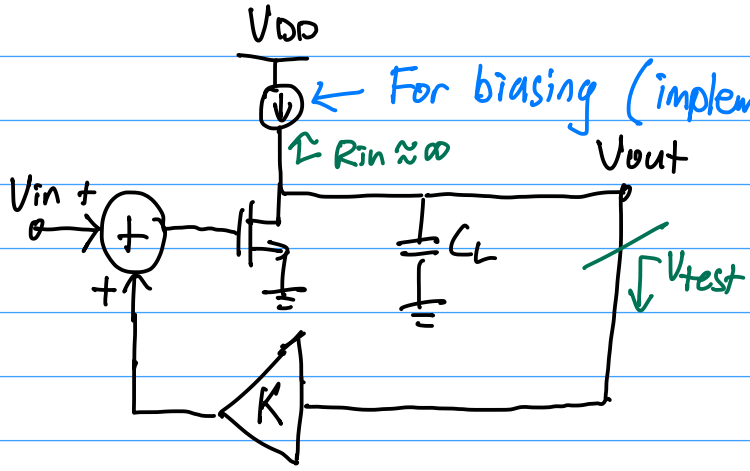

Common source amp. with ideal current source biasing ($R_{in} \to \infty$) has only the transistor r_o to AC ground.

$\therefore$ Open loop DC gain $= -g_m r_o$. ← Big value

There is a pole at Vout with $\omega_p = \frac{1}{r_o C_L}$.

$\therefore$ Open loop $H_1(s) = \frac{-g_m r_o}{1 + \frac{s}{\omega_p}} = \frac{-g_m r_o}{1 + s r_o C_L}$

Low freq loop gain $= \frac{-V_{out}}{V_{test}} = +K g_m r_o$.

In a feedback network, the bandwidth rises by a factor of (1 + loop gain).

$\therefore$ New bandwidth $= (1 + K g_m r_o)\left(\frac{1}{r_o C_L}\right)$

$$B = \frac{1}{r_o C_L} + \frac{K g_m}{C_L}$$

$$B - \frac{1}{r_o C_L} = \frac{K g_m}{C_L}$$

$$\frac{B C_L}{g_m} - \frac{1}{r_o g_m} = K.$$