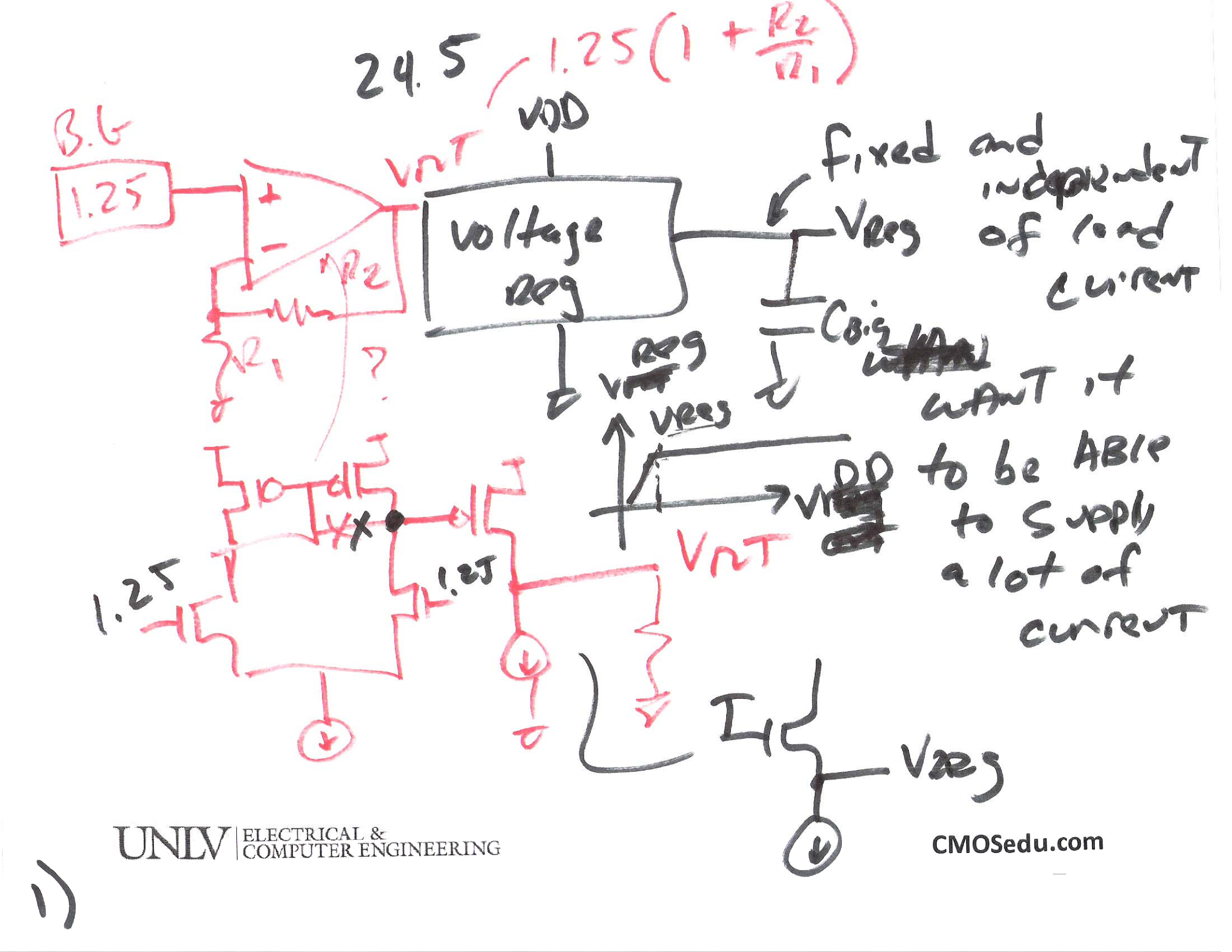

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