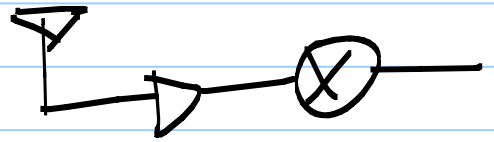
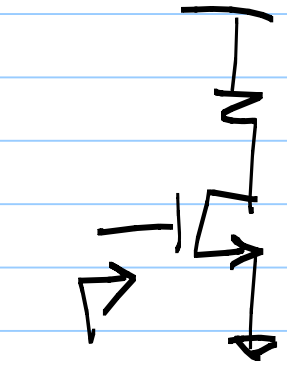
4/2/20

Lec 9

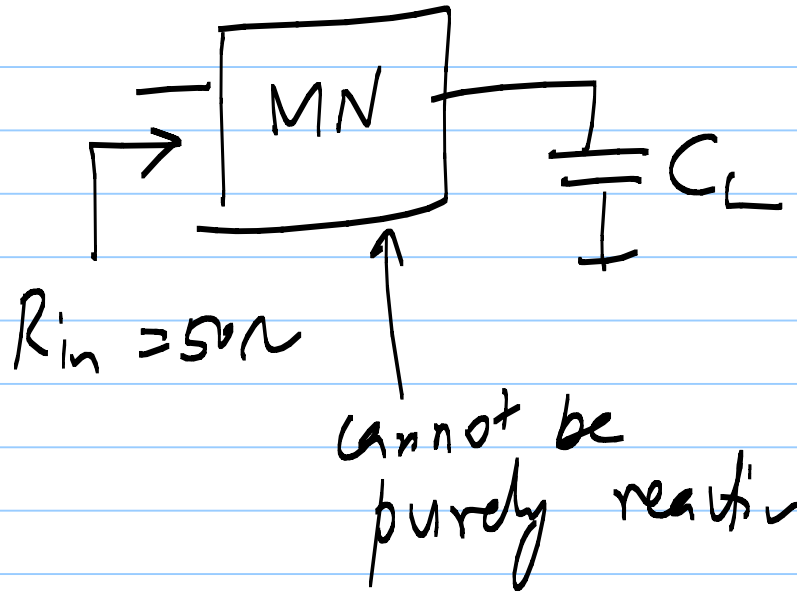
Low Noise Amplifier

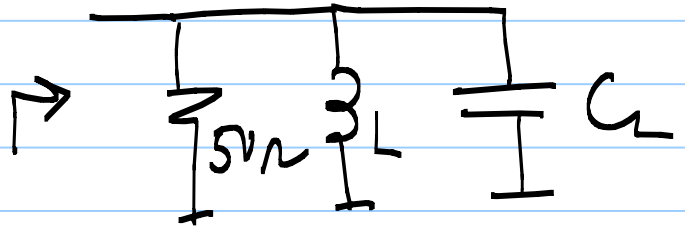


- high gain
- low noise
- $Z_{in} = 50\Omega$
- high IIP_3
- low Power consumption

