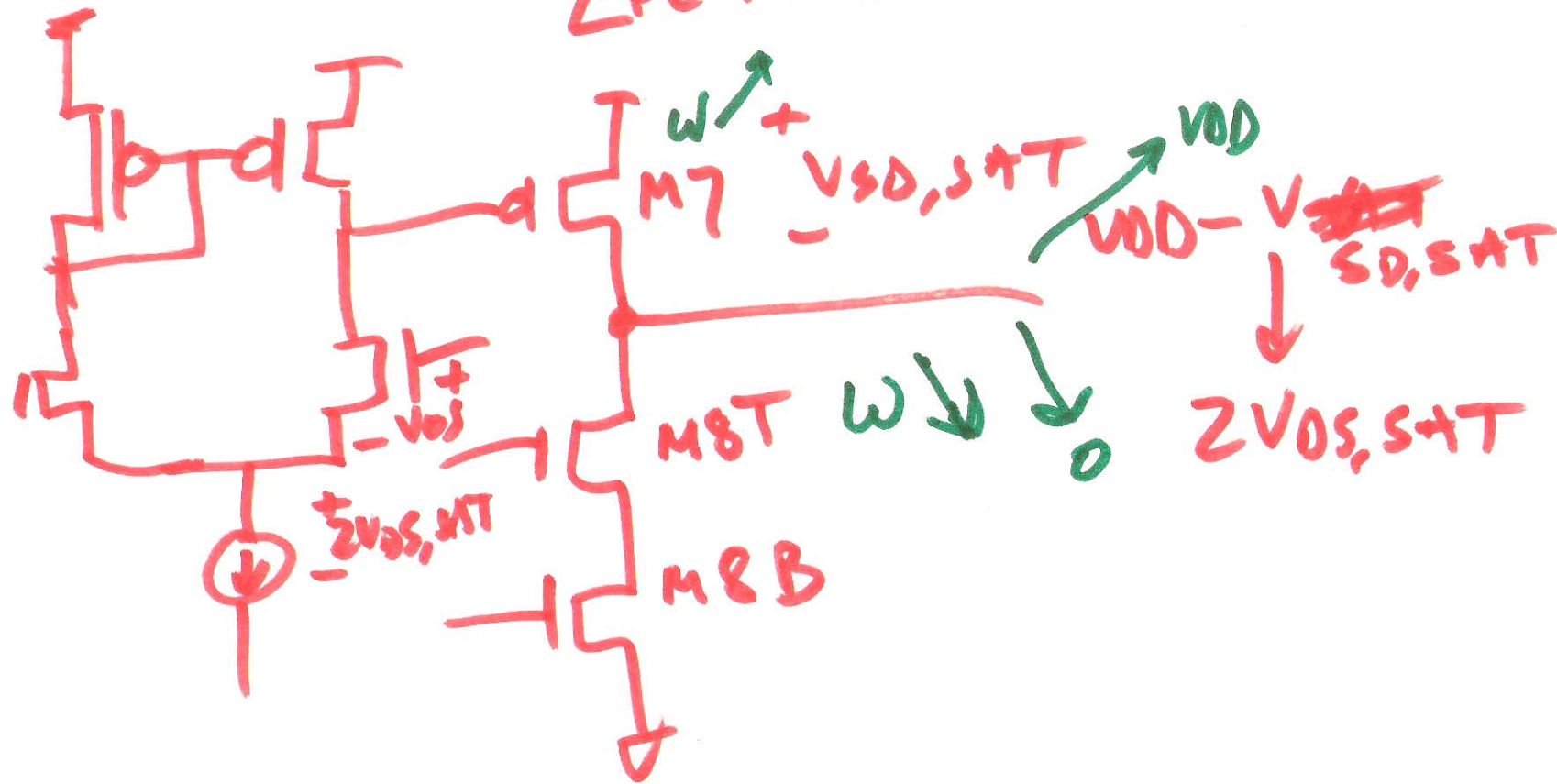


EE 422
Analog

EEG 622
IC Design

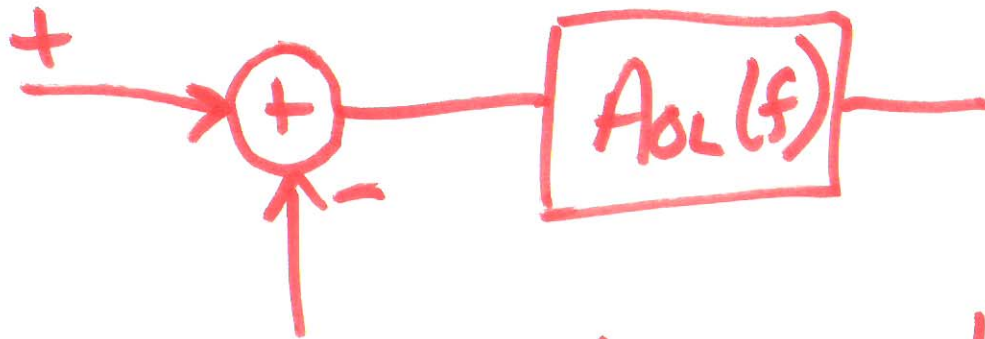
4/22/13

Lecture 22



1)

$$A_{CL}(f) = \frac{A_{OL}(f)}{1 + \beta A_{OL}(f)} \rightarrow -1 \text{ UNSTABLE}$$

