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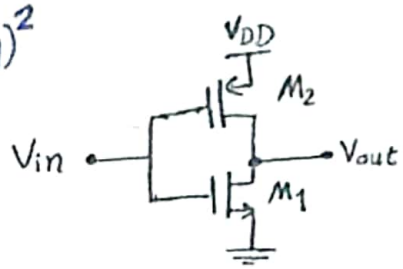
سكشن: 1

بنش نمبر: 38

⇒ to get trip point : both M_1 and M_2 work in saturation region. (at trip point)

$$\frac{1}{2}\mu_n C_{ox}\left(\frac{W}{L}\right)_1 (V_i - V_{th_1})^2 = \frac{1}{2}\mu_p C_{ox}\left(\frac{W}{L}\right)_2 (V_{DD} - V_i - |V_{th_2}|)^2$$



- in model sim, I used 2N6804 (pMOS) with the following properties:

$L_2 = 1\mu$, $\Delta W = 1\mu$, $V_{th_2} = -3.63214$, $\lambda_p = 0$, $k_p = 5.22109$

and I used 2N6659 (NMOS) with the following properties:

$L_1 = 1\mu$, $V_{th_1} = 1.72558$, $\lambda_n = 0$, $k_n = 0.240544$

then

$$0.240544 \times W_n \times (5.5 - 1.72558)^2 = 5.22109 \times \left(\frac{1}{L}\right) \times (12 - 5.5 - 3.63214)^2$$

$\therefore W_n = 12.53089$

then at constant length : $\frac{W_{NMOS}}{W_{PMOS}} = \frac{12.53}{1}$

analytically, this should make the trip point at 5.5 volt, but practically when I simulated this design on modelsim, I found that the trip point was around 6.36 Volt, I don't know what did I do wrong ?