**LAB NOTE**

**Subject: Electronic Design Principles**

**Topic: Scale Adder**

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# Objectives

* Build a scaled adder that one inverting input with R1 will be amplified by 10 and the other R2 by 5.
* Use 10 kOhm resister for one of the input resisters, R1 and calculate Rf. Use the same Rf to calculate R2.
* Show your design in using Multisim in your pre-lab.
* Prepare a table for measurement in advance to prove that your circuit work by comparing your calculated values with the actual values.

# Theory and Calculation

## Theory

* A scaling adder has two or more inputs with each input having a different gain. The output represents the negative scaled sum of the inputs.

## Design and Calculation

A diagram of a circuit

Description automatically generated

Figure 2‑1: Scale Adder's design

For this design the following equipment are use:

* Resistor , Resistor and Resistor
* IC LM348N
* Function Generator
* Power Supply

Formula to calculate gain:

Formula to calculate Vout:

* **Calculation for Rf:**

The requirement stated that it need the gain of 10 for input 1 and gain 2 for input 2, with R1 = :

* **Calculation for R2:**

Because the kit does not have a resistor with value so instead will use resistor.

* **Power supply:**

**A black and white line

Description automatically generated with medium confidence**

Figure 2‑2: LM348N's datasheet

From the datasheet, it said that it recommended that the power supply of Vcc+ should be in range from 4V to 18V, and for Vcc- should be from -4 to -18.

# Design and Result

For this assignment, 6 cases will be tested, 3 will be with DC power and 3 will be from AC power.

## Multisim’s design.

A diagram of a circuit

Description automatically generated

Figure 3‑1: Multisim's design

## Breadboard’s design

5A circuit board with wires and a round object

Description automatically generated

Figure 3‑2: Breadboard’s design

## Result

### DC power

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Input | Output | | | |
| Theory | Multisim | | Breadboard |
| -0.28 | 4.2 |  | |  |
| -0.4 | 6 |  | |  |
| -0.64 | 9.6 |  |  | |

Table 3‑1: DC power for Scale Adder

### AC power

* Inverting

|  |  |  |  |
| --- | --- | --- | --- |
| Input (Vpp) | Output | | |
| Theory | Multisim | Breadboard |
| 0.56 | 7.4 |  |  |
| 1.12 | 16.8 |  |  |
| 0.62 | 9.3 |  |  |

Table 3‑2: AC power for Scale Adder

# CONCLUSION

From the result of all cases:

* All cases have Theory’s result, Multisim’s result and Breadboard’s result nearly the same.

**REFERENCES**