



TITLE OF THE RESEARCH

By

STUDENT NAME HERE

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
Malaysia, in Fulfillment of the Requirements for the Doctor of Philosophy**

January 2018

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DEDICATIONS

To all of my love

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment
of the requirement for the degree of Doctor of Philosophy

TITLE OF THE RESEARCH

By

STUDENT NAME HERE

January 2018

Chairman: Professor Dr. A, PhD

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Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

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ACKNOWLEDGEMENTS

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NOR AINI AB. SHUKOR, PhD

Professor and Deputy Dean
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Universiti Putra Malaysia

Date: 28 June 2018

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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Committee: Associate Professor Dr. D, PhD

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LIST OF ABBREVIATIONS

AIC	Akaike Information Criteria
AICc	Corrected Akaike Information Criteria
B	Number of re-samples
CV	Coefficient of Variation
EB	Extra Balance
EVT	Extreme Value Theory
FANOVA	Functional Analysis of Variance
FDA	Functional Data Analysis
FEDA	Functional Extreme Data Analysis
FPC	Functional Principal Component
GCV	Generalized Cross-Validation
GEV	Generalised Extreme Value
GPD	Generalised Pareto Distribution
IDW	Inverse Distance Weight
K	Number of Basis Function
LP	Lower Point
m	Number of block
MRL	Mean Residual Life
n	Number of observations
N	Number of Functional Data
NR	Normal Ratio
NRIDW	Normal Ratio with Inverse Distance Weight
PENSSE	Penalized Sum Square Error
POT	Peak Over Threshold
pdf	Probability Density Function
r	Most highest values in each block
SI	Smoothing Index
SIR	Smoothing Index Rank
SSE	Sum Square Error
t	Time
T	Number of time
UP	Upper Point

CHAPTER 1

INTRODUCTION

1.1 Section

"Functional Data Analysis" is known as FDA and an extreme data are two important things to be comprehended in this study. Method of functional data analysis will be used as a main technique to the extreme environmental data. New approach of functional data analysis might give a different point of view to the data with a functional observations as a replacement of discrete observations. At the same time, the extreme value data will possibly be implemented by considering only the highest values present in the data. The development of FDA methods can be seen through various problems occurred in many fields of study, Ramsay and Silverman (2002). Hence, this study proposes a method development of functional data analysis for extreme data and the application of FDA on the extreme environmental data. The entire all three extreme value data approaches are tested to FDA which can be listed as Block Maxima, r -Largest Order Statistics, and Peak Over Threshold (POT). The extreme data used for this study will be transformed into functional form. The idea of how FDA and extreme data work are explained in the next subsection.

1.1.1 Subsection

Subsubsection

Either raw discrete or continuous data which is widely used as a current conventional approach in various research areas are easy to be implemented and dealt with as numerous data are collected and presented in this form. A discrete or continuous observations of one data set values always be represented as $\{x_1, x_2, x_3, \dots, x_T\}$ or simply written as x_t for data which are recorded in time, t for $t = 1, \dots, T$ where T is the finite value of t . This conventional method gives less information especially for an illustration of the pattern to shows the behavior of the collected data.

As can be seen in Figure 1.1, an **example** of plotting a raw continuous data as a single observation over the time for $t = 1, \dots, 36$. The plot shows that it is not enough evidence to obtain towards the behavior of the data. Nothing much can be achieved rather than a summary value of the data like a minimum, maximum, range, mean and median value. The most general behavior that can be seen here there is an increasing pattern along the time.

One can easily use time series analysis in obtaining the pattern of the data which also provide forecast for the future pattern. Unfortunately, time series analysis only work for equally time space and required for stationary assumption. However,

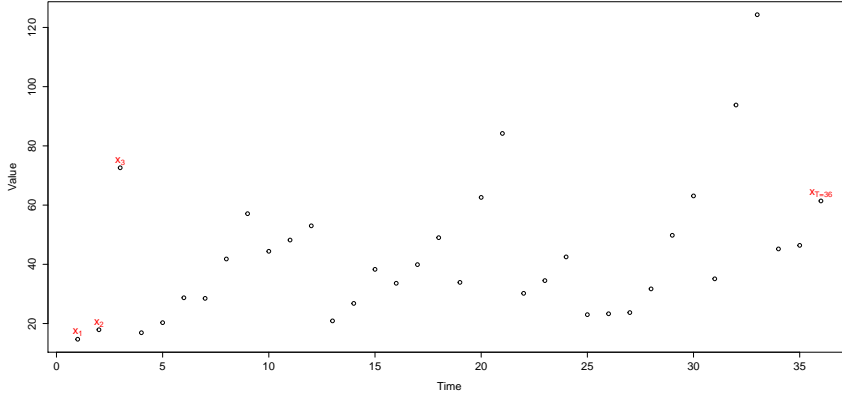


Figure 1.1: Example of plotting the 36 raw continuous data over time. Each point treated as a single observation.

compared to the functional data analysis, FDA provides additional and extensive evidence to the research that aid further analysis without any restriction where the data can be arranged in unequal time space and no assumptions need to be followed.

