Homework #5 of「類比積體電路導論」

作業繳交截止日期: Nov. 14, 2024 12:00 (上傳 E3 數位平台繳交)

本次作業共四大題, 5.1~5.4

請將作業轉成一個 PDF 檔案(file size 小於 10MB)，檔名請使用「AIC_HW5_自己的學號」(例如: AIC_HW5_109700018)，於作業繳交截止日期/時間前，上傳到指定的 E3 數位平台繳交。

Use the g_m, ω, 4kT, γ to represent the answer of following questions.

5.1 Calculate the input-referred noise voltage and current of Figure 1, including only the thermal noise of M_1 and R_D. Neglect channel length modulation.

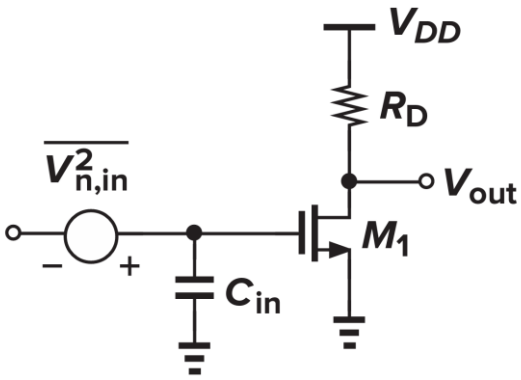
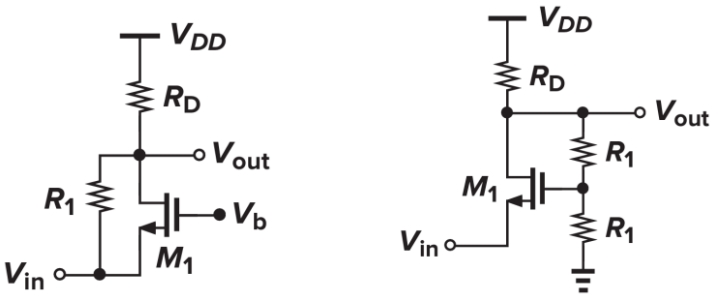


Figure 1

5.2 Calculate the input-referred thermal noise voltage of each circuit in Figure 2. Assume using the long channel transistors, neglecting channel-length modulation and body effect, and ignoring the noise generated by the polysilicon gate.



(a) (b)

Figure 2

5.3 **Calculate the input-referred 1/f noise voltage of the source follower shown in Figure 3.**

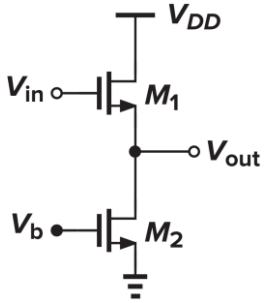


Figure 3

5.4 Figure 4 shows a noiseless amplifier driven by a source resistance of R_S. If the amplifier can be modeled by a low-frequency gain of A_0 and a single pole at ω_0, determine the total integrated noise at the output due to R_S.

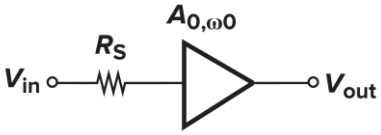


Figure 4