DISSERTATION OR THESIS TITLE

A Thesis

Presented to

The Graduate Faculty of The University of Akron

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

First Middle Last

Month, Year

DISSERTATION OR THESIS TITLE

First Middle Last

Thesis

Approved:

Advisor
Name of Advisor

Faculty Reader
Name of Fac Reader

Faculty Reader
Name of Fac Reader

Department Chair
Name of Chair

Accepted:

Dean of the College
Name of Coll Dean

Dean of the Graduate School
Name of Grad Schl Dean

Date

ABSTRACT

An abstract...

Thanks...

TABLE OF CONTENTS

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CHAPTER I

INTRODUCTION

The wave equation can be used to describe many physical phenomena. Challenging topics in meteorology, acoustics, electro-magnetics, and others involve solving the time-dependent wave equation. Many of these problems are described in an unbounded domain (i.e. there is no boundary to reflect the outward traveling waves). When an exact, theoretical solution is unavailable, the lack of a boundary prescription of accurate radiation conditions creates a problem for numerical solutions. The difficulty lies in is finding a way to do calculations on an infinite domain using a computer with finite memory in a finite amount of time and within a finite region.

CHAPTER II

THE TWO DIMENSIONAL WAVE EQUATION

Here is an example of a 'section' and a few equations.

2.1 Recurrence Relation

A series solution for the two-dimensional wave equation

$$\frac{1}{c^2}\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial r^2} + \frac{1}{r}\frac{\partial u}{\partial r} + \frac{1}{r^2}\frac{\partial^2 u}{\partial \theta^2} \tag{2.1}$$

for outgoing waves is

$$u = \sum_{n=0}^{\infty} a_n(\theta) f^n(r,t), \tag{2.2}$$

where

$$f^n = \sum_{k=0}^{\infty} r^{-k-\frac{1}{2}} f_k^n(ct-r). \tag{2.3}$$

You can reference a labeled equation by using the *ref* command. For example, you can show that equations (2.2) and (2.3) are a solution to equation (2.1). (see the file chap2.tex for the commands).

2.2 Second Section Long Subtitle Second Section Long Subtitle Second Section Long Subtitle

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2.2.1 First Subsection

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2.3 Third Section

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CHAPTER III

YOU NAME ANY CHAPTER HERE. MAKE SURE THEY'RE IN ALL CAPS

This text is from the file chap4.tex. Look at this file to see the[1] format of this text. A bibliography file will be need as well. The bibliography file used here is bio.bib. Not this file as many entries but not all are used. To reference a paper use \citelabel. Here is a reference for a paper [1]. The book ASM Handbook[2] Volume 15, [2].

When running Latex you need two run the folling commands:

latex main.tex

latex main.tex

bibtex main

latex main.tex

latex main.tex

dvips -o main.ps main.dvi

Then you should have a postscript file you can read using ghost view (gv main.ps).

You will have problems, when you do look in a book, the web or ask someone.

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[1]Footnote text. Footnote text. Footnote text. Footnote text. Footnote text. Footnote text. Footnote text. Footnote text. Footnote text. Footnote text. Footnote text.

[2]Footnote text. Footnote text. Footnote text. Footnote text.

CHAPTER IV

EXAMPLE OF A TABLE AND A FIGURE

Table 4.1: Table captions belong above the table. Just some text to lengthen the title of the table beyond a single line.

Name	**Variable**	**Discretization**	**Step**
Radius	$r \in [a, R]$	$r_k = a + kdr, \quad k = 0, 1, 2, \ldots, K$	$dr = (R - a)/K$
Angle	$\theta \in [0, 2\pi)$	$\theta_l = ld\theta, \quad l = 0, 1, 2, \ldots, L - 1$	$d\theta = 2\pi/L$
Time	$t \in [0, T]$	$t_p = pdt, \quad p = 0, 1, 2, \ldots, P$	$dt = T/P$

To include figures side-by-side use the minipage environment.