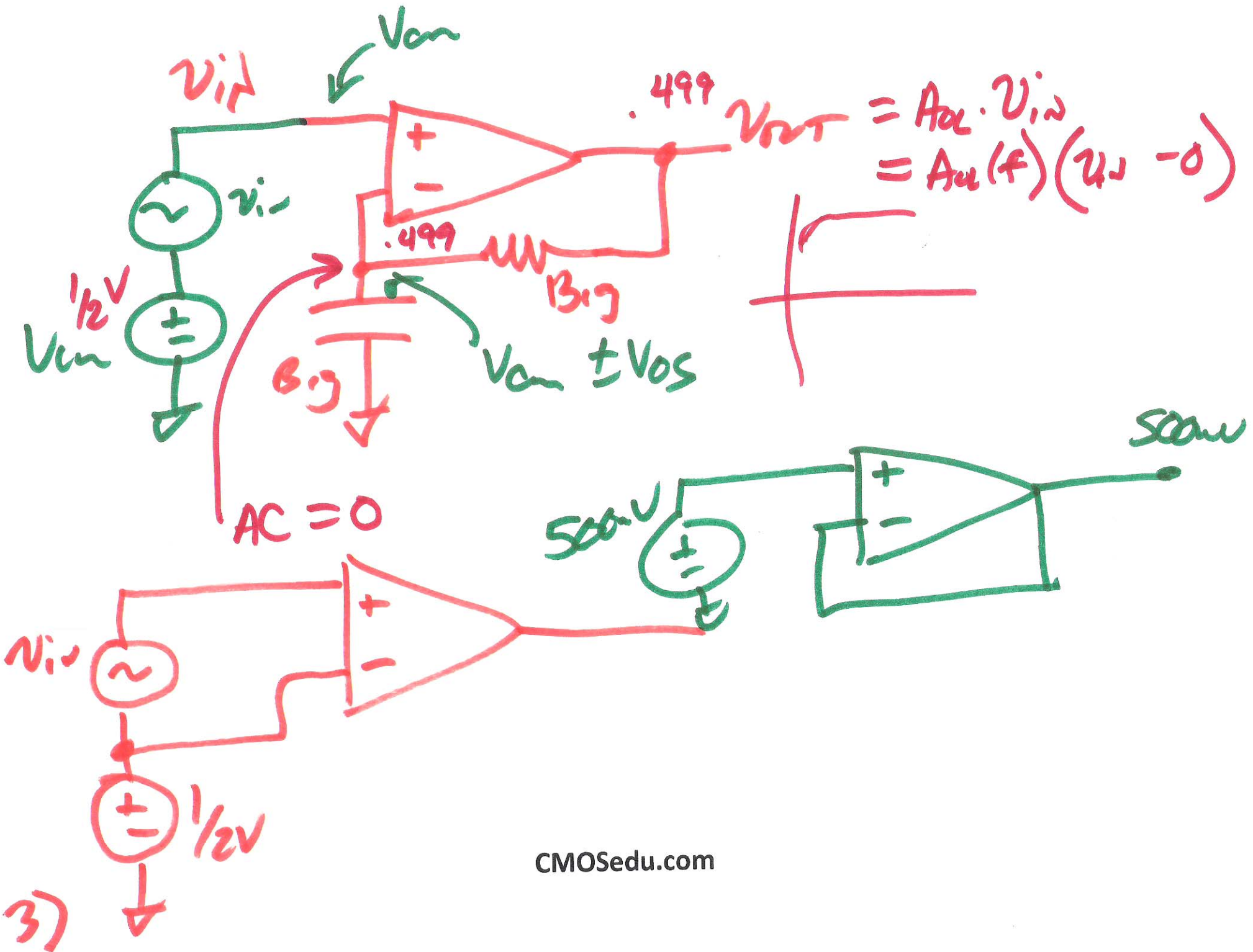


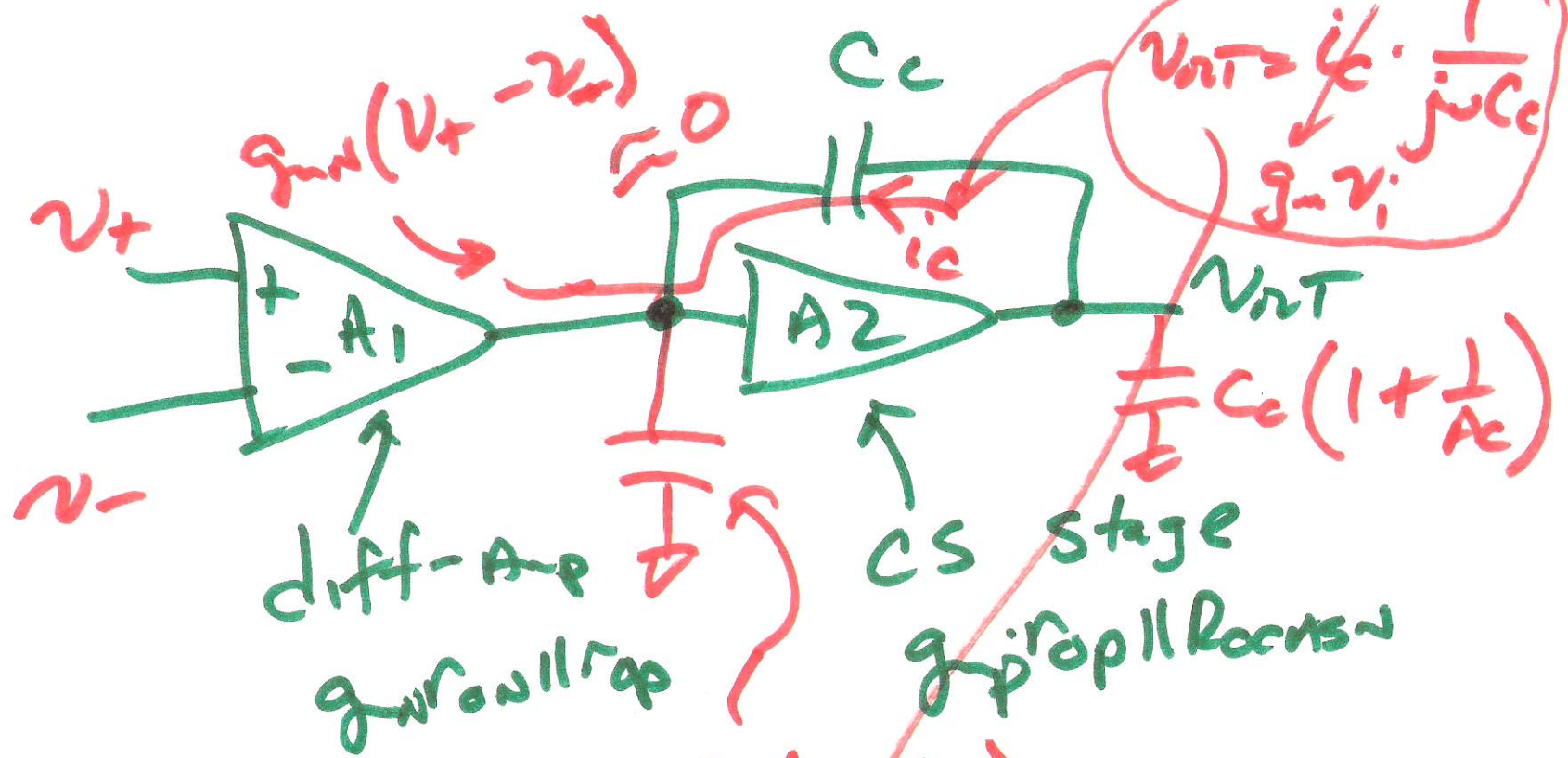
feedback factor

$$\beta \cdot v_{out} = v_{in}$$

