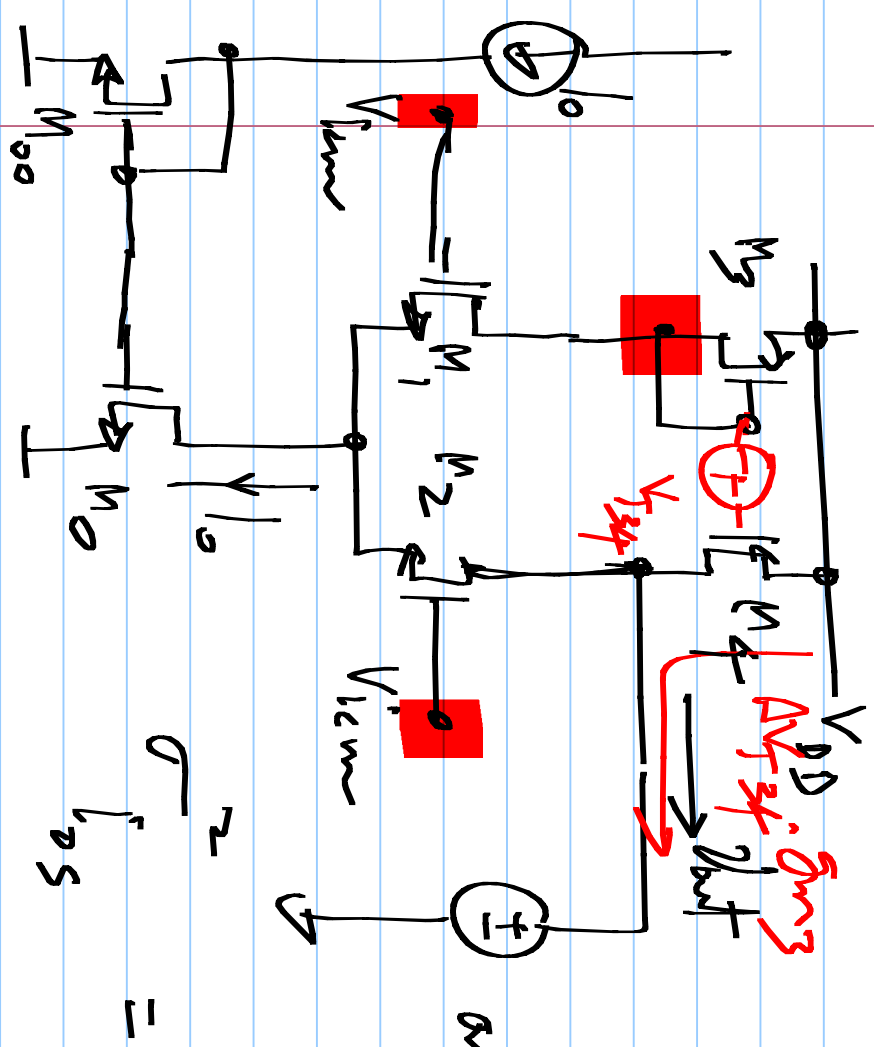


Lecture 16

18/2/2016.

