A diagram of a circuit

Description automatically generated** Manual to Lab 8: PHY2048C**

**Florida State University**

**Circuits III**

**About labs in this class**

The labs in this class will have general instructions, and many things need to be figured out by the students. I will be answering any specific questions the students may have without completely giving away the key to the puzzle. **Answer the questions and record your measurements in your lab notebook and submit the notebook at the end of the activity.**

**About this lab**

In this lab, you are provided with tools to make an RC Circuit, an LRC Circuit, and an LCR circuit. Troubleshooting this experiment is part of the experiment.

**Activity 1:** Make a charging RC circuit by placing a resistor and a capacitor in series with a battery and a switch.

**Activity 2:** Measure the characteristic capacitor charge time using the oscilloscope (the Universal Interface). Sketch a plot of current over time.

**Question 1:** What is the characteristic time of the circuit? Is it ?

**Activity 3: While the capacitor is still charged,** make an LRC circuit without a battery (add an inductor in series with a resistor and a charged capacitor), you must be quick to keep the capacitor charged since it discharges with the air.

**Question 2:** How long until the circuit damps the charge 1/e of the initial charge? Is this time consistent with the theoretical value ([Ch 14.6](https://openstax.org/books/university-physics-volume-2/pages/14-6-rlc-series-circuits))

**Activity 4:** Now connect the LCR to the Universal Interface’s power supply and output an AC signal that [resonates](https://openstax.org/books/university-physics-volume-2/pages/15-5-resonance-in-an-ac-circuit) with the circuit?

**Question 3:** What is the maximum current you can get through the resistor? Is this in line with the theoretical estimate? ([Ch 15.3](https://openstax.org/books/university-physics-volume-2/pages/15-3-rlc-series-circuits-with-ac)).

**Activity 5:** Pass a constant current thought to an inductor (do not short it), then open the circuit abruptly and generate a kickback signal. Show me this signal.