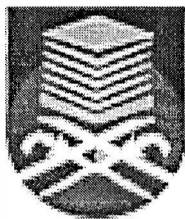


**GENETIC ALGORITHM BASED FOR OPTIMIZING FILTER
DESIGN**

Project is presented in partial fulfillment for the award of the
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ABSTRACT

Filter design is usually a long and complicated process. The process involves a lot of computational work and mistakes are easily made. There is also possibility that the design does not meet specification thus forcing the process to be repeated.

This project describe how Genetic Algorithm (GA) could be used to optimize the process of designing analog filter by considering such as magnitude response. The aim is to reduce the cost by reducing the filter order. Different type of filter such as Chebyshev, Inverse Chebyshev, Butterworth and Elliptical filter are considered. The transfer function of the network are obtained in a standard form. The conventional filter design technique is adapted in writing a MATLAB program using the Signal Processing Toolbox. GA is then implemented using the Genetic Algorithm Toolbox (GAOT).

The result of using GA based methods are then compared to conventional design technique. Its provides an alternative means in filter design.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The conventional method of designing filter is complicated, time consuming and involves a lot of computational works [1-4]. Problems arise in the approach include the need to correct a lot of parameters if the results are not satisfactory and the most irritating is to go through most of the process again.

In analog filter design, the most considered factor is cost reduction. Therefore, the optimization of analog filter design emphasizes on reducing the cost of circuit implementation by means of minimizing the number of components used as much as the time and energy consumed without compromising on performance. This can be realized by keeping the order of filter to its lowest possible number and in the same time keeping the magnitude response towards the ideal filter curve.

The emergence of language programming has involved the process of filter design. It has opened the door to a more fast, accurate, advanced and reliable filter design process. The once prone to error process of filter design is nowadays a history. One such useful language is MATLAB, which is used in this project.

The use of the computer language has also provided opportunities to optimize the process for further improvement. The project uses a method of optimization, which is Genetic Algorithms (GA). Both elements, MATLAB and GA are combined to perform the optimization of the desired filter design.

GA optimization is focused on this part of design by following the stopband frequency to be selected randomly by setting its lower and upper bounds. An initial set of population will go through evolution process until the optimum value of the