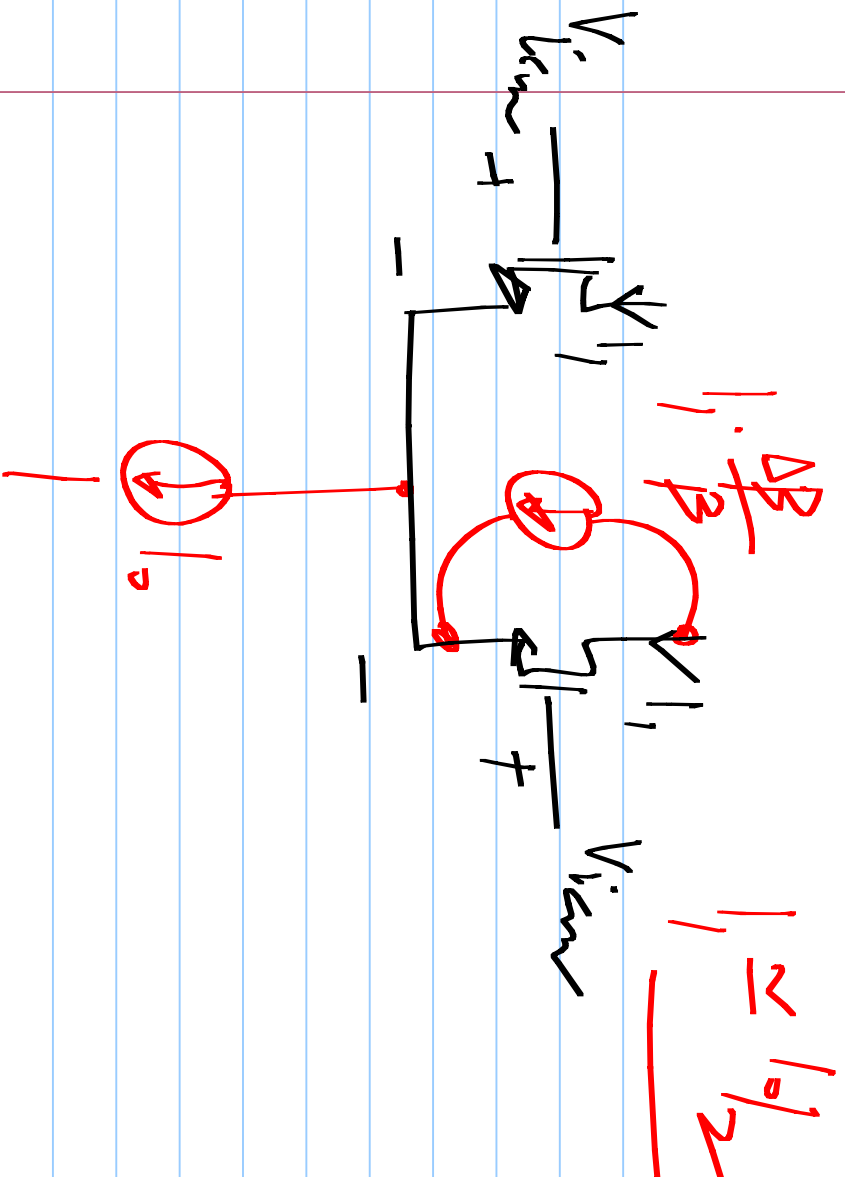
$$\Delta V_{34} \approx V_{T3} - V_{T4}$$



