

AN EXAMPLE DISSERTATION

Nate Iverson

A Dissertation

Submitted to the Graduate College of Bowling Green
State University in partial fulfillment of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2007

Committee:

Corneliu Hoffman, Committee Chair

Darth Vader,
Graduate Faculty Representative

Kit Chan

Warren McGovern

Copyright © August 2007

Nate Iverson

All rights reserved

ABSTRACT

Corneliu Hoffman, Committee Chair

Darth Vader: There is no escape. Don't make me destroy you. pauses Luke, you do not yet realize your importance. You have only begun to discover your power. Join me, and I will complete your training. With our combined strength, we can end this destructive conflict and bring order to the galaxy. Luke Skywalker: I'll never join you! Darth Vader: If you only knew the *power* of the dark side. Obi-wan never told you what happened to your father. Luke Skywalker: He told me enough! He told me *you* killed him. Darth Vader: No. *I* am your father.

I would like to dedicate this work to the memory of my grandparents. They were a great
inspiration to me.

ACKNOWLEDGMENTS

I would like to acknowledge my family, my teachers, my professors, my roommates, and the people who delivered food to my apartment.

I would also like to acknowledge my grade school teachers. This paragraph is automatically indented, that's good.

TABLE OF CONTENTS

	Page
CHAPTER 1 MATHEMATICS	1
1.1 Small figures	1
1.2 Making tables	1
1.3 Citations	1
1.4 Large, wide figures in landscape orientation	2
1.5 Numbering definitions, theorems, and proofs	4
1.6 Additional numbered results	5
CHAPTER 2 BOB DYLAN	7
CHAPTER 3 SILLYNESS	8
3.1 Firefly	8
3.2 Lorem ipsum	8
CHAPTER 4 HOW TO PROVE IT	10
4.1 Proof by accumulated evidence:	10
4.2 Proof by cosmology:	10
4.3 Proof by mutual reference:	10
4.4 Proof by metaproof:	10
CHAPTER 5 OTHERNESS	11
5.1 deja-vu	11
5.2 More references	11
BIBLIOGRAPHY	12
APPENDIX A SELECTED R PROGRAMS	13
APPENDIX B SELECTED R PROGRAMS	14

LIST OF FIGURES

Figure	Page
1.1 Caption of a figure.	1
1.2 Short caption for List of Figures	3

LIST OF TABLES

Table	Page
1.1 The values of test statistics and the corresponding critical values at t_0 . $\alpha = 0.1$. . .	1

PREFACE

A preface is like a pre-introduction. Dissertations probably don't need them. Here is a bit more text to make clear that this paragraph is being indented.

If you don't want a preface, delete the corresponding lines in `dissertation.tex`.

CHAPTER 1 MATHEMATICS

1.1 Small figures

This section illustrates how to include a small .eps figure. You can also use .pdf figures. Run PDFLaTeX to compile the LaTeX source code.

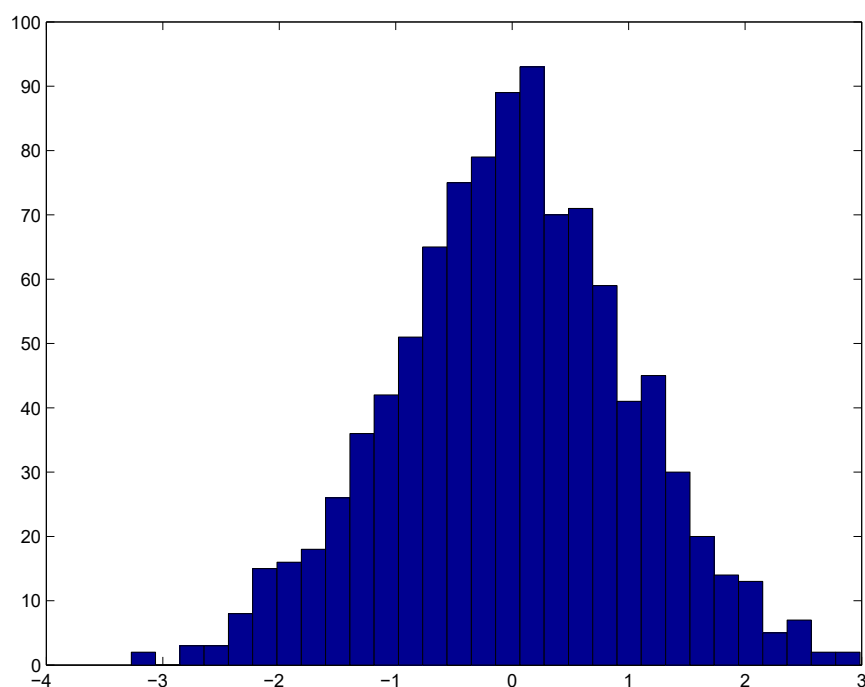


Figure 1.1 Caption of a figure.

