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Electromagnetic Theory EMM780 Assignment#2 Report

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**Abstract**

# Introduction

This document provides a report on the EMM780 assignment. Modal analysis technique was to used to analyse an H-Step discontinuity of a rectangular waveguide. Modal analysis technique was used to implement an Octave program that analyses the H-Step waveguide discontinuity and produce a plot of the magnitude of the dominant mode. Section 2 provides the mathematical model of modal analysis of the discontinuity, section 3 provides details of the implemented Octave software program, section 4 provides the Octave software program and CST studio analysis results of the discontinuity.

# Mathematical Modelling

Figure 1 demonstrates the cross-section plot of the discontinuity in the x-y axis. The discontinuity has a change only in the x-direction (width), only the Ey is affected by the discontinuity. Modal analysis example in section 4.4 in [1] was modified to develop equations of this assignment. It was assumed that the dimension of both sections of the waveguide allow only for the dominant mode TE10 to propagate. The electric and magnetic fields that insident on the discontinuity are represented by equation 1 and 2.

(1)

(2)

# octave Software Program

# Analysis Results

# CoNCLUSION

References

1. D.M. Pozar, Microwave Engineering, 4th Edition, John Wiley & Sons