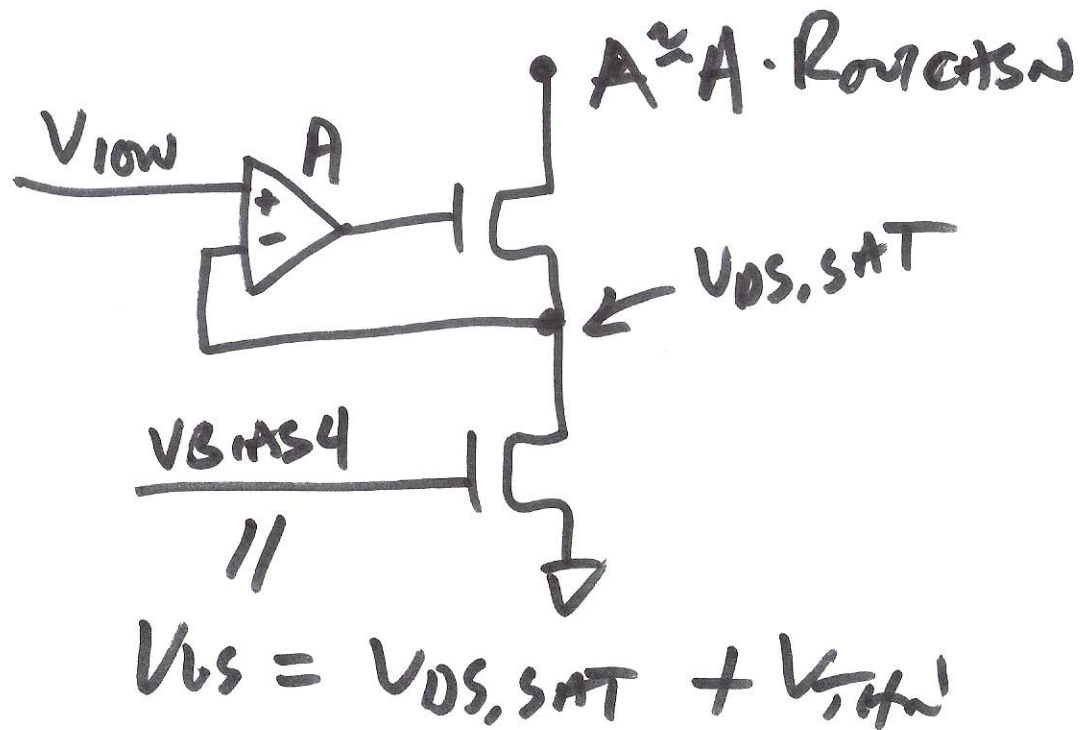
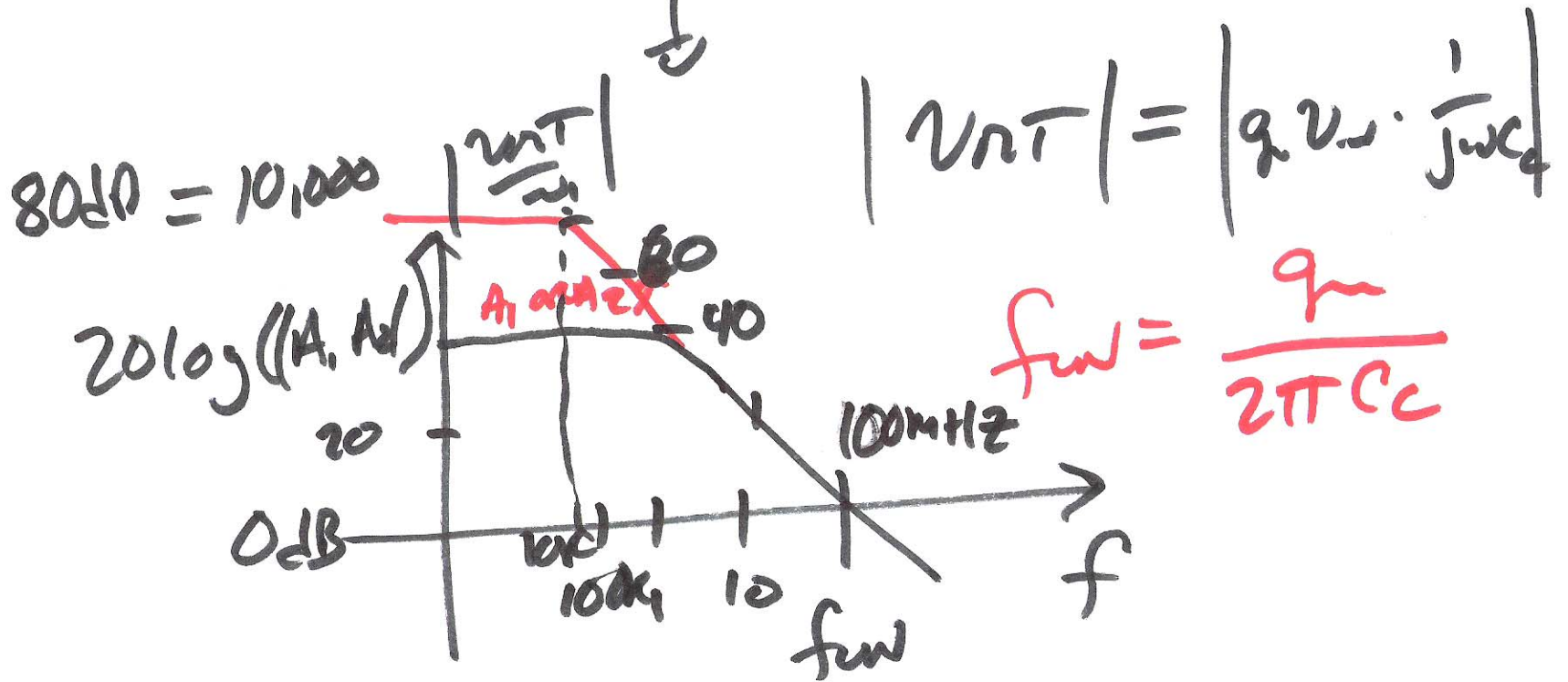