1.2 Making tables

Table 1.1 The values of test statistics and the corresponding critical values at t_0 . $\alpha = 0.1$.

t_0	30	60	90	120	150	180
Critical Value	11.2282	10.5357	11.1108	11.7942	11.7343	11.7471
Test Statistic	25.3182	24.6395	24.6049	25.6623	27.1320	29.3247

1.3 Citations

The easiest way to cite published works is to look them up with an online tool like scholar.google.com, copy the BibTeX citation information into the file reference.bib (click the double quotes under the article in Google Scholar), then run BibTeX on dissertation.tex. Below

are the commands to insert citations into your dissertation.

To cite an article use `cite`, `citet`, or `citep`.

For “in text” citations use `citet`: The original result is attributed to von Neumann (1928).
Refer to Mardia (1970) for an example. Refer to Mardia (1970) for an example.

For a “parenthetical citation” use `citep`: The computations were implemented in R (R Core Team, 2014) using bootstrap (Davison and Hinkley, 1997; Efron and Tibshirani, 1993).

When citing a book, it is helpful to mention where to find the result by indicating a chapter or a page number or an equation number: Efron and Tibshirani (1993, Ch. 6) discuss additional results.

Add your reference information to the file `reference.bib`. Every time you edit `reference.bib`, run BibTeX on the `dissertation.tex` file so that LaTeX will know what the references are.

1.4 Large, wide figures in landscape orientation

It’s not hard to incorporate very wide figures by making a landscape page in the middle of the PDF. However, then you need the page number to move, in order to stay in the upper right corner. That is handled by special LaTeX code in the following example.

