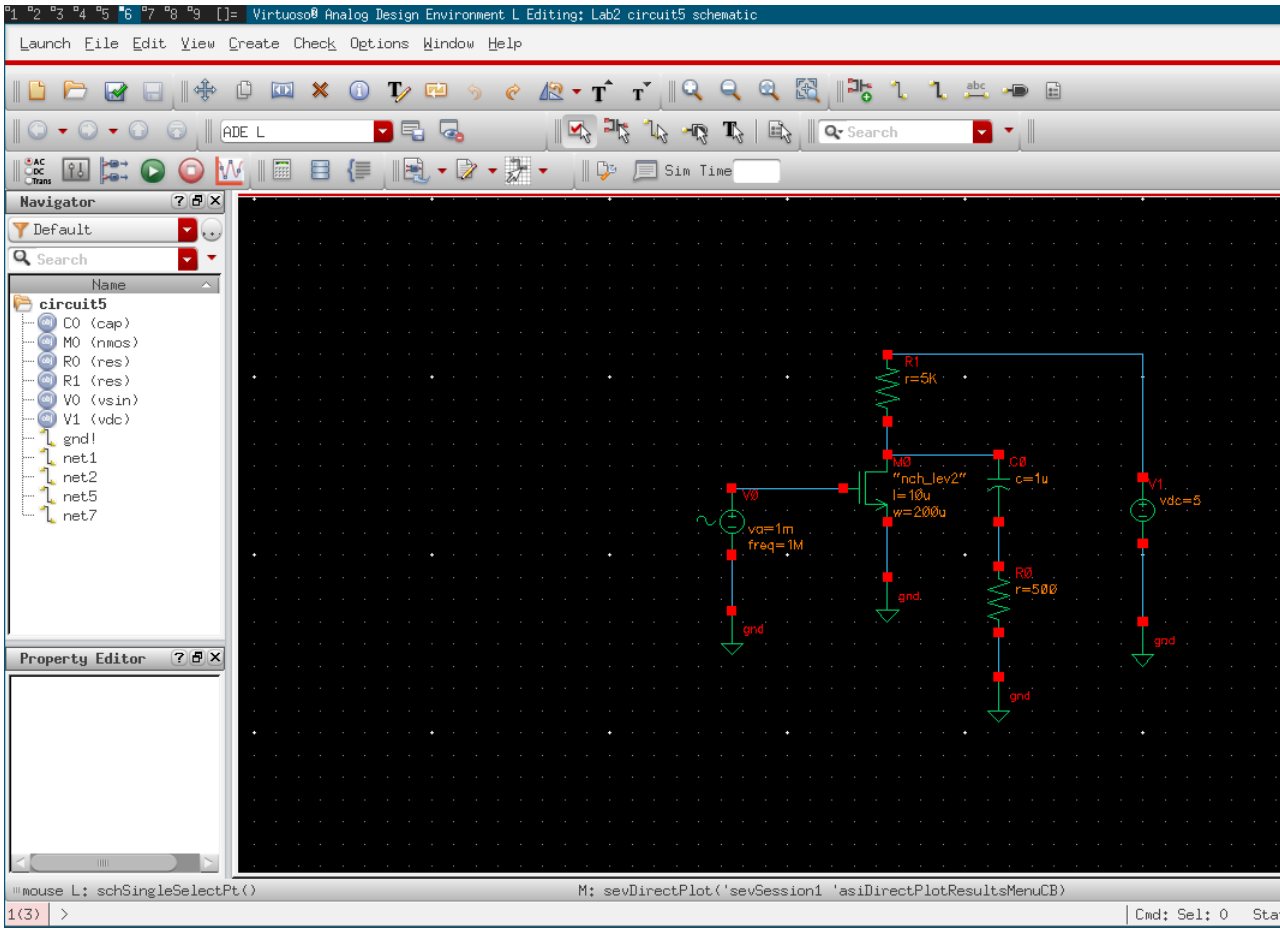

Figure 1: Circuit 5

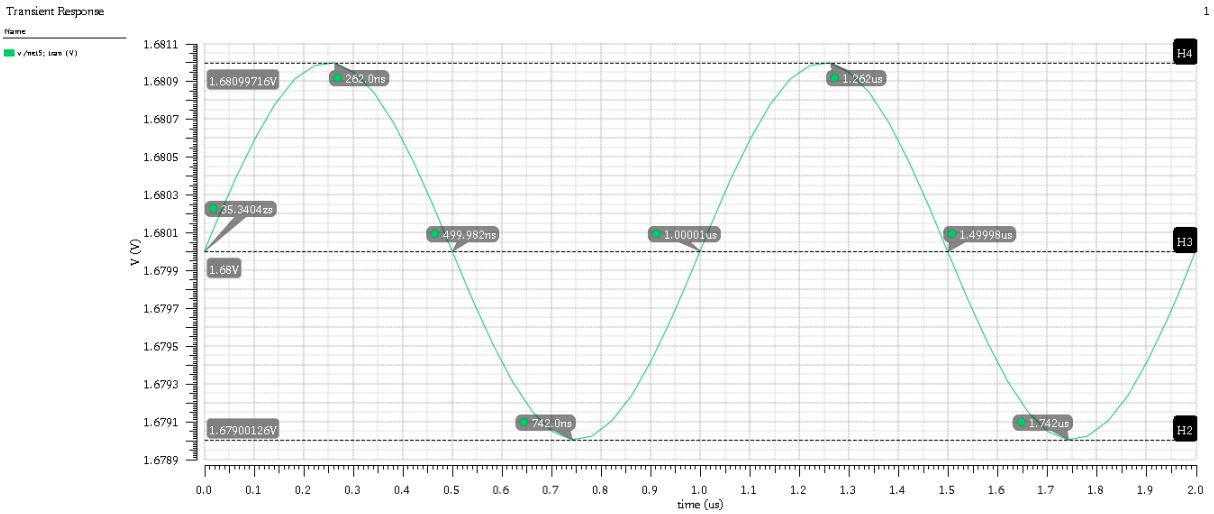

Figure 2: V_{in} for Small-Signal Test of Circuit 5

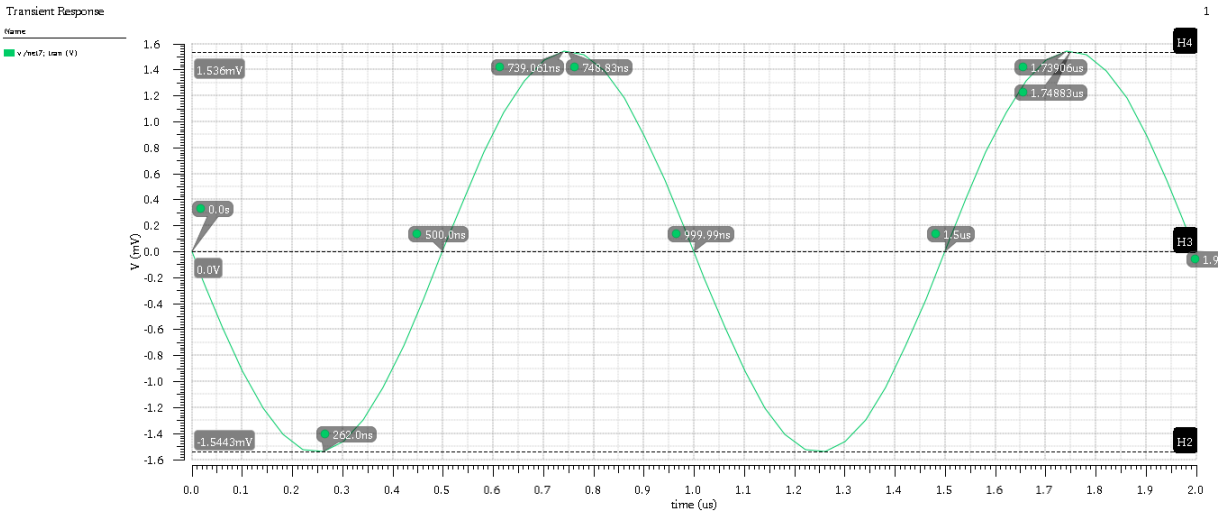

Figure 3: V_{out} for Small-Signal Test of Circuit 5

The small-signal gain can simply be acquired by taking the ratio of the amplitude of V_{out} to the amplitude of V_{in}. This should also be multiplied by a factor of -1 since the signals are out of phase by 180^o. The gain can be determined theoretically from $-g_m(R_D||R_L)$.