$$M_0 - M_0, \quad M_1 - M_2, \quad M_3 - M_4$$

$$i_{out} = (-g_{m1} \cdot \Delta V_{T12} - g_{m3} \cdot \Delta V_{T34})$$

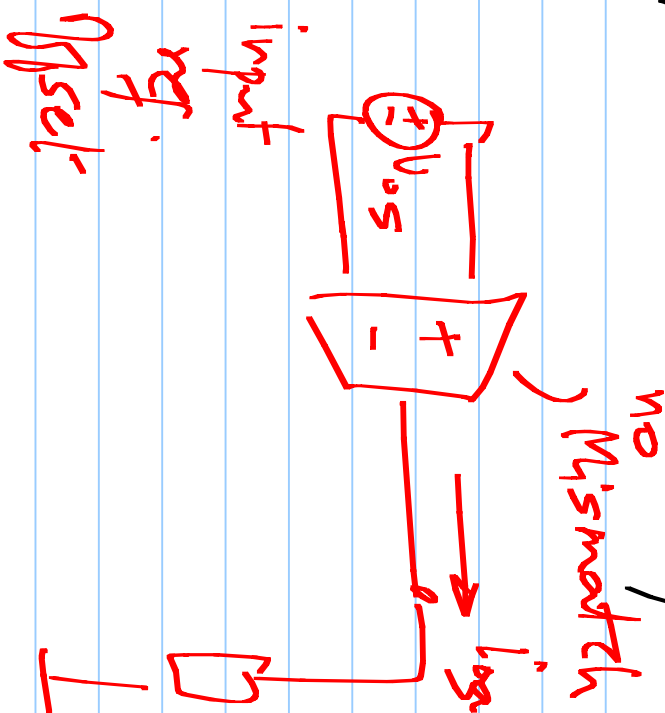
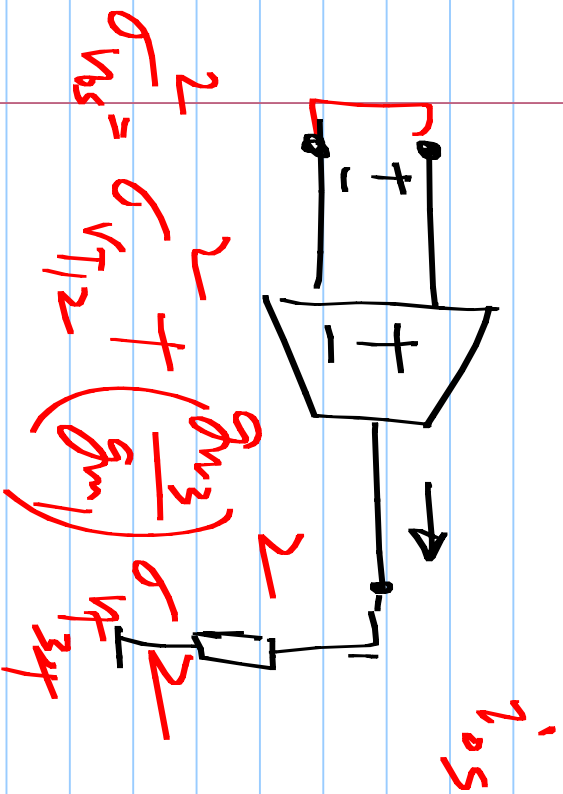
$$\sigma_{los}^2 = g_{m1}^2 \sigma_{V_{T12}}^2 + g_{m3}^2 \sigma_{V_{T34}}^2$$