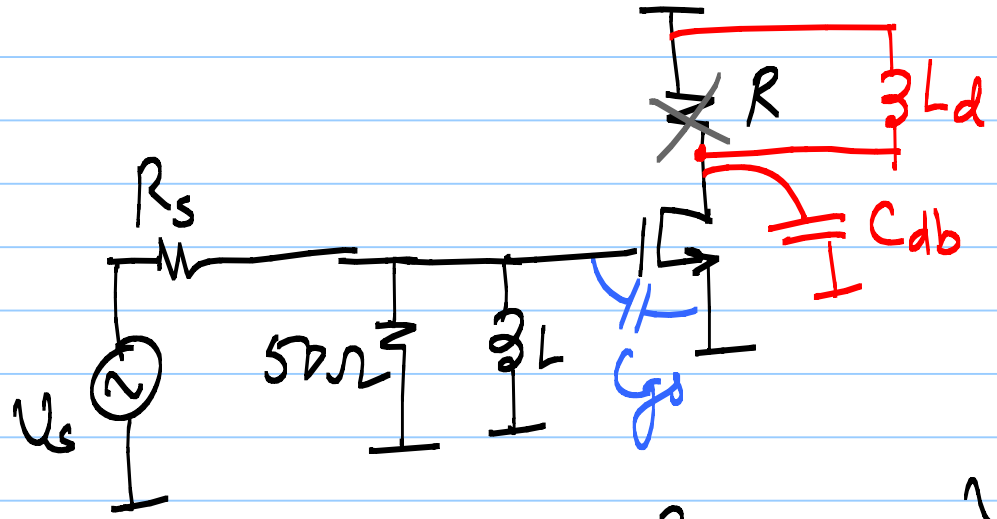


Z_{in} = Capacitive



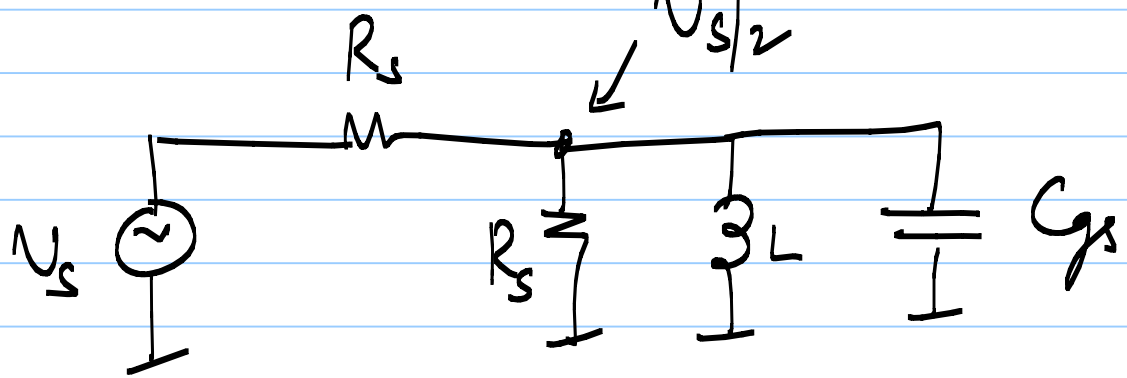


$$f_o = \frac{1}{2\pi\sqrt{LC_L}}$$



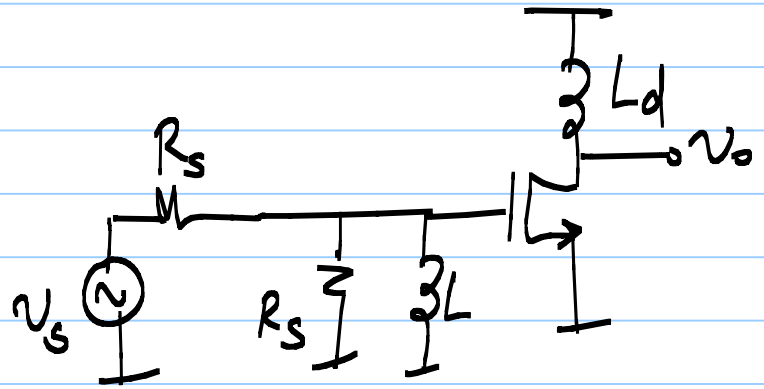
$$gain = \frac{g_m R_L}{2}$$

$$V_{gs} = \frac{V_s}{2}$$



$$f_o = \frac{1}{2\pi\sqrt{LC_{gs}}}$$

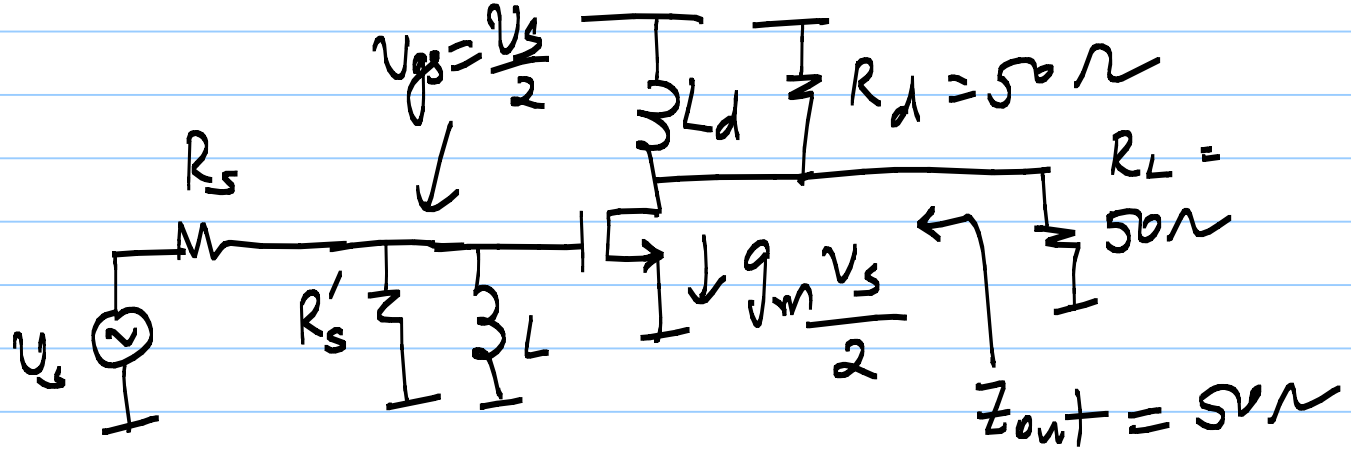
$$f_o = \frac{1}{2\pi\sqrt{L_d C_{db}}}$$



