



Swiss Federal Institute of Technology Zurich

Seminar for  
Statistics

Department of Mathematics

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Master Thesis

Summer 2009

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Student Muster

The title of my thesis  
which should be split on  
several lines if it is too long

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Submission Date: August 19th 2009

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Co-Adviser Markus Kalisch  
Adviser: Prof. Dr. Sara van de Geer



To some special person



# Preface

First words and acknowledgements.



# Abstract

Short summary of my thesis.

## Contents



## List of Figures

## List of Tables

# Notation

Explain your symbols and abbreviations.



# Chapter 1

## Introduction

Description of the work. Prepare the reader for the following chapters.

You will cite literature here, typically, but



## Chapter 2

# First Chapter

### 2.1 To include a picture

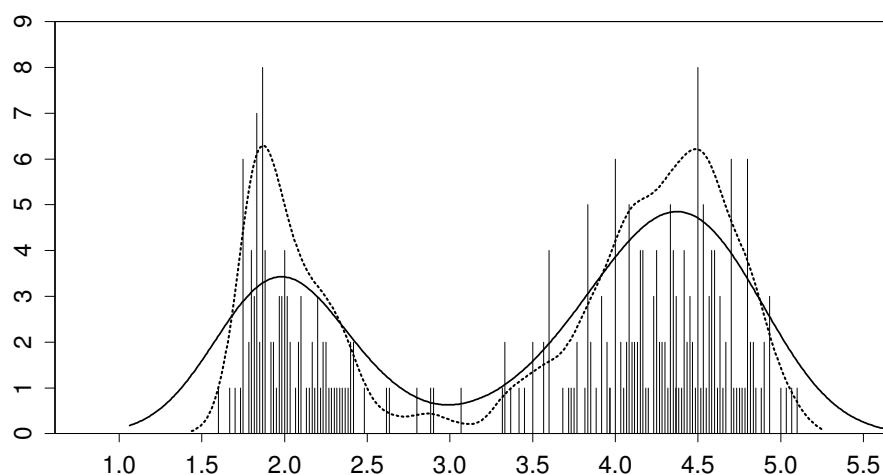


Figure 2.1: Old Faithful Geyser eruption lengths,  $n = 272$ ; binned data and two (Gaussian) kernel density estimates ( $\times 10$ ) with  $h = h^* = .3348$  and  $h = .1$  (dotted).

Or also with `includegraphics`:

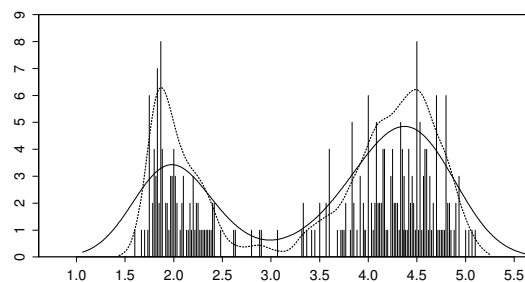


Figure 2.2: Old Faithful Geyser eruption lengths,  $n = 272$ ; binned data and two (Gaussian) kernel density estimates ( $\times 10$ ) with  $h = h^* = .3348$  and  $h = .1$  (dotted).

## 2.2 To make a proof

*Proof.*  $1 + 1 = 2$

□

## 2.3 To include R code

See information in Appendix ??.

## 2.4 Other information

Put a text between quotes: make sure to use nice quotes, such as “quote”.

Cite an article or book you refer shortly here, and then listed in the bibliography: ?. Or mention that ? (a person) or ? (two persons) have already done quite a bit work.

Referencing a different part of your work: please refer to Appendix ??.



## **Chapter 3**

### **Summary**

Summarize the presented work. Why is it useful to the research field or institute?

#### **3.1 Future Work**

Possible ways to extend the work.



# Appendix A

## Complementary information

Additional material. For example long mathematical derivations could be given in the appendix. Or you could include part of your code that is needed in printed form. You can add several Appendices to your thesis (as you can include several chapters in the main part of your work).

