. Assume that $\lambda \neq 0$.




3) Due to a manufacturing error, a parasitic resistance has appeared in series with the source of $M_1$ in Fig. 1a. Assuming $\lambda > 0$ and neglecting other capacitances, determine the input and output poles of the circuit.

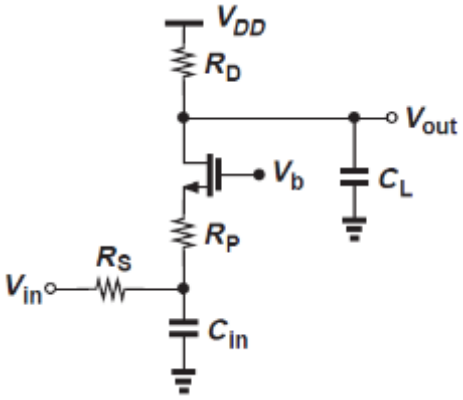



Fig 1a. Figure of Question 3

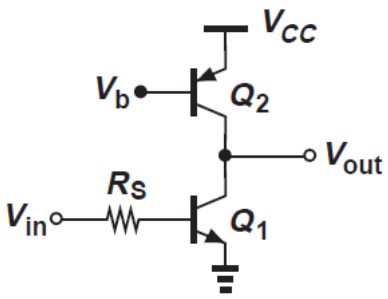



Fig 1b. Figure of Question 4

4) By using the open-circuit time constant method, determine the upper corner frequency (−3 dB frequency) of the amplifier in Fig 1b. Assume that $V_A < \infty$.
5) The amplifier below must drive a load capacitance of 100 fF. Use 2N2222 npn transistor in LTSpice.
   a. Select the input DC level to obtain an output DC level of 1.2 V.
   b. Plot the frequency response and find the low-frequency gain and the −3 dB bandwidth from the simulation results.