Experiment 7
Rectifiers, Capacitors and Inductors

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January 3, 2022

Contents

1 Introduction

In this experiment, as students, we are expected to experiment with rectifiers, capacitors, and inductor circuits by completing the steps described in the seventh experiment laboratory manual. The half-full rectifier circuit structures and ripple voltages are expected to be learned throughout these steps. The output versus input characteristics is observed by connecting the signal generator to the oscilloscope and the circuit. Also, the measurement techniques for the capacitance of capacitors and the inductance of inductors are expected to be expressed and experimented. The results of the steps were recorded and plotted for further comments.

2 Experimental Results

In this section, the results of Experiment 7 are discussed.

2.1 Step 1

In this step, circuit shown in the Figure 1 is constructed.

3 Conclusion

In conclusion, in experiment 7, "Rectifiers, Capacitors and Inductors," as students, we have learned how various functional circuit setups rectifiers constructed. Preliminary laboratory work is done via simulations of the rectifier, capacitor, and inductor circuits in an LTSpice environment and by mathematical relations. As students, we have seen how half-wave and full wave rectifiers behave. We have inferred the capacitance and inductance values indirectly and compared them with the direct ones. The characteristics of the q-v and ϕ-i are observed with the help of their calculations. Lastly, different inductors and their behaviors are observed, and the mathematical expressions are verified via measurements. To sum up, in this experiment, as students, we have experimented with how different rectifier circuits operate, how we can measure or calculate the inductance and capacitance values.

Appendix I

Total time spent on/during:

- Pre-lab preparation: 5 hours (including the preliminary work and simulations)
- Experimental work: 2 hours (hours spent in lab)
- Report writing: 5 hours

Appendix II

The outputs of the simulations are fetched from LTSpice and plotted in MATLAB.