Laboratory #1 Pre-lab

Class:

Name: Student ID:

1. Explore the frequency response of CS amplifier,
2. Use PSpice to do the ac analysis on the circuit below, and show the plot of frequency response of Vo/Vi (dB). Note that the NMOS model is NMOSOP5\_BODY, and PMOS model is PMOSOP5\_ BODY, which can be used when Sedra library is included. Schematic of the circuit is shown in Fig. 1.8 and the values of components’ parameters are all listed in Table 1.2.



**Vi**

**Vo**

Fig. 1.8 Schematic of the CS amplifier for AC analysis

Table 1.2 Values of components’ parameters of the CS amplifier

|  |  |
| --- | --- |
| Component | Spec. |
| W/L (μm) | M |
| M1 | 5/0.6 | 4 |
| M2 | 5/0.6 | 4 |
| M3 | 1.25/0.6 | 18 |
| R1 | 100Ω |
| C1 | 0.5pF |
| C2 | 1F |
| V1 | DC 2.45V with AC 1V  |
| V2 | DC 3.3V |
| I1 | 100μA |
| I2 | 100μA |

1. Explore the frequency response of CS-CG folded-cascode amplifier,
2. To avoid the problem of limited operating range resulted from transistor stacking in cascode configuration. Folded-cascode is a more common topology in modern circuit design. By folding the PMOS down, DC gain remains the same as cascode configuration, but the input common-mode range has been improved. The circuit is as shown in Fig. 1.9.



Fig. 1.9 Schematic of the folded-cascode amplifier

**Vi**

Use PSpice to do the ac analysis on the circuit shown in Fig.1.10, and show the plot of frequency response of Vo/Vi (dB)

 Fig. 1.10 Schematic of the CS-CG cascode amplifier

**Vo**

1. Which of the transistor is operated as CG configuration, similar to the function of MP in Fig. 1.9?