Title of Your Thesis

BY

AUTHOR'S NAME
Author's degree, year

THESIS

Submitted as partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Electrical and Computer Engineering
in the Graduate College of the
University of Illinois at Chicago, 2020

Chicago, Illinois

Defense Committee:

Member 1, Chair and Advisor
Member 2
Member 3
Member 4
Member 5, Affiliation

To myself,

the only person worthy of my company

ACKNOWLEDGMENTS

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AN

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Author's Name
March 2, 2020

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LIST OF ABBREVIATIONS

LOL	Laugh Out Loud
LMAO	Laughing My Ass Off
UIC	University of Illinois at Chicago

NOTATIONS

Bold lowercase letters are used to denote the vectors and bold uppercase letters for matrices. The following mathematical notations are used throughout this thesis:

$\lvert x \rvert$	the absolute value of a scalar x
$[x]$	the integral part of a real scalar x, *i.e.*, the greatest integer $\leq x$
$\{x\}$	the fractional part of a real scalar x, *i.e.*, $\{x\} = x - [x]$
$\boldsymbol{x}_m(k)$	the k^{th} element of vector $\boldsymbol{x}_m$
$[\boldsymbol{X}]_{i,j}$	the $(i,j)^{\text{th}}$ element of matrix $\boldsymbol{X}$
$\lVert \boldsymbol{x} \rVert_p$	the l_p-norm of $\boldsymbol{x}$, defined as $(\sum_k \lvert \boldsymbol{x}(k) \rvert^p)^{\frac{1}{p}}$
$\lVert \boldsymbol{x} \rVert$	the l_2-norm of $\boldsymbol{x}$
$\boldsymbol{x} \circledast \boldsymbol{y}$	denotes convolution of $\boldsymbol{x}$ and $\boldsymbol{y}$
$\lVert \boldsymbol{X} \rVert_F$	the Frobenius norm of matrix $\boldsymbol{X}$ defined as $\sqrt{\sum_{i=1}^{m} \sum_{j=1}^{n} \lvert [\boldsymbol{X}]_{i,j} \rvert^2}$
$\boldsymbol{X}^*$	the complex conjugate of the matrix $\boldsymbol{X}$
$\boldsymbol{X}^T$	the transpose of the matrix $\boldsymbol{X}$
$\boldsymbol{X}^H$	the complex conjugate transpose of the matrix $\boldsymbol{X}$
$\boldsymbol{X}^\dagger$	the Moore-Penrose pseudoinverse of the matrix $\boldsymbol{X}$
$\text{Tr}\,(\boldsymbol{X})$	the trace of matrix $\boldsymbol{X}$
$\text{vec}\,(\boldsymbol{X})$	the vector obtained by column-wise stacking of matrix $\boldsymbol{X}$

NOTATIONS (Continued)

$\mathrm{diag}\,(\boldsymbol{X})$	denotes a vector formed by diagonal entries of the matrix $\boldsymbol{X}$
$\mathrm{Diag}\,(\boldsymbol{x})$	denotes a diagonal matrix formed by the entries of the vector $\boldsymbol{x}$
$\arg(\boldsymbol{X})$	the phase angle (in radians) of $\boldsymbol{X}$
$\mathrm{cov}\,(\boldsymbol{X})$	the covariance matrix of $\boldsymbol{X}$
$\Re(\boldsymbol{X})$	the real part of $\boldsymbol{X}$
$\Im(\boldsymbol{X})$	the imaginary part of $\boldsymbol{X}$
$\sigma_n(\boldsymbol{X})$	the n^{th} maximal eigenvalue of $\boldsymbol{X}$
$\lambda_n(\boldsymbol{X})$	the n^{th} maximal singular value of $\boldsymbol{X}$
$\boldsymbol{X} \otimes \boldsymbol{Y}$	the Kronecker product of two matrices $\boldsymbol{X}$ and $\boldsymbol{Y}$
$\boldsymbol{X} \odot \boldsymbol{Y}$	the Hadamard product of two matrices $\boldsymbol{X}$ and $\boldsymbol{Y}$
$\boldsymbol{X} \succ \boldsymbol{Y}$	$\boldsymbol{X} - \boldsymbol{Y}$ is positive definite
$\boldsymbol{X} \succeq \boldsymbol{Y}$	$\boldsymbol{X} - \boldsymbol{Y}$ is positive semidefinite
$\boldsymbol{I}_n$	the identity matrix of dimension n
$\mathbf{1}_n$	the all-one vector of size $n \times 1$
$\mathbf{0}_n$	the all-zero vector of size $n \times 1$
$\boldsymbol{O}$	the matrix with all elements as zero
$\boldsymbol{e}_n$	the n^{th} standard basis of $\mathbb{C}^n$ or n^{th} column of an identity matrix
$\mathbb{R}$	the set of real numbers

NOTATIONS (Continued)

$\mathbb{R}_+$	the sets of real non-negative numbers
$\mathbb{C}$	the set of complex numbers
$\mathbb{N}$	the set of natural numbers
$\mathbb{Z}$	the set of integers
$\mathbb{B}_N^M$	the set of binary vectors with size M and N non-zero elements, $N \leq M$
$\mathcal{S}^M$	the set of all real symmetric matrices of size $M \times M$
$\mathbf{F}_n$	the n dimensional discrete Fourier transform matrix
$\mathbb{E}\{\cdot\}$	the mathematical expectation of a random variable
$\mathbb{P}\mathrm{r}\{\cdot\}$	denotes the probability of a random event
$\mathrm{sign}(\cdot)$	the element-wise signum operator
$\mathrm{csign}(\cdot)$	the element-wise complex signum operator as $\mathrm{sign}(\Re\{\cdot\}) + j\mathrm{sign}(\Im\{\cdot\})$
$\mathcal{N}(\cdot,\cdot)$	the normal distribution with mean, and covariance as first and second arguments, respectively
$\ln a$	natural logarithm of a, equivalent to $\log_e a$
j	the imaginary unit *i.e.*, $j = \sqrt{-1}$

SUMMARY

Briefly describe your project and your contribution here.