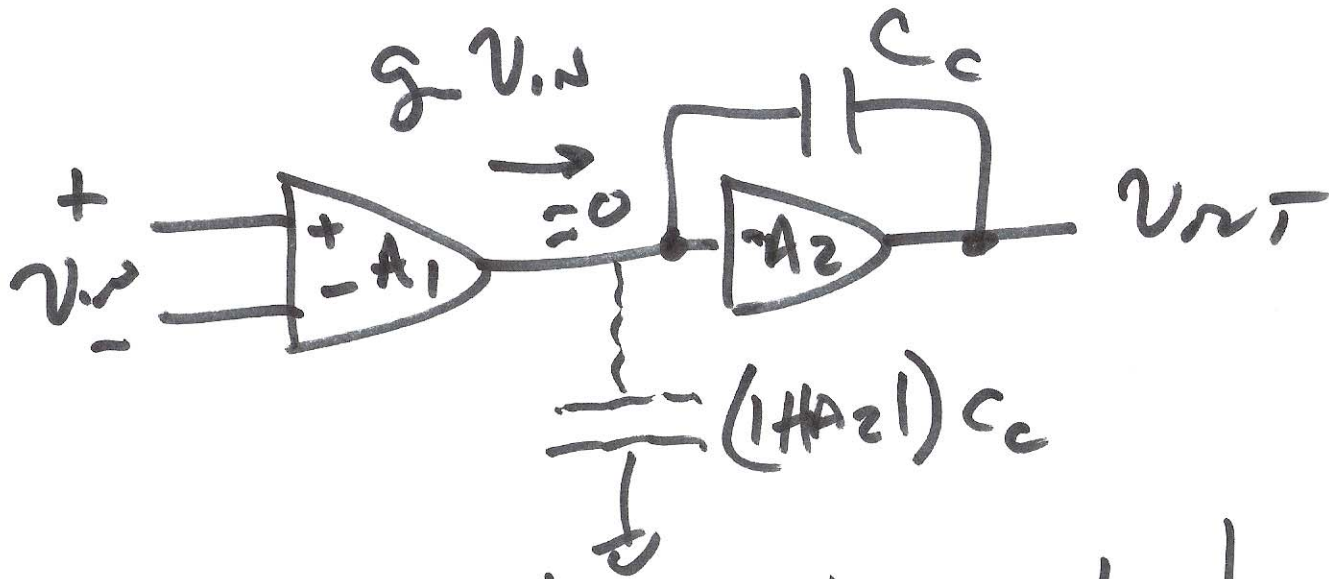