See chap4.tex for the commands used to build the table and figure. As you add chapters, figures, and tables, the table of contents and lists will automatically be updated.

Figure 4.2 is an example of figures side-by-side, with Figure 4.2A to the left of 4.2B.

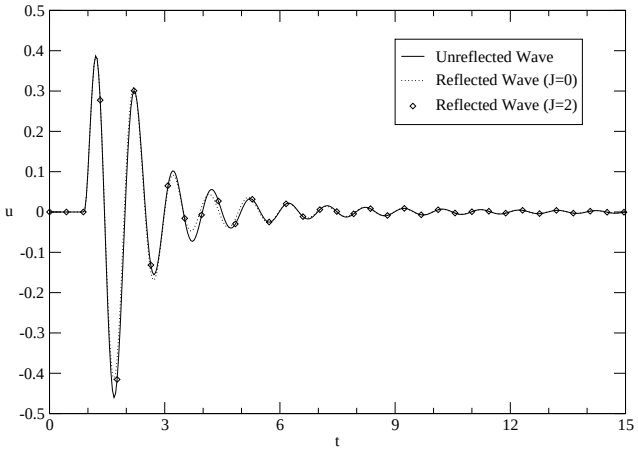

Figure 4.1: Figure labels go below the figure. Just some text to lengthen the title of the figure beyond a single line. Just some text to lengthen the title of the figure beyond a single line.

4.1 First Section

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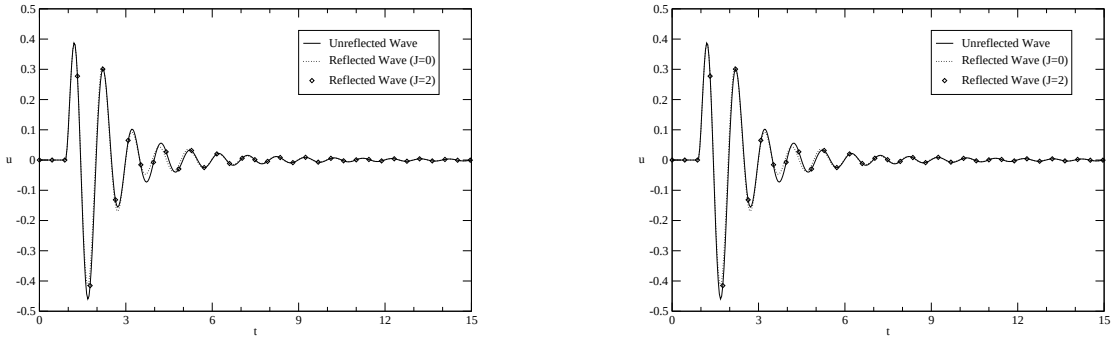

4.2A: 4.2B:

Figure 4.2: Figures side-by side(a) part a (b) part b

4.2.1 First Subsection

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4.4 Forth Section

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BIBLIOGRAPHY

[1] T. Hagstrom and S.I. Hariharan. A formulation of asymptotic and exact boundary conditions using local operators. *Applied Numerical Mathematics*, 27:403–416, 1998.

[2] ASM Handbook Committee. *Casting, ASM Handbook Volume 15*. ASM International, USA, 1988.

APPENDIX

APPENDIX TITLE GOES HERE

A.1 First Section

We will recylcle Chapters 2 and 4 to make the following two appendices.

A.2 Second Section

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A.2.1 First Subsection

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A.3 Third Section

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APPENDIX

SECOND APPENDIX: THE TWO DIMENSIONAL WAVE EQUATION

Here is an example of a 'section' and a few equations.

