

EE 220/220L Circuits I (Fall 2019)

Technical Report on Laboratory Projects 10 and 11

Introduction

In this technical report, you will use your lab logbook as a reference resource after having investigated first-order circuits in Laboratory Project 10 RL and RC Circuits (Lab 10) and used PSpice to model the circuits in Laboratory Project 11 PSpice for Transient Circuits (Lab 11). This is meant to aid in satisfying the ABET course objective to “Understand and use a laboratory notebook for documenting experiments and writing technical reports.”

Technical Report (separate document, not in logbook)

- Here, you will use your logbook as a reference resource to compose a technical report on the **RC circuit** portions of Lab 10 and Lab 11. Do **NOT** include *RL* circuit material in the technical report.
- The technical report is a separate document consisting of: 1) Cover Page, 2) Introduction, 3) Body, 4) Summary & Conclusions, 5) References, and 6) Appendices (optional). It should be entirely electronically produced (i.e., use MS-Word or equivalent), no photos of handwritten items.
- Use professional font(s) (e.g., times new roman, Arial, ...) of appropriate size (12 point or larger) and line spacing (e.g., 1.25 or 1.5) on fronts of pages only. In addition, follow format guidelines contained in the syllabus for homework for units, lead zeros, etcetera.
- Your text and logbook are reference items and should be listed and cited in your report using IEEE format. A short tutorial on the IEEE system of references and citations is shown in Appendix I.
- Put calculations, equations, results, and plots/figures in **body** of the report in appropriate sections as they occur. Appendices are **NOT** to be used as a “dumping ground” for these items; do **NOT** expect a reader to flip between the report body and appendices. However, long derivations and computer code/m-files may be put in Appendices **if referenced in text** of the report.
- The Cover Page should include: EE 220/220L Circuits I (Fall 2019), Technical Report on Laboratory Project 10 RL and RC Circuits and Laboratory Project 11 PSpice for Transient Circuits, *your name*, and *date*. Center and format in a legible and professional manner.
- Introduction- tell reader what you are going to discuss in paper. (Hint: include a circuit diagram)
- The Body should be broken down into **titled subsections** based on the analytic and experimental parts of Labs 10 and 11 (e.g., Analytic & Experimental OR Analytic, pSpice Simulation of Analytic Circuit, Experimental, & pSpice Simulation of Experimental Circuit). A list of items that **must** be included is shown in Table 1.
- Comparisons should be quantitative (e.g., compare specific voltage values) **NOT** “The plots look similar.” **All** tables and figures should be captioned (i.e., numbered and named).
- The report should be as long as necessary to cover the material, but no longer. I.e., there is no specified length. A ‘report’ consisting only of equations, graphs, and figures with no explanatory text is insufficient. A 50+ page opus starting with the formation of the solar system is too long.
- Correct spelling and proper grammar will be considered in grading (part of being professional).

Technical report & logbooks due at Practical Exam on Thursday, December 5, 2019.

Table 1 Items to include in body of report

<u>Analytic section(s)</u>
➤ $v_c(t)$ equations found in Lab 10 preliminary
➤ MATLAB graph of $v_c(t)$ equations from the Lab 10 preliminary
➤ PSpice circuit for Lab 11 simulation of <u>preliminary</u> circuit
➤ $v_c(t)$ plot from Lab 11 PSpice simulation of <u>preliminary</u> circuit
➤ voltage comparison table from Lab 11
➤ Matlab plot of analytic $v_c(t)$ equations (line) and PSpice $v_c(t)$ data points (dots); use a legend
<u>Experimental section(s)</u>
➤ derived $v_c(t)$ equations for the RC circuit from experimental and analysis sections of Lab 10
➤ bitmap of $v_c(t)$ for the RC circuit from experimental part of Lab 10
➤ PSpice circuit with <u>experimental/measured component values</u> from Lab 11
➤ $v_c(t)$ plot from Lab 11 PSpice simulation of <u>experimental</u> circuit
➤ voltage comparison table from Lab 11
➤ Matlab plot of experimental $v_c(t)$ equations (line), experimental $v_c(t)$ data points (dots) & PSpice $v_c(t)$ data points (squares); use a legend

Appendix I References/Citations

Per the IEEE system, a consecutive numbered list of references is provided at the end of the technical articles/reports using square brackets. The list should be arranged in the order of citation in text of article/report, not in alphabetical order. References not cited in text **DO NOT EXIST**. Each reference should be given a unique reference number. Include all authors' names on a paper in the reference list; do not use “et al.”. Capitalize only the first word in a paper title, except for proper nouns and element symbols. Logbooks that have not been professionally published should be cited as “unpublished” [1].

When citing references within body of report, simply refer to the reference number enclosed by square brackets, e.g., [2]. Do not use “Ref. [2]” or “reference [2]” except at the beginning of a sentence, e.g., “Reference [2] was the first...” When citing specific items within a longer work, you may use page, section, or equation number references, e.g., “... as shown in equation (3.1) of [3] ...” or “... the derivation of the Telegrapher’s equations [3, pp. 557-558].”

References

- [1] J. Doe, EE 220L Circuits I logbook, unpublished.
- [2] G. Eason, B. Noble, and I. N. Sneddon, “On certain integrals of Lipschitz-Hankel type involving products of Bessel functions,” Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955.
- [3] Matthew Sadiku, *Elements of Electromagnetics*, 7th ed., Oxford University Press, New York, 2018.