$$|\beta A_{OL}| = 1 \quad \angle \beta A_{OL} = 180^\circ$$

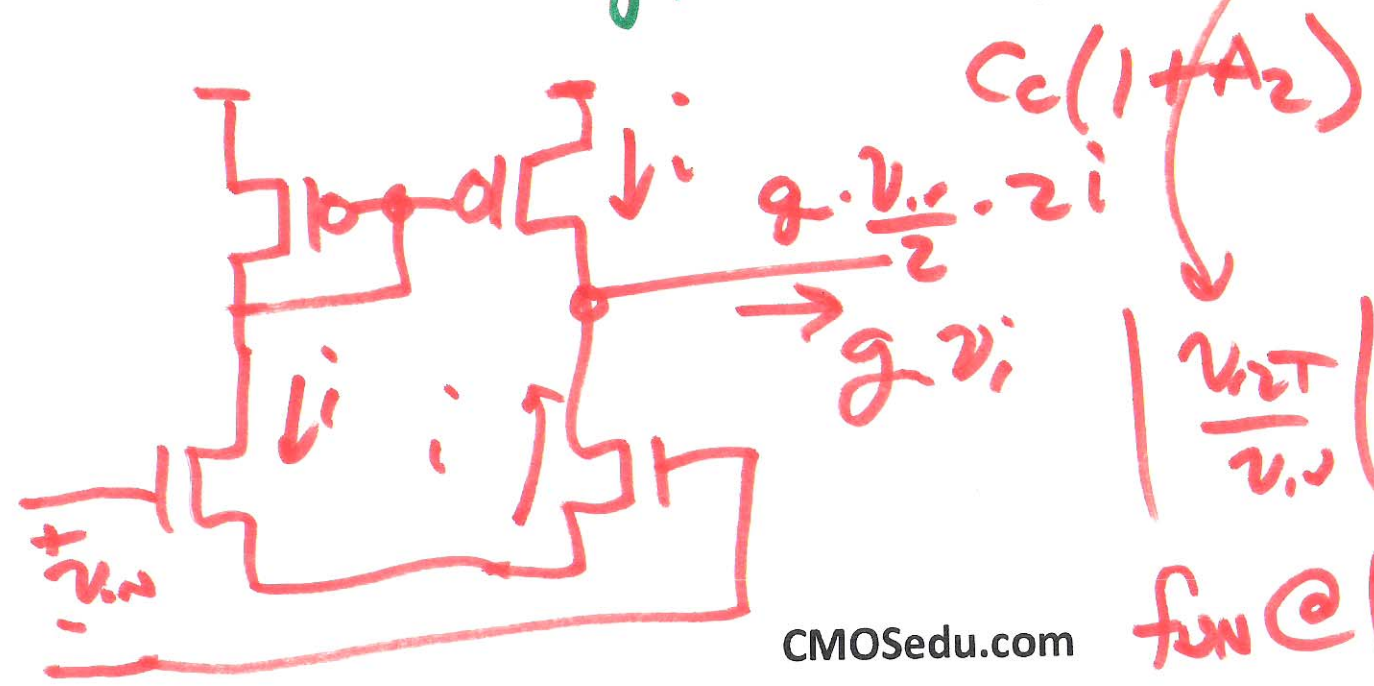
$$|A_{OL}| = 1 \quad \angle A_{OL} = 150^\circ$$