SEC. 24.4 GAIN ENHANCEMENT



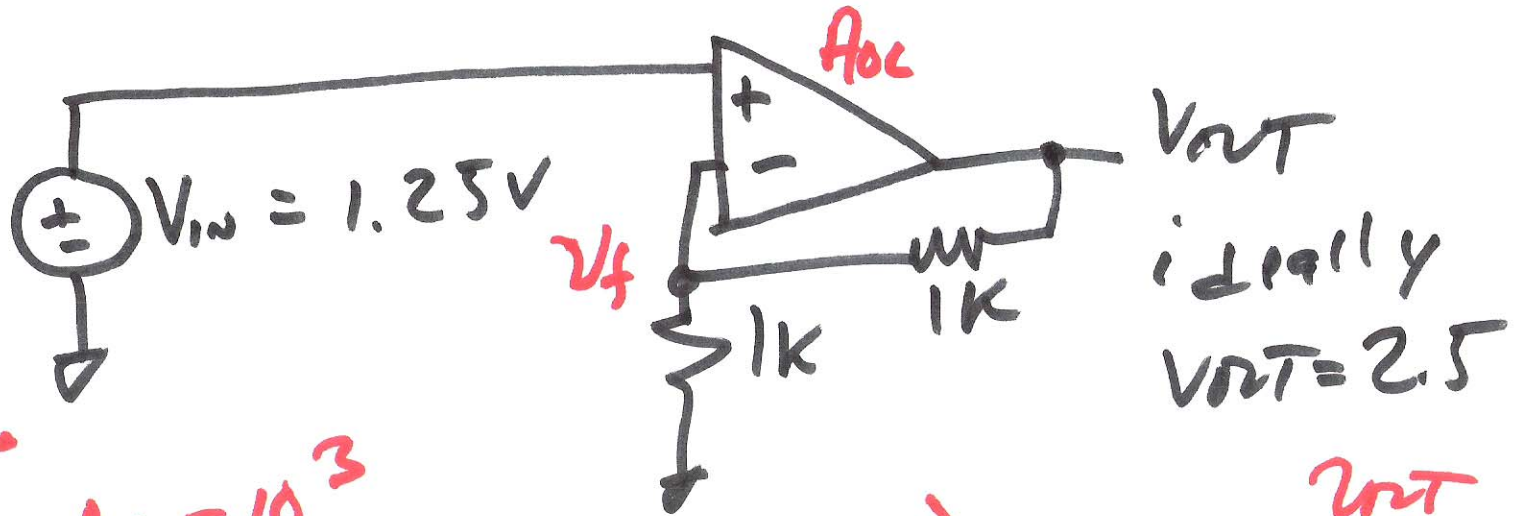
1)



$f_{\text{cut}} \downarrow$
 $|v_{\text{out}}| = 1$

2)

Why is A_{OL} important?



