

To the University of Wyoming:

The members of the Committee approve the thesis of Iman A. Student presented on May 6, 2010.

Claude E. Shannon, Chairperson

Robert E. Heinlein, External Department Member

Homer S. Simpson

APPROVED:

Mark J. Balas, Head, Department of Electrical and Computer Engineering

Robert Ettema, Dean, College of Engineering and Applied Science

Student, Iman A., An Obfuscated Analysis and Exposition of Really Cool Things That I Understand and You Do Not, M.S., Department of Electrical and Computer Engineering, May, 2010.

This is where you write your abstract. Here are the guidelines on the abstract according to UW and the ProQuest/UMI organization (the company that archives theses and dissertations from universities worldwide).

For a masters thesis, the abstract should ideally be around 60 to 80 words in length. If you must, you can exceed this length, but the abstract cannot exceed one page. Any abstract text that exceeds 150 words will be truncated to the first 150 words (and any non-textual content will be removed) by ProQuest for the online databases, although your full abstract will be preserved in the complete electronic (PDF) version of your thesis.

For a Ph.D. dissertation, the abstract should ideally be no longer than 350 words. If the abstract exceeds 350 words, it will be truncated to the first 350 words (and any non-textual content will be removed) by ProQuest for the online databases, although your full abstract will be preserved in the electronic (PDF) version of your dissertation. In any case, the dissertation abstract cannot exceed two pages (one page is preferred).

New paragraph. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance.

# AN OBFUSCATED ANALYSIS AND EXPOSITION OF REALLY COOL THINGS THAT I UNDERSTAND AND YOU DO NOT

by

**Iman A. Student, B.S.E.E.**

A thesis submitted to the  
Department of Electrical and Computer Engineering  
and the  
University of Wyoming  
in partial fulfillment of the requirements  
for the degree of

MASTER OF SCIENCE  
in  
ELECTRICAL ENGINEERING

Laramie, Wyoming  
May 2010

Copyright © 2010

by

Iman A. Student

I dedicate this to my parents, who had the good fortune to have me in their lives, and to my dog Spot who helped proof-read this document...

# Contents

<b>List of Figures</b>	<b>vi</b>
<b>List of Tables</b>	<b>vii</b>
<b>List of Computer Programs</b>	<b>viii</b>
<b>Acknowledgments</b>	<b>ix</b>
<b>Chapter 1 Introduction</b>	<b>1</b>
1.1 The Need for This Research . . . . .	1
1.2 Previous Research . . . . .	1
1.3 Dissertation Overview and Organization . . . . .	2
<b>Chapter 2 Theoretical Background</b>	<b>3</b>
2.1 My First Section . . . . .	3
2.1.1 A Subsection . . . . .	3
2.1.2 Another Subsection . . . . .	3
2.2 My Second Section . . . . .	4
2.3 My Third Section . . . . .	6
<b>Appendix A Supporting Topics</b>	<b>8</b>
A.1 My First Section . . . . .	8
A.1.1 A Subsection . . . . .	8
A.1.2 Another Subsection . . . . .	8

A.2	My Second Section . . . . .	9
A.3	My Third Section . . . . .	9
<b>Appendix B Equipment and Setup</b>		<b>10</b>
B.1	My First Section . . . . .	10
B.1.1	A Subsection . . . . .	10
B.1.2	Another Subsection . . . . .	10
B.2	My Second Section . . . . .	11
B.3	My Third Section . . . . .	11
B.3.1	A Subsection . . . . .	11
B.3.2	A Subsection . . . . .	12
<b>References</b>		<b>13</b>

# List of Figures

2.1	MTF versus CTF. . . . .	4
-----	-------------------------	---



# List of Tables

2.1	Results of the experiment testing for recognition of occluded objects. . . . .	6
-----	--	---

# List of Computer Programs

2.1	Main program for simple frame-based processing using ISRs. . . . .	5
2.2	Simple MATLAB FIR filter example. . . . .	5

# Acknowledgments

This is where you write any paragraphs you want to show up on the Acknowledgments page. Traditionally, you use this space to thank your committee members for their help, any funding sources such as an NSF grant that helped you, and so on. This section is up to you (no page or word limit, but exercise restraint) as long as it is written in a professional manner. Be careful you don't end up with a messy page break, such as when the automatic insertion of your name, the university name, and the month and date at the end of this environment is the only thing that shows up on the next page. Write more or less text here to fix it!