$v_{out} = i_c \cdot \frac{1}{j\omega C_c}$
 $g_m v_i$

$\frac{1}{j\omega} C_c (1 + \frac{1}{A_c})$



$\left| \frac{v_{out}}{v_{in}} \right| = \frac{g_m}{2\pi f C_c}$

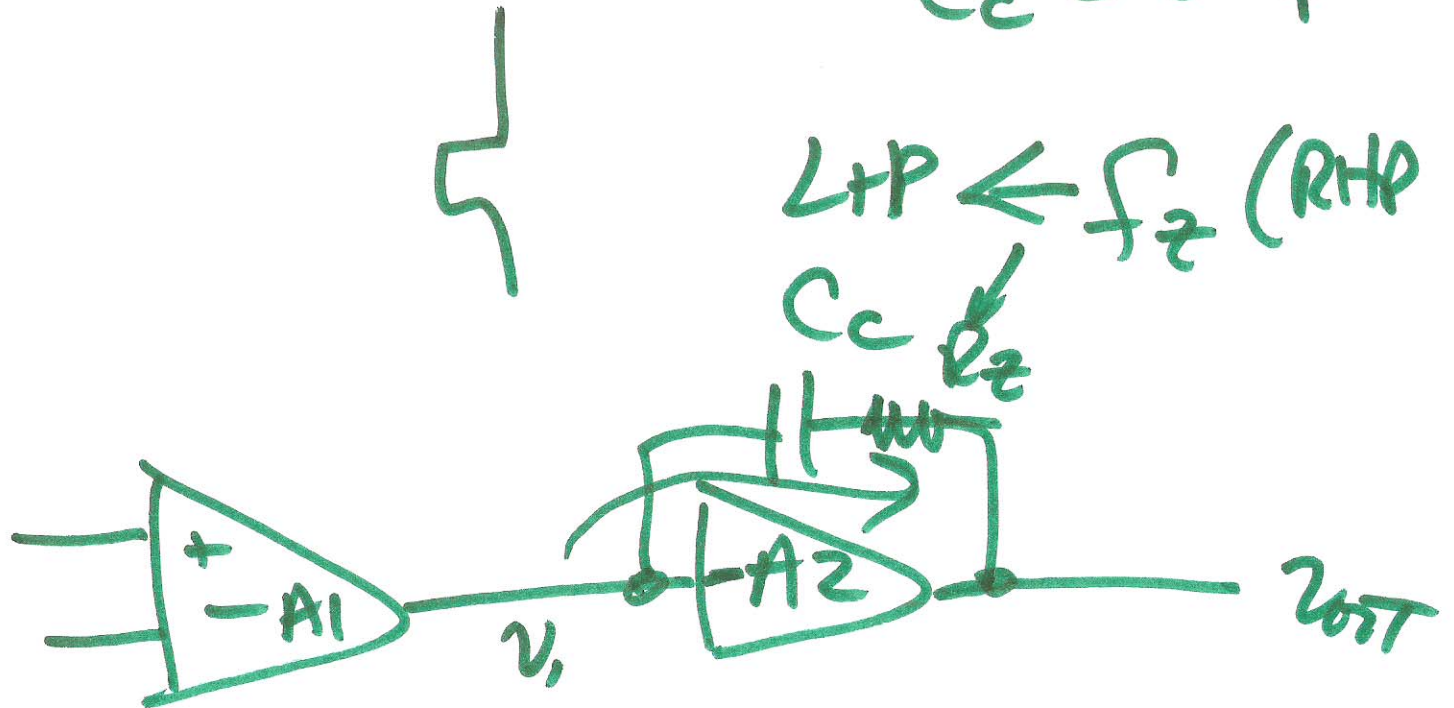
$fun @ \left(\frac{v_{out}}{v_{in}} \right) = 1$

4)

