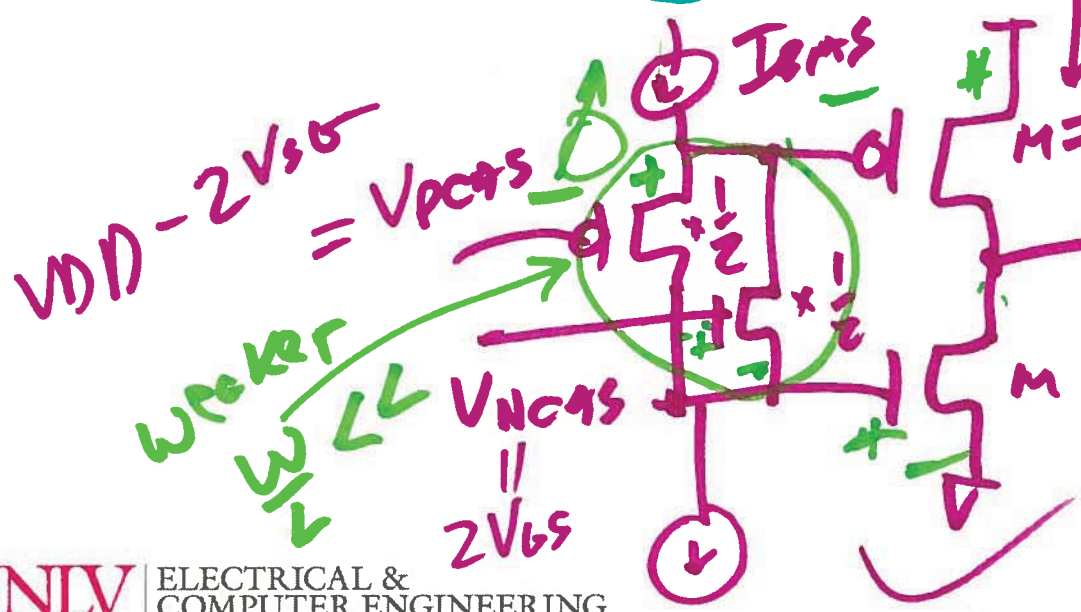
Lecture 28

May 3, 2016

EE 420/ECG 620

Analog IC Design



$g_m = KP \cdot \frac{W}{L}(V_{GS} - V_{TH})$

$g_m = \sqrt{2 I_D \cdot KP \cdot \frac{W}{L}}$

$f_2 \propto g_{m2}$

$V_{SG}/V_{GS} \downarrow$

