26/10/12

# Lec 38

$$Dr. = \frac{s^2}{C_L C_S}\left[C_{gd}C_{gs} + C_{db}C_{gs} + C_{db}C_{gd}\right] + \frac{s}{C_L C_S}\left[C_L(C_{gs}+C_{gd}) + C_S(C_{gd}+C_{db}) + g_m C_{gd}\right] + 1$$

$$Dr. = \frac{s^2}{C_L C_S}\left[C_{gs}(C_{gd}+C_{db})\right] + \frac{s}{C_L C_S}\left[C_{gd}\left(\frac{C_S}{C_L}+\frac{g_m}{C_L}\right) + C_{db}\cdot\frac{C_S}{C_L} + C_{gs}\cdot C_L\right] + 1$$

$$= \frac{s^2}{C_L C_S}\cdot C_{gs}(C_{gd}+C_{db}) + \frac{s}{C_S}\left[C_{gd}\frac{g_m}{C_L} + C_{gs}\right] + 1$$

$$\left(1+\frac{s}{p_1}\right)\left(1+\frac{s}{p_2}\right) = \frac{s^2}{p_1 p_2} + s\left(\frac{1}{p_1}+\frac{1}{p_2}\right) + 1$$

$$p_1 >> p_2 \Rightarrow \frac{1}{p_2} >> \frac{1}{p_1}$$

$$\frac{s^2}{p_1 p_2} + \frac{s}{p_2} + 1$$

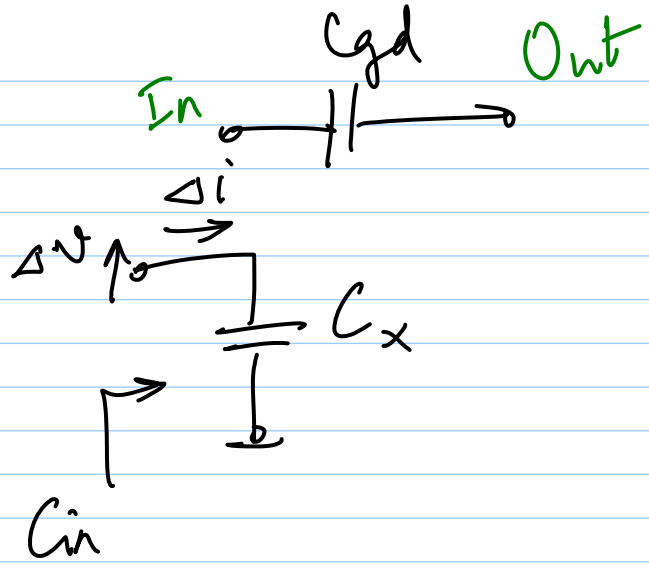
$\frac{s^2}{p_1 p_2}$ → $p_1$ ; $\frac{s}{p_2}$ → $p_2$

$$p_2 = \frac{G_s}{C_{gs} + C_{gd}\cdot\frac{g_m}{G_L}} \longleftrightarrow p_{2_0} = \frac{G_s}{C_{gs}}$$

$$p_1 = p_1 p_2 \cdot \frac{1}{p_2} = \frac{G_L G_s}{C_{gs}(C_{gd}+C_{db})} \cdot \frac{C_{gs} + C_{gd}\cdot\frac{g_m}{G_L}}{G_s}$$

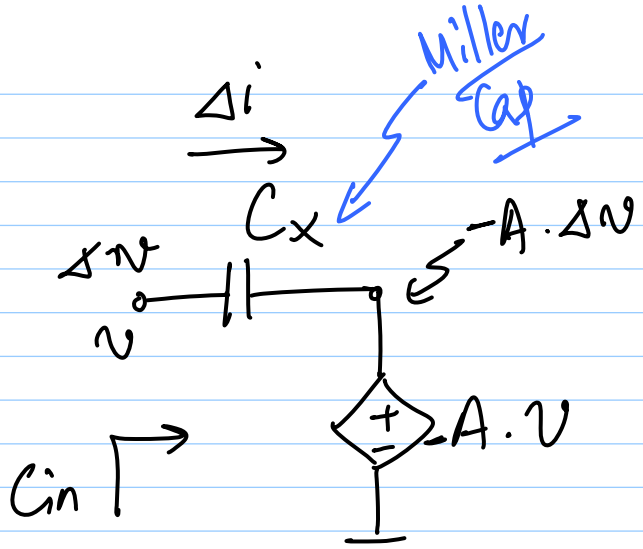
$$= \frac{G_L\left(C_{gs} + C_{gd}\cdot g_m/G_L\right)}{C_{gs}(C_{gd}+C_{db})}$$