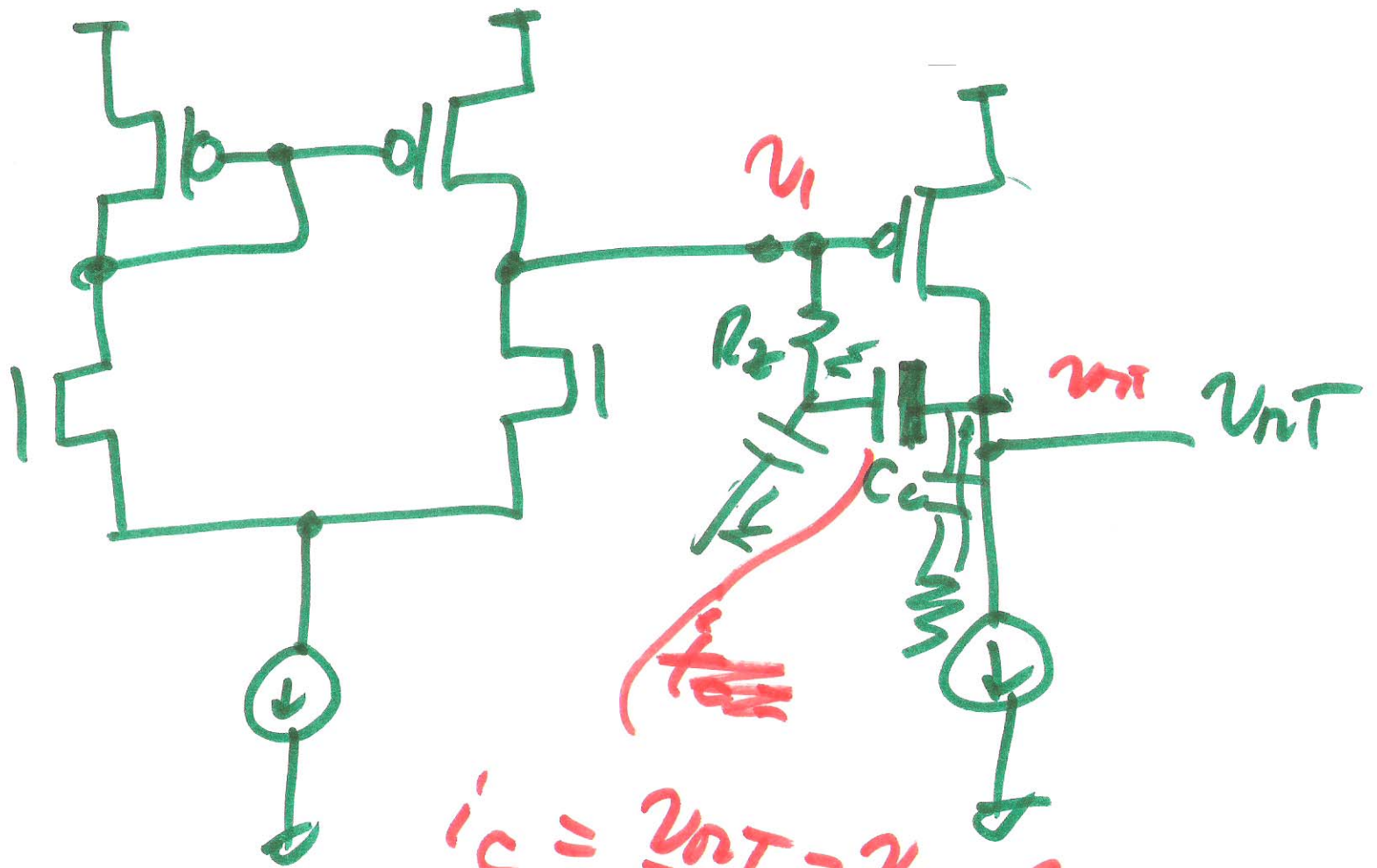
$$f_{UN} = \frac{g_m}{2\pi f \cdot C_c} \quad 150 \mu A/V$$

$$f_w = 10 \text{ kHz} = \frac{g_m}{2\pi \cdot C_c}$$

$$C_c = 2.4 \text{ pF}$$

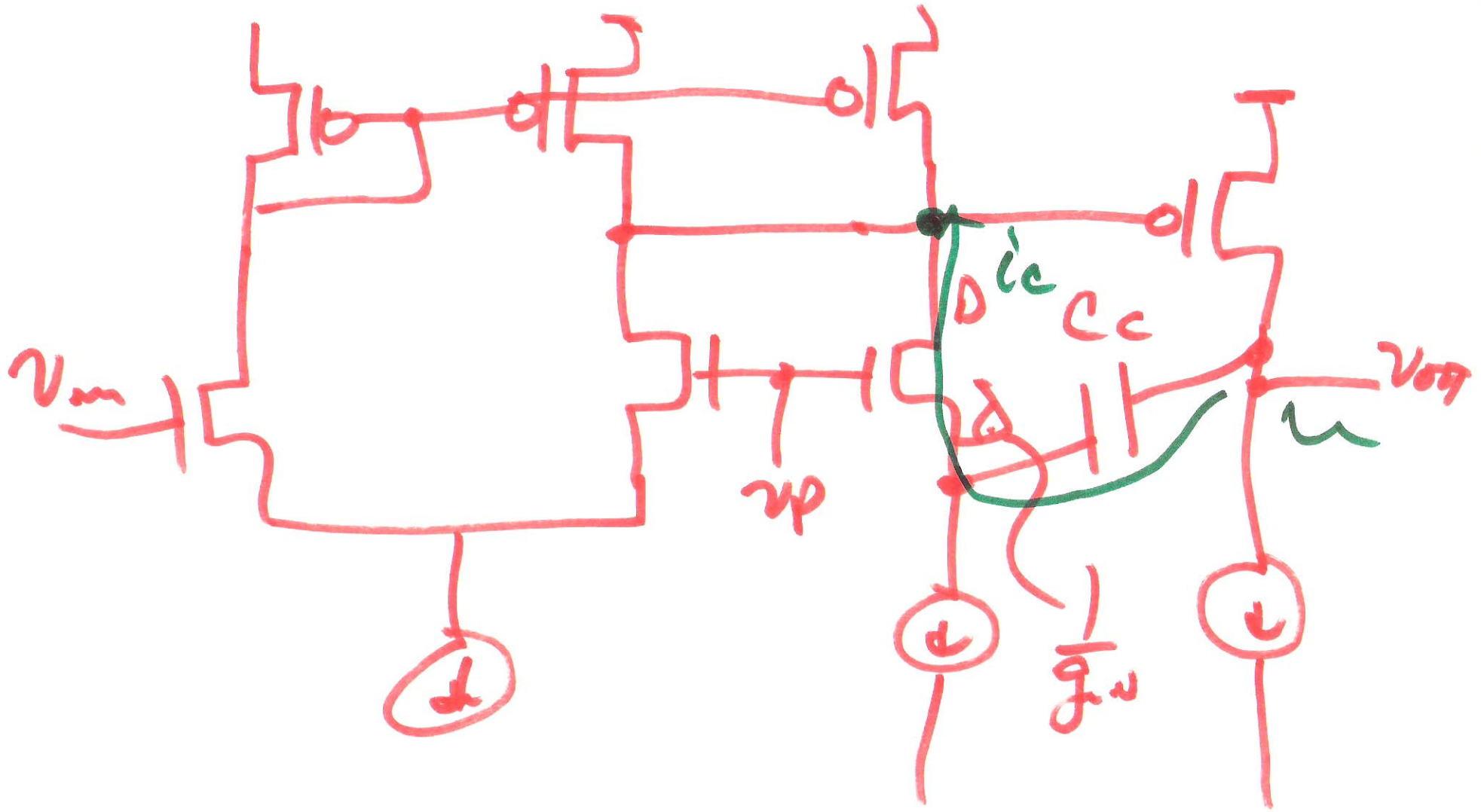


5)