### A.1 Including R code with verbatim

A simple (rather too simple, see ??) way to include code or *R* output is to use `verbatim`. It just prints the text however it is (including all spaces, “strange” symbols,...) in a slightly different font.

```
## loading packages
library(RBGL)
library(Rgraphviz)
library(boot)
```

```
## global variables
X_MAX <- 150
```

```
    This allows me to put as many s p a c e s as I want.
I can also use \ and ' and & and all the rest that is usually only
accepted in the math mode.
```

```
I can also make as
                many
                line
                breaks as
I want... and
                where I want.
```

But really recommended, much better is the following:

However, it is much nicer to use the *listings* package to include R code in your report. It allows you to number the lines, color the comments differently than the code, and so on. All the following is produced by simply writing `\lstinputlisting{Pictures/picture.R}` in your L<sup>A</sup>T<sub>E</sub>X “code”:

```
or \lstinputlisting{/u/maechler/R/Pkgs/sfsmisc/R/ellipse.R} :
```

[illegible]

### A.3 Using Sweave (or knitr) to include R code (and more) in your report

The easiest (and most elegant) way to include R code and its output (and have all your figures up to date with your report) is to use Sweave—or the **knitr** R package with even more possibilities.

Search the web to find lots of intro material on how to use Sweave or **knitr** ([on Wikipedia](#)).



## Appendix B

# Yet another appendix....

### B.1 Description

**Something** details.

**Something else** other definition.

### B.2 Tables

Refer to Table ?? to see a left justified table with caption on top.

Table B.1: Results.

<b>Student</b>	<b>Grade</b>
Marie	6
Alain	5.5
Josette	4.5
Pierre	5





## Appendix C

# 2nd Appendix: More sophisticated R code listing

Chapter-wise listing of parts of R code, using

- `firstline=n1`
- `lastline=n2`
- `title=<text>`

e.g., for the first example below

```
\lstinputlisting[firstline=1,lastline=32,  
                  title= \texttt{read\_irwls\_fn.R}]{../RCode/read_irwls_fn.R}
```

### C.1 Chapter 5

```
1 ellipsePoints ← function(a,b, alpha = 0, loc = c(0,0), n = 201,  
2                       keep.ab.order = FALSE)  
3 {  
4   ## Purpose: ellipse points, radially equispaced, given geometric par.s  
5   ## -----  
6   ## Arguments: a, b : length of half axes in (x,y) direction  
7   ##             alpha: angle (in degrees) for rotation  
8   ##             loc  : center of ellipse  
9   ##             n    : number of points  
10  ## -----  
11  ## Author: Martin Maechler, Date: 19 Mar 2002  
12  
13  stopifnot(is.numeric(a), is.numeric(b))  
14  reorder ← a < b && keep.ab.order  
15  B ← min(a,b)  
16  A ← max(a,b)  
17  ## B <= A  
18  d2 ← (A-B)*(A+B) ## = A^2 - B^2  
19  phi ← 2*pi*seq(0,1, len = n)  
20  sp ← sin(phi)  
21  cp ← cos(phi)  
22  r ← a*b / sqrt(B^2 + d2 * sp^2)  
23  xy ← r * if(reorder) cbind(sp, cp) else cbind(cp, sp)  
24  ## xy are the ellipse points for alpha = 0 and loc = (0,0)  
25  al ← alpha * pi/180  
26  ca ← cos(al)  
27  sa ← sin(al)
```

```

28 xy %*% rbind(c(ca, sa), c(-sa, ca)) + cbind(rep(loc[1],n),
29                                               rep(loc[2],n))
30 }

```

read\_irwls\_fn.R

```

1 ellipsePoints ← function(a,b, alpha = 0, loc = c(0,0), n = 201,
2                       keep.ab.order = FALSE)
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29                                               rep(loc[2],n))
30 }

```

plot.psi.R

# Epilogue

A few final words.



# Declaration of Originality

The signed declaration of originality is a component of every semester paper, Bachelor's thesis, Master's thesis and any other degree paper undertaken during the course of studies, including the respective electronic versions.

Lecturers may also require a declaration of originality for other written papers compiled for their courses.

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**Authored by** (in block letters):

*For papers written by groups the names of all authors are required.*

**Name(s):**

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- I am aware that the work may be screened electronically for plagiarism.
- I have understood and followed the guidelines in the document *Scientific Works in Mathematics*.

**Place, date:**

**Signature(s):**

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