Influenced by the features of FDA, the data used in this study is in functional form. FDA basically represents the observations x_t from the raw data into a functional form or functional observation. The number of x_t which is represent for the observations of raw data is denoted as n . FDA will represents the entire x_t as one function denoted as $f(t)$. This functional form of function $f(t)$ contains the fitted values of f_i that are also recorded in time t , which can be written as $f(t) = \{f_1, f_2, f_3, \dots, f_T\}$. The process of how to transform the raw of discrete or continuous data into functional form will be discussed in Chapter ??.

This study considers a smoothing method in a way to represent a non-parametric continuous-time functions by basis expansion methods, where the function $f(t)$ can be examined by

$$f(t) = \sum_{k=1}^K \beta_k \phi_k \quad (1.1.1)$$

Table 1.1 shows an **example** of deviance analysis with several values of p -value of reduction in deviance for $K = 113, \dots, 129$. The analysis supposedly represents the p -value from $K = 1, \dots, 720$. The significant value is $K = 121$ as p -value is less than 0.05. This K which also has a largest reduction in deviance of 20.4477 and show that s^2 is fails to decline for the next value of K . Through these plotting and

analysis of deviance approaches, an appropriate value of K can be obtained. It is important to select a suitable K in order to obtain a smooth function, since a very small value of K lead to over smooth the curve while a very large value of K gives an under smooth curve.

Table 1.1: Example of the analysis of deviance for respective value of K .

Basis, K	Estimated Variance, s^2	Reduction in Deviance	p -value
113	492.5549	0.3064	0.8579
115	491.3333	1.2216	0.5429
117	491.2973	0.0359	0.9821
119	492.6675	-1.3702	1.0000
121	472.2198	20.4477	< 0.0001
123	473.7527	-1.5329	1.0000
125	474.1958	-0.4430	1.0000
127	475.7003	-1.5046	1.0000
129	476.5167	-0.8164	1.0000

CHAPTER 2

LITERATURE REVIEW

2.1 Section

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Table 2.1: The summary table comparing previous studies in FDA application on environmental data.

Author	Type of Data	Basis System	Selection Method	FDA Method	Conclusion
Wan and Jamaludin (2015)	Daily wind and rainfall	Fourier	Variance estimation	Functional descriptive, correlation and cross-correlation function	i. There are no study analyse the extreme rainfall data by using functional data analysis.
King (2014)	Climate Change weather	Spline	K against s^2	Functional descriptive, mean and standard deviation function	ii. There are no study either conduct nor introduce the tolerance bands using the bootstrapping method.
Hamdan et al. (2013)	Daily rainfall	Fourier	Variance estimation	Functional descriptive, mean and first derivative	iii. All studies use variation estimation and the plot of K against s^2
Shaadan et al. (2012)	Daily PM ₁₀	Fourier	Variance estimation	Functional descriptive	
Jamaludin and Jemain (2011)	Daily rainfall	Fourier	Variance estimation	Functional Analysis of Variance (FANOVA)	
Ainsworth et al. (2011)	River flow	Spline	Variance estimation	Functional regression analysis, Functional principal component analysis	
Torres et al. (2011)	Daily gas emission	Fourier	Variance estimation	Functional depth	
Temiyasathi (2008)	Daily PM _{2.5}	Wavelet	Variance estimation	Functional regression analysis	
Gao (2007)	Daily ozone NOx	Fourier	Variance estimation	Functional Analysis of Variance (FANOVA)	
Meiring (2007)	Daily Ozone	Spline	Variance estimation	Functional Variation	

CHAPTER 3

SPECIAL TOPIC ONE

3.1 Introduction

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Author={Hoffstein, Jeffrey And Pipher, Jill And Silverman, Joseph H},  
Year={2008},  
Publisher={Springer}  
}
```

```
@Book{Hoffstein2008b,  
Title={An Introduction to Mathematical Cryptography Two}},
```