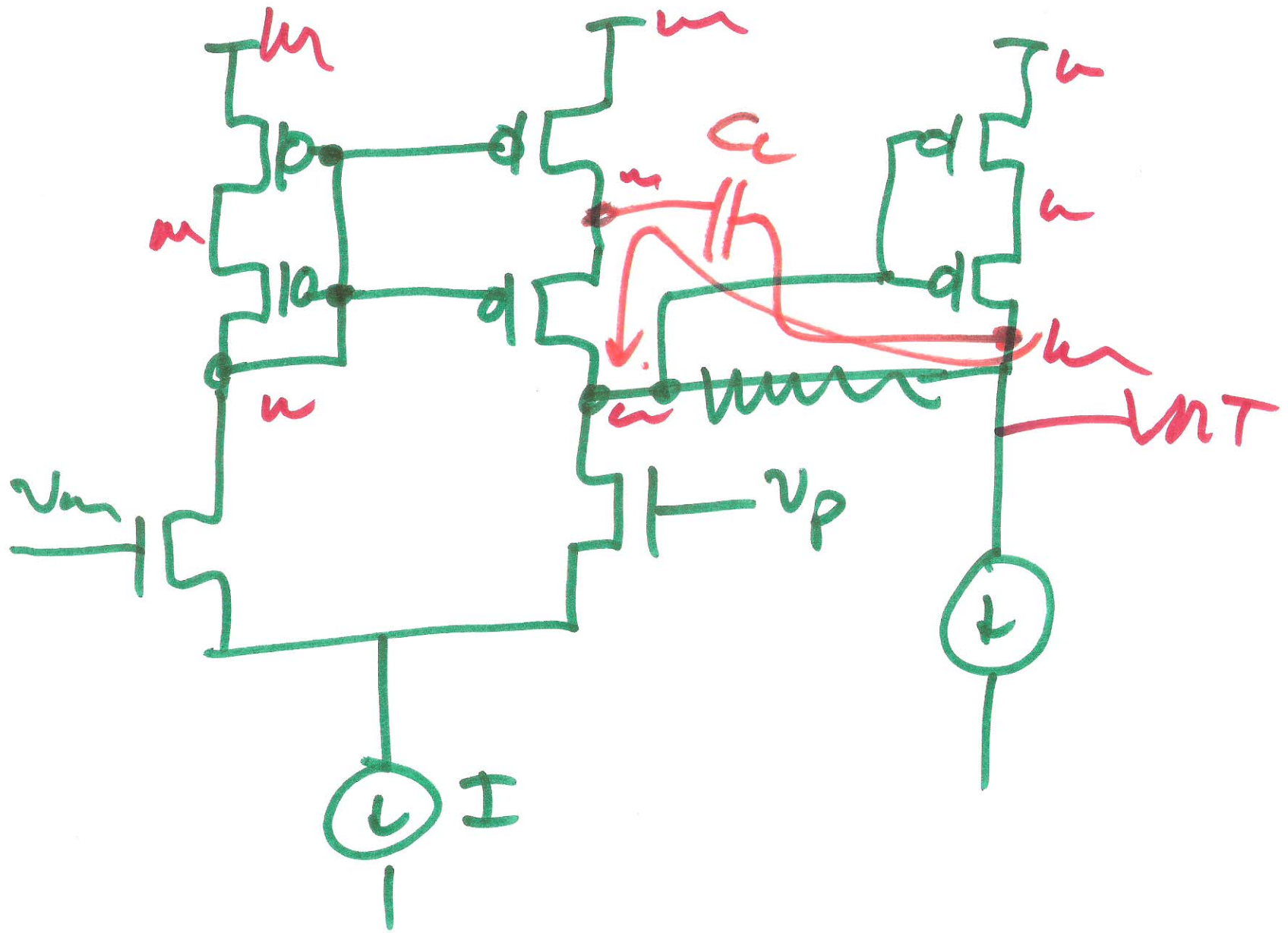


$$i_c = \frac{v_{out} - v_i}{1/j\omega C_L} \quad v_{out} \gg v_i$$

