Ryerson University

Department of Electrical,
Computer, & Biomedical Engineering
Faculty of Engineering & Architectural Science

ELE 202
Electric Circuit Analysis
LAB COVER PAGE for Part II submission.

Lab #:	7	Lab Title:	SinusoidalSteady-State Response of Simple R-C and R-L Circuits

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***Signature*:**	

(* Note: remove the first 4 digits from your student ID)

Section #:	11
Submission date and time:	17:00
Due date and time:	14/4/2023

Document submission for Part II:

- A completed and signed "COVER PAGE – **Part II**" has to be included with your submission, a copy of which is available on D2L. The report will not be graded if the signed cover page is not included.
- Scan your completed pages of **Section 5.0** and **Section 6.0** (via a scanner or phone images), together with any required In-Lab Oscilloscope screen-shot images.
- Collate and create a .pdf or .docx file of the above, and upload it via D2L **by 11.59 p.m. on the same day** your lab is scheduled. ***Late submissions will not be graded.***

**By signing above, you attest that you have contributed to this submission and confirm that all work you have contributed to this submission is your own work. Any suspicion of copying or plagiarism in this work will result in an investigation of Academic Misconduct and may result in a "0" on the work, an "F" in the course, or possibly more severe penalties, as well as a Disciplinary Notice on your academic record under the Student Code of Academic Conduct, which can be found online at: www.ryerson.ca/senate/current/pol60.pdf.*

6.0 POST-LAB: OBSERVATIONS AND ANALYSIS OF RESULTS

1. From the above in-Lab results recorded in **Table 4.0:-** For *each* frequency, **f;** determine the corresponding values for the magnitudes $\|\mathbf{Z}\|$ and $\|\mathbf{I_Z}\|$, and the phase-angle, $\boldsymbol{\Theta_Z}^o$; and record these in the respective columns of **Table 4.0**. Compare $\|\mathbf{Z}\|$, $\|\mathbf{I_Z}\|$ and $\boldsymbol{\Theta_Z}^o$ values with corresponding theoretical values in **Table 2.0** and MultiSIM values in **Table 2.1**. Explain your observations, and reasons for any discrepancies.

workspace

The Results were very similar to the theoretical values. Differences can be due to different tolerance values and other measurement errors

2. From the above in-Lab results recorded in **Table 4.1** for each frequency, **f;** determine the corresponding values for the magnitudes $\|\mathbf{Z}\|$ and $\|\mathbf{I_Z}\|$, and the phase-angle, $\boldsymbol{\Theta_Z}^o$ and record these in the respective columns of **Table 4.1**. Compare $\|\mathbf{Z}\|$, $\|\mathbf{I_Z}\|$ and $\boldsymbol{\Theta_Z}^o$ values with corresponding theoretical values in **Table 3.0** and MultiSIM values in **Table 3.1**. Explain your observations, and reasons for any discrepancies.

workspace

There were errors in the values of V-Ch2 and t. This makes the ||I2||, ||Z|| and 2 values inconsistant to the prelab, However, the values recorded from V-CH2 were generally accurate

=> Sources of error can be due to the actual components of the circuit itself, specifically the inductor. Other sources of error can be from tolerance and other measurements.

3. For the "Design Question" circuit in **Figure 4.0**: **(i)** How does the measured value of the potentiometer resistance, R_P match up with your theoretical prediction in the Pre-Lab 4(c)? and **(ii)** what factors would have contributed to any difference in these two values?

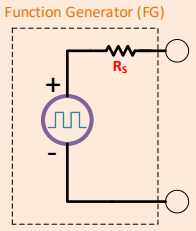
workspace

Therefore, In the lab, the resistance was about 1.9k which is the theoretical prediction of 3.2 k.

Sources of error can due to the measuring errors.
The results on the machine were fluctuations so 2.9 k may not be accurate to the real values.

4. For both **R-C** and **R-L** circuits, the Function Generator (**FG**) was assumed to be ideal, meaning that its output (source) resistance, $R_S = 0\Omega$. In reality, the **FG** has $R_S = 50\Omega$ as depicted below, and so if one takes this into account then how might this have affected your measured results compared to the theoretical value. Can this measurement error be considered negligible? Why?

workspace



A very similar question was answered in the prelab wherein it was answered thst it is situationally negligible. It does depend on the size of the resistor in comparision to the Rs, considering how the percentage error would be larger if the two values are closer to each other.

In this case, the measurements erro would be the net negligible, assuming anything under a 5% error is acceptable.