HOW TO WRITE THESES
WITH TWO LINE TITLES

BY

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(Don't copy this sample text. Write your own acknowledgement.)

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LIST OF SYMBOLS

Symbol	Definition
β	probability of non-detecting bad data
δ	Transition Coefficient Constant for the Design of Linear-Phase FIR Filters
ζ	Reflection Coefficient Parameter

ABSTRACT

Your Abstract goes here!

CHAPTER 1
INTRODUCTION

1.1 Basic Models

In this chapter, we discuss the system identification problem for discrete-time nonlinear dynamic systems. The discussion includes an overview of the representations of various nonlinear systems and their identification methods. Even though some of these methods are developed for continuous-time system representations, we only consider to work on the discrete-time representation of the nonlinear systems. These techniques will guide us to develop the FPET model structure. The main system equation we use here is:

$$x^2 + y^2 = z^2 \tag{1.1}$$

However, we will also represent a brief discuss on some more complex cases as well.

1.2 Functional Series Methods in Linear Systems using Impulse Response Generalization Algorithm

One can represent a linear system by its impulse response. Volterra developed a generalization of this representation for nonlinear systems in which the single impulse response is replaced with a series of integration kernels. This generalization of the impulse response, usually called Volterra series, can be used to approximate a wide variety of systems. For instance, Boyd and Chua in [3][1] showed that a finite Volterra series can be used to approximate any nonlinear operator which has fading memory. This is explained in Section 1.1. Now you will see a listing example:

1. Suppression of hepatic glucose production
2. Stimulation of hepatic glucose uptake

[1] Corresponding to references in the Bibliography.

3. Stimulation of glucose uptake by peripheral tissues, mainly muscle

Fading memory concept can be defined as the effect of past inputs on the present output fades out when time approaches infinity [4]. In general, we can write the input-output relationship of any causal, discrete-time, time-invariant nonlinear systems by a series of generalized convolutions [2]. Now you will see a quotation example:

> (This is a test for quotation environment!) In the Minimum Variance Method, the peaks are sharp. We compare the graphs where N=512 and p=64 and N=512 and p=128, it can be seen that when the order p is increased frequency [1].

1.2.1 Least Squares Based Identification. Block oriented nonlinear systems can be represented by an interconnection of linear dynamic and static nonlinear blocks. Well known block oriented nonlinear models are Hammerstein, Wiener, and LNL (Linear-Nonlinear-Linear) models as shown in the figure. Hammerstein (NL, Nonlinear-Linear) and Wiener (LN, Linear-Nonlinear) models are two special cases of the LNL cascade model.You can see the results in Table 1.1.

Table 1.1. Nonlinear Model Results

Case	Method#1	Method#2	Method#3
1	50	837	970
2	47	877	230
3	31	25	415
4	35	144	2356
5	45	300	556

1.2.1.1 Modified Periodogram. In the Modified Periodogram, the spectrum is smoother and noise level is a little bit less comparing to the Peridogram Method, since the data is multiplied with Hamming window. In the Bartlett Method, overlapping is not used and K= 4. In this realization, we can see that frequency resolution has

Table 1.2. Performance Analysis using Hard Decision Detection Method in Low-Level Noise Systems with Nonlinear Behavior

Audio Name	Sum of Extracted Bits						
Police	5	-1	5	5	-7	-5	3
Midnight	7	-3	5	3	-1	-3	5
News	9	-3	7	9	-5	-1	9

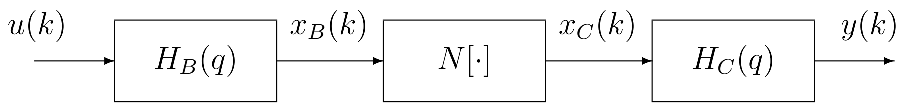


Figure 1.1. An LNL Block Oriented Model Structure

been decreased (peaks are broader) .On the other hand,noise level has been also reduced. As we expected, there is a trade-off between frequency resolution and noise level. Decreasing noise level is paid off by decreasing frequency resolution. In the Blackman-Tuckey Method, both frequency resolution and noise level seems good, see Figure 1.1.

1.2.1.2 Other Useful Methods. There are some other methods which are more complex for implementation. However, they will give more efficient results. The figures below illustrate the results obtained using method XYZ for a fuel metabolism process.