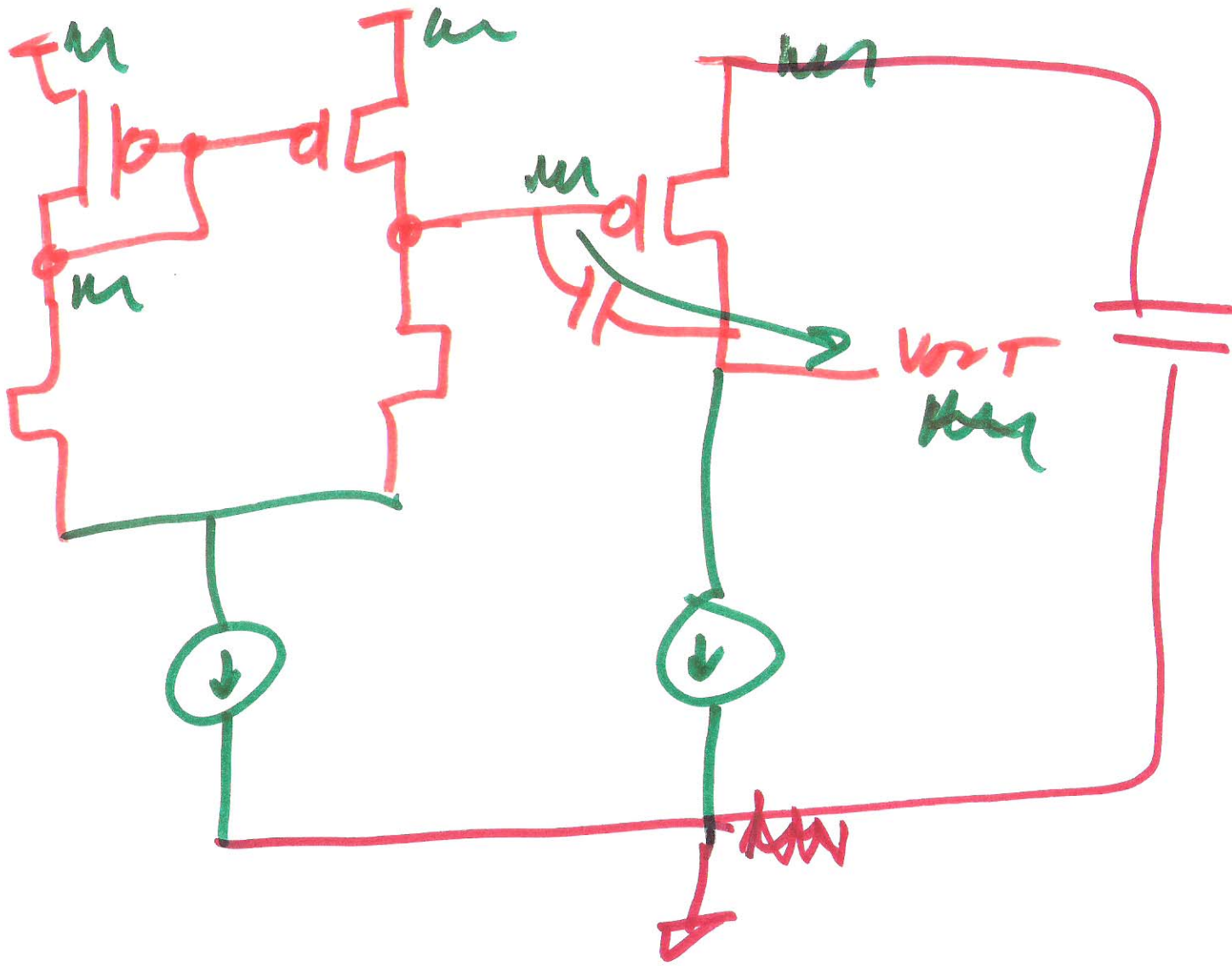
$$= j\omega C_L \cdot v_{out}$$



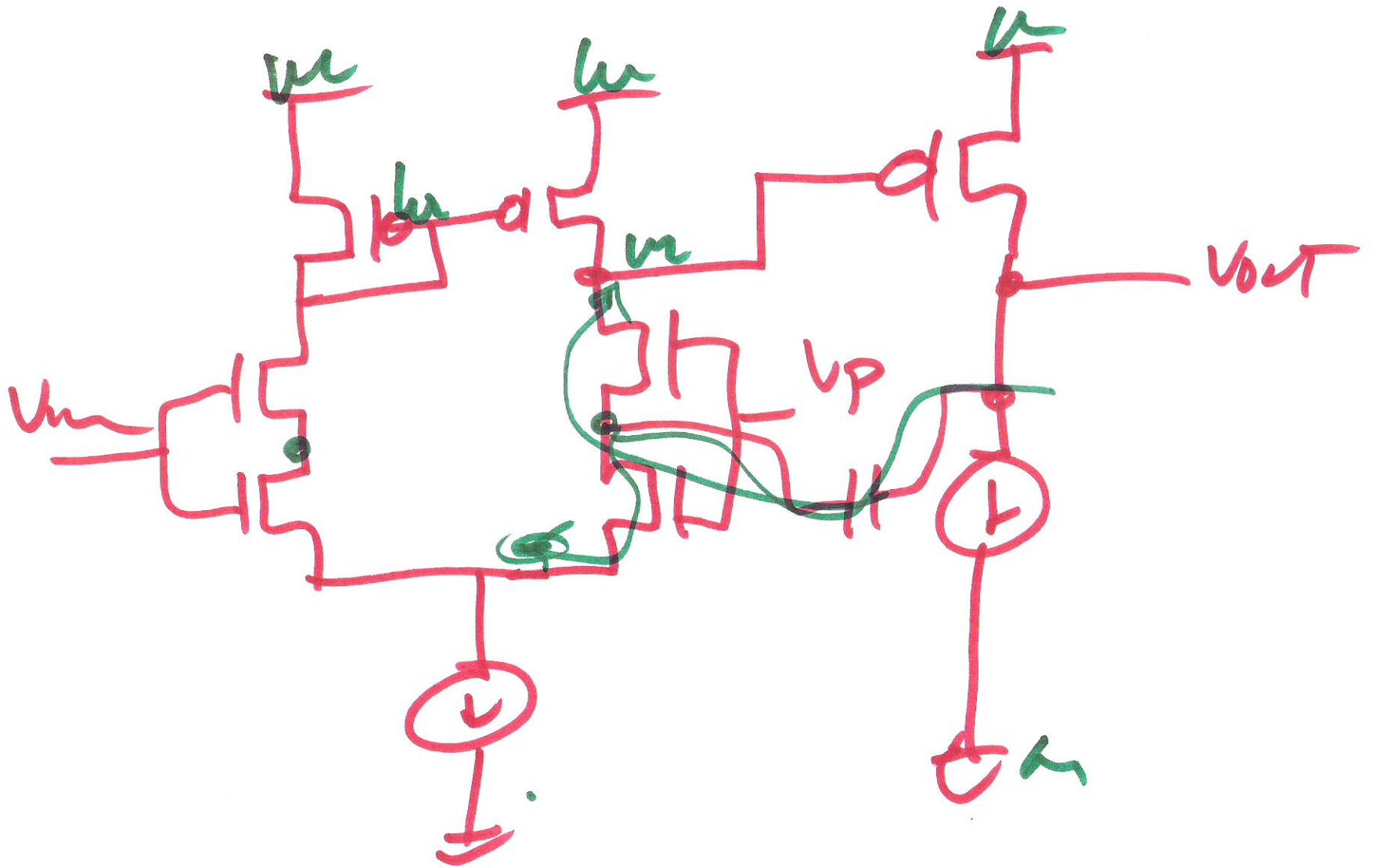
7)

