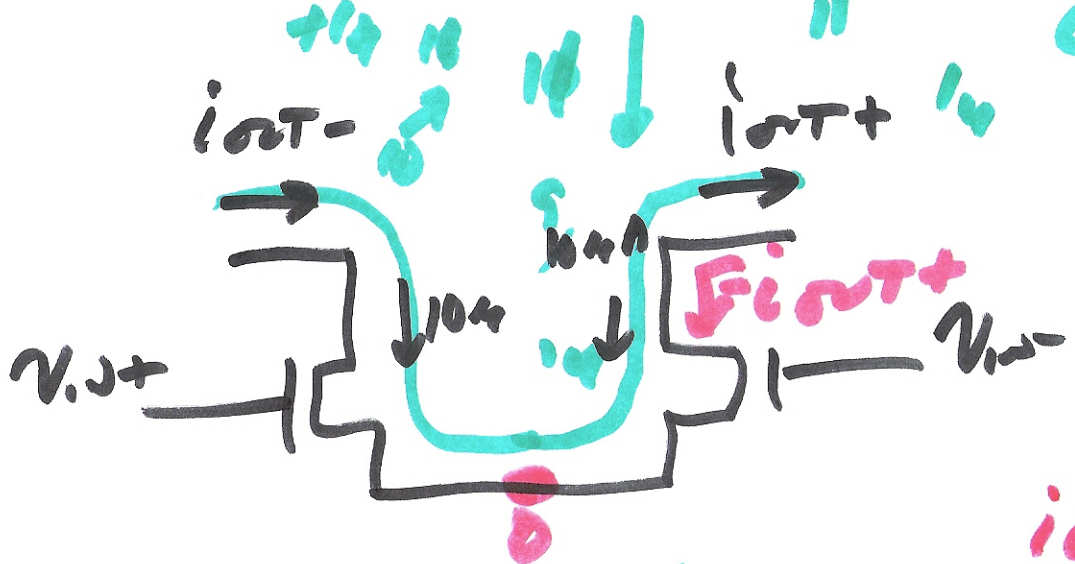
Lecture 14 OCT. 11, 2010

BOISE STATE UNIVERSITY

ECE 615 CMOS Mixed-Signal Circuit design



$v_{in+} = -v_{in-}$

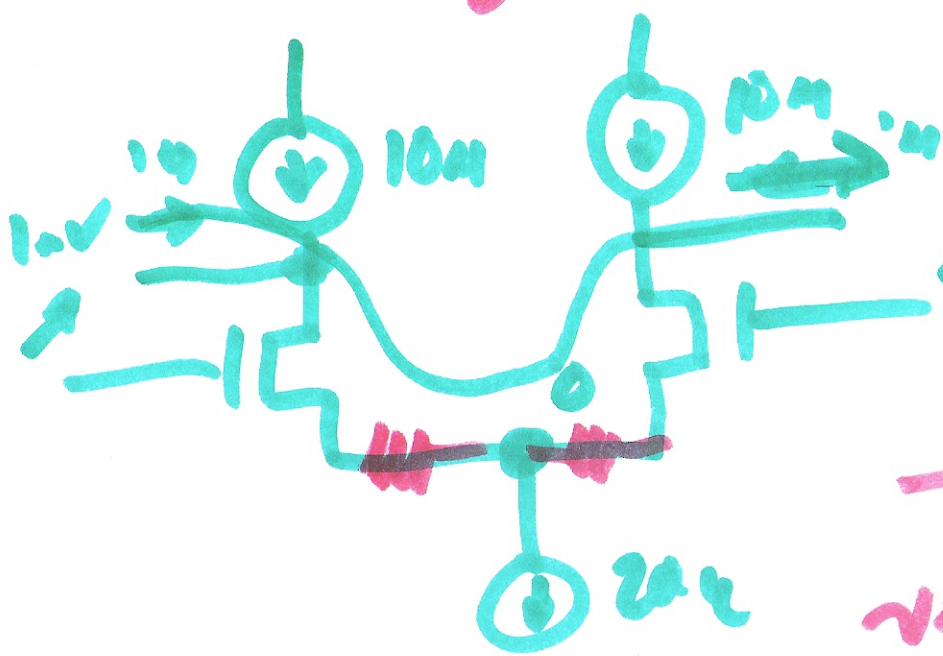
$-i_{OUT+} = g_m \cdot v_{in-}$

$i_{OUT-} = g_m \cdot v_{in+}$

$i_{OUT+} = \frac{g_m}{2}(v_{in+} - v_{in-})$

$g_m = \frac{g_m}{2}$

$i_D = g \, v_{GS}$



v_{GS}

$V_{ov} = 70mV$ $\quad L = 2$

$V_{DS} = 350mV$ $\quad f_t = 6\,GHz\ N$

$g_m = 150mA/V$ $\quad 3\,GHz\ P$

@ $W = 50$ N → 70

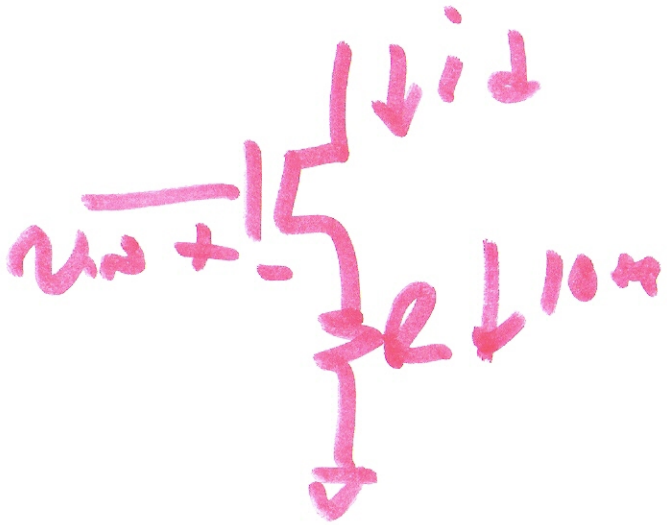
$= 100$ P → 140

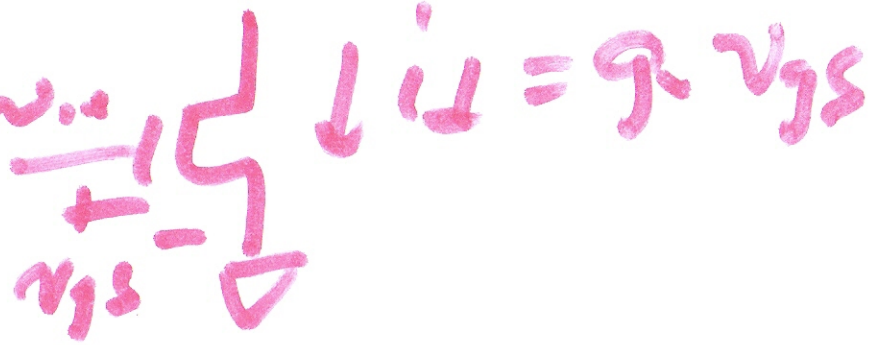
$g_m \propto W \cdot V_{ov}$

$g_m = B(V_{DS} - V_{TH})$

↖ Long channel

2)





$R = 5k$ $\quad v_{gs} = v_{gs} + i_d \cdot R$

$$v_{in} = \frac{i_d}{g} + i_d \cdot R$$

$$i_d = \underbrace{\frac{1}{R}}_{0} \cdot v_{in} = i_d\left(\frac{1}{g} + R\right)$$

3)