CHAPTER 1

INTRODUCTION

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This is a paragraph with a name.

1.1 Section Title

Some text [1].

1.1.1 Subsection Title

Some more texts

1.1.1.1 Part I: Title

1.1.1.2 Part II: Title

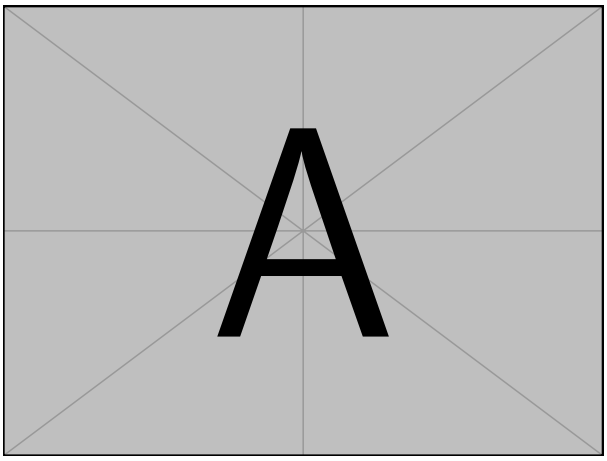

Figure 1. An example figure

TABLE I

AN EXAMPLE TABLE

Notation	Title A	Title B
P_{Text}	Some text	Some more text
S_{Text}	Some text	Some more text
S_{Text}	Some text	Some more text

Algorithm 1.1 ExampleAlgorithm

Require: `var1`, `var2`, N
Ensure: `var1` $\leftarrow 1$, `var2` $\leftarrow 1$, `flag` $\leftarrow 0$
Input: `var1`, `var2`, N
Initialize: `var1` $\leftarrow 1$, `var2` $\leftarrow 1$, `flag` $\leftarrow 0$
Output: `var3` ▷ All five commands are equally valid

1: **repeat** ▷ Example: `repeat`
2: SomeSteps
3: **until** SomeConditionIsMet
4: **for** $i = 0$ **to** 10 **do** ▷ Example: `for` loop
5: SomeStepsForLoop
6: **end for**
7: **while** `flag` **do** ▷ Example: `while` loop
8: `var1` $\leftarrow$ DoSomeShit
9: `var2` $\leftarrow$ DoSomeMoreShit
10: **end while**
11: **loop** ▷ Example: `loop`
12: SomeInfiniteLoopStuff
13: **end loop**
14: **if** `var1` $< N$ **then** ▷ Example: `if-else if- else`
15: `flag` $\leftarrow 1$
16: **else if** `var1` $= N$ **then**
17: `flag` $\leftarrow 0$
18: **else**
19: `var3` $\leftarrow$ `var1` + `var2`
20: **end if**
21: **print** some results
22: **return** `var3`

Part I

Part I

I-A

Subpart I A

CHAPTER 2

PAPER I TITLE

Overview: Write abstract here.

Keywords: Write keywords here

2.1 Introduction

Basic stuffs:

1. put figures in 'figures' folder
2. use 'CHID_' to label stuffs
3. put appendices in appendices.tex with appropriate CHID

Parts of this chapter is taken from published journal article

I-B

Subpart I B

CHAPTER 3

PAPER I TITLE

Overview: Write abstract here.

Keywords: Write keywords here

3.1 Introduction

Basic stuffs:

1. put figures in 'figures' folder
2. use 'CHID_' to label stuffs
3. put appendices in appendices.tex with appropriate CHID

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Part II

Part II

II-A

Subpart II A

CHAPTER 4

PAPER I TITLE

Overview: Write abstract here.

Keywords: Write keywords here

4.1 Introduction

Basic stuffs:

1. put figures in 'figures' folder
2. use 'CHID_' to label stuffs
3. put appendices in appendices.tex with appropriate CHID

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II-B

Subpart II B

CHAPTER 5

PAPER I TITLE

Overview: Write abstract here.

Keywords: Write keywords here

5.1 Introduction

Basic stuffs:

1. put figures in 'figures' folder
2. use 'CHID_' to label stuffs
3. put appendices in appendices.tex with appropriate CHID

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II-C

Subpart II C

CHAPTER 6

PAPER I TITLE

Overview: Write abstract here.

Keywords: Write keywords here

6.1 Introduction

Basic stuffs:

1. put figures in 'figures' folder
2. use 'CHID_' to label stuffs
3. put appendices in appendices.tex with appropriate CHID

Parts of this chapter is taken from published journal article

APPENDICES

Appendix A

Proof of convergence

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Appendix B

Time-complexity analysis of the Algorithm

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Appendix C

Proof

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Appendix D

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CITED LITERATURE

1. Grant, M. and Boyd, S.: CVX: Matlab software for disciplined convex programming, version 2.1. `http://cvxr.com/cvx`, March 2014.

VITA

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