PHYS 431, Homework #6
Due Tuesday, February 25, start of class.

1. Using a current-summing configuration, design a circuit to produce an output voltage $V_{out} = 2V_1 + V_2$. Use resistors that are integer multiples of 1 kΩ. Hint: you will need to use 2 op-amps to avoid an overall negative sign...

2. Show that the circuit below acts as a difference amplifier with $V_{out} = \frac{R_2}{R_1}(V_+ - V_-)$. Solve this by finding the currents flowing through the resistors rather than using the voltage divider equation as shown in the Steck notes.

3. Show that the following circuit also acts as a difference amplifier. Find the gain $G$. [Steck, Prob. 7.16]

4. Find the amplitude transfer function $|\tilde{T}(\omega)|$ of the following circuit. Graph the result as a Bode plot.

5. Consider the circuit below. Design an equivalent circuit (e.g. the same $|\tilde{T}(\omega)|$) using an op-amp, the same resistor $R$, and a capacitor. Find the value of the capacitor in terms of $R$ and $L$. [Steck, Prob. 7.15]