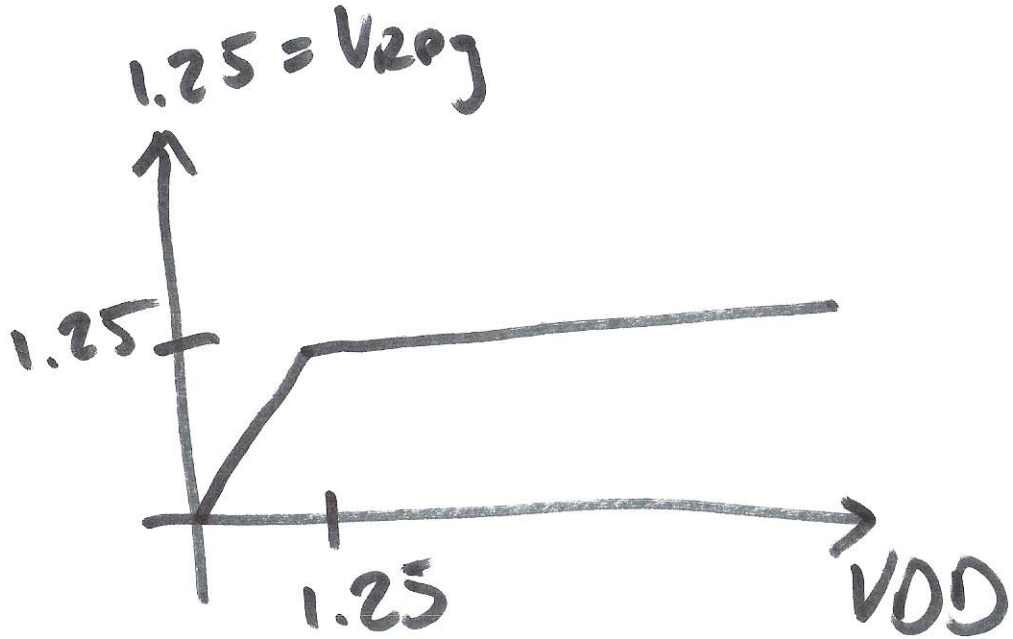
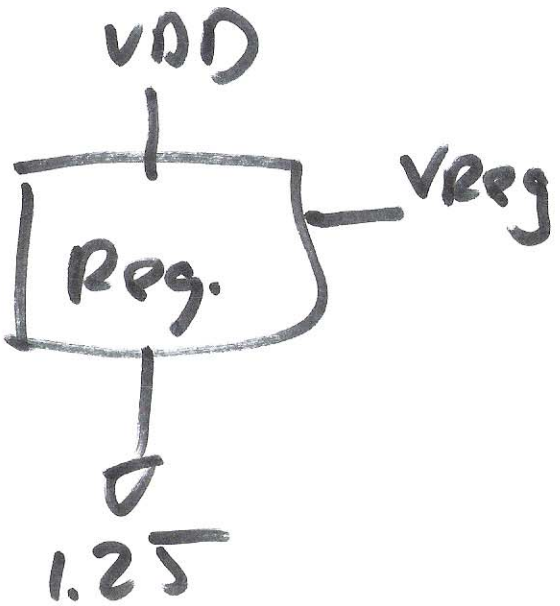
