A STUDY OF MICRO-MACHINED SILICON VIBRATING GYROSCOPE BEHAVIOR USING TAGUCHI METHOD

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ABSTRACT

This thesis presents a study of Micro-machined silicon Vibrating Ring gyroscope by using ANSYS software. It concludes the process from designing the structure until the simulation. There are four control factors have been varied for four levels, which are support spring diameter, ring diameter, height of ring structure and support post diameter by using taguchi method. A research on the structure has been done to find the suitable design and parameter. The experiments were arranged involving the control factor in L16 orthogonal arrays. This method is used to find the optimum frequency from the combination of experiment. After done simulate all 16 experiment, it shows that the optimum frequency simulated in ANSYS is 11769 Hz, which is experiment 6 the combination A2B2C1D4. Based on previous work, it show that this project from experiment 6 give better resonant frequency value than previous work.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

In this section, a brief introduction to the subject matter and the problem will be stated. The discussion commences with background of study related with this project, the objective, problems statement, scope of project, significant of project and thesis overview. The section is aimed to give the reader an insight into the project.

1.1 BACKGROUND OF STUDY

A gyroscope is a device that maintaining its orientation, based on the principles of angular momentum. Basically, a gyroscope is an instrument or device that consists of a spinning wheel, mounted on a base so that its axis can turn freely in any direction thereby maintaining its orientation without regard to any movement of the base [1]. A spinning wheel try to maintain its orientation based on the principle of conservation of angular momentum. This phenomenon is used for measuring and maintaining orientation in many applications, such as compasses