output offset due to V_{T12} mismatch

$$\sigma_{los}^2 = g_{m1}^2 \sigma_{V_{T12}}^2 + g_{m3}^2 \sigma_{V_{T34}}^2$$

$$V_{os} = \frac{I_{os}}{g_{m1}}$$



DATA SHEET

$$A_o : \frac{g_{m1}}{g_{ds1} + g_{ds3}}$$

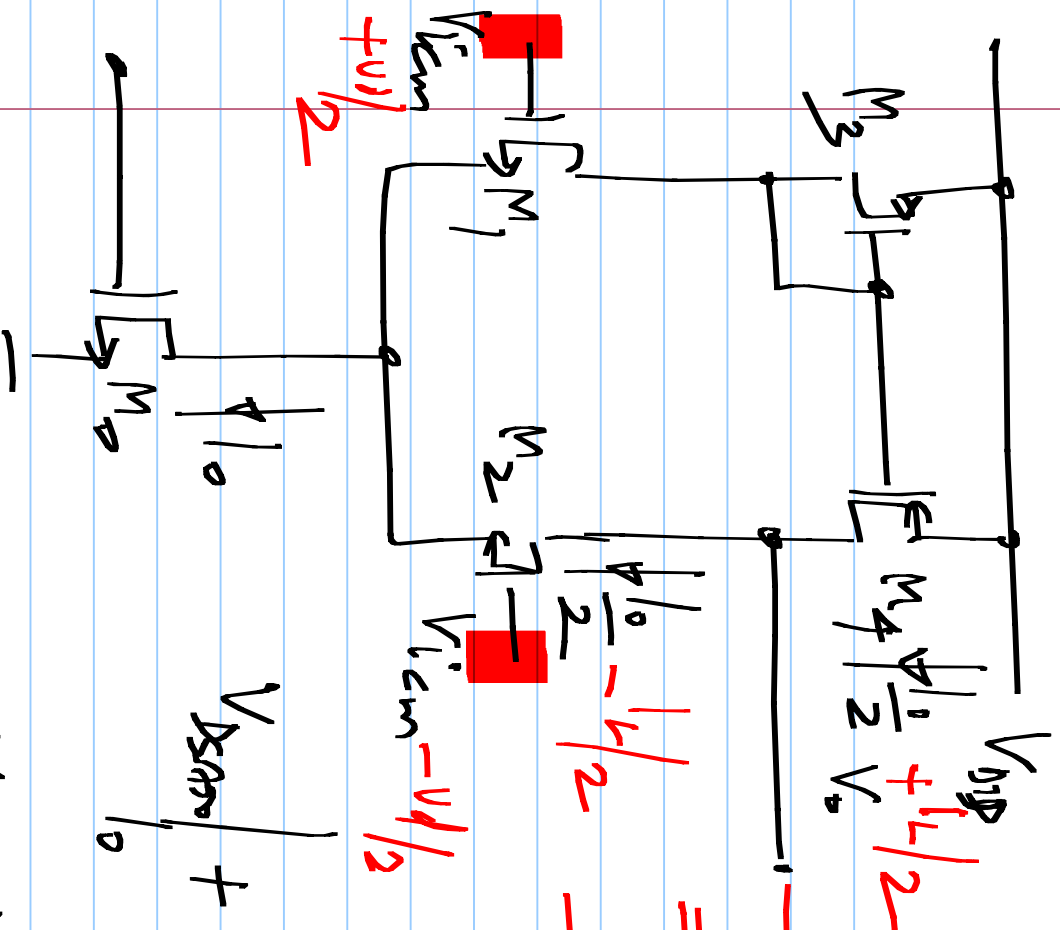
$$\omega_n : g_{m1}/C_L$$

$$S_{v1} = \frac{16kT}{3g_{m1}} \left(1 + \frac{g_{m3}}{g_{m1}} \right)$$

$$\sigma_{v_{DS}}^2 = \sigma_{v_{T1/2}}^2 + \left(\frac{g_{m3}}{g_{m1}} \right)^2 \sigma_{v_{T3/4}}^2$$

