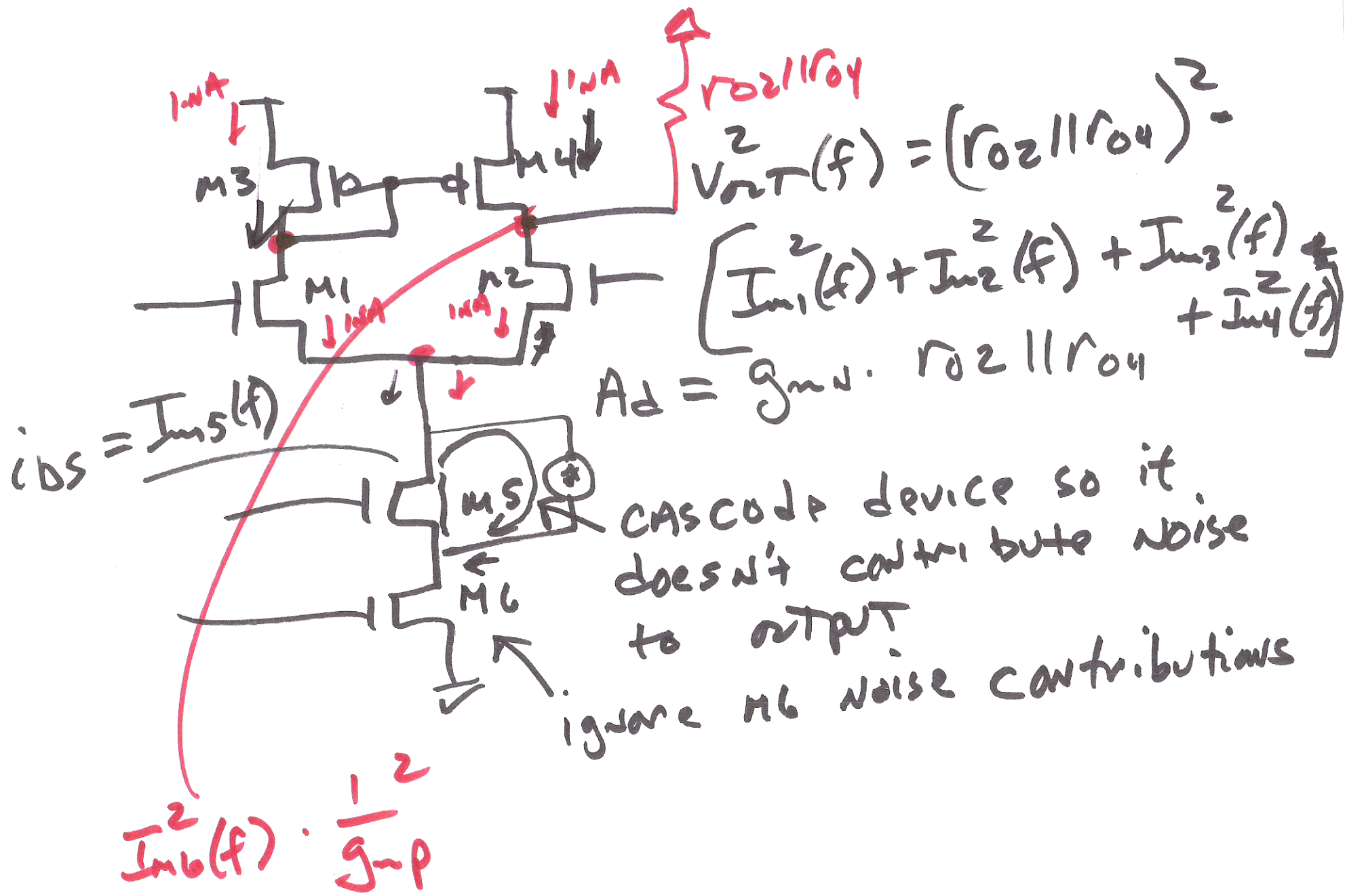


NOISE IN diff - Amps



$$V_{\text{noise}}^2(f) = [I_{n1}^2(f) + I_{n2}^2(f) + I_{n3}^2(f) + I_{n4}^2(f)] \cdot (r_{o2} \parallel r_{o4})^2$$

$$V_{\text{noise}}^2(f) = \frac{I_{n1}^2 + I_{n2}^2 + I_{n3}^2 + I_{n4}^2}{g_{mN}^2}$$

Reduce input-referred noise $g_{mN} \uparrow$
 $A \downarrow \uparrow$

notice not changing bias current

reduce input-referred noise by

$$\propto \frac{1}{LW}$$

$$I_{n3} \downarrow \quad I_{n4} \downarrow$$

pmos $g \downarrow$

increase L
 or pmos