New paragraph. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance. This line is meant to check the margins and text appearance.

IMAN A. STUDENT

*University of Wyoming*

*May 2010*

# Chapter 1

## Introduction

### 1.1 The Need for This Research

There are many good reference sources to help you make the most out of using L<sup>A</sup>T<sub>E</sub>X, both on the Internet and as books. There is also a huge worldwide group of users who willingly share their expertise as needed. Take a look at the web page for the T<sub>E</sub>X Users Group (TUG) at [www.tug.org](http://www.tug.org).

A blank line starts a new paragraph. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

### 1.2 Previous Research

This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

to test the margins and such. This is meaningless text used only to test the margins and such.

### 1.3 Dissertation Overview and Organization

# Chapter 2

## Theoretical Background

### 2.1 My First Section

This first work theoretical in this area was performed by Golomb [1]. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

#### 2.1.1 A Subsection

Bringing this work to practical fruition has been attributed to Dixon [2]. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

#### 2.1.2 Another Subsection

Let's try out an equation. The expression for a double-sideband (with carrier) AM signal is

$$s_{\text{AM}}(t) = A_c[1 + m(t)] \cos(\omega_c t) \quad (2.1)$$

where  $A_c$  is the amplitude of the carrier,  $m(t)$  is the message signal (with amplitude always  $\leq 1$  to prevent overmodulation), and  $\omega_c$  is the carrier frequency expressed in radians/sec [3]. In order to recover the message signal from (2.1), it is necessary to extract the envelope of

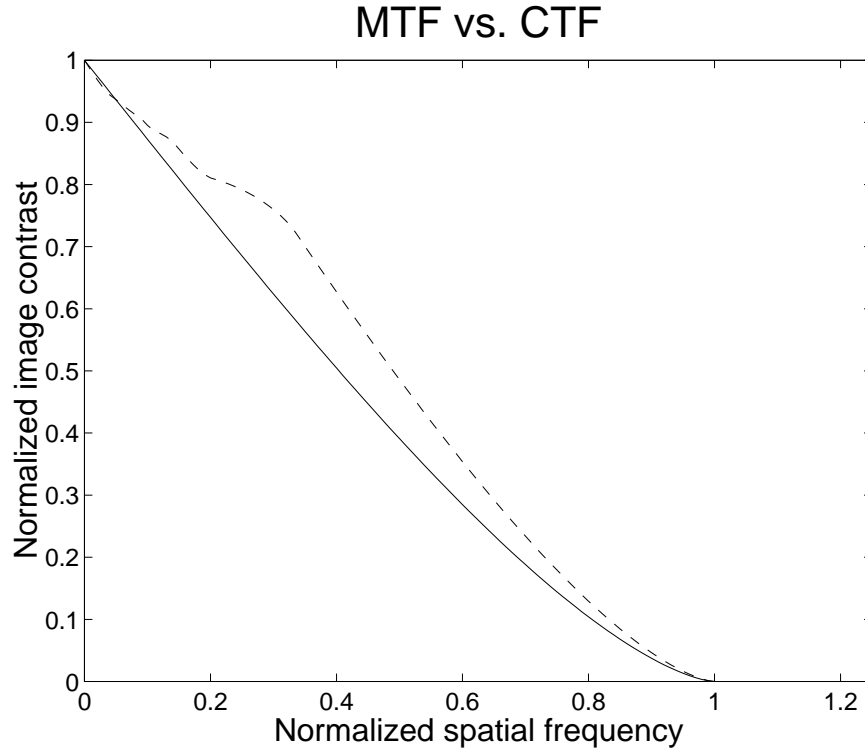


Figure 2.1: A comparison of the modulation transfer function and the contrast transfer function.

the signal  $A_c[1 + m(t)]$ . Once the envelope is obtained, the DC component can be removed with a DC blocking filter, leaving  $A_cm(t)$ , which is a scaled version of the original message signal. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

## 2.2 My Second Section

Let's see how a floating figure is formatted. As we see in Figure 2.1, the optical measures of MTF and CTF are not equal [4]. Note that for a figure environment, the caption comes *after* the definition of the figure itself.