Table 1: Common-Source Amplifier Gain

Measured Gain [V/V]	Theoretical Gain [V/V]	Error from Theoretical
-1.54	-1.55	0.16%

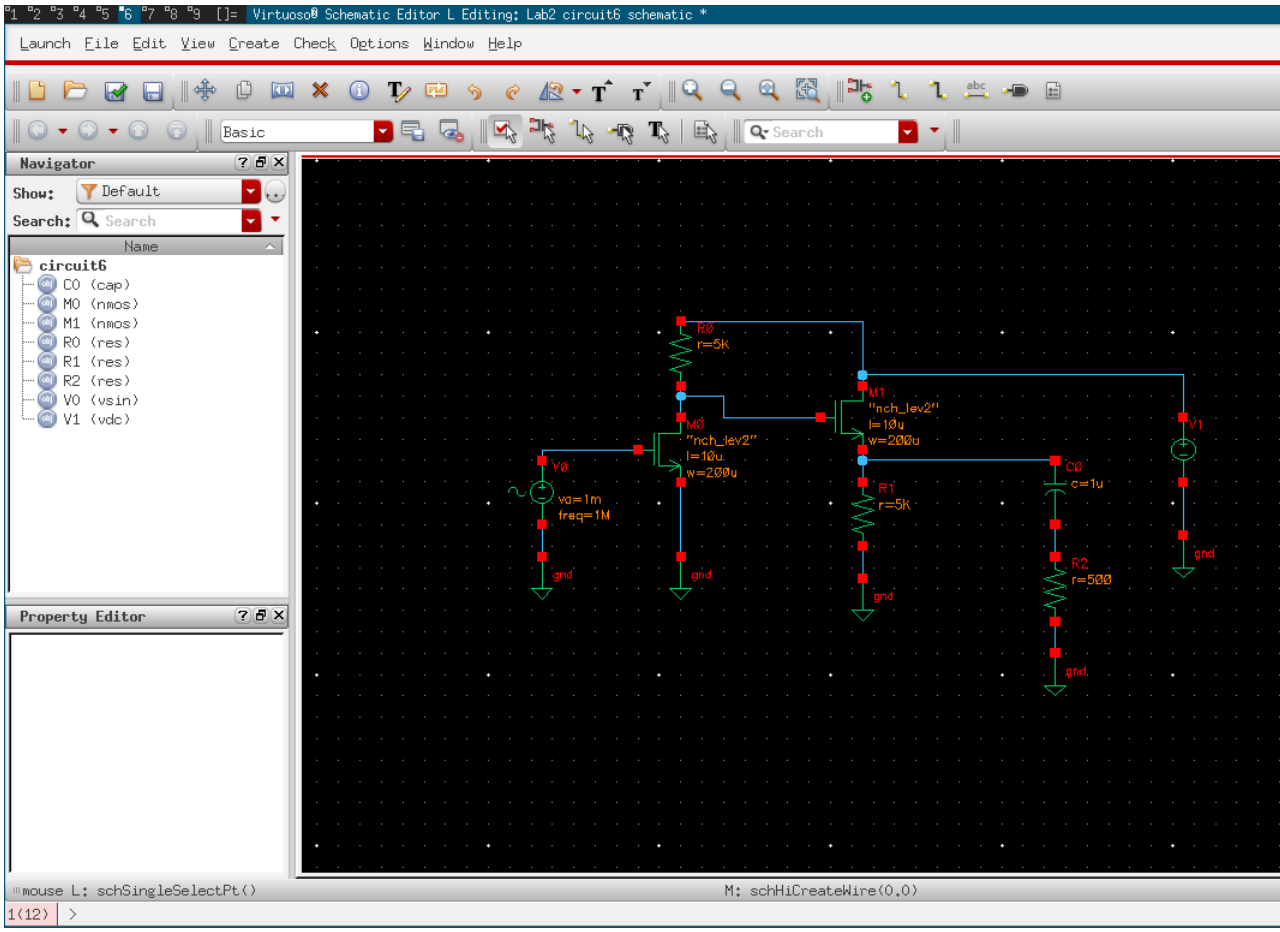

Figure 4: Two-Stage Amplifier

The common-drain amplifier at the output will present nearly the same output voltage, but with a much lower output resistance. The theoretical gain can be calculated by multiplying a common-source gain with a common-drain gain (assumed to be about 1) and then applying the voltage division equation.

$$A_{cascade} = -\frac{g_{m,CSA} R_L (R_D || r_{o,CSA})}{r_{out,CDA} + R_L} \tag{1}$$

Table 2: Gain of Cascaded Amplifier

Measured Gain [V/V]	Theoretical Gain [V/V]	Error from Theoretical
-8.50	-10.13	16.12%