City University of Hong Kong
Department of Electronic Engineering

Formatting requirements

- Use single line spacing and **ONLY** Times New Roman font size 12 for the whole report.
- Margin: 1 inch all around.

A template for the report has been provided and you must use the provided template. Reports deviating from this format will be rejected.

With reference to the template provided:

- Replace the headings (highlighted in red) with your name and lab section
- Above the abstract on the first page, fill in your name, student ID, and lab section

Your report **should not exceed 8 pages** (equivalent to four A4 sheets printed double side).

Submission Procedure for Lab Report

All reports must be submitted through the Canvas Assignment Submission link.
Deadline: NOV 24, 2020 NO LATE SUBMISSIONS ALLOWED.

Submissions by other channels will be ignored (e.g. hard copies or email / Canvas Messaging).

Expected good practices of report writing

Use of figures: Each figure included in the report should have a caption underneath the image as the example given in the document (see Fig 1). For every figure that is used in the report, the text should make reference to it. E.g. "Fig 1 shows an inverting amplifier".

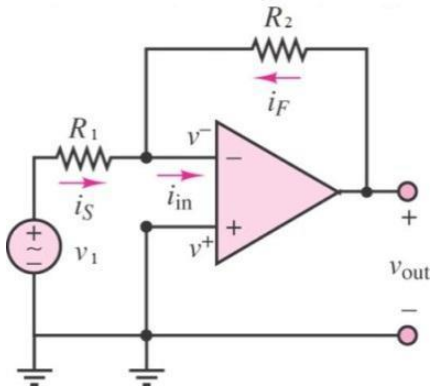

Fig. 1: Circuit diagram of an inverting amplifier

Use of graphs: Lab 5 contains the use of quite a few graphs to present the experimental data. As such, this report should include them. Graphs should be treated like figures. As such, each graph should have a caption under the image like you see in Fig 2. And just like figures, for every graph that is used in the report, the text should make reference to it, e.g. "Fig 2 shows the change of output voltage with input voltage for the inverting amplifier".

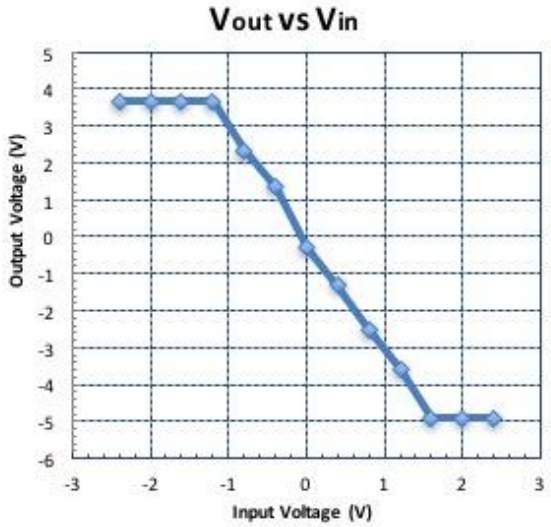

Fig 2: Measurement of output voltage versus input voltage

Citation of references: You will most certainly have to rely on various sources of information and these should be duly acknowledged. For instance, the background and description of the amplifiers that you used in Lab 5 could be taken from internet sources or from the text book [1]. For the style of references to use, please refer to the University's library resource [2]. Plagiarism: It is important to bear in mind that failing to acknowledge sources of information would be a classic case of plagiarism, and must be avoided. Even if you acknowledge a course in your reference, **you must rephrase the text** as copying even a phrase is also understood as plagiarism.

Basic contents required in the lab report

Your report is to be based on your work for Lab 5. The report should NOT be written in bullet points: ideas should connect from one full sentence to another. The report should consist of the following sessions.

Abstract

Summarize in NOT more than 150 words:

- The objective the experiment in Lab 5
- How the experiment was achieved in terms of the components used and circuit configurations
- Key findings from the experimental results
- Conclusions

1. Description of Components

The aim of this section is to provide an introduction to the main components that were used in this experiment. This would definitely include the op amp.

1.1 Operational Amplifier (op amp)

Points you should try to cover would include:

- What are op amps made of?
- What are they key characteristics of op amps?
- Identify the model of the op amp you have used and describe the pin configuration.

…

2. Introduction to the Design of the Circuit

Describe the overall function of the circuit and explain how the different parts fit together. For example, you should explain that the full circuit and describe the function of each stage.

A deeper analysis into each stage should be included in the following sub-sections:

2.1 Inverting Amplifier

- Derive the closed loop gain of the amplifier
- Distinguish the difference between the closed-loop gain and the open-loop gain
- Describe the function of an inverting amplifier, and how this is related to its close-loop gain expression
- Explain your choice of resistors in relation to the specified gain
- What limits the output of the amplifier?
- What is the input resistance of the circuit?

2.2 DAC

…

2.3 Comparator

…

3. Results

Do not include any of the tables in this section if the data can be presented using the relevant graphs. Use table if the data cannot be presented using graphs.

3.1 Inverting Amplifier

- Report your results from Task 1.
- Include the graph of output voltage versus input voltage
- Describe the various parts of the curve (e.g. relationship of the slope with amplifier gain, saturation).
- Input current (i_{in}) and its implication for the circuit input resistance.
- Describe the different features of this graph of v_o against v_i (e.g. the slope and how this relates to gain and resistor values, saturation)

3.2 DAC

- Report your results from Task 2.
- Explain your choice of resistor values
- Describe what your measured results show, for example with regards to the function. You will naturally have to make references to the table, for example:

  "Table 1 summarizes …"

  "The measured results in Table 1 show …"

  "The measured results in Table 1 demonstrate …"

  "As compared to the measured values listed in Table 1 …"

- Compare your measured results with theory and discuss the underlying causes of any discrepancy between the two sets of values.

3.3 Comparator

- Report your results from Task 3.
- …

4. Discussion

- Compare the experimental results presented in Section 3 with the theoretical predictions described in Section 2.
- Identify and explain sources of discrepancies (i.e. differences) between the experimental data and theory. Comments such as "experimental error" are too basic and uninformative, and as such will be ignored.

5. Conclusions

- Summarize all your key finding(s) from Section 4.
- NOT more than 1/3 of an A4 page.

References

Refer to "Examples of reference list entries – IEEE style" on the website below.
http://libguides.library.cityu.edu.hk/citing/ieee

[1] C. K. Alexander and M. N. O. Sadiku, "Operational Amplifiers", in *Fundamentals of Electric Circuits*, 5th Ed. New York: McGraw-Hill Education, 2013, pp. 196-7.
[2] Source: http://libguides.library.cityu.edu.hk/citing/ieee (This citation is NOT example of IEEE style)