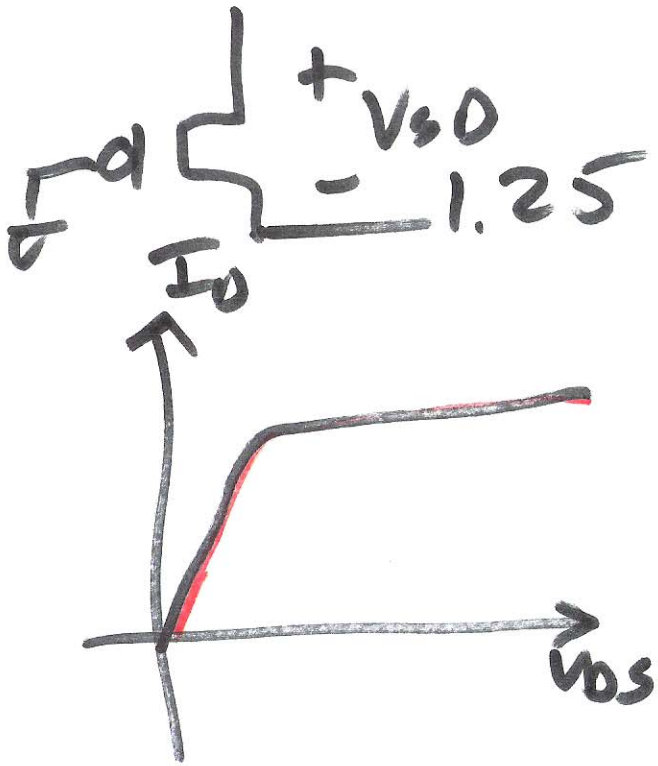
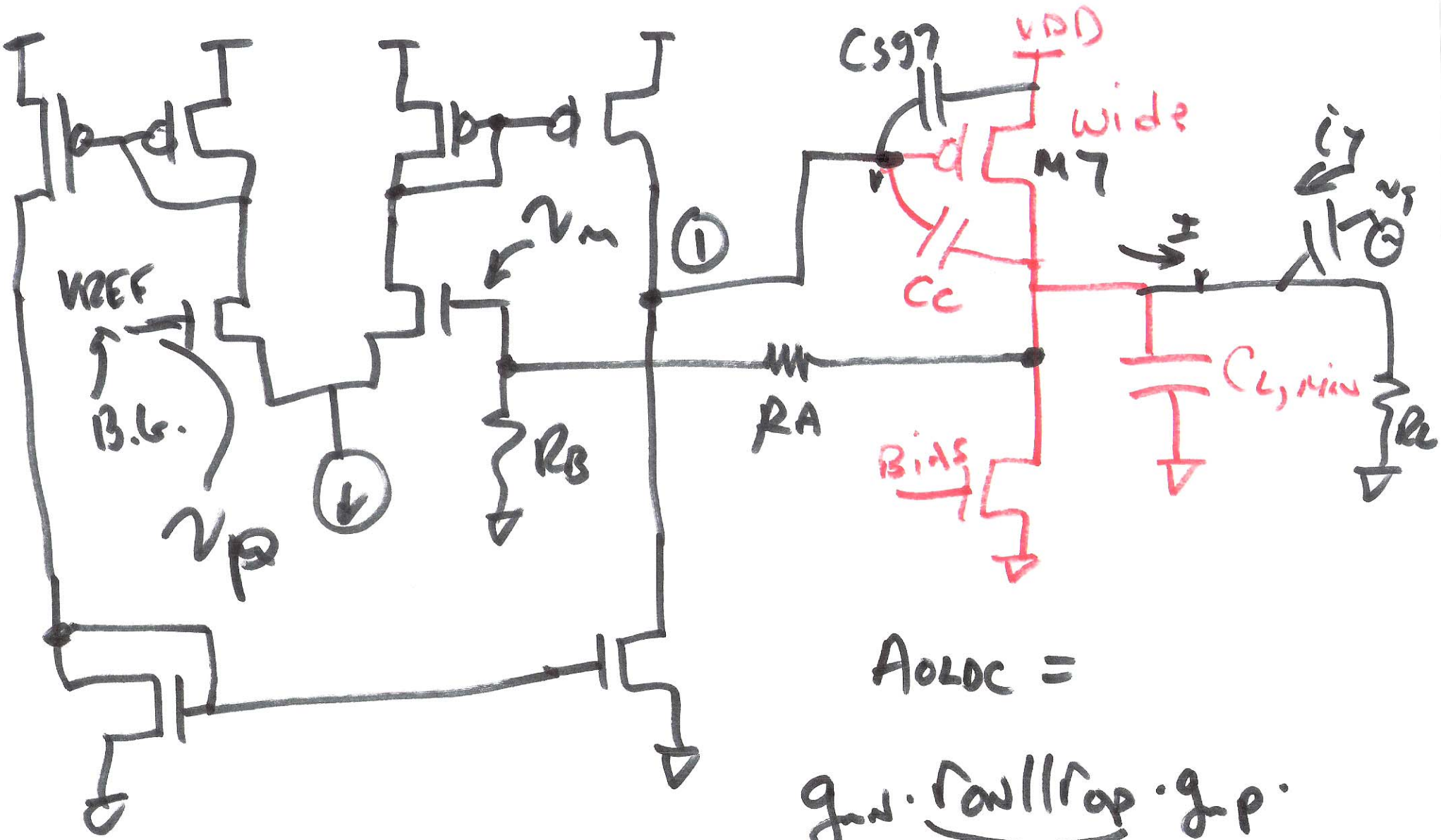
1)