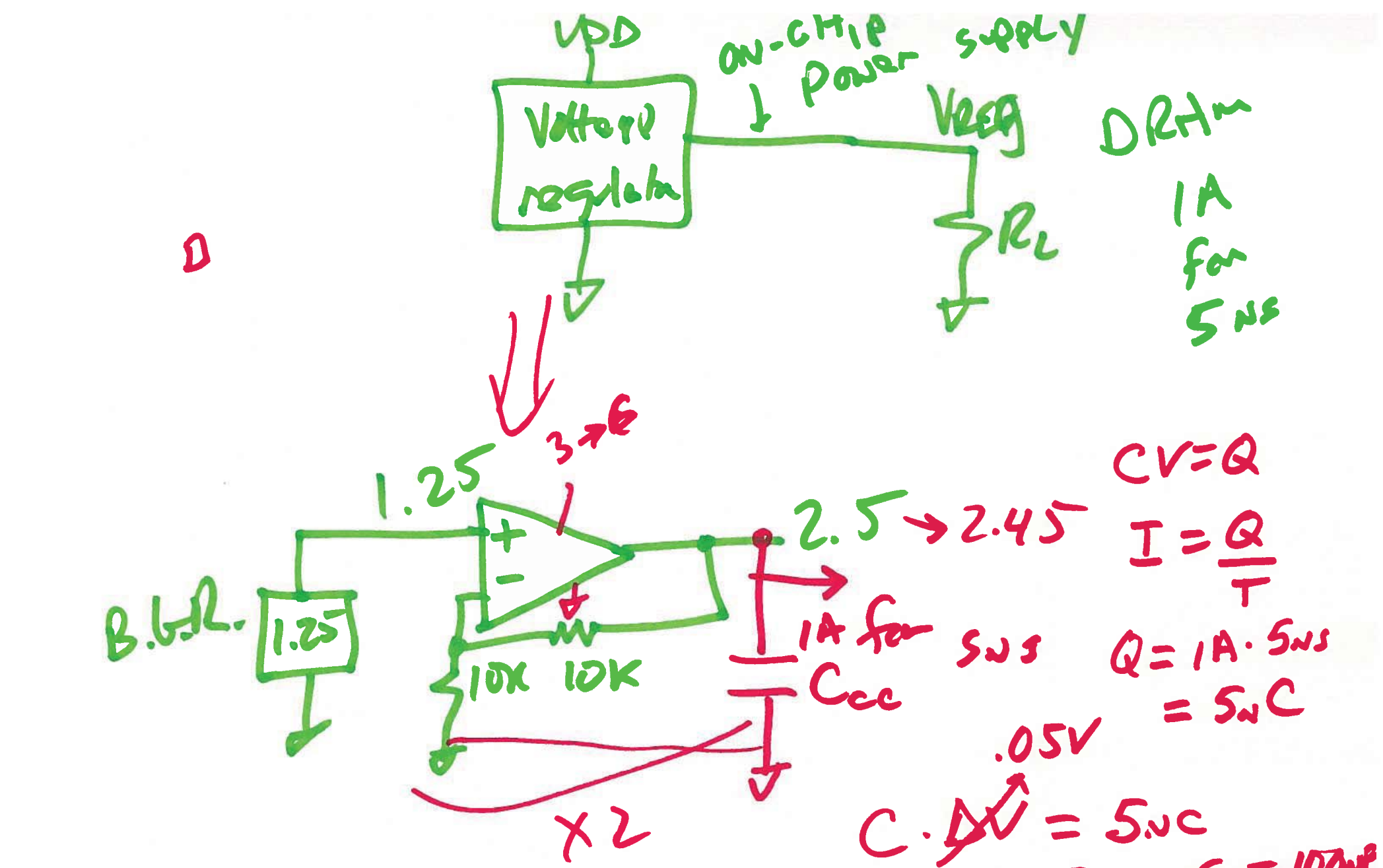
$g_{m2} \downarrow$

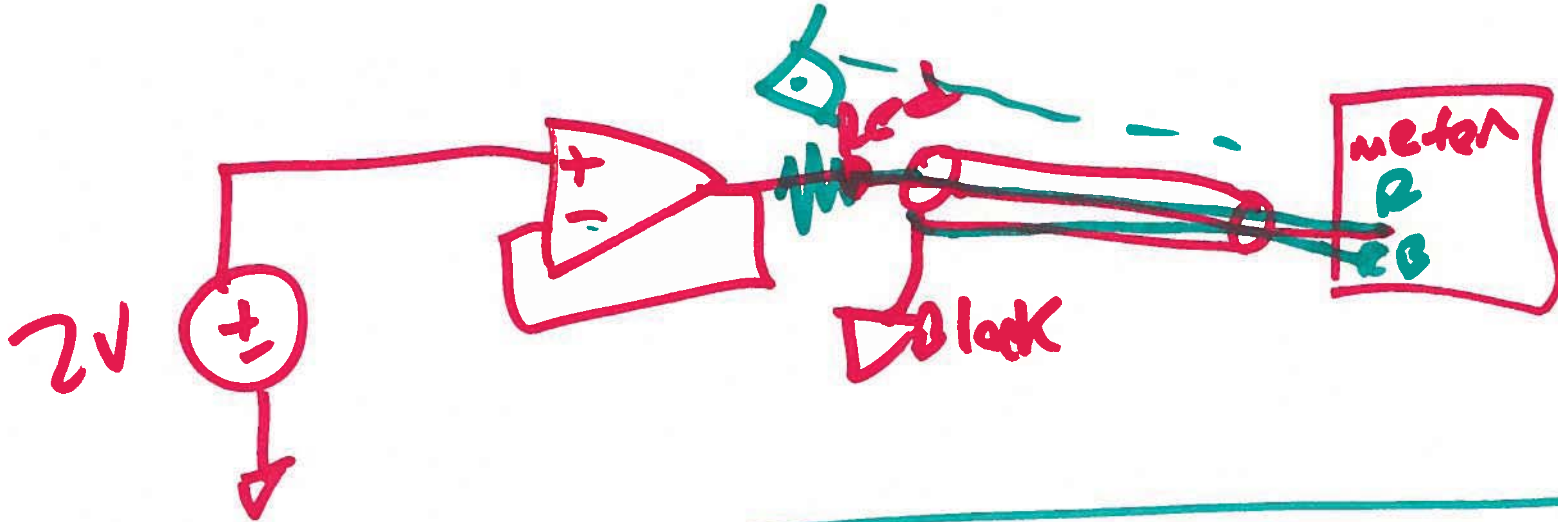
$I_D \downarrow$

$M \uparrow$

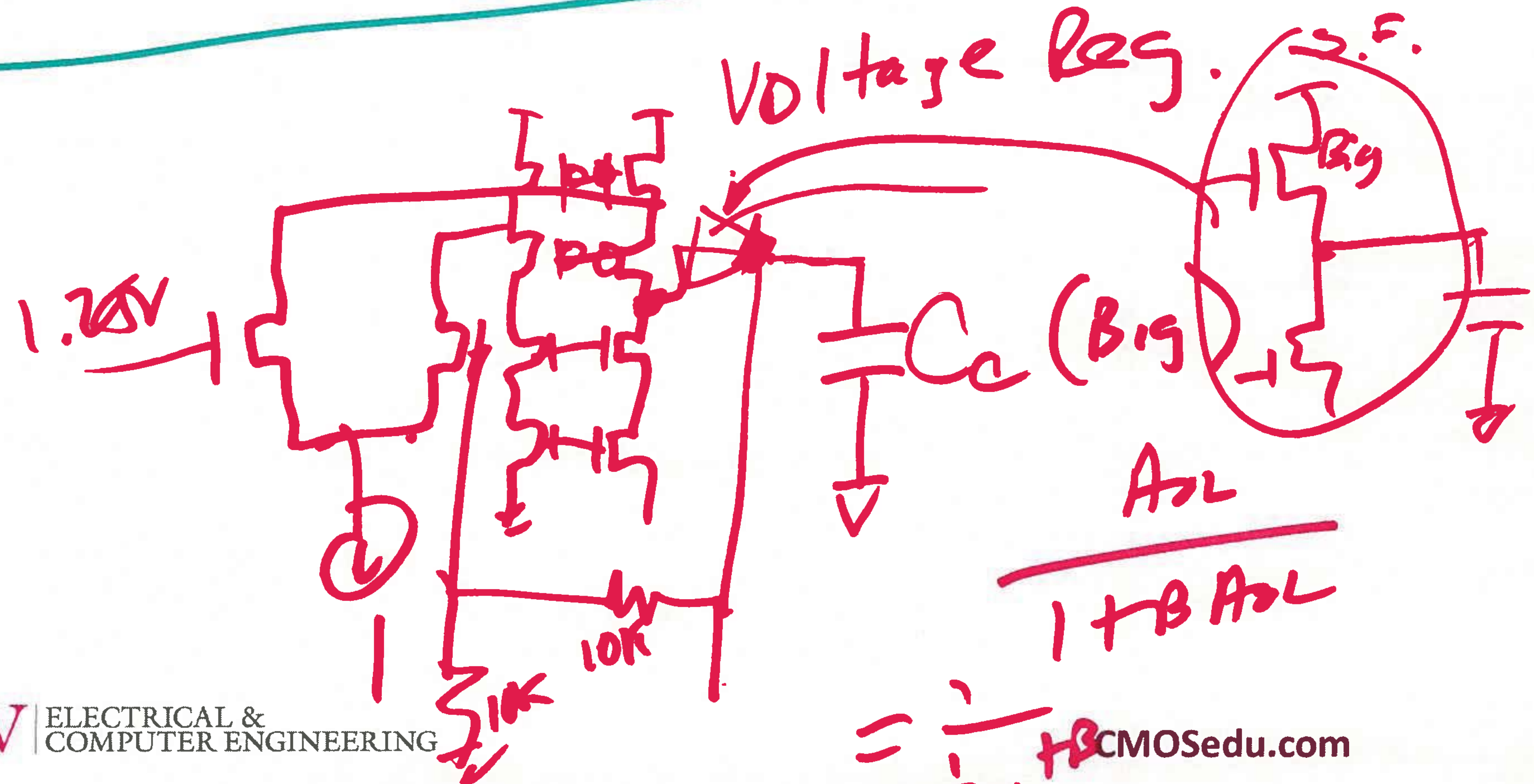
$g_{m2} \uparrow$

$g_{M2} = g_{mP} + g_{mN}$


VDD
ON-CHIP Power supply
Voltage regulator
Vreg
R_L
DRAM
1A for 5NS
D
3→6
1.25
2.5 → 2.45
B.G.R.
1.25
10K
10K
1A for 5NS
C_{cc}
X2
CV=Q
$I = \frac{Q}{T}$
$Q = 1A \cdot 5NS$
$= 5NC$
.05V
$C \cdot \Delta V = 5NC$
$C = \frac{5}{.05} NF = 100NF$