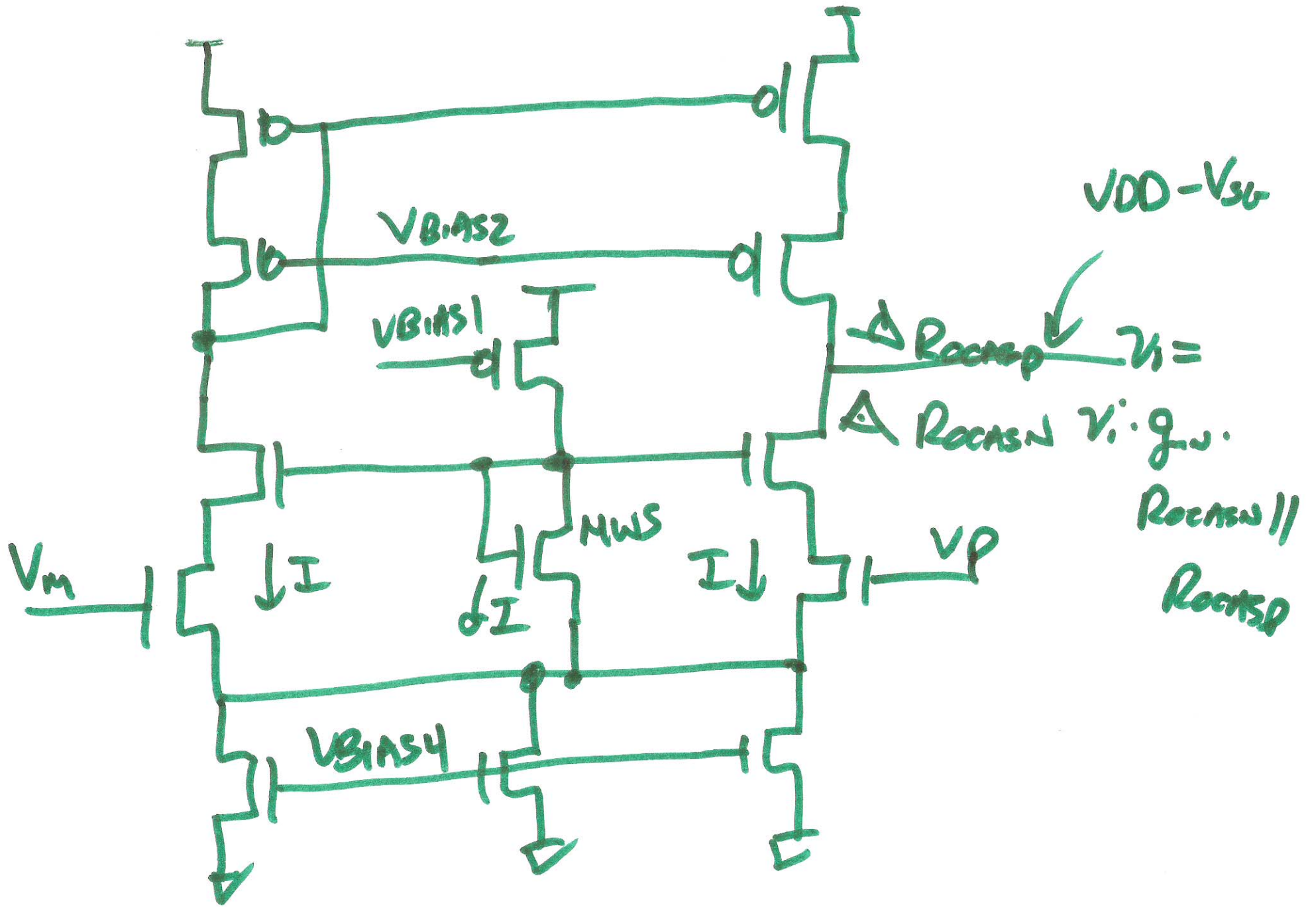


8)



9)





11)