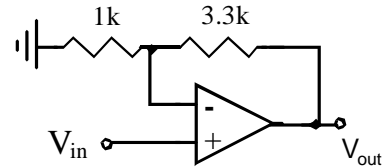


Analog & Digital Electronics

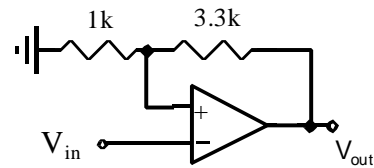
We will have an exam in about two weeks, Probably April 25 or 27.

Assignment 8: Due Friday, April 20.

1. The input to the circuit at the right is a triangle wave of 5V peak to peak. Sketch the output and the input. Assume the output of the op amp can swing from -10V to +10V. Be sure to label important points.



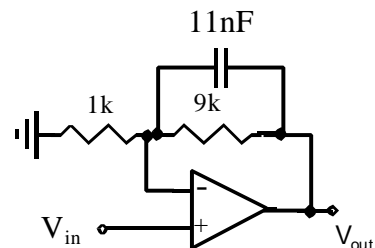
2. The input to the circuit at the right is a triangle wave of 10V peak to peak, i.e. $\pm 5V$. Sketch the output and the input for one full cycle of the input. Assume the output of the op amp can swing from -10V to +10V. Be sure to **label important points**. (Note that this circuit is not quite the same as the one above!)



3. Consider the product of two signals, $[\sin(100\pi t) + 1] \cdot [\sin(2000\pi t)]$. Draw the frequency spectrum of the product (i.e. plot the amplitudes vs. Frequency).
4. I have the function of time shown below and I multiply it by $\cos(40\pi t)$ and then low pass filter it with a cut off frequency of 10π rad/s. What frequencies are present in the resulting signal and what are their amplitudes? (Make a table of the results.)

$$f(t) = 7\cos(40\pi t) + 4\cos(240\pi t) + 9\cos(320\pi t).$$

5. Explain how the op amp at the right will work. Assume the unity gain frequency of the op amp is very large, essentially infinite, when you answer this question. (Hint: What is the gain at low frequencies and what is the gain at high frequencies?)



6. Describe how the op amp at the right will work, i.e. what will it do? Assume the output of the op amp can swing from +10V to -10V.

