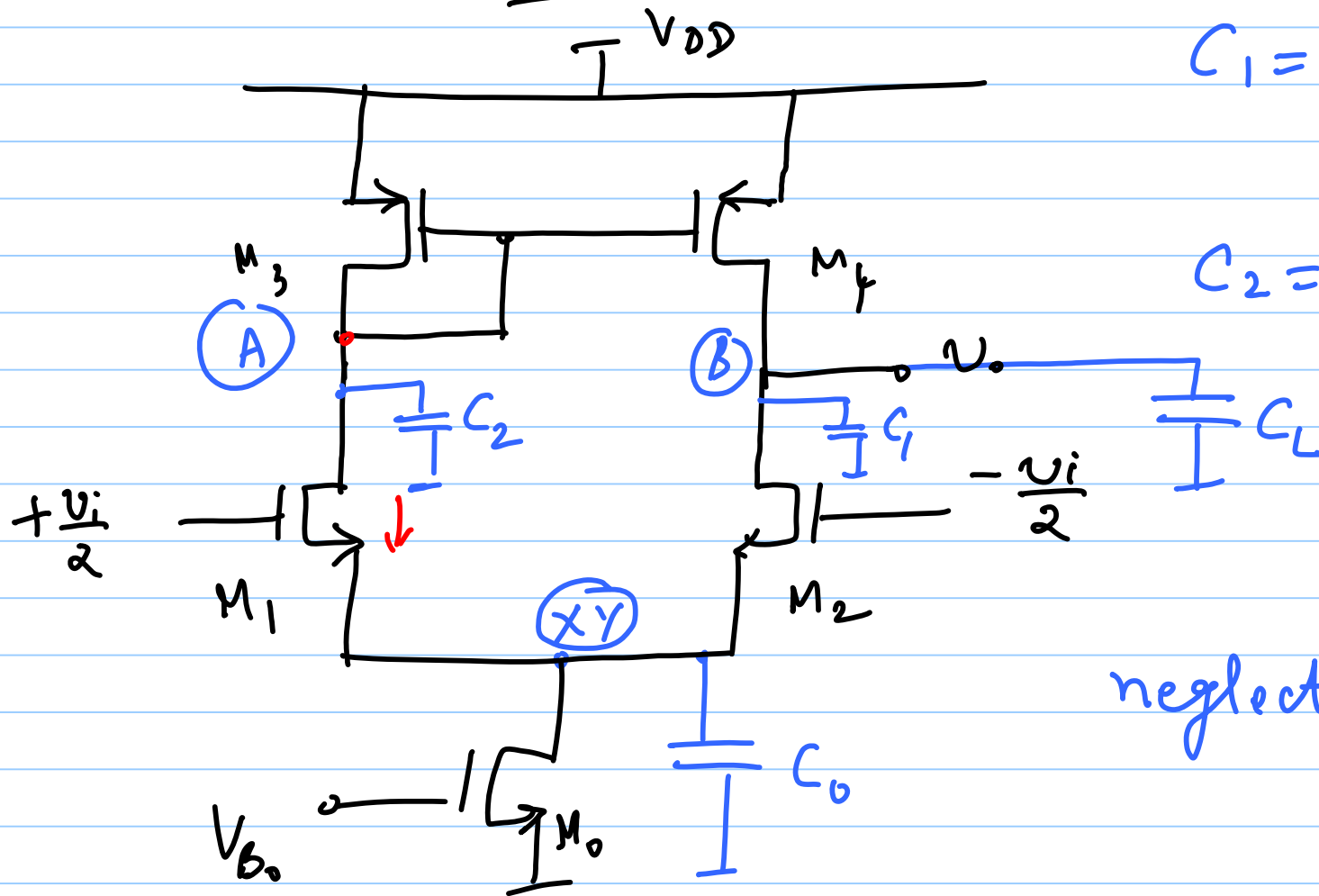


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Lec 27



$$C_0 = C_{db0} + C_{sb1} + C_{sb2}$$

$$C_1 = C_{gs3} + C_{gs4} + C_{db3} + C_{db1}$$

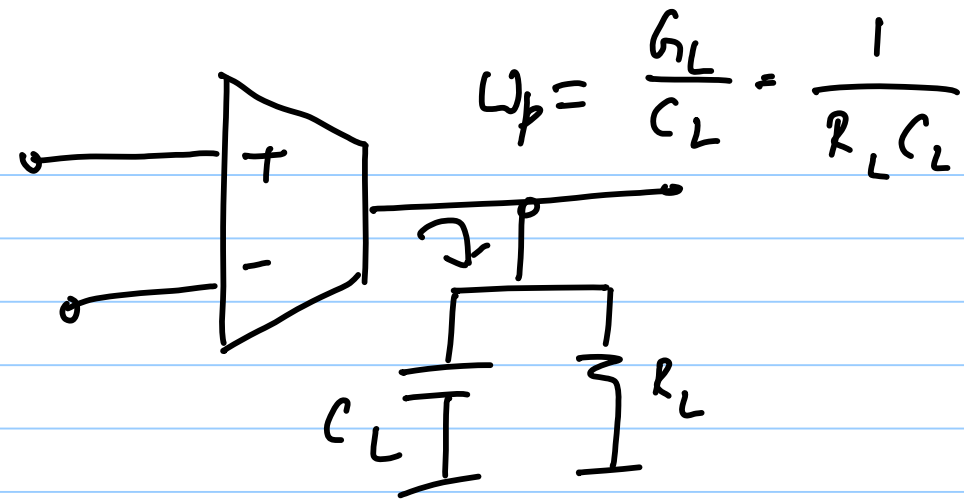
$$C_2 = C_{db4} + C_{db2}$$

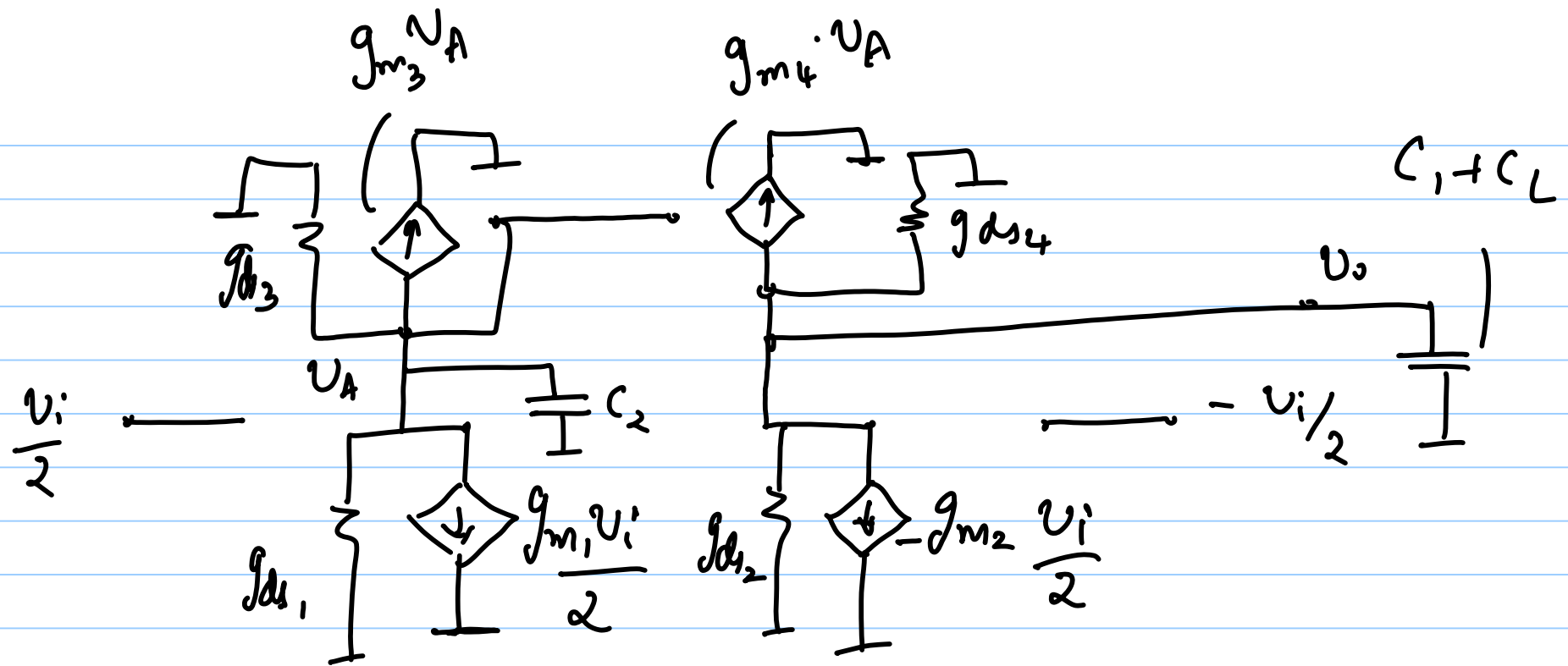
all neglect C_{gd} 's

$$\frac{v_o}{v_i}(s) = ?$$

$$\omega_{p1} = - \frac{g_{ds2} + g_{ds4}}{C_1 + C_L}$$

$$\omega_{p2} = - \frac{g_{m3} + g_{ds3} + g_{ds1}}{C_2} \approx - \frac{g_{m3}}{C_2}$$





$$v_A = -\frac{g_{m1} v_i}{2} \left[\frac{1}{g_{m3} + g_{d3} + g_{d1} + sC_2} \right]$$

$$v_A = - \frac{g_{m1} v_i / 2}{g_{m3}} \left[\frac{1}{1 + \frac{sC_2}{g_{m3}}} \right]$$

