

Homework 3: Due Tuesday, October 21

Problem 1 (Chapter 7)

do problem 7.2 in book (note V_M is the book's notation for V_{TH} , the threshold voltage of the inverter)

Problem2 (Chapter 7)

do problem 7.3 in book

Problem 3 (Chapter 7)

Consider a CMOS inverter that is designed in a process with parameters of $t_{ox}=150\text{\AA}$, $\mu_n=580\text{cm}^2/\text{V}\cdot\text{s}$, $\mu_p=235$, $V_{T0n}=0.75\text{ V}$, and $V_{T0p}=-0.8\text{ V}$. The transistors have aspect ratios of $(W/L)_n=(W/L)_p=12$ and $V_{dd}=3\text{ V}$.

- Calculate the inverter threshold voltage V_{th}
- Calculate the values of V_{IL} and V_{IH} , and then find the noise margins.
- Using your values for V_{th} , V_{IL} and V_{IH} , sketch the VTC of the inverter.
- Assuming $C_{out} = 140\text{fF}$, find t_{HL} and t_{LH} for the inverter.

Problem 4 (Chapter 7)

do problem 7.8 in book

Problem 5 (Chapter 7)

do problem 7.10 in book