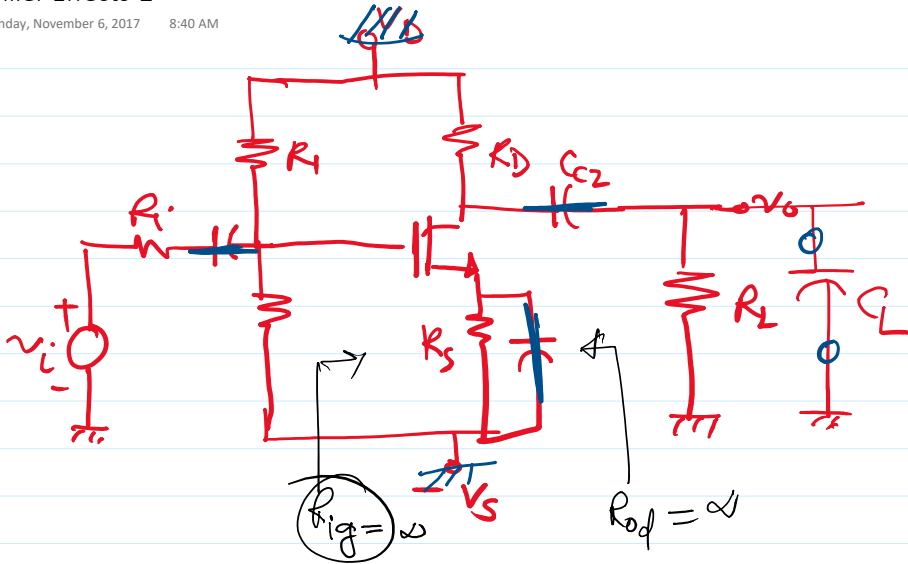
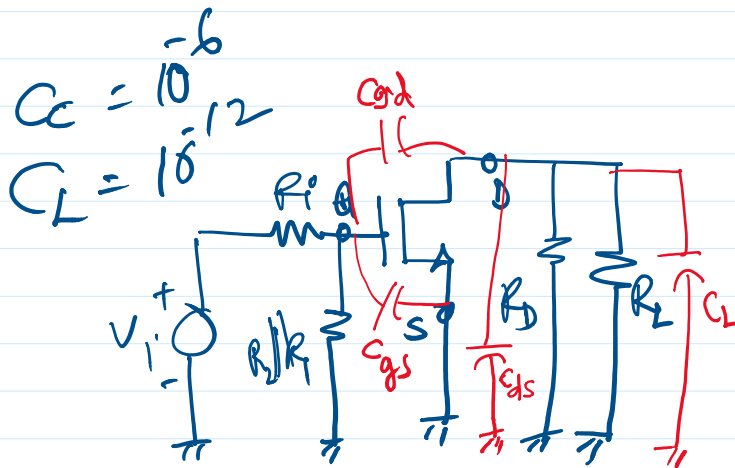


# Miller Effects-2

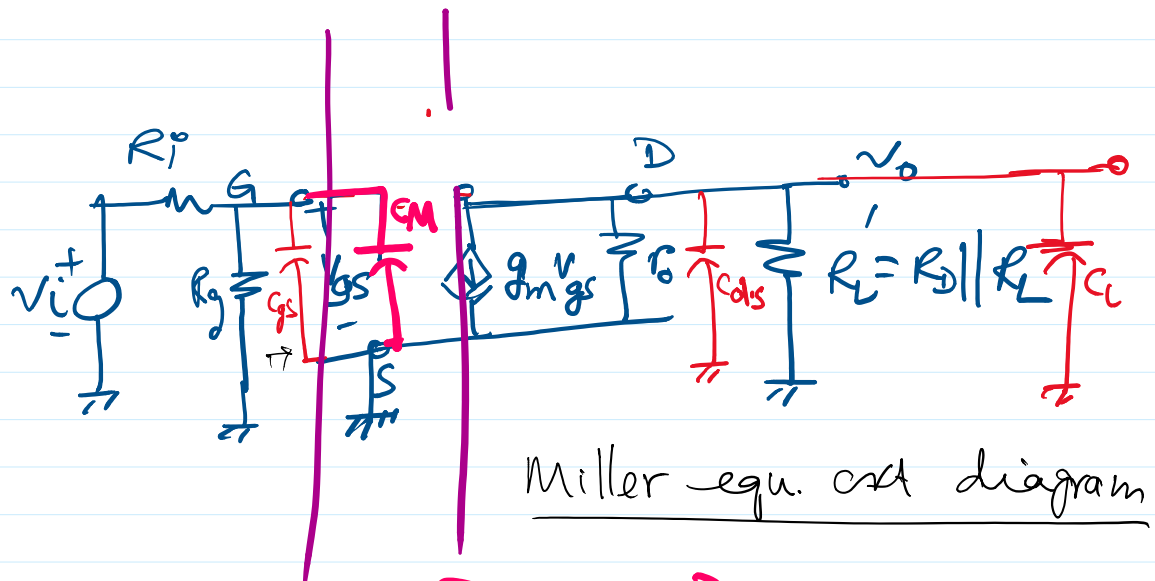
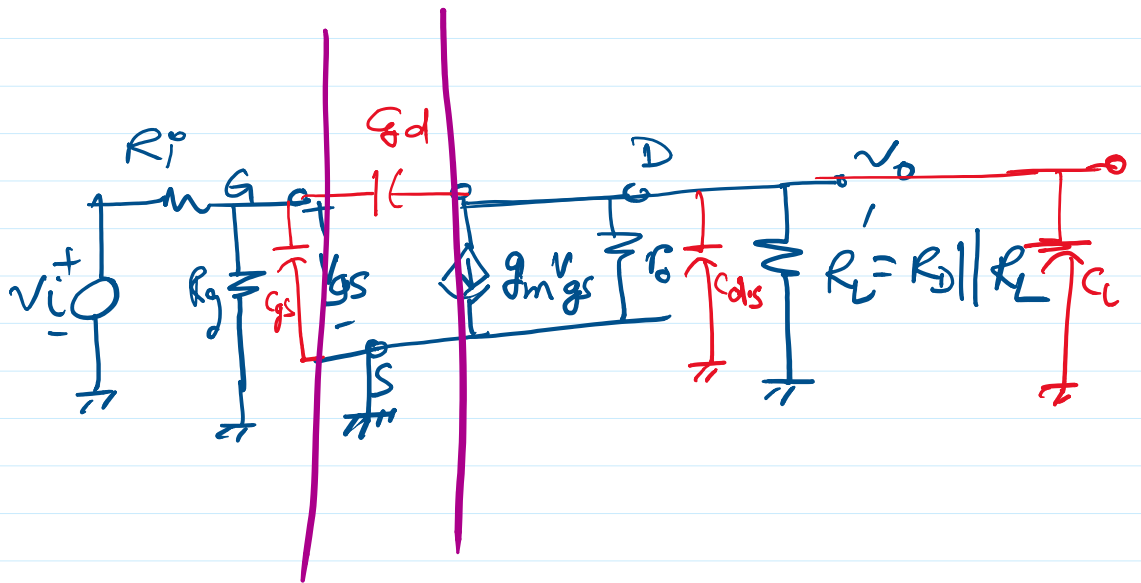
Monday, November 6, 2017 8:40 AM