✓




$$\Delta i = \Delta V \cdot s C_x$$

$$C_{in} = C_x$$

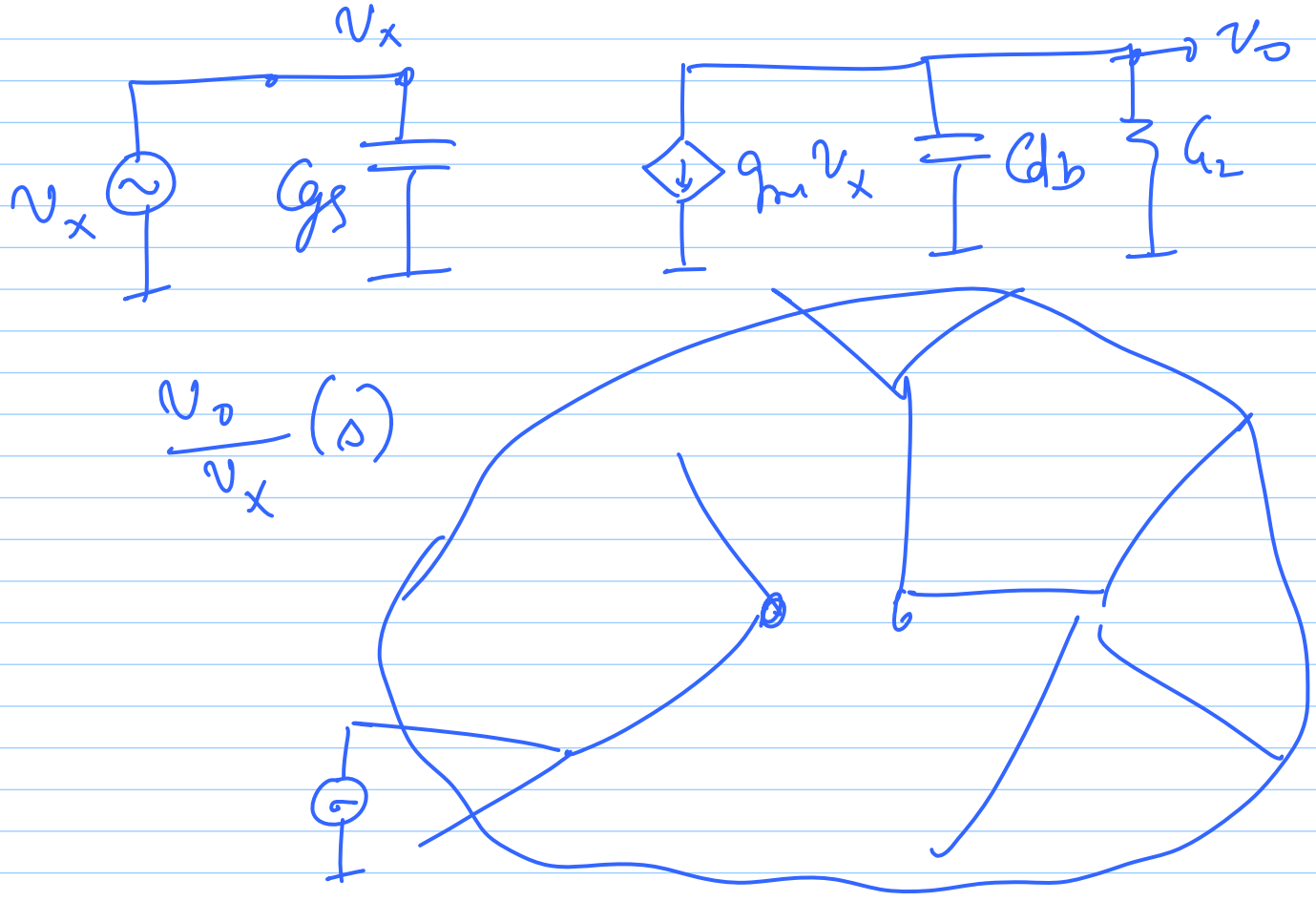



$$\Delta i = (1+A)\Delta V \cdot s C_x$$

$$C_{in} = (1+A)C_x$$

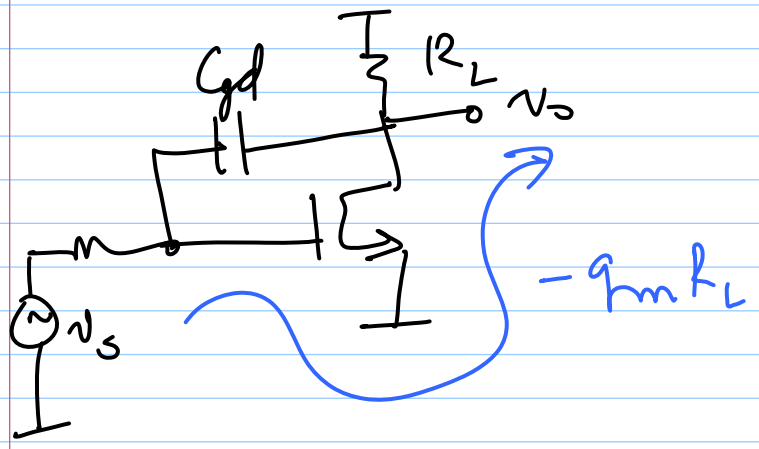
"Miller Effect"

or "miller multiplication"



Low freq. gain of the CS amp

$= -g_m R_L$

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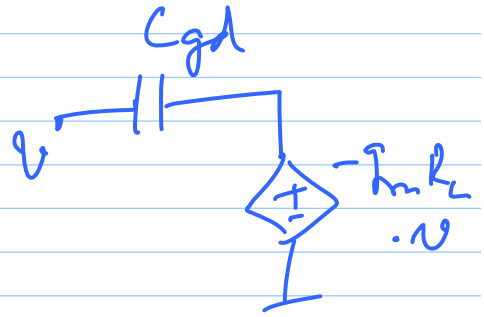


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