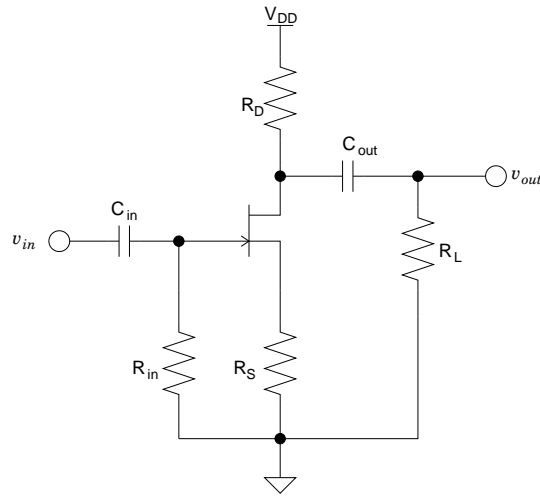


Physics 536 - Assignment #6

Consider the JFET amplifier circuit shown below:



in which $V_{DD} = 15\text{ V}$ and the parameters for the JFET are

$$\begin{aligned} V_P &= -4\text{ V} \\ I_{DSS} &= 10\text{ mA}. \end{aligned}$$

1. For a quiescent current of 2 mA, determine component values that will yield an intrinsic gain of -2 for input signals with amplitudes of $50\text{ }\mu\text{V}$ and have an input impedance of $1\text{ M}\Omega$ for frequencies above 10 kHz, ignoring the resistance of the load R_L . Explicitly show that the JFET is in the active region for these component values.

2. What is the output impedance of the amplifier? What would be an appropriate choice for the value of C_{out} ?

3. If the load resistance was $R_L = 10\text{ k}\Omega$, calculate the voltage and current through R_L as a function of v_{in} . What is the effective voltage gain of the amplifier? What is the current gain? What is the power gain?