Feng Chia University

Electrical Engineering Fundamentals II Lab

Laboratory 7

OPAmp-T Network and Adjustable Gain

Instructor: Prof. Shyan-Lung Lin

Student Name: 周嘉禾

Student ID: D1166506

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I. Introduction

a. To observe the behavior of Op Amp with T Network

II. Materials

a. Power supply

b. Digital Multimeter

c. Function generator

d. Devices

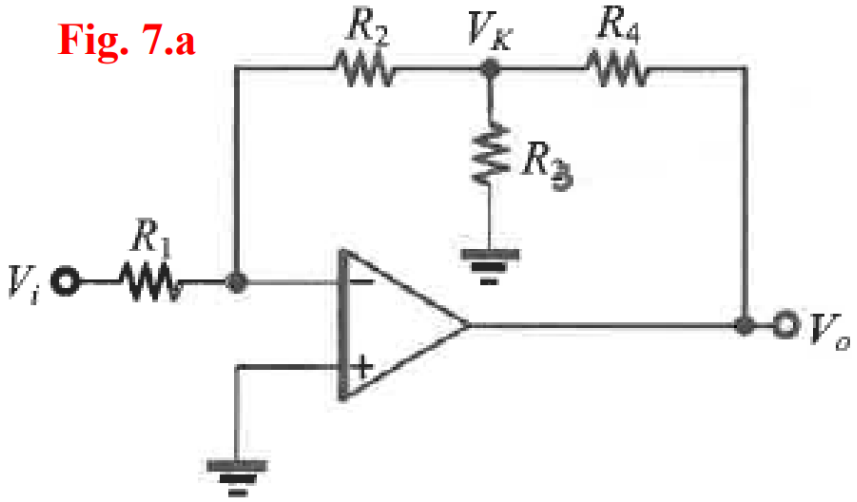
OPAmp: μA741

Resistors: R = 1kΩ×2, 2kΩ×2, 3kΩ×1, 10kΩ×2, 12kΩ×1, 20kΩ×1, 47kΩ×1

Variable Resistor: 10 kΩ×1

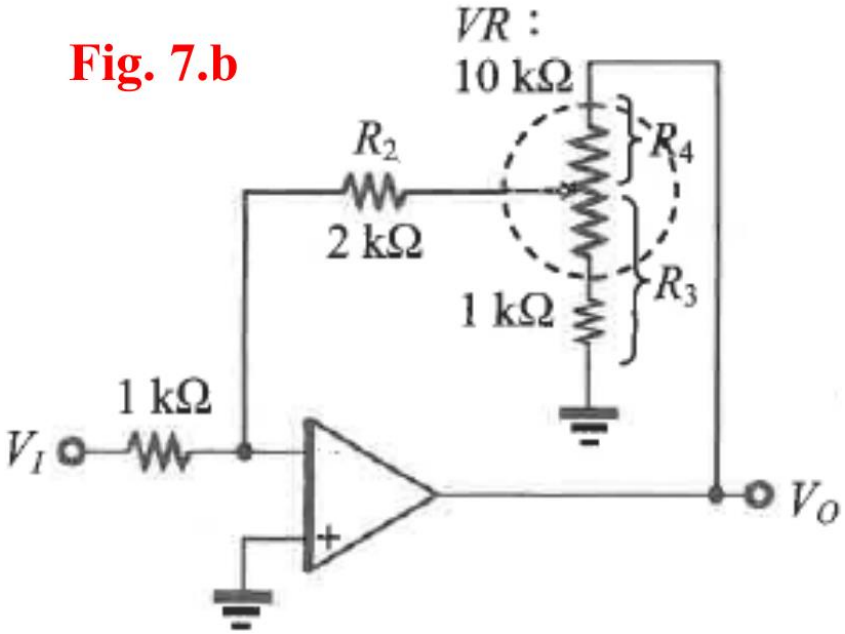
III. Circuit diagram

Fig. 7.a

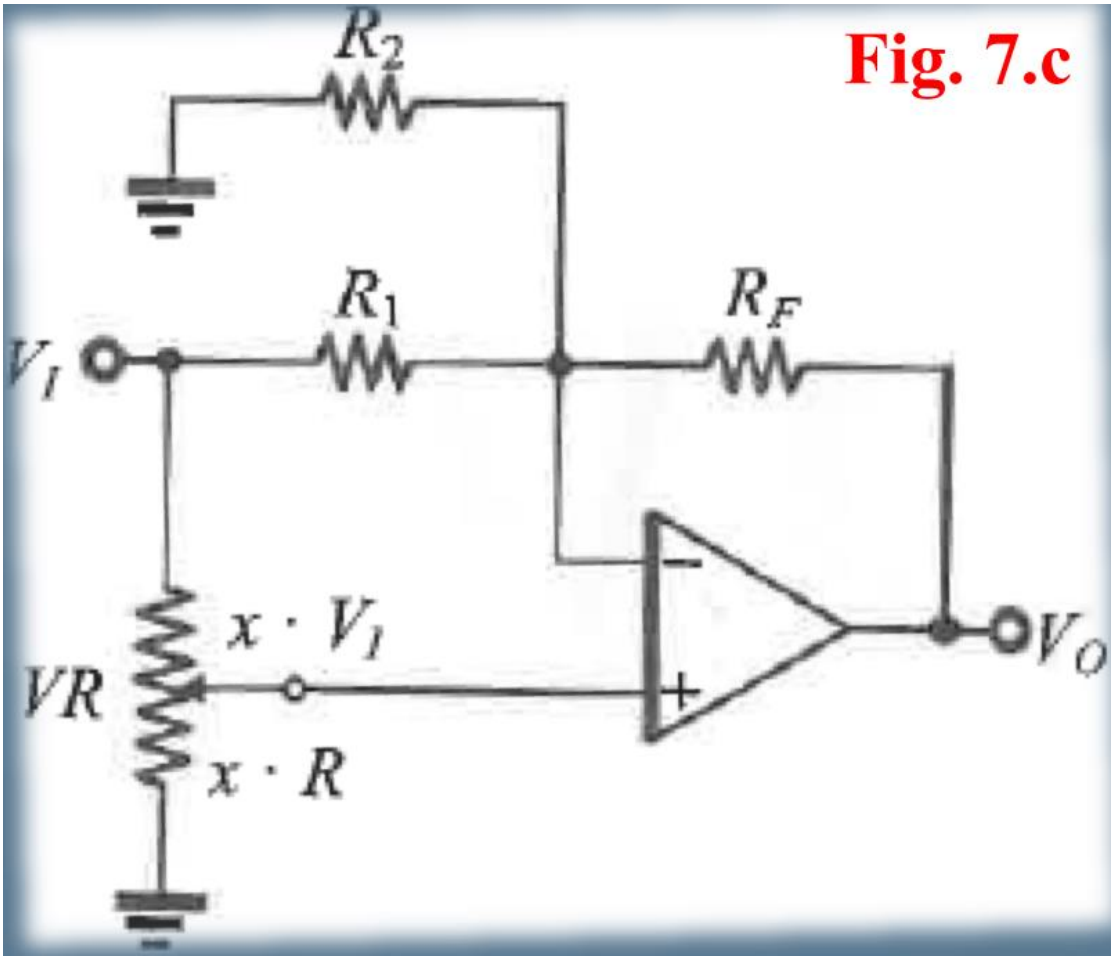


▲ Figure 1. Circuit of Experiment 7.a T Network

Fig. 7.b



▲ Figure 2. Circuit of Experiment 7.b The Adjustable High-gain Amplifier



▲ Figure 3. Circuit of Experiment 7.c The adjustable Positive- and negative-gain amplifier

IV. Methods

Using Digital Multimeter to observe voltage.

V. Experiments data

a. Experiment 7.a T Network

Table 1: Measurement of output voltages V_O with fixed T Network

	DC				AC f=1kHz		
V_{in}	-0.1 V	-0.5 V	0.1 V	0.5 V	0.1 V	0.2 V	0.5 V
V_o	5.4987 V	14.264 V	-5.3749 V	-12.952 V	3.8457 V	7.6783 V	12.036 V
Gain	-54.987 V	-28.528 V	-53.749 V	-25.904 V	38.457 V	38.3915 V	24.072 V

b. Experiment 7.b The Adjustable High-gain Amplifier

Table 2: Measurement of gain with adjustable T Network

The maximum gain	-2.0031
The minimum gain	-12.875

c. Experiment 7.c The adjustable Positive- and negative-gain amplifier

Table 3: Measurement of adjustable Positive- and negative-gain

	gain	ratio x
Theoretical	3	0.875
	-3	0.125
Measurement	3	0.8307
	-3	0.1273

VI. Results

None

VII. Discussion

The V_o and gain of Op Amp with T Network will vary with the resistors.

VIII. Conclusion

From the experimental data above, the operational amplifiers work in an ideal situation.