1. Draw the simplified high freq equivalent circuit diagram.
2. Find the Miller capacitance
3. Find the 3-dB frequency due to Miller effect and without Miller effect.



AC equivalent  
Ckt under  
Midband/high  
freq.

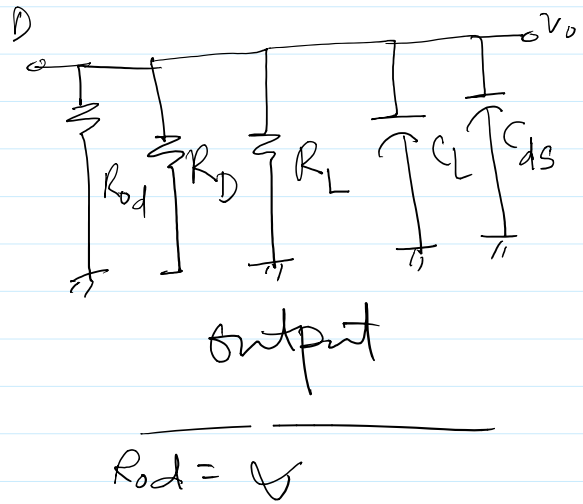
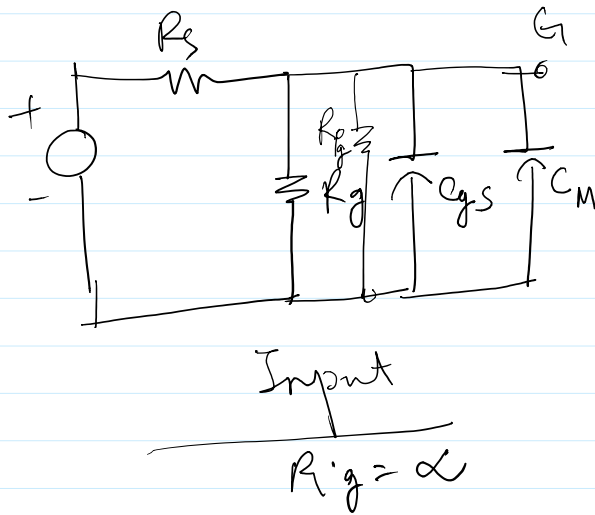


$$C_M = C_{gd} (1 + |A_{vA}|)$$

$$A_{vA} = \frac{v_o}{v_g} = \frac{-g_m v_{gs} R_D || R_L'}{v_{gs}} = -g_m (R_D || R_L')$$

$$C_M = C_{gd} (1 + g_m R_D || R_L')$$

# 3-AB freq



$$\tau_1 = R_s \parallel R_{g1} \parallel R_{g2} (C_{gs} + C_M)$$

due to Miller effect

$$\tau_3 = R_D \parallel R_L (C_L + C_{ds})$$

$$f_{H3} = \frac{1}{2\pi \tau_3}$$

$$\rightarrow f_{H1} = \frac{1}{2\pi R_s \parallel R_{g1} \parallel R_{g2} (C_{gs} + C_M)} \text{ due to Miller effect}$$

$$\tau_2 = R_i \parallel R_{g1} \parallel R_{g2} C_{gs}$$

Neglecting Miller effect

$$\rightarrow f_{H2} = \frac{1}{2\pi R_i \parallel R_{g1} \parallel R_{g2} C_{gs}}$$