$$V_{DSsat} + V_{DS1} < V_{icm} < V_{D0} - V_{DS3} + V_{T1}$$

$$V_{icm} - V_{T1} < V_{D0} < V_{D0} - V_{DS3}$$

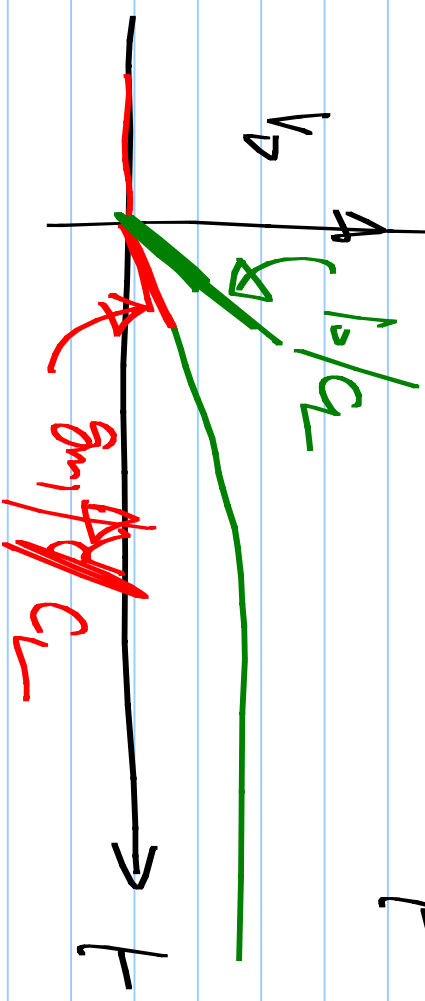
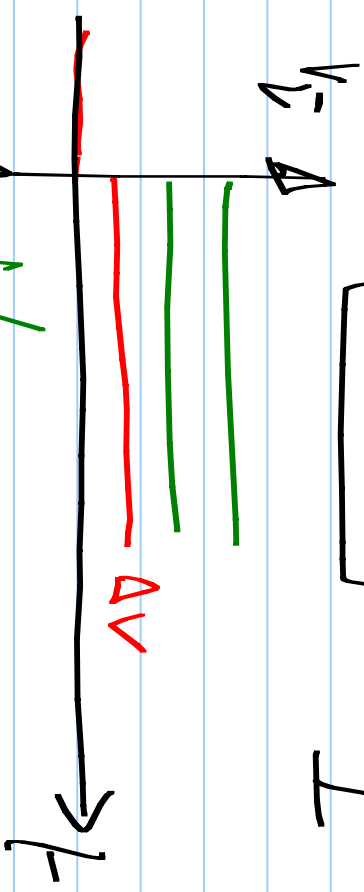
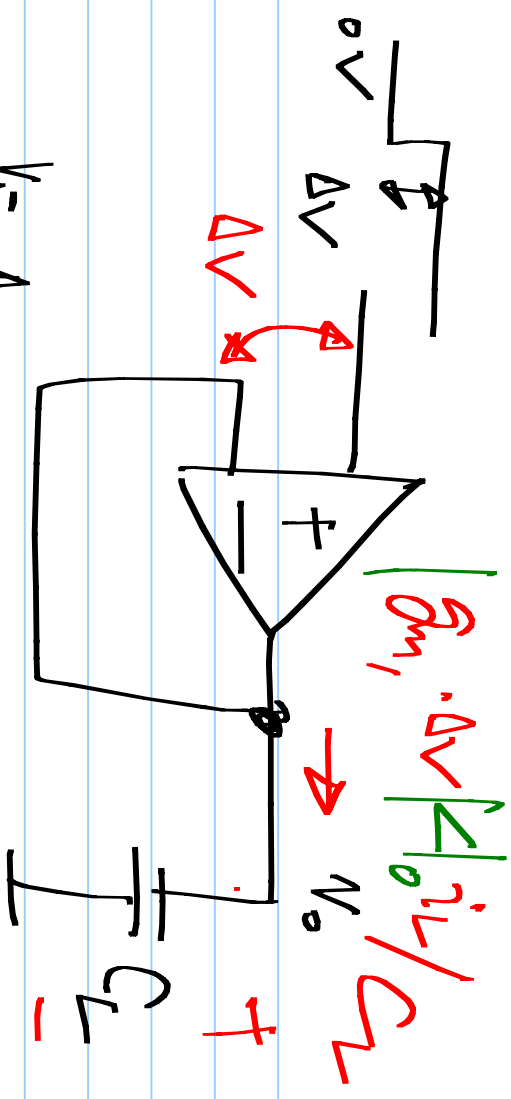


