ECE 332 Lab 11v

s for Real

In the previous two labs, we simulated the behavior of a series RLC circuit to see where the poles were for various values of resistance and then observed the sinusoidal responses as a result of these poles. In this lab, we will observe this response with physical elements.

Goals

In this lab, we will

- Measure using myDAQ the sinusoidal response of a second-order RLC circuit as a function of frequency.
- Compare the outcome with the result of the simulation done in Lab 9s.

Procedure

1. Use a DMM (either a stand-alone or myDAQ) to measure the DC resistance, R_L, of the 100-mH inductor. Record the value on the turn-in page.
2. Choose a value of the resistance R so that the total resistance in the circuit, $R + R_L = 300\ \ \Omega\ \ \pm 3\%$.
3. Build the circuit shown in Figure **??** and connect the myDAQ leads to it as shown.

   Excitation for the circuit is via $AO0$ and AGND.

   Circuit input feeds Channel 0 of the scope via $AI0+$ and $AI0-$.
4. Launch the Function Generator and set it up.
   - Frequency = 1 kHz
   - Amplitude = 0.5 V_{pp}
   - DC Offset = 0 V
   - Signal Route = AO 0
   - Run
5. Launch the Scope and set it up.

   Enable both channels.

   Set **Scale Volts/Div** = 100 mV

   Set **Vertical Position (Div)** = 0

   Time/Div = 500 μs

   Trigger Type = Edge

   Run
6. Note: As you take data, you will be increasing the frequency, so the scope's display will change. Continually readjust the scope. Keep displaying only about two or three cylces of the sine waves and make them fill much of the vertical space on the screen
7. Use the V_{PP} values at the bottom of the screen to record the input and output voltages in the table on the hand-in page.
8. Calculate the magnitudes of the transfer function, $|H(f)| = |V_{out}|/|V_{in}|$ and complete the table.
9. Plot $|H(f)|$ versus frequency on the graph you created in Lab 9s.

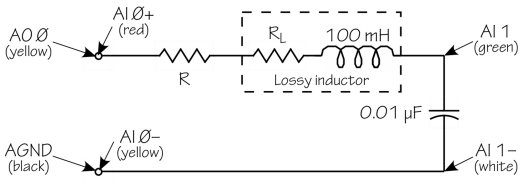

Figure 1: RLC Test Circuit

The End

How do the traces on your graph compare? Does the circuit behave as expected from the simulation? Is it close? Or not? If not, explain what is probably happening to make the results differ.

Turn in the completed graph with your hand-in page.

Report of Lab 11v Results

Name _____

$R_{L-measured}$ _____ R_{added} _____ R_{total} _____

Frequency (kHz)	V_{in} (Channel 0)	V_{out} (Channel 1)	V_{out}/V_{in}
1.0			
2.0			
3.0			
4.0			
4.2			
4.4			
4.6			
4.8			
5.0			
5.2			
5.4			
5.6			
5.8			
6.0			
6.5			
7.0			
8.0			
10.0			

Attach the graph from Lab 9s with the Lab 11v data added.