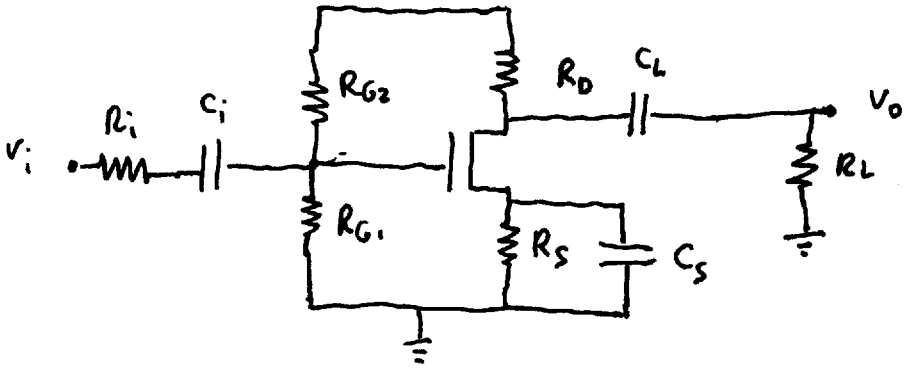


$R_i = 20\ k\Omega$ $\quad R_S = 830\ \Omega$ $\quad C_i = 20\ nF$

$R_{G1} = 330\ k\Omega$ $\quad R_D = 2\ k\Omega$ $\quad C_S = 1\ \mu F$

$R_{G2} = 1.5\ M\Omega$ $\quad R_L = 40\ k\Omega$ $\quad C_L = 20\ nF$

$r_d = 100\ k\Omega$, $C_{gs} = 4\ pF$, $C_{ds} = 0.5\ pF$, $C_{gd} = 1.2\ pF$

$g_m = 3.4\ mS$

$$\frac{V_o}{v_i} = \frac{V_o}{V_g} \cdot \frac{V_g}{v_i} = -\frac{R_D \,/\!/\, r_d \,/\!/\, R_L}{1/g_m} \cdot \frac{R_{G1} \,/\!/\, R_{G2}}{R_{G1} \,/\!/\, R_{G1} + R_i}$$

$$= -\frac{1.869\ k\Omega}{1/3.4\ mS} \cdot \frac{270.5\ k\Omega}{270.5\ k\Omega + 20\ k\Omega}$$

$$= -6.36 \cdot 0.93 = -5.9$$

$\tau_i = (R_i + R_{G1} \,/\!/\, R_{G2}) \cdot C_i =$

$f_i = \frac{1}{2\pi\tau_i} = 27.4\ Hz$

$\tau_L = (R_D \,/\!/\, r_d + R_L) \cdot C_L =$

$f_L = 189.6\ Hz$

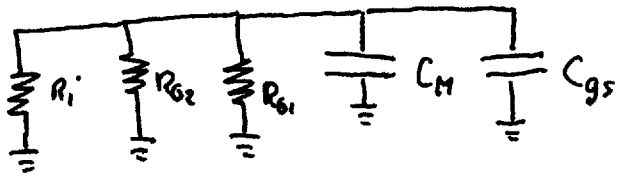
$\tau_S = (R_S \,/\!/\, 1/g_m) \cdot C_S =$

$f_S = 735.1\ Hz$

$f_{total} = 27.4 + 189.6 + 735.1 = 950\ Hz$

in

IN:



$$C_M = C_{gd} \cdot (1 - A) \quad !$$

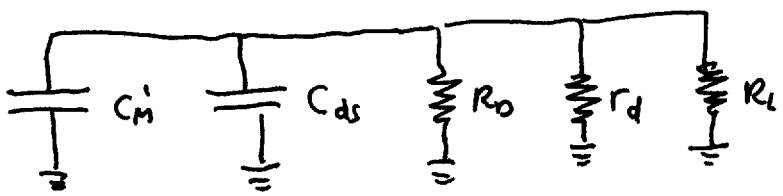
$$= 1.2\ pF \cdot (1 - (-6.36))$$

$$= 8.83\ pF$$

$$\tau_{in} = (C_M + C_{gs}) \times (R_{G1} \,//\, R_{G2} \,//\, R_i) = 2.4 \times 10^{-7}\ s$$

$$f_{in} = 666\ kHz$$

OUT:



$$C_M' = C_{gd}\left(1 - \frac{1}{A}\right) = 1.39\ pF$$

$$\tau_{out} = (C_M' + C_{ds}) \times (R_O \,//\, r_d \,//\, R_L) = 3.53 \times 10^{-9}\ s$$

$$f_{out} = 45\ MHz$$

$$\tau_{total} = 2.4 \times 10^{-7}\ s + 3.53\ 10^{-9}\ s = 2.43 \times 10^{-7}\ s$$

$$f_{total} = \frac{1}{2\pi \tau_{total}} = 650\ kHz$$