Università degli studi di Trento

Group **MAR01**

REPORT OF THE EXPERIMENTS PERFORMED IN THE COURSE OF PHYSICS LABORATORY III

Authors:
Canteri Marco
Biasi Lorenzo
Luca Vespucci

Professor:
Rolly Grisenti

September 21, 2016

Contents

Experiment 1

Basic circuits with an operational amplifier

In this experiment we have built five different circuits. The first is an open loop circuit with the operational amplifier uA741, the goal was to find the maximum voltage outputed by the op-amp as justified from the equation $v_o = A_{ol}(v_+ - v_-)$ where A_{ol} tends to infinity in the ideal model. The last four circuits are in closed loop configuration with a negative feedback, they consist on a follower, a non inverting amplifier, an inverting amplifier and a weighted summing amplifier. We have measured the voltage input and the voltage output of every circut.

1.1 Materials

- Operational amplifier uA741
- Resistors, nominal value: 100 Ω, 220 Ω
- Power supply RIGOL DP831A
- Waveform generator RIGOL DG1032
- Multimeter RIGOL DM3068
- Oscilloscope AGILENT 54261A

1.2 Experiment setup

In the first four circuits the output of the waveform generator was a sine wave of 100Hz frequency and a peak-peak voltage of 100mV. We measured the waveform output signal and the output voltage v_o of the ap-amp. The measurements were performed using an oscilloscope triggered externally, the signal acquired is an 8 cyles average. The voltage supply of the op-amp was set to $v_{cc} = 15$V for all the circuits.
For the last circuit we used another sine wave signal with the same 100Hz frequency and a different peak-peak voltage. The oscilloscope's setting and the measurement taken was the same as before.

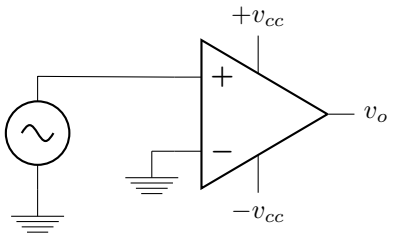

Figure 1.1: Open loop circuit

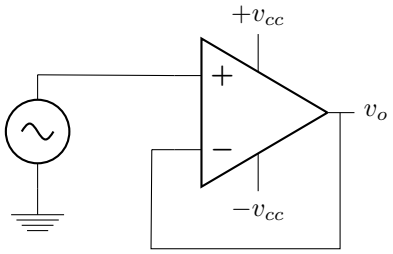

Figure 1.2: Follower

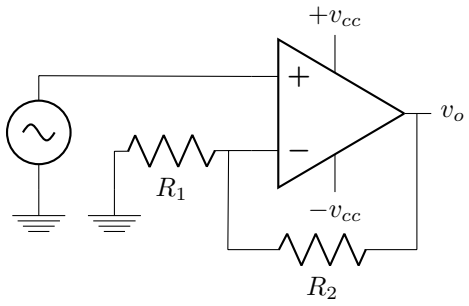

Figure 1.3: Non inverting amplifier

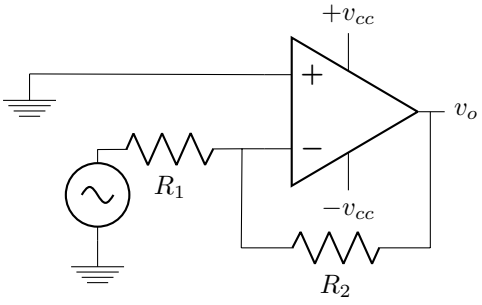

Figure 1.4: Inverting amplifier

1.3 Data analysis