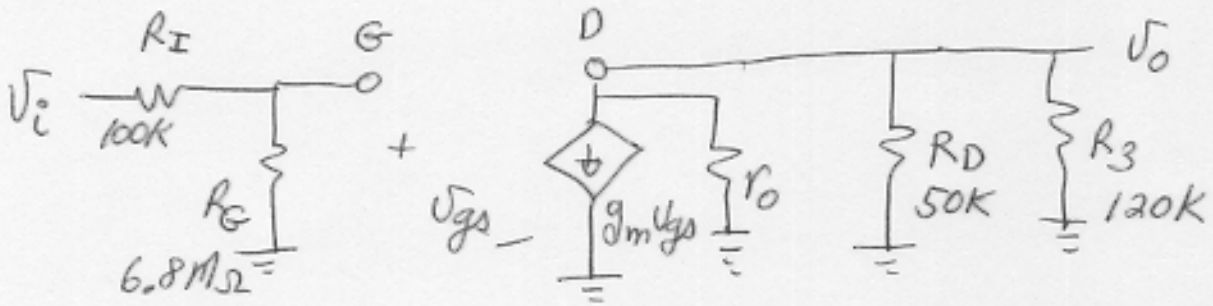
Jaeger 3rd ed

13.99

$K_n = 500\,\mu A/V^2$ $\quad I_D = 100\,\mu A$

$\lambda = \frac{1}{50V}$ $\quad V_{DS} = 5V.$



$$g_m = \sqrt{2 K_n I_D (1 + \lambda V_{DS})} = 332\,\mu S \qquad \left(\cong \sqrt{2 K_n I_D}\right)$$

$$= 316\,\mu S$$

$$r_o = \frac{1 + \lambda V_{DS}}{\lambda I_D} = 550\,K\Omega \qquad \left(\cong \frac{1}{\lambda I_D} = 500\,K\Omega\right)$$

$$A_v \equiv \frac{v_o}{v_i} = \left(\frac{R_G}{R_I + R_G}\right)(-g_m)(r_o \parallel R_D \parallel R_3)$$

$$= (0.986)(-332\,\mu S)(33.2\,K\Omega)$$

$$= -10.8 \qquad (+21\,dB)$$