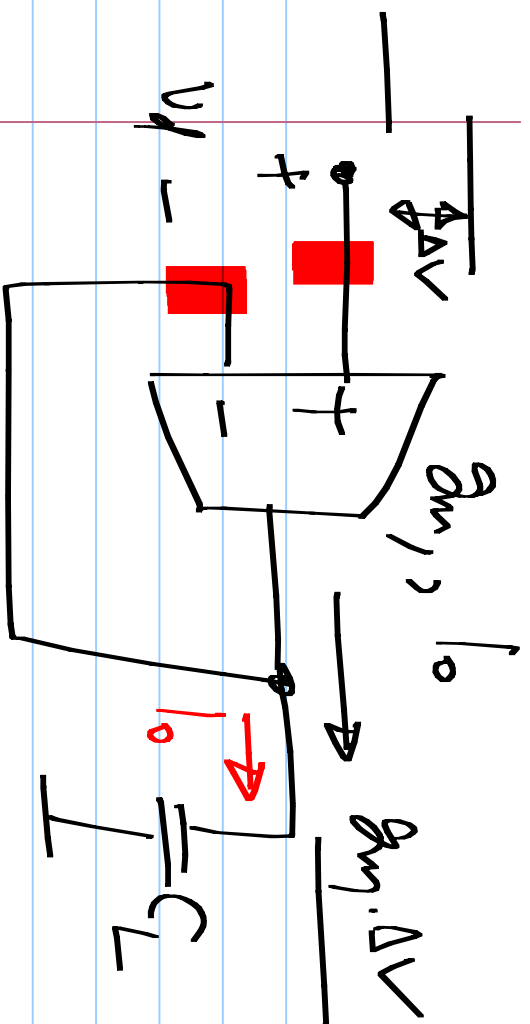
$$|1_L| < 1_0$$

slewrate

$$SR_+ = I_0 / C_L$$

$$SR_- = I_0 / C_L$$

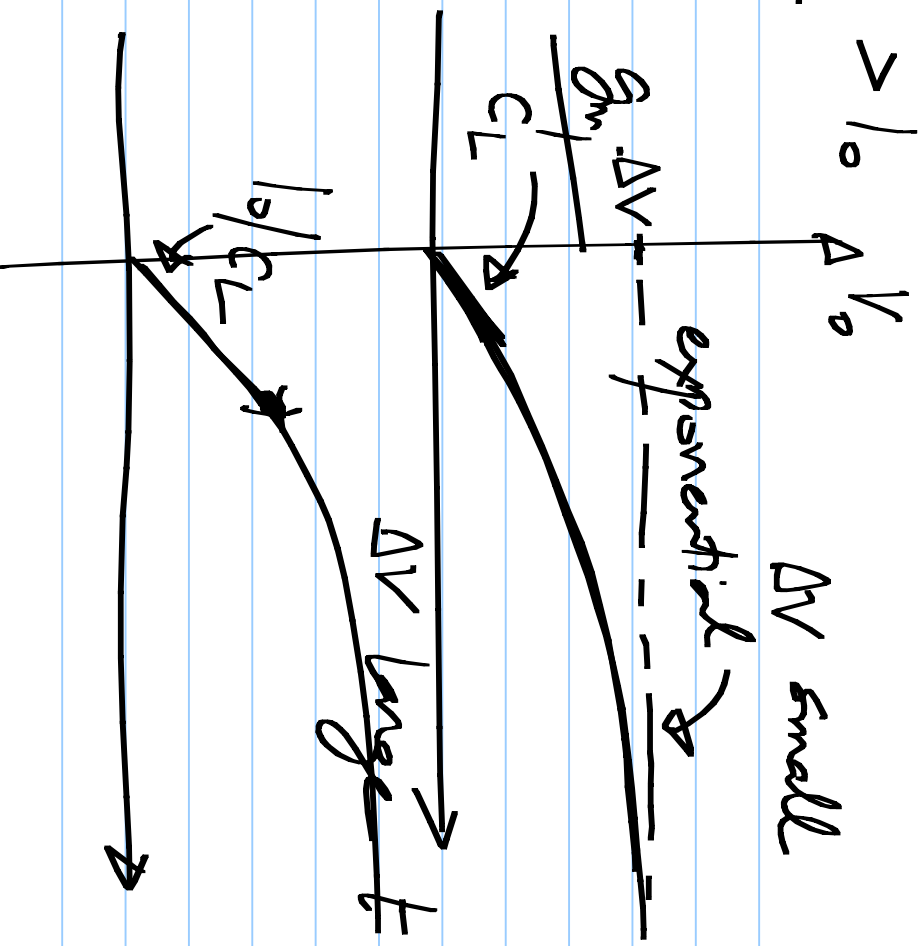




* Calculate $V_0(t)$ for

a step input, assuming
a linear g_{m1}

$$g_{m1} \cdot \Delta V < I_0$$



$$\omega_T = \frac{g_m}{C_{gs}}$$

