EXPERIMENTS
WITH
OPERATIONAL AMPLIFIERS

EXPERIMENTS WITH OPERATIONAL AMPLIFIERS

Learning by Doing

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Preface

Integrated circuit operational amplifiers are now so cheap that it is economically possible to use them freely in all types of electronic instrumentation. One can afford to think of them as some kind of 'super transistor' but their use considerably simplifies the design and construction of circuits compared with the use of discrete components and transistors. Also, operational amplifier modules make it easier for the non-electronics specialist to construct the instrumentation circuits needed for his particular field of work.

This book covers a range of practical operational amplifier applications, gives circuits which include component values and suggests measurements that can be made in order to study circuit action. The book is intended as an experimental supplement to the author's previous book on operational amplifiers¹.

It is suggested that the quickest way for the non-electronics specialist to learn about operational amplifiers is actually to use them in working circuits. It does not matter very much if a wrong connection is made in the experimental circuits, the operational amplifier type suggested for use will tolerate quite a few mistakes and even if you destroy it it should not break you. If resistor values suggested in the circuits are not at hand try other values; electronic systems will work (in a fashion) with a considerable range of component values. Having investigated the practical circuits, then is the time to start reading to find out in more detail how the circuits work and how their performance can be refined. This alternation between experimental work and reading is most rewarding. Experimental work increases confidence and leads to sounder understanding, the reading suggests further experimental work which when carried out encourages further theoretical exploration.

The experiments suggested in the book cover a wide range of operational amplifier applications which will be found useful for a variety of measurement and instrumentation systems. The emphasis is on working circuits designed to give a practical understanding of the principles underlying each application. The way in which performance errors are related to the characteristics of the particular amplifier used in the circuit are briefly treated in an Appendix. The reader wishing to refine the performance capabilities of the circuits given in the book may find it necessary to supplement this treatment of errors by a reading of the

author's earlier book.

This book should prove useful for all those interested in experimentally finding out about the capabilities of operational amplifiers. A prerequisite for the reading of the book extends little beyond a knowledge of basic d.c. and a.c. circuit theory.

Liverpool, 1975

G.B.C.

Reference

1. G.B. Clayton. *Operational Amplifiers*, Butterworths (1971)

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