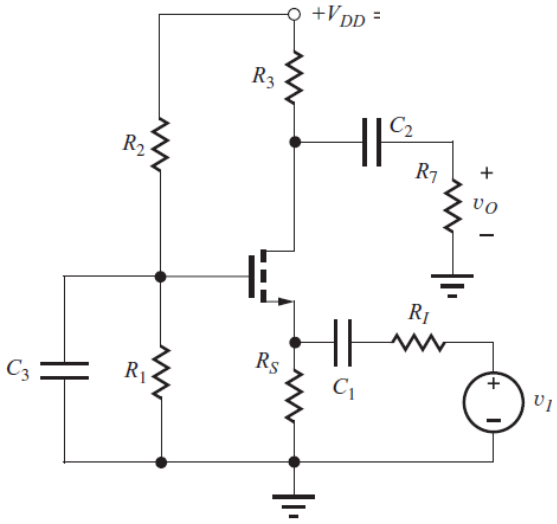
EHB 335E HW#2

Due: 17 October 2018 @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.

$$H(s) = \frac{100(100+s)(1000+s)}{(10+s)(10000+s)}$$

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) Consider the common based amplifier in Fig. 1a. Assuming $V_A < \infty$, and neglecting C_1 and C_2, which are coupling capacitors, determine the input and output poles of the circuit.

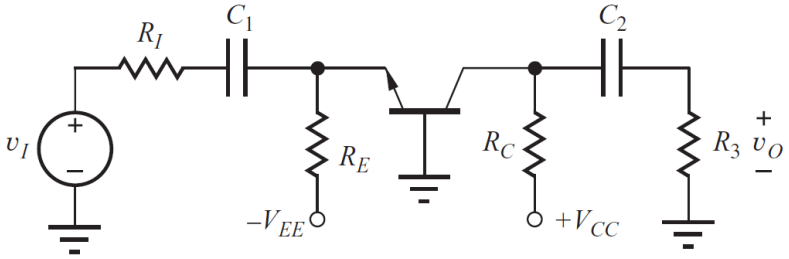


Fig 1a. Figure of Question 3

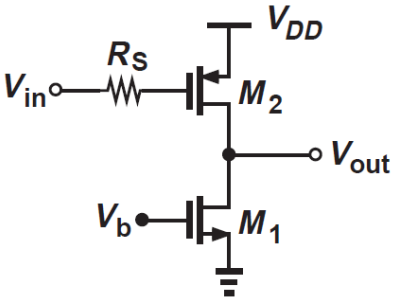


Fig 1b. Figure of Question 4

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 $\lambda > 0$.
5) The amplifier below must drive a load capacitance of 250 fF. Use 2N2222 npn transistor in LTSpice.
   a. Select the input DC level to obtain an output DC level of 1 V.
   b. Plot the frequency response and find the low-frequency gain and the −3 dB bandwidth from the simulation results.