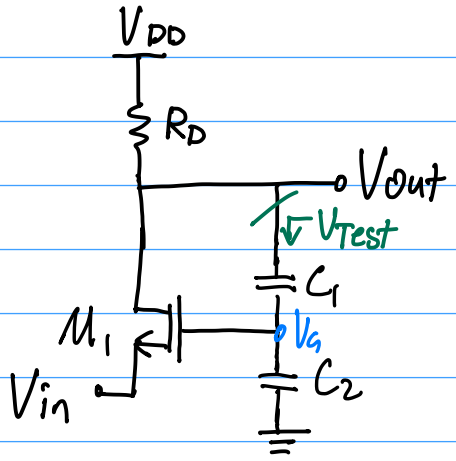

Find closed loop gain and I/O impedances.

Notice V_G is given by a voltage divider over the AC impedances of C_1 and C_2.

$$\therefore V_G = V_{out}\left(\frac{\frac{1}{j\omega C_2}}{\frac{1}{j\omega C_1}+\frac{1}{j\omega C_2}}\right) = V_{out}\frac{C_1}{C_2+C_1}$$

Analysing the gain around the loop:

(Assuming impedances of C_1 and C_2 are large compared to R_D)

$$V_{out} = -g_m R_D V_{test}\frac{C_1}{C_1+C_2}$$

$$\therefore \text{Loop gain} = -\frac{V_{out}}{V_{test}} = g_m R_D \frac{C_1}{C_1+C_2}.$$

$$\therefore \text{Closed loop gain} = \frac{g_m R_D}{1+g_m R_D \frac{C_1}{C_1+C_2}}.$$

$$\text{Input imp.} = \frac{1}{g_m}\left(1+g_m R_D \frac{C_1}{C_1+C_2}\right).$$

$$\text{Output imp.} = \frac{R_D}{1+g_m R_D \frac{C_1}{C_1+C_2}}.$$