How about listings of computer programs? The main program (`main.c`) is very basic, as shown below. Note that unless your advisor objects, program listings should be single-

spaced, which can be controlled with the `\spacing` command as shown. If you have longer and/or many program listings, it's usually better to place them in an appendix.

Listing 2.1: Main program for simple frame-based processing using ISRs.

```

1 #include "..\Common_Code\DSK_Config.h"
  #include "frames.h"
3
4 int main() {
5     // initialize all buffers to 0
    ZeroBuffers();
7
8     // initialize DSK for selected codec
9     DSK_Init(CodecType, TimerDivider);
10
11    // main loop here, process buffer when ready
    while(1) {
12        if(IsBufferReady()) // process buffers in background
            ProcessBuffer();
13    }
14 }

```

Wasn't that a nice program?

How about some MATLAB code? Note you have to specify the language since MATLAB wasn't the default language in the "listings" setup.

Listing 2.2: Simple MATLAB FIR filter example.

```

% This m-file is used to convolve x[n] and B[n]
2 %
% Assumes that both x[n] and B[n] start at n = 0
4 %
% written by Dr. Thad B. Welch, PE {t.b.welch@ieee.org}
6 % copyright 2001
% completed on 13 December 2001 revision 1.0
8
% Simulation inputs
10 x = [1 2 3 0 1 -3 4 1];           % input vector x[n]
    B = [0.25 0.25 0.25 0.25];      % FIR filter coefficients B[n]
12
% Calculated terms
14 PaddedX = [x zeros(1,length(B)-1)]; % zeros pads x[n] to flush the
    [+] filter
    n = 0:(length(x) + length(B) - 2); % plotting index for the
    [+] output

```





text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

# Appendix A

## Supporting Topics

### A.1 My First Section

This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

#### A.1.1 A Subsection

This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

#### A.1.2 Another Subsection

This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

## A.2 My Second Section

This is meaningless text used only to test the margins and such. This is meaningless text  
used only to test the margins and such. This is meaningless text used only to test the  
margins and such. This is meaningless text used only to test the margins and such. This is  
meaningless text used only to test the margins and such. This is meaningless text used only  
to test the margins and such. This is meaningless text used only to test the margins and  
such. This is meaningless text used only to test the margins and such. This is meaningless  
text used only to test the margins and such. This is meaningless text used only to test the  
margins and such. This is meaningless text used only to test the margins and such. This is  
meaningless text used only to test the margins and such. This is meaningless text used only  
to test the margins and such. This is meaningless text used only to test the margins and  
such. This is meaningless text used only to test the margins and such.

### A.3 My Third Section

[illegible]

# Appendix B

## Equipment and Setup

### B.1 My First Section

This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

#### B.1.1 A Subsection

This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

#### B.1.2 Another Subsection

This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

## B.2 My Second Section

This is meaningless text used only to test the margins and such. This is meaningless text  
used only to test the margins and such. This is meaningless text used only to test the  
margins and such. This is meaningless text used only to test the margins and such. This is  
meaningless text used only to test the margins and such. This is meaningless text used only  
to test the margins and such. This is meaningless text used only to test the margins and  
such. This is meaningless text used only to test the margins and such. This is meaningless  
text used only to test the margins and such. This is meaningless text used only to test the  
margins and such. This is meaningless text used only to test the margins and such. This is  
meaningless text used only to test the margins and such. This is meaningless text used only  
to test the margins and such. This is meaningless text used only to test the margins and  
such. This is meaningless text used only to test the margins and such.

