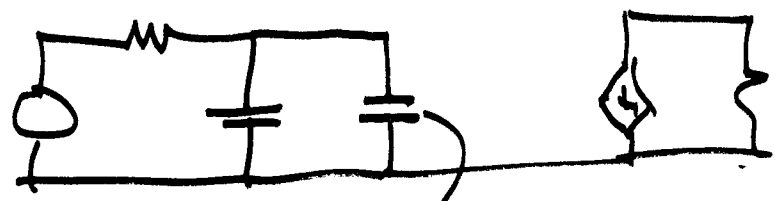
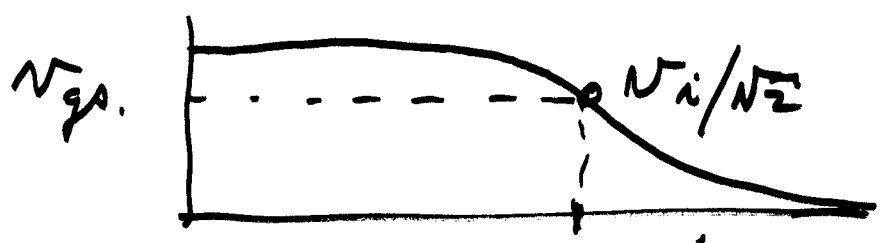
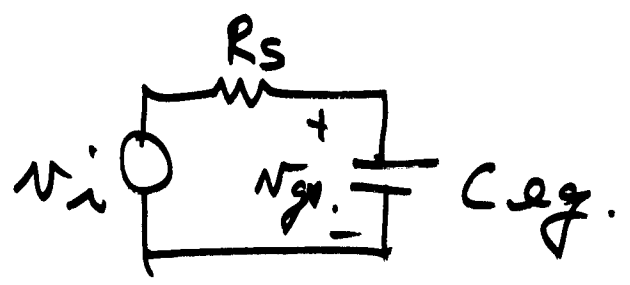


$$A_v = -g_m R_D$$

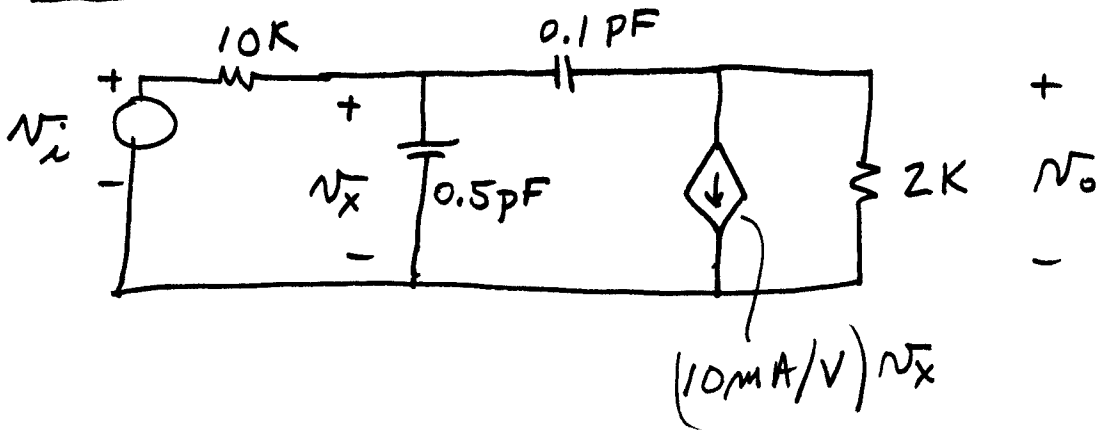


$$C_M = C_{gd}(1 - A)$$

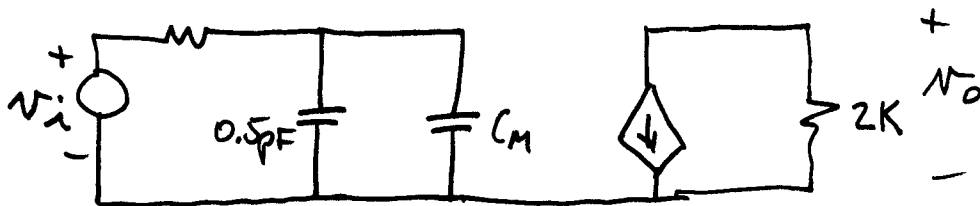


$$\left. \begin{aligned} \omega &= \frac{1}{R_o C_{eq}} \\ f &= \frac{\omega}{2\pi} \end{aligned} \right\} = BW$$

BANDWIDTH EXAMPLE



DETERMINE THE BANDWIDTH

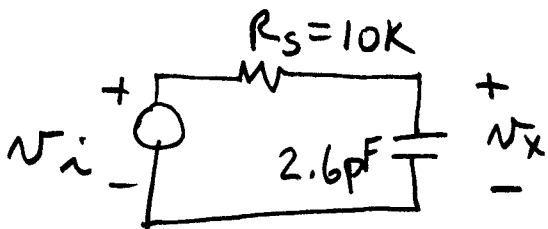


$$C_M = 0.1pF(1-A)$$

$$A = \frac{V_o}{V_i} \quad \text{AT LOW FREQUENCIES}$$

$$A = -(10mA/V)(2K) = -20$$

$$C_M = 0.1pF(1 - (-20)) = 2.1pF$$



$$V_x = V_i \left[\frac{\frac{1}{j\omega C}}{R + j\omega C} \right] = V_i \left[\frac{1}{1 + j\omega RC} \right]$$

$$\omega_c = \frac{1}{RC} = \frac{1}{10^4(2.6)(10)^{-12}}$$

$$\omega_c = 38.5(10)^6 \text{ rad/s}$$

$$\omega f_c = \frac{\omega_c}{2\pi} = \underline{\underline{6.1MHz = BW}}$$