Voltage Reg.



$$\frac{A_{OL}}{1+\beta A_{OL}} = \frac{1}{\frac{1}{A_{OL}}+\beta}$$

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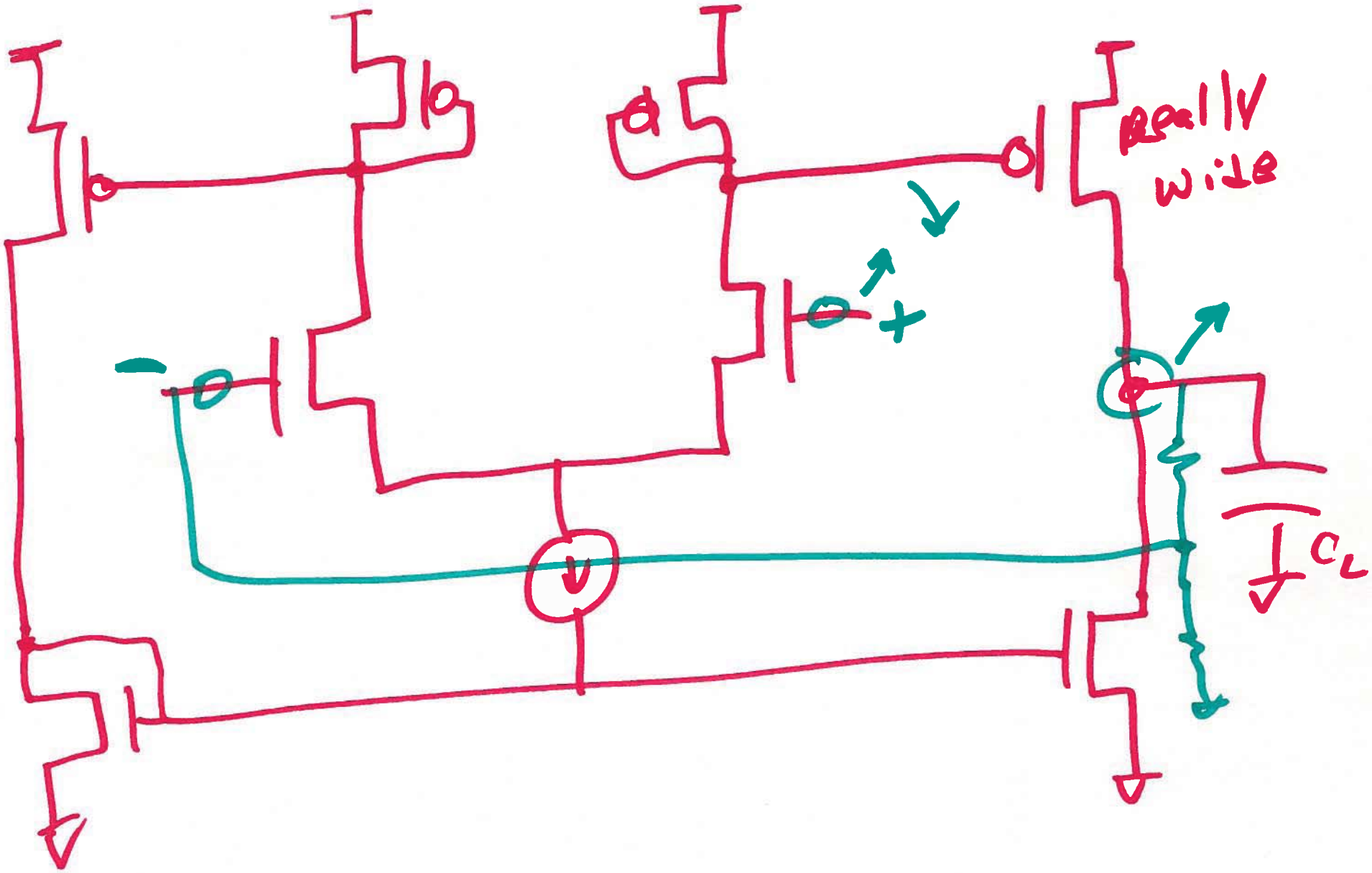
Real W
wide
C_L