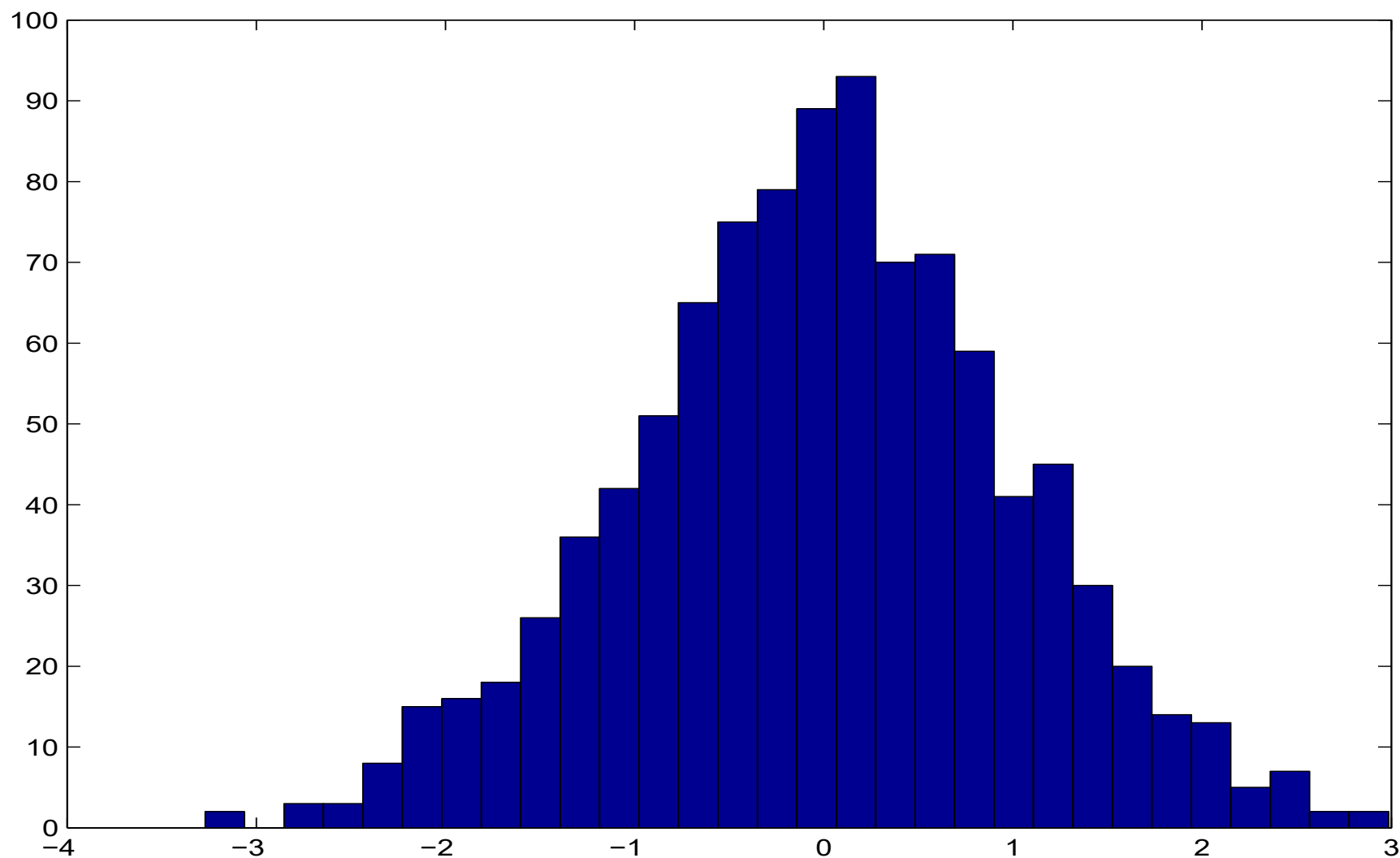


Figure 1.2 Long caption to appear under the figure. Make sure the figure is small enough that the caption stays within the margins. Note that the page number is still in the upper right corner of the PDF file; this is how it needs to be, so follow the code in chapter1.tex.

1.5 Numbering definitions, theorems, and proofs

This section illustrates the appearance of definitions, theorems, proofs, and similar items in mathematical work. When it says Definition 1.1, that means that it is the first definition in Chapter 1, then Definition 1.2 is the second definition in Chapter 1. The section number is not part of the numbering.

There is a page break here to make it easier to start a screen reader to hear how it reads the equations on the next page.

Definition 1.1. We say that $\lim_{x \rightarrow a} f(x) = L$ if for all $\varepsilon > 0$, there exists $\delta > 0$ such that for all $x \in (a - \delta, a + \delta)$, we have $|f(x) - L| < \varepsilon$.

Definition 1.2. An integer n is even if $n = 2k$ for some integer k . Thus, for example, the number 0 is even because $0 = 2 \cdot 0$.

Theorem 1.1 (Pythagorean Theorem). For a right triangle with edge lengths a , b , and c where c is the length of the hypotenuse,

$$a^2 + b^2 = c^2 \quad (1.5.1)$$

Proof. Many proofs are available. Here, we focus on the structure of the proof.

Case 1: Suppose that the triangle is isosceles. Then $a = b$ and everything works out well.

Case 2: Suppose that the triangle is not isosceles. The proof of this case is beyond the scope of this template. □

1.6 Additional numbered results

Now we are starting a new section of Chapter 1. We can still refer back to Equation 1.5.1.

Lemma 1.1. A lemma is a short, technical result that is needed in the proof of a theorem.

Note how equations are numbered.

$$(a + b)^2 = a^2 + 2ab + b^2 \quad (1.6.1)$$

Proposition 1.1. A proposition is like a little theorem.

Corollary 1.1. A corollary is an easy result that follows a theorem.

Definition 1.3. An integer n is odd if $n = 2k + 1$ for some integer k .

Note that that was the third definition in Chapter 1, which appears in Section 1.6. An alternative way to number is to number each equation, definition, theorem, etc. using the same

counter, so that the numbers increase throughout the chapter. You can get numbering like that by changing certain lines in the preamble of the file `dissertation.tex`, as is explained there.

Once again, we can refer back to Equation 1.5.1. We can also refer to Equation 1.6.1. Note that when you are reading the PDF version of this document and you click a link to take you to an equation or a reference, you can press Left Alt plus the left arrow key to get back to where you were. That's pretty arcane, but it sure helps you navigate a PDF.

CHAPTER 2 BOB DYLAN

John the Baptist after poisoning a thief, Looks up at his hero, the Commander-in-Chief,
Saying tell me great leader, but please make it brief Is there a hole for me to get sick in? The
Commander-in-Chief answers him while chasing a fly, Saying death to all those who would
whimper and cry. And dropping a barbell he points to the sky, Saying the sun is not yellow, it's
chicken. – Bob Dylan, "Tombstone Blues"

CHAPTER 3 SILLYNESS

Chapter 3 is pretty short, it is just here to illustrate that you can have several chapters and sections.

3.1 Firefly

River: “I took you away from there.”

Simon: “No.”

River: “I know I did. You don’t think I do, but... I get confused. I remember everything. I remember too much and.... Some of it’s made up and... some of it can’t be quantified and there’s secrets...”

Simon: “It’s okay.”

River: “But I understand. You gave up everything to find me, and you found me broken. It’s hard for you. You gave up everything you had.”

Simon: “Mei mei, everything I have is right here.”

3.2 Lorem ipsum

When people need to fill in a block of text but don’t have anything to write, they often use Lorem ipsum. See <https://www.lipsum.com/> for an explanation of where this text comes from. It’s basically random Latin words. It has apparently been used since the 1500’s.

