MODELING AND EXPERIMENTAL INVESTIGATION ON ERBIUM-DOPED FIBER LASER (EDFL)

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ABSTRACT

This final year project is a research of photonics field. Photonics is the field of science that study about the characteristics, generation, modulation, transmission, emission, signal process, amplification, and switching of light. Erbium-doped fiber laser or well known as EDFL is the laser where the active gain medium of its optical fiber is doped by erbium material. A few of objective was identified in order to persuade the project's goals namely to comprehend theoretical model of Erbium-doped fiber laser (EDFL), rewrite and modify C++ source code program to model EDFL, and also setup experimental work and determine the characteristics of EDFL and to compare the characteristics with the theoretical model. By this project, two parts have been done. Firstly is by modeling the theoretical EDFL by using C++ and the second one is by used experimental work. Both of this parts of methodology have the similar results in order to tell that that both of this parts are actually not have different results of the characterisation or exploitation of EDFL. This project is to exploit and explore the functionality of EDFL for the communication system and transmission of data based on a few parameter that already be changed in order to determine at what situation that the best functionality of EDFL can be used maximally and effective. Based on the procedures, the expected result was found where the characteristics of EDFL are quite similar for both experimental and theoretical modeling.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

This project "Modeling and Experimental Investigation On Erbium-doped Fiber Laser (EDFL)" is the field in photonics and optics. Based on this project, photonics is the field of science and engineering that encompassing the physical phenomenon and associated with the generation, transmission, manipulation, detection, characteristics and utilization of light. As everybody know, light is one of the most familiar and essential things to world existence. So, photonics is the art and science to study about light.

Based on experiment on this field of science (photonics), the term photonics more specifically connotes:

- The particle properties of light,
- The potential of creating signal processing device technologies using photons,
- The practical application of optics, and
- An analogy to electronics.

Applications of photonics are ubiquitous. The applications for these field of science is included light detection, telecommunications, information processing,