### B.3 My Third Section

[illegible]

### B.3.1 A Subsection

This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such. This is meaningless text used only to test the margins and such.

### B.3.2 A Subsection

[illegible]

# References

- [1] S. W. Golomb, *Shift Register Sequences*. Laguna Hills, CA: Aegean Park Press, 1982.
- [2] R. C. Dixon, *Spread Spectrum Systems with Commercial Applications*, 3rd ed. John Wiley & Sons, 1994.
- [3] L. W. Couch, II, *Digital and Analog Communication Systems*, 6th ed. Prentice Hall, 2001.
- [4] W. J. Smith, *Modern Optical Engineering*, 2nd ed. McGraw-Hill, 1990.
- [5] A. B. Carlson, P. B. Crilly, and J. C. Rutledge, *Communication Systems*, 4th ed. McGraw-Hill, 2002.
- [6] P. M. Shankar, *Introduction to Wireless Systems*. John Wiley & Sons, 2002.
- [7] J. G. Proakis, *Digital Communications*, 4th ed. McGraw Hill, 2001.
- [8] B. Sklar, *Digital Communications: Fundamentals and Applications*, 2nd ed. Prentice Hall, 2001.
- [9] B. P. Lathi, *Modern Digital and Analog Communications Systems*, 3rd ed. Oxford University Press, 1998.
- [10] J. D. Gibson, Ed., *The Mobile Communications Handbook*. CRC Press, 1996.
- [11] M. M.-K. Liu, *Principles and Applications of Optical Communications*. Irwin, 1996.
- [12] K. Feher, *Wireless Digital Communications: Modulation and Spread Spectrum Applications*. Prentice Hall PTR, 1995.
- [13] W. C. Y. Lee, *Mobile Cellular Telecommunications*, 2nd ed. McGraw-Hill, 1995.
- [14] R. L. Peterson, R. E. Ziemer, and D. E. Borth, *Introduction to Spread Spectrum Communications*. Prentice Hall, 1995.
- [15] J. D. Gibson, *Principles of Digital and Analog Communications*, 2nd ed. Macmillan, 1993.



- [16] S. V. Vaddiparty, K. M. Price, G. P. Heckert, and C. H. G. Wright, "Milsatcom inter-satellite link architecture," in *Proceedings of the AIAA 14th International Communications Satellite Systems Conference*, Washington, DC, March 1992.
- [17] R. E. Ziemer and R. L. Peterson, *Introduction to Digital Communication*. Macmillan, 1992.
- [18] C. H. G. Wright, G. P. Heckert, and T. E. Bleier, "Low-cost design approach for a space-based data relay," in *Proceedings of the 1991 IEEE Military Communications Conference*, Fairfax, VA, October 1991.
- [19] T. E. Bleier, G. P. Heckert, S. J. Jarzombek, H. Wolf, and C. H. G. Wright, "Opportunity for an X-band relay capability in support of the space test range," in *Proceedings of the 1989 IEEE Military Communications Conference*, Boston, MA, October 1989.
- [20] J. G. Proakis, *Digital Communications*, 2nd ed. McGraw-Hill, 1989.
- [21] K. Feher, Ed., *Advanced Digital Communications: Systems and Signal Processing Techniques*. Prentice Hall, 1987.
- [22] G. R. Cooper and C. D. McGillem, *Modern Communications and Spread Spectrum*. McGraw-Hill, 1986.
- [23] T. Pratt and C. W. Bostian, *Satellite Communications*. John Wiley & Sons, 1986.
- [24] C. E. Cook, F. W. Ellersick, L. B. Milstein, and D. L. Schilling, Eds., *Spread Spectrum Communications*. IEEE Press, 1983.
- [25] K. Feher, *Digital Communications: Satellite/Earth Station Engineering*. Prentice Hall, 1983.
- [26] G. Keiser, *Optical Fiber Communications*. McGraw-Hill, 1983.