B.1 Recurrence Relation

A series solution for the two-dimensional wave equation

$$\frac{1}{c^2}\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial r^2} + \frac{1}{r}\frac{\partial u}{\partial r} + \frac{1}{r^2}\frac{\partial^2 u}{\partial \theta^2} \tag{B.1}$$

for outgoing waves is

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where

$$f^n = \sum_{k=0}^{\infty} r^{-k-\frac{1}{2}} f_k^n(ct-r). \tag{B.3}$$

You can reference a labeled equation by using the *ref* command. For example, you can show that equations (B.2) and (B.3) are a solution to equation (B.1). (see the file chap2.tex for the commands).

B.2 Second Section

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B.2.1 First Subsection

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APPENDIX

EXAMPLE OF A TABLE AND A FIGURE

Table C.1: Table captions belong above the table

Name	**Variable**	**Discretization**	**Step**
Radius	$r \in [a, R]$	$r_k = a + kdr, \quad k = 0, 1, 2, \ldots, K$	$dr = (R - a)/K$
Angle	$\theta \in [0, 2\pi)$	$\theta_l = ld\theta, \quad l = 0, 1, 2, \ldots, L - 1$	$d\theta = 2\pi/L$
Time	$t \in [0, T]$	$t_p = pdt, \quad p = 0, 1, 2, \ldots, P$	$dt = T/P$

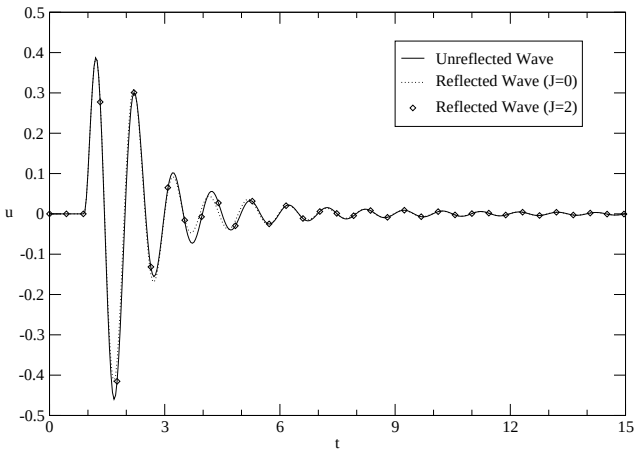
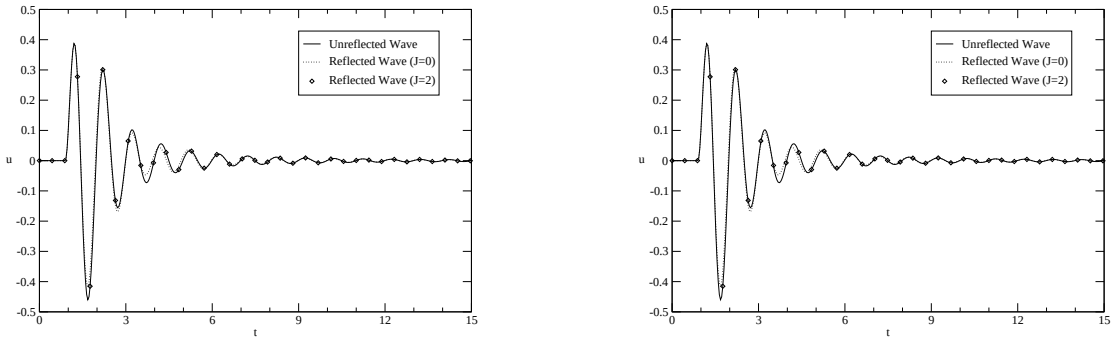


Figure C.1: Figure labels go below the figure

To include figures side-by-side use the minipage environment.



C.2A: C.2B:

Figure C.2: Figures side-by side

See chap4.tex for the commands used to build the table and figure. As you add chapters, figures, and tables, the table of contents and lists will automatically be updated.

Figure C.2 is an example of figures side-by-side, with Figure C.2A to the left of C.2B.

C.1 First Section

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C.2 Second Section

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C.2.1 First Subsection

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