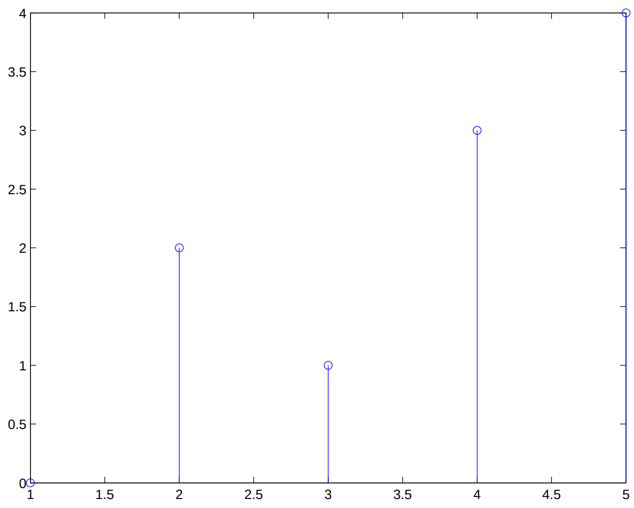
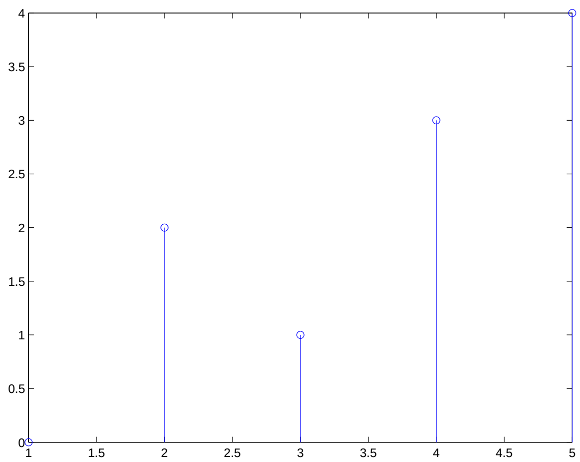
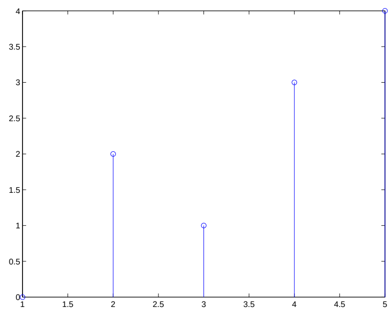


Figure 1.2. Fuel Metabolism results with Method A



(a) Big



(b) Small

Figure 1.3. Fuel Metabolism results using Method XYZ in complex systems for both linear and Nonlinear behavior cases

CHAPTER 2

REPRESENTATION OF LINEAR CONSTRAINTS METHODS WITH CONVEX FUNCTION CONDITIONS IN MODERN OPTIMIZATION THEORY

2.1 Basic Concepts

In this chapter we examine ways of representing linear constraints. The goal is to write the constraints in a form that makes it easy to move from one feasible point to another. The constraints specify interrelationship among the variables so that, for example, if we increase the first variable, retaining feasibility might require making a complicated sequence of changes to all the other variables. It is much easier if we express the constraints using a coordinate system that is "natural" for the constraints. [2] Then the interrelationship among the variables are taken care of by the coordinate system, and moves between feasible points.

2.2 Null and Range Spaces

The null sapce of a matrix is orthogonal to the rows of that matrix......

2.3 Generating Null Space Matrices using VR Method

VR stands for Variable Reduction method. This is a simple method used in linear programming ......

2.4 Orthogonal Projection Matrix

A matrix is called orthogonal projection if we have ....

[2] Natural means that the points be global optimums

CHAPTER 3

DUALITY AND SENSIVITY

3.1 The Dual Problem

For every linear programming problem there is a companion problem, called dual linear problem...........

3.2 Duality Theory

There are two major results relating the primal and dual problems. The first is called weak duality and is easier to prove.

CHAPTER 4

NETWORK PROBLEMS

4.1 Basic Examples

The most general network problem that we face with is called the minimum cost network flow problem.

4.2 Basis Representation Many of the efficiencies in the network simplex method come about because of the special form of the basis in the network problem.

CHAPTER 5

CONCLUSION

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5.1 Summary

This was just to create a sample section...

APPENDIX A

TABLE OF TRANSITION COEFFICIENTS FOR THE DESIGN OF LINEAR-PHASE FIR FILTERS

Your Appendix will go here !

APPENDIX B

NAME OF YOUR SECOND APPENDIX

Your second appendix text....

APPENDIX C

NAME OF YOUR THIRD APPENDIX

Your third appendix text....

BIBLIOGRAPHY

[1] L. Boney, A. H. Tewfik, and K. N. Hamdy. Digital watermarks for audio signals. In *Proceedings of the Third IEEE International Conference on Multimedia*, pages 473–480, June 1996.

[2] M. Goossens, F. Mittelbach, and A. Samarin. *A LaTeX Companion*. Addison-Wesley, Reading, MA, 1994.

[3] H. Kopka and P. W. Daly. *A Guide to LaTeX*. Addison-Wesley, Reading, MA, 1999.

[4] D. Pan. A tutorial on mpeg/audio compression. *IEEE Multimedia*, 2:60–74, Summer 1995.