

**HIGHER TECHNICAL INSTITUTE**  
**ELECTRICAL ENGINEERING DEPARTMENT**

**DIPLOMA PROJECT**

**AN INVESTIGATION INTO THE EFFECT OF  
FEEDBACK ON VOLTAGE AMPLIFIER  
(E/1030)**

By  
**PARVEZ IMRUL**

**JUNE 1966**

HIGHER TECHNICAL INSTITUTE  
ELECTRICAL ENGINEERING COURSE

DIPLOMA PROJECT

AN INVESTIGATION INTO THE EFFECT OF FEEDBACK  
ON VOLTAGE AMPLIFIER

E/1030

PARVEZ IMRUL

JUNE 96

HIGHER TECHNICAL INSTITUTE	PROJECT NO. 2574
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**AN INVESTIGATION INTO THE EFFECT OF FEEDBACK**

**ON VOLTAGE AMPLIFIER**

**by**

**PARVEZ IMRUL**

**Project Report**

**Submitted to**

**the Department of Electrical Engineering  
of the Higher Technical Institute**

**Nicosia Cyprus**

**In partial fulfilment of the requirements  
of the diploma as**

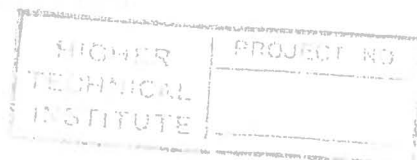
**TECHNICIAN ENGINEER**

**IN**

**ELECTRICAL ENGINEERING**

**JUNE 96**

**Project Supervisor: Dr. CC. Marouchos**



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Second, I want to express my thanks to my parents who anxiously waiting for their son and also to all of them, who one way or other, helped with their ideas for this project.

The last but not least, my thanks might go to my typist Mrs. Marina for whom this project gets its shape.

## SUMMARY

**PROJECT TITLE:** AN INVESTIGATION INTO THE EFFECT OF FEEDBACK ON VOLTAGE AMPLIFIERS.

**SUBMITTED BY:** PARVEZ IMRUL

The objectives of this project are:

1. To measure and calculate the gain, input resistance, output resistance, distortion and frequency response of a voltage amplifier.
2. To apply voltage negative feedback and measure/calculate the above parameters of the amplifier.
3. To apply current negative feedback and measure/calculate the above parameters of the amplifier.
4. To apply voltage and current (negative) feedback and measure/calculate the above parameters of the amplifiers.

The project was experimental and a circuit for the push - pull power amplifier has been designed and constructed for the tests.

The negative feedback signal (voltage and/or current) produces remarkable changes in circuit performance.

By applying a negative feedback on the amplifier, it is possible to obtain stable gain, less distorted output, and wider bandwidth, lower input resistance and higher output resistance.

HIGHER TECHNICAL INSTITUTE  
NICOSIA CYPRUS

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

1995/96

Project Number: 1030

Title: An investigation into the effect of feedback on voltage amplifiers.

**Objectives**

1. Measure and calculate the gain, input resistance, output resistance, distortion and frequency response of a voltage amplifier.
2. Apply voltage negative feedback and measure/calculate the above parameters of the amplifier.

Apply current negative feedback and measure/calculate the above parameters of the amplifier.

Apply voltage and current feedback and measure/calculate the above parameters of the amplifier.

**Terms and conditions**

1. The project is highly experimental and the student is expected to spend ALL the time allocated on Thursdays in the lab.
2. The student can use existing circuits for his tests.
3. Documentation of the results by photographs and otherwise is highly recommended.

Student: Mr Parvez Imrul, 3E2

Supervisor: Dr. CC Marouchos

External Assessor .....



## PREFACE

The aim of this project was an investigation into the effect of feedback on voltage amplifiers. This project dominantly deals with feedback, to be more specific, the application of different negative feedbacks and its effect on certain parameters like - input resistance, output resistance, gain, frequency response and distortion of the typical amplifiers.

Feedback is a condition for a physical system in which a portion of the output is returned to the input. When feedback is used with a physical system, such as electronic amplifier, the operating characteristics of that system are modified.

The signal fed back can be either a voltage or a current, being applied in series or shunt respectively with the input signal. Moreover, the feedback signal, whether voltage or current, can be directly proportional to the output signal voltage or current. This gives rise to four basic types of feedback i.e. series - voltage, series - current, shunt - voltage and shunt - current. The characteristics produced by these four types feedback are similar in some respects and differ in others.

In the majority of the feedback applications, an amplifier circuit is arranged so that a signal is fed back to the input and subtracted from the impressed signal. The feedback in that case is called negative or degenerative. Conversely, when an amplifier circuit is arranged so the feedback signal adds to the impressed signal, the feedback is termed positive or regenerative.

As negative feedback has a stabilizing effect on amplifier gain, increase the bandwidth and decrease the noise and distortion, hence it is used more often than positive feedback.

Positive feedback, in contrast, increase the gain but decrease the band width and stability. Although positive feedback is occasionally used in multiloop feedback amplifier it is used primarily for oscillators.

The application of feedback also affects the input and output impedances of an amplifier. However, the manner in which the impedance levels change depends on the type of feedback arrangement used. (i.e. voltage or current and series or shunt).

In Chapter 1, general terms have been defined that are related with the project.

Chapter 2, shows the block diagram, the PCB design and the circuit diagram that are used for this project.

Chapter 3 contains the definitions of the parameters that are commonly used for the typical amplifiers.

Chapter 4 contains the experimental results of the input resistance, output resistance and frequency response without feedback.

Chapter 5, Chapter 6 and 7 shows what effect it might have if a voltage and/or current feedback is applied and how the negative feedback changes the circuit performance of the amplifiers.

Negative feedback is one of the most useful concept used in electronic circuit and control engineering. Moreover, negative feedback has become one of the valuable ideas ever discovered in electronics.