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

Aenean eu aliquet lectus. Sed ultrices fringilla imperdiet. Nullam sollicitudin pulvinar erat, in eleifend nunc hendrerit nec. Phasellus tincidunt lobortis ultricies. Donec vitae felis euismod arcu facilisis gravida. Curabitur vel finibus tortor, eget pulvinar purus. Nullam quis velit eleifend risus eleifend tristique vitae ultrices justo.

Fusce dolor dolor, fermentum in elit viverra, lacinia scelerisque erat. Vestibulum posuere cursus sollicitudin. Maecenas sollicitudin, nisi vel faucibus malesuada, est diam ornare lacus, quis placerat nisi est in ante. Morbi ultricies ac felis ac pharetra. Aliquam erat volutpat. Sed magna nibh, efficitur euismod ipsum bibendum, sodales dapibus eros. Quisque eu porttitor ipsum. Praesent ac ante magna. Nullam eget tellus porta elit mattis dapibus. Nullam augue nibh, imperdiet ac viverra id, porttitor malesuada est. Nunc metus urna, consectetur eu lacus ac, auctor ultricies enim. Donec eleifend orci id vestibulum faucibus.

Curabitur sit amet sem sed lorem suscipit iaculis non hendrerit nisl. Donec hendrerit, enim ut pulvinar tincidunt, nisi ante suscipit tortor, ut dignissim nulla dolor quis turpis. Proin at pellentesque sapien, porttitor rhoncus orci. Vivamus dictum ligula nisl, nec vestibulum sapien tempor ac. Aenean euismod ut arcu ac ultrices. Mauris pellentesque justo at tellus euismod, sed tristique felis tempus. In hac habitasse platea dictumst. Aliquam erat volutpat. Curabitur sagittis eget erat ac feugiat. Vivamus iaculis imperdiet arcu, eget consectetur orci venenatis id. Quisque mollis commodo elementum.

Sed dui felis, pellentesque sit amet nunc vitae, vestibulum laoreet lectus. Nunc in purus quis turpis tempus sodales. Sed a ipsum accumsan, feugiat tortor non, finibus magna. Aenean sagittis risus non mollis suscipit. Fusce non pellentesque dolor. Donec ut vestibulum urna. In molestie odio turpis. Sed aliquam risus in laoreet hendrerit. Cras id urna eget justo rhoncus sodales. Donec pulvinar a massa eget consequat. Vestibulum sed diam et nunc euismod mattis. Integer nec consequat augue. Suspendisse ut tortor sit amet quam maximus porta.

CHAPTER 4 HOW TO PROVE IT

4.1 Proof by accumulated evidence:

Long and diligent search has not revealed a counterexample.

4.2 Proof by cosmology:

The negation of the proposition is unimaginable or meaningless. Popular for proofs of the existence of God.

4.3 Proof by mutual reference:

In reference A, Theorem 5 is said to follow from Theorem 3 in reference B, which is shown to follow from Corollary 6.2 in reference C, which is an easy consequence of Theorem 5 in reference A.

4.4 Proof by metaproof:

A method is given to construct the desired proof. The correctness of the method is proved by any of these techniques.

CHAPTER 5 OTHERNESS

In a surprise raid last night, federal agents ransacked a house in search of a rebel computer hacker. However, they were unable to complete the arrest because the warrant was made out in the name of Don Provan, while the only person in the house was named don provan. Proving, once again, that Unix is superior to Tops10.

5.1 deja-vu

Over the years, I've developed my sense of deja vu so acutely that now I can remember things that *have* happened before ...

5.2 More references

Once again, we can refer back to Equation 1.5.1. We can also refer to Equation 1.6.1. Finally, we can refer back to Section 1.6.

BIBLIOGRAPHY

- Davison, A. and D. Hinkley (1997). *Bootstrap Methods and their Application*. Oxford: Cambridge University Press.
- Efron, B. and R. Tibshirani (1993). *An Introduction to the Bootstrap*. Boca Raton, FL: Chapman & Hall/CRC.
- Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrika* 57, 519–530.
- R Core Team (2014). *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing.
- von Neumann, J. (1928). Zur theorie der gesellschaftsspiele. *Math. Annalen* 100, 295–320.

APPENDIX A SELECTED R PROGRAMS

An appendix is a pretty good place to put short programs or lists of data items or other things that a reader wants to be able to see, but might not ever actually look at. Sometimes a document will have more than one appendix. That's OK. You can label them A, B, C, however many you need.

- The function `kernel` is used to compute the kernel function of variances

```
kernel=function(x,y) {  
  h = 0.5*(x-y)^2  
  return(h)  
}
```

APPENDIX B SELECTED R PROGRAMS

Text of appendix goes here.

- The function kernel is used to compute the kernel function of variances

```
kernel=function(x,y) {  
  h = 0.5*(x-y)^2  
  return(h)  
}
```