1.25 = VReg
1.25
1.25
VDD


VDD
Reg.
VReg
1.25

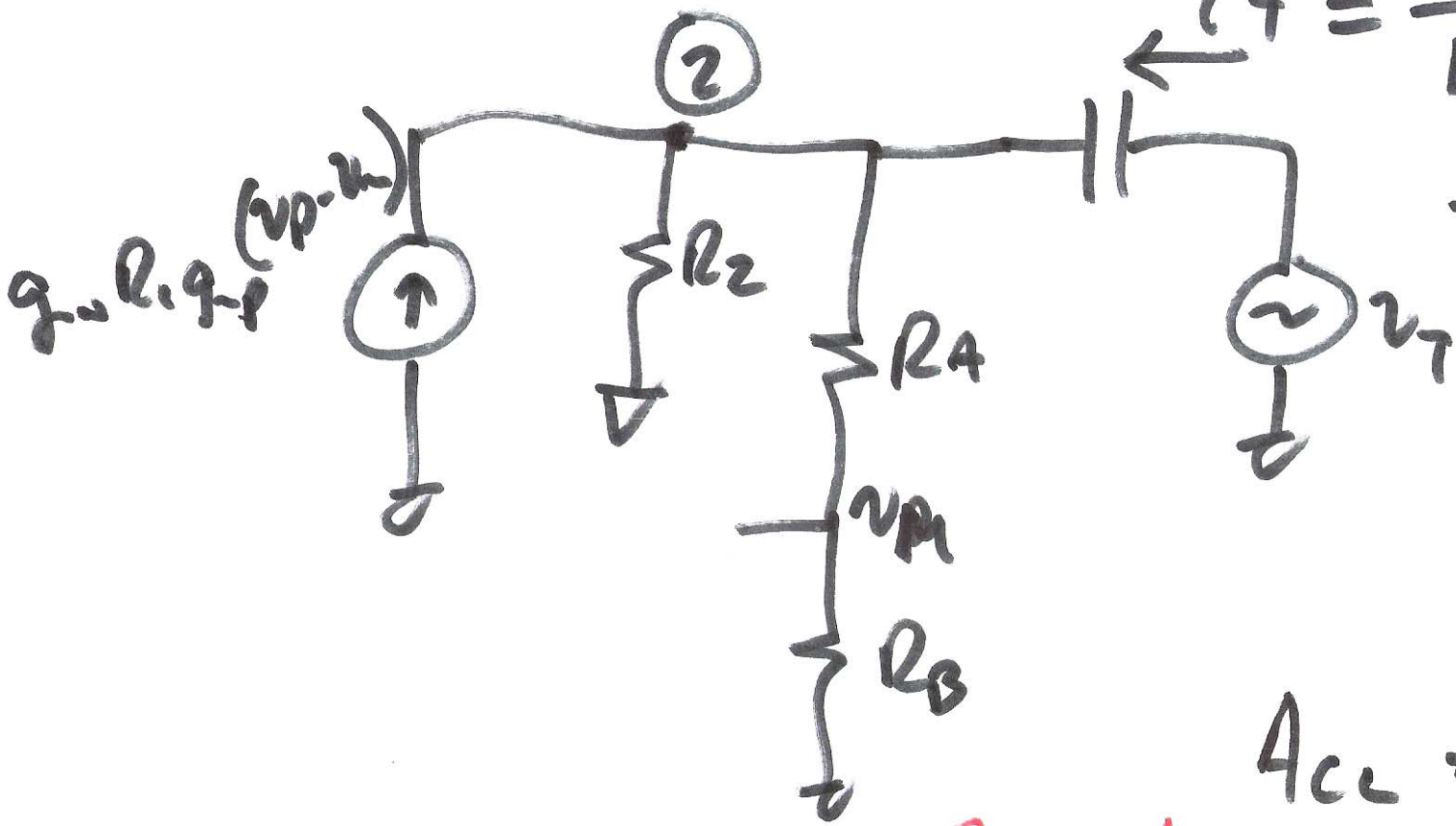

+
VSD
-
1.25
ID
VDS



$$A_{OLDC} =$$

$$g_{m1} \cdot \frac{r_{ds1} \| r_{ds4}}{R} \cdot g_{mP} \cdot \frac{r_{ds7} \| r_{ds6} \| R_L}{R_2}$$

$$A_{OLDC} = g_{m1} \cdot R_1 \cdot g_{mP} \cdot R_2$$



$$\frac{v_1 \cdot R_B}{R_A + R_B}$$

$$A_{CL} = \frac{R_A + R_B}{R_B}$$

$$R_{CL} = \frac{v_T}{i_T} = \frac{R_2 \cdot A_{CL}}{\frac{R_2}{R_2} + g_{m1}R_1g_{mp} \cdot R_2}$$

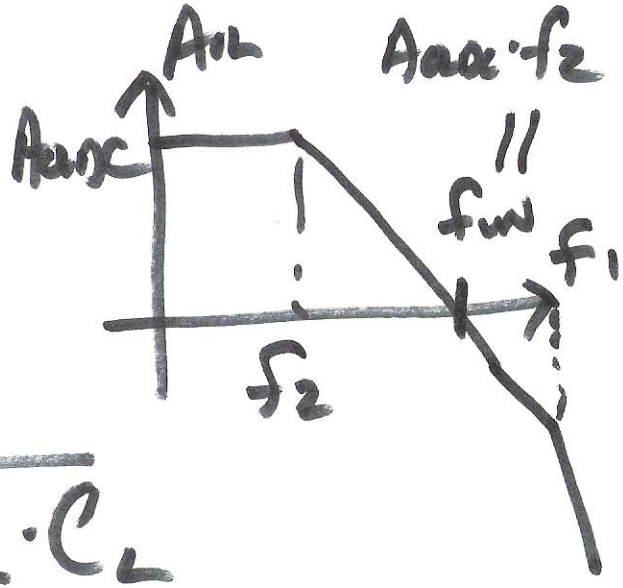
$$\frac{A_{CL}}{A_{CL}}$$

$$\approx \frac{R_2 \cdot A_{CL}}{g_{m1}R_1g_{mp}R_2} = \frac{R_2 \cdot A_{CL}}{A_{OL}OC}$$

$\beta < 1$, $A_{CL} > 1$

$A_{CL,ideal} = \frac{1}{\beta}$

$$f_2 = \frac{1}{2\pi R_{CL} \cdot C_L}$$



$$= \frac{A_{OLDC}}{2\pi R_2 \cdot A_{CL} \cdot C_L}$$

$$f_1 = \frac{1}{2\pi R_1 \cdot C_{SGT}} = 1.7\,MHz$$

key points

use small A_{OLDC}

Large C_L

problem with A_{OLDC} is control

$$f_2 = \frac{A_{OLDC}}{2\pi R_2 C_L \cdot A_{CL}}$$

$$= \frac{277}{2\pi(111k) \cdot C_L}$$

$f_{UW} = 1\,MHz$

$$f_W = A_{CLOC} \cdot f_2 = \frac{A_{CLOC}^2}{2\pi R_2 C_{L,min} A_{CL}}$$

$$= 1MHz \qquad A_{OLDC} = g_{mN} R_1 \cdot g_{mP} R_2$$

$$C_{L,MIN} = \frac{g_{mN}^2 R_1^2 g_{mP}^2 R_2}{2\pi f_W \cdot A_{CL}}$$

$$C_{L,MIN} = 1{,}000pF$$

$$R_2 \simeq R_{L,max} = 1k$$