$$\frac{V_o}{V_s} = \frac{g_m r_{dy}}{2}$$

$Z_{out} = ?$

1) stand alone LNA

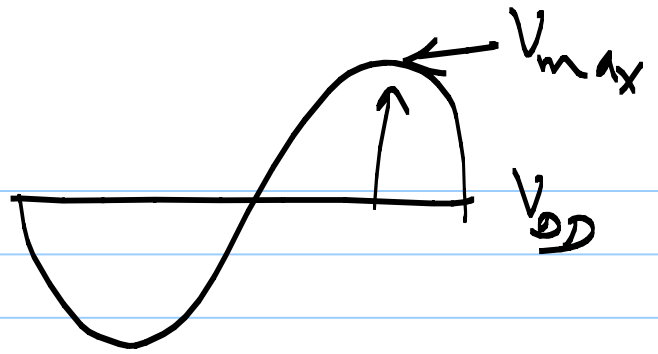


$$gain = \frac{g_m \cdot 25\Omega}{2}$$

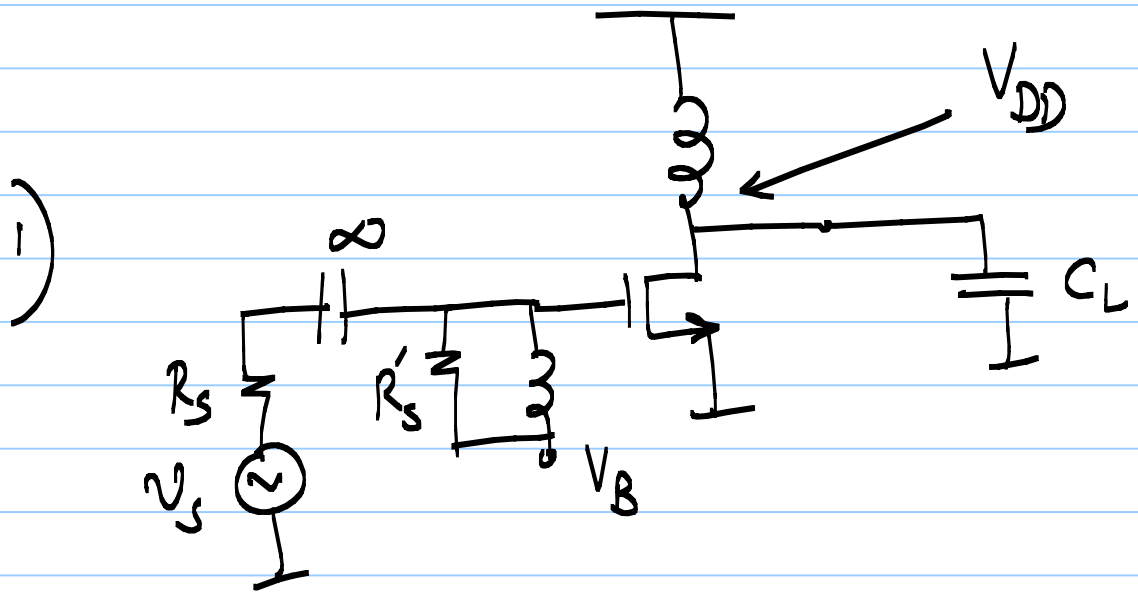
2) LNA driving C_L (on IC) ; f_0 = desired operating freq.

