DEVELOPMENT OF REAL TIME AUDIO SIGNAL MEASURING INSTRUMENT AND SIGNAL CONDITIONING CIRCUIT

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ABSTRACT

This paper presents the development of real time audio signal measuring instrument and signal conditioning circuit. The design undergoes several processes and displayed using computer via interfacing system. The process also involve with the used of Artificial Intelligent (AI) technique, i.e. Fuzzy Logic. MATLAB Fuzzy Toolbox and Simulink are use to realized real-time simulation and displayed the results in the form of fuzzy classification. The raw signal which is in term of frequency is detected by sensor and then was amplified, filtered and purified through signal conditioning circuitry. The output signal from signal conditioning circuitry is then injected to the interfacing system circuit. Interfacing system circuit is use as a medium to allow communication between signal conditioning circuitry and personal computer. All the conversion necessary to produce compatible signal for computer communication are solve in the interfacing circuit. Those signal then classified using fuzzy logic membership function.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Measurement is a process by which the infinitely varied observation are reduced to compact description or models that are presumed to represent meaningful regularities in the entities that are observed [10]. By classic definition, measure is defined simply as the assignment of numerals to objects or events according to rules [11]. Rules for assigning number constitute measurement only if the subsequent numbers end up representing something of meaning, some regularity of attributes or behavior that permits prediction.

Measurement is essential for observing and testing science and technological investigation. Measurement systems are use for essential main purpose to obtain data about some even or item, for inspection or testing and as element in a control system. Measurement system can be considered to have basic constituent element that is transducer or sensory element which responds to the quantity being measured by giving as its output a signal which related to the quantity, signal conditioning circuitry that takes the signal from sensor and manipulated the signal into a condition which is suitable for display purpose and display system where the output are displayed.

The quality of the measurement of the variable being controlled sets the bottoms line on overall system performance. Transducer used to convert a physical quantity into an electrical signal. Whereas signal conditioning refers to operation performed on signal to convert them to a suitable form for interfacing with element in process control loop. Signal conditioning can be categories into several general types that are signal-level and bias changes, linearization, conversion, filtering and impedance matching and concept of loading.