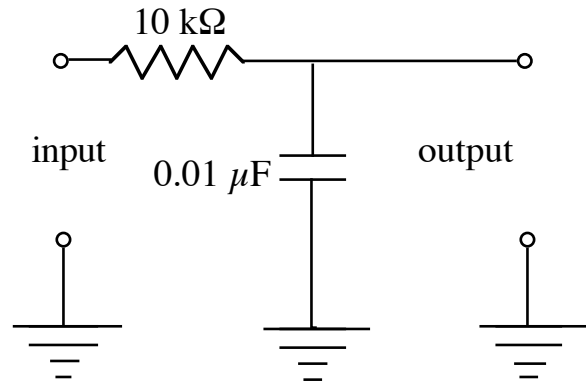


## Lab 3

## RC Circuits

### Part 1:

- Is this circuit an integrator or a differentiator?
- Drive the circuit with a 100 kHz square wave. (ie the voltage input should be a square wave.) Carefully draw the output waveform and the input waveform together. Make sure to indicate the voltage scale for each signal and the time scale.



- What do you expect the waveform to look like? Justify your answer as explicitly as you can. In other words figure out a way to turn the graph into a mathematical waveform and do the integral or take the derivative. Talk about other features of the waveform like why does the wave increase or decrease? If there should be a phase difference explicitly show what it is.
- Is what you see consistent with your expectations?
- Repeat each step you did using a square wave with a triangle wave and then with sine wave.
- Measure the frequency where this circuit begins to behave as an integrator or differentiator? Will it continue to behave in this manner for larger or smaller frequencies? Try it.
- Is the output of the circuit consistent with what you expect from the derivation? Why or Why not?

### Part 2:

Repeat part 1 using the circuit shown on the right.

