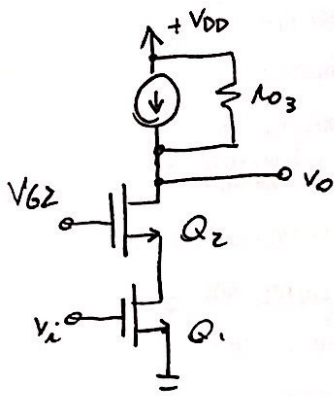
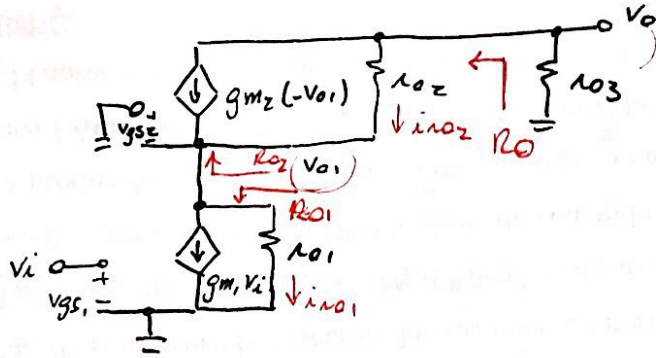


• Nota de aula CEA

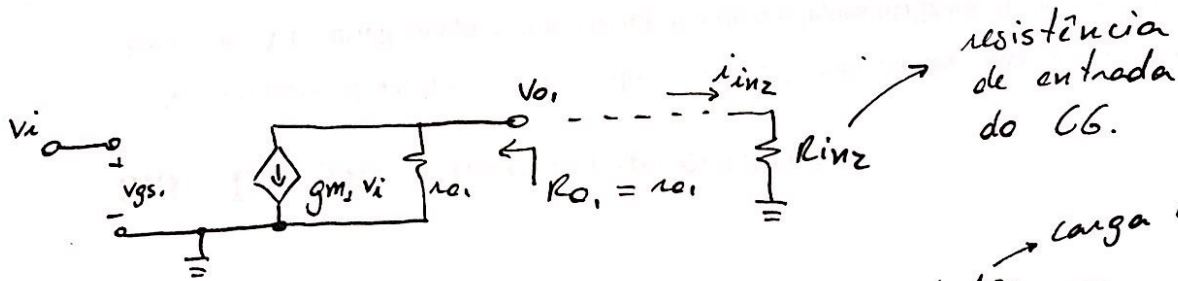
• Análise cascode NMOS com carga:



pequenos sinais



① Analisando por partes: [Estágio C5]



resistência de entrada do C6.

carga do C6.

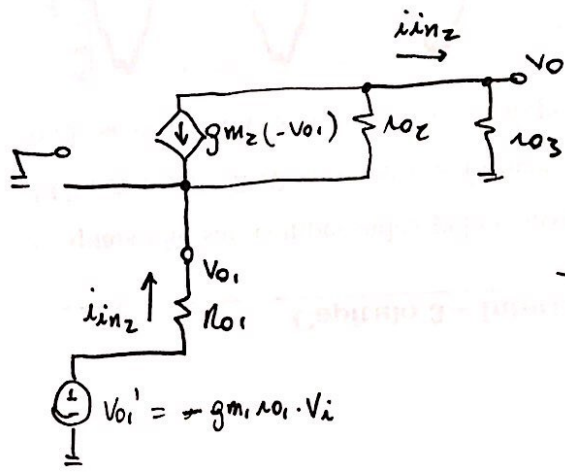
→ Pela análise feita em sala: $R_{in2} = \frac{\lambda_{o2} + \lambda_{o3}}{1 + g_{m2}\lambda_{o2}}$

• $i_{in2} = -g_{m1} \cdot v_i \cdot \frac{\lambda_{o1}}{\lambda_{o1} + R_{in2}} \Rightarrow i_{in2} = -\frac{g_{m1} \cdot \lambda_{o1} \cdot v_i}{\lambda_{o1} + \frac{\lambda_{o2} + \lambda_{o3}}{1 + g_{m2}\lambda_{o2}}} = -\frac{[g_{m1}\lambda_{o1} + g_{m1}g_{m2}\lambda_{o1}\lambda_{o2}]v_i}{\lambda_{o1} + \lambda_{o2} + \lambda_{o3} + g_{m2}\lambda_{o1}\lambda_{o2}}$

$v_{o1} = -g_{m1} \cdot \frac{\lambda_{o1} R_{in2}}{\lambda_{o1} + R_{in2}}$

② Estágio C6

• $R_O = \lambda_{o2} + \lambda_{o1} + g_{m2}\lambda_{o2}\lambda_{o1}$
↳ dedução feita em sala



$R_O = \lambda_{o2} + \lambda_{o1} + g_{m2}\lambda_{o2}\lambda_{o1}$

$v_o = \lambda_{o3} \cdot i_{in2}$

$v_o = -\frac{[g_{m1}\lambda_{o1}\lambda_{o3} + g_{m1}g_{m2}\lambda_{o1}\lambda_{o2}\lambda_{o3}]v_i}{\lambda_{o1} + \lambda_{o2} + \lambda_{o3} + g_{m2}\lambda_{o1}\lambda_{o2}}$

- Se $g_{m1} = g_{m2} = g_m$ e $r_{o1} = r_{o2} = r_o$

$$i_{in2} = \frac{-[g_m r_o + g_m^2 r_o^2] v_i}{2r_o + r_{o3} + g_m r_o^2}$$

- assumindo $g_m r_o \gg 1 \rightarrow i_{in2} \approx -\frac{g_m r_o^2}{g_m r_o^2} v_i \approx -g_m v_i$

$$v_o \approx -r_{o3} \cdot g_m \cdot v_i \Rightarrow \boxed{\frac{v_o}{v_i} = A_v \approx -g_m r_{o3}}$$