$$\left\{ \begin{array}{l} \text{assume} \\ g_{m3} \gg g_{ds3}, g_{ds1} \end{array} \right\}$$

$$C_1 + C_L = C_L'$$

$$g_{m4} v_A = - g_{m1} \frac{v_i}{2} \left[\frac{1}{1 + \frac{sC_2}{g_{m3}}} \right]$$

$$g_{ds2} + g_{ds4} = g_o$$

$$v_o = \left[g_{m1} \frac{v_i}{2} \left[\frac{1}{1 + \frac{sC_2}{g_{m3}}} \right] + g_{m2} \frac{v_i}{2} \right] \times$$

$$\times \left[\frac{1}{g_{ds2} + g_{ds4} + s(C_1 + C_L)} \right]$$

$$v_o = \frac{v_i}{2} \cdot \frac{g_{m1}}{g_o} \cdot \left[1 + \frac{1}{1 + \frac{sC_2}{g_{m3}}} \right] \cdot \left[\frac{1}{1 + \frac{sC_L'}{g_o}} \right]$$

$$\frac{v_o}{v_i} = \frac{g_m}{2g_o} \cdot \frac{2 + \frac{sC_2}{g_{m3}}}{\left(1 + \frac{sC_L'}{g_o}\right) \left(1 + \frac{sC_2}{g_{m3}}\right)}$$