MICROCONTROLLER-BASED MICRO-RESONATOR SENSOR SIGNAL DETECTION TECHNIQUE

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ABSTRACT

Microcontroller-Based Micro-Resonator Sensor Signal Detection Technique was designed to detect small Alternating Current (AC) signal from micro-resonator sensors. This project is an alternative approach to measurement technique to typically done in the laboratory that requires table top equipments such as oscilloscope and function generator. The objective of this project is to design a technique that extracts amplitude and frequency of sensor response using microcontrollers as an alternative approach to Micro Electro Mechanical System (MEMS) application. This project is implemented using two techniques. The first technique is voltage incremental comparison and the second technique is voltage differentiation. The input AC signal data read from sensor will be transmitted to microcontroller and displayed on liquid crystal display (LCD). Resonator response is artificially generated and validated against oscilloscope measurements. As for the result, the first technique is much better from the second technique and able to measure micro-resonator sensor response. It found that amplitude average of percentage accuracy is 94.35% while for frequency average of percentage accuracy is 86.35%.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter presents the background of the study, which is an introduction of the research. Then, it is followed by the problem statement, objectives and scope of the study.

1.2 BACKGROUND OF STUDY

Micro Electro-Mechanical Systems (MEMS) is rapidly expanding technology in all aspects of application such as military, automotive, telecommunication, medical and others. Since their introduction in the 1970's and rapid commercialization, MEMS have made their way into a strikingly vast variety of applications with appealing qualities of MEMS in their small size, cost effectiveness, and precision. With improved technology now, there is much room for improvement in all these categories with the implication that MEMS can only become more attractive.