$\Rightarrow$ Choose Ld such that

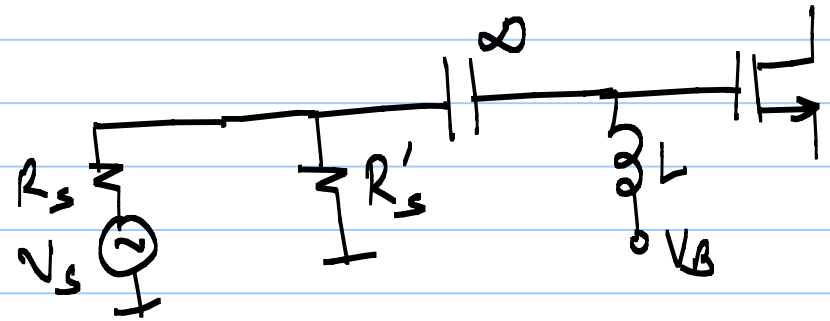
$$f_0 = \frac{1}{2\pi \sqrt{L_d (C_{db} + C_L)}}$$



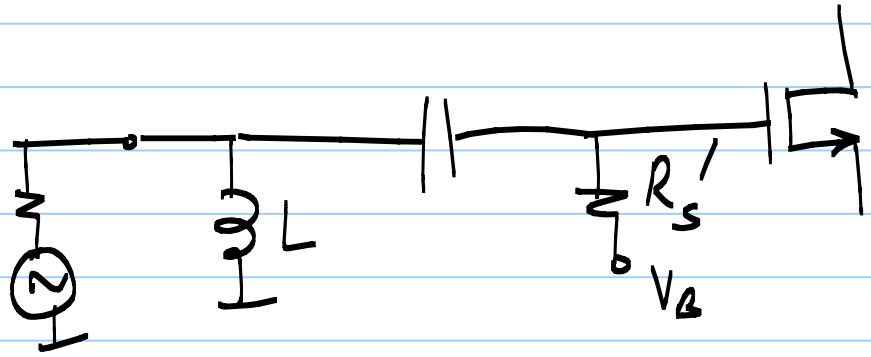
1)

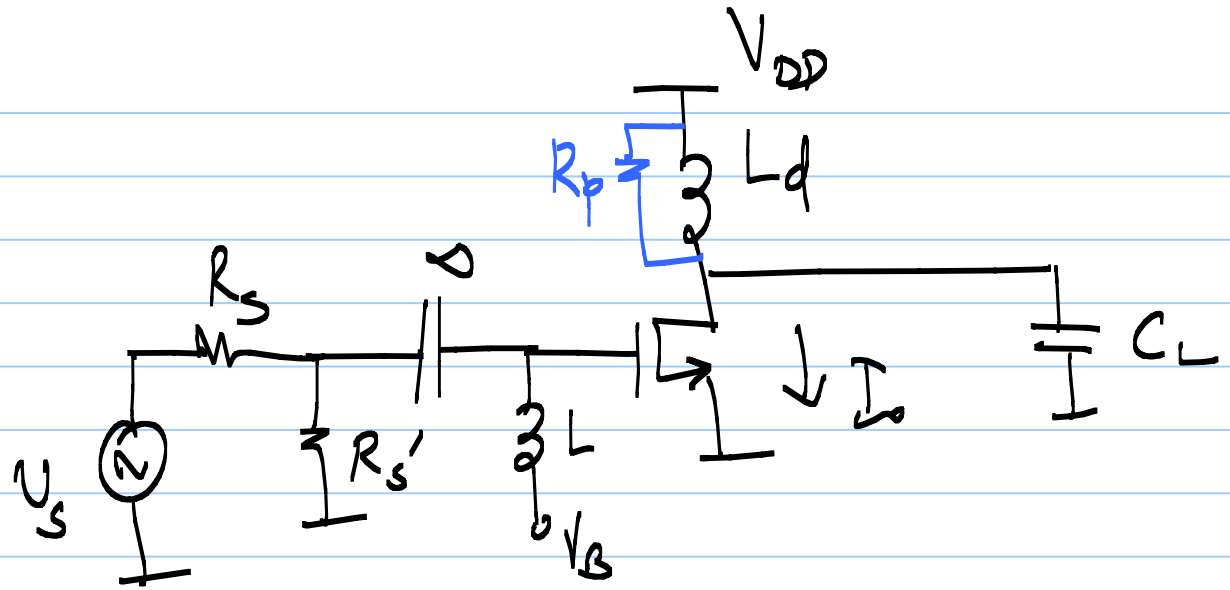


2)



3)





$$\text{gain} = \frac{g_m(r_{ds} \| R_p)}{2}$$

Set I_o, W, $L = L_{min}$.