$V_{OUT} = 1.25$

$A_{OL} = 10^3$

$V_{OUT} = A_{OL}(V_{IN} - V_f), V_f = \frac{V_{OUT}}{2}$

$V_{OUT} = \frac{1.25}{.501}$

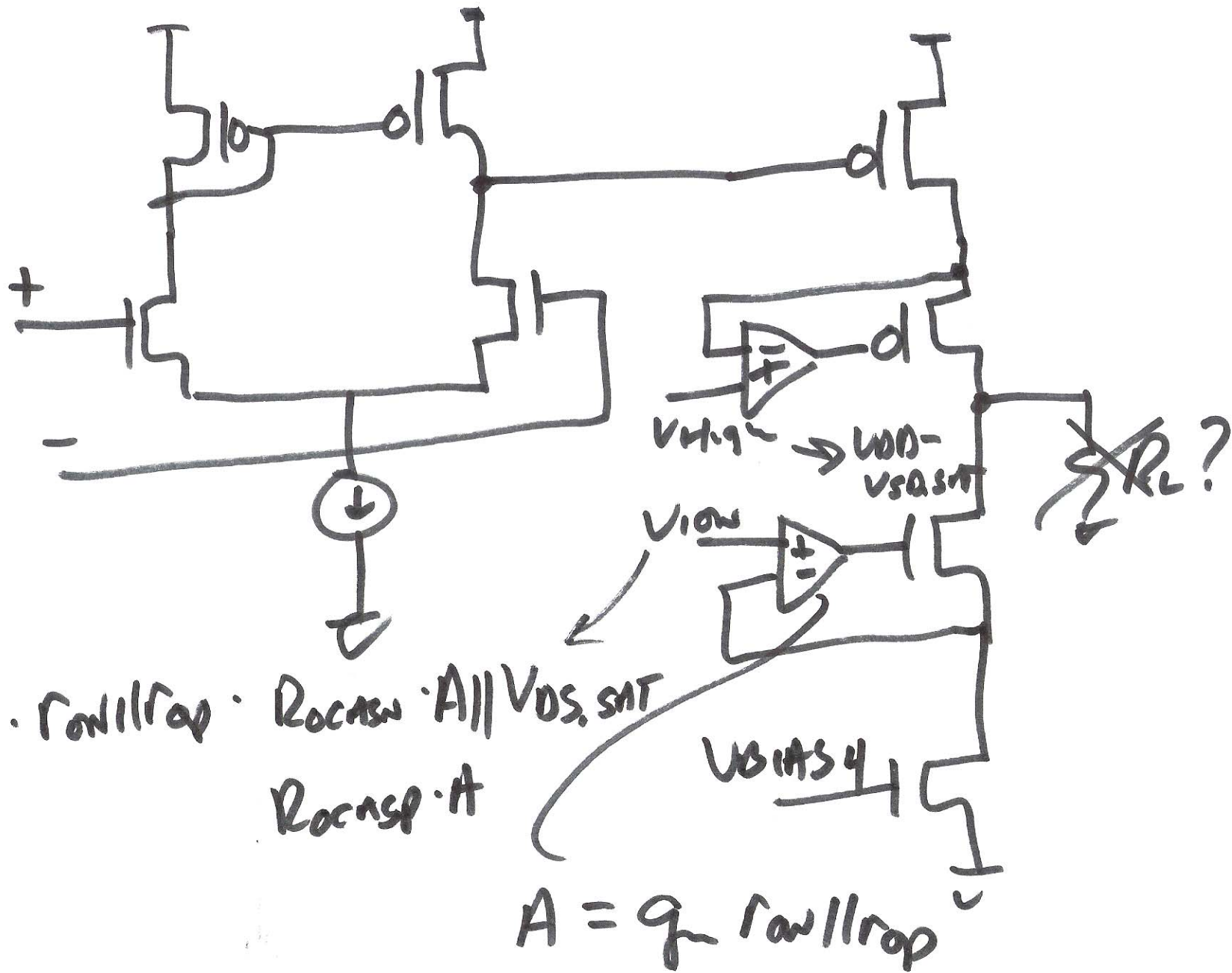
$V_{OUT} = A_{OL}V_{IN} - \frac{V_{OUT} \cdot A_{OL}}{2}$

$= 2.495$
NOT 2.5!

$V_{OUT} \left(1 + \frac{A_{OL}}{2}\right) = A_{OL} V_i$

$\frac{V_{OUT}}{V_i} = \frac{A_{OL}}{1 + \frac{1}{2} A_{OL}}$

3)



$g_m \cdot r_{o1} \parallel r_{op} \cdot R_{oc,as} \cdot A \parallel V_{DS,sat}$
 $R_{oc,as} \cdot A$

$A = g_m \cdot r_{o1} \parallel r_{op}$

4)