```

Author={Hoffstein, Jeffrey And Pipher, Jill And Silverman, Joseph H},
Year={2008},
Publisher={Springer}
}

```

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@Article{Goldwasser1988,
Title={{A Digital .... Attacks}},
Author={Goldwasser, Shafi And Micali, Silvio And Rivest, Ronald L},
Journal={SIAM Journal On Computing},
Volume={17},
Number={2},
Pages={281--308},
Year={1988},
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Author={May, Alexander},
Year={2003},
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Author={Dolev, Danny And Dwork, Cynthia And Naor, Moni},
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Title={{Equivalence ... Attacks}},
Author={Watanabe, Yodai And Shikata, Junji And Imai, Hideki},
Booktitle={Public Key Cryptography - PKC 2003},
Pages={71--84},
Year={2002},
Publisher={Springer}
}

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@Techreport{Kaliski1998,
Title={{PKCs} \# 1: {RSA} Cryptography Specifications Version 2.0},
Author={Kaliski, Burt And Staddon, Jessica},
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3.2 This section we will learn how to creat best table in LaTeX

Most important guidelines for making tables are

1. Avoid vertical lines
2. Avoid "boxing up" cells, usually 3 horizontal lines are enough: above below, and after heading
3. Avoid double horizontal lines
4. Enough space between rows
5. If in doubt, align left
6. Style: `\usepackage{booktabs}`
7. Horizontal lines: read documentation of booktabs
<http://texcatalogue.sarovar.org/entries/booktabs.html>
8. More space between rows: `\renewcommand{\arraystretch}{1.2}` (or 1.3)
9. Remove space to the vertical edges: `\begin{tabular}{@{}lll@{}} ...`

First name	Last Name	Grade
John	Doe	7.5
Richard	Miles	2

```
\begin{table}
\centering
\begin{tabular}{llr}
\toprule First name & Last Name & Grade \\
\midrule John & Doe & $7.5$ \\
\bottomrule Richard & Miles & $2$ \\
\end{tabular}
\end{table}
```

Name		
First name	Last Name	Grade
John	Doe	7.5
Richard	Miles	2

```

\begin{tabular}{llr}
\toprule \multicolumn{2}{c}{Name} \\
\cmidrule(r){1-2} First name & Last Name & Grade \\
\midrule John & Doe & $7.5$ \\
\bottomrule
\end{tabular}

```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

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Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

As the example are longer we are using landscape for this verbatim part

```
%\usepackage{booktabs}
\newcommand{\ra}[1]{\renewcommand{\arraystretch}{#1}}
\begin{sidewaystable*}\centering
\ra{1.3}
\begin{tabular}{@{}rrrrrrrrr@{}}\toprule
& \multicolumn{3}{c}{\$w = 8\$} & \phantom{abc}& \multicolumn{3}{c}{\$w = 16\$} & &
& \multicolumn{3}{c}{\$w = 32\$}\\
\phantom{abc} & \multicolumn{3}{c}{\$w = 8\$} & \phantom{abc}& \multicolumn{3}{c}{\$w = 16\$} & & \cmidrule{10-12}
& \$t=0\$ & \$t=1\$ & \$t=2\$ & & \$t=0\$ & \$t=1\$ & \$t=2\$\\
\midrule
\$dir=1\$\\
\$c\$ & 0.0790 & 0.1692 & 0.2945 & 0.3670 & 0.7187 & 3.1815 & -1.0032 & -1.7104 & -21.7969\\
\$c\$ & -0.8651& 50.0476& 5.9384& -9.0714& 297.0923& 46.2143& 4.3590& 34.5809& 76.9167\\
\$c\$ & 124.2756&-50.9612& -14.2721&128.2265&-630.5455&-381.0930& 121.0518&-137.1210&-220.2500\\
\$dir=0\$\\
\$c\$ & 0.0357& 1.2473& 0.2119&0.3593& -0.2755& 2.1764&-1.2998& -3.8202& -1.2784\\
\$c\$ & -17.9048& -37.1111& 8.8591&-30.7381& -9.5952& -3.0000&-11.1631& -5.7108& -15.6728\\
\$c\$ & 105.5518& 232.1160& -94.7351&100.2497& 141.2778& -259.7326& 52.5745& 10.1098& -140.2130\\
\bottomrule
\end{tabular}
\caption{Caption}
\end{sidewaystable*}
```

Some more stuff about eigenvectors and eigenvalues. Something about eigen-decomposition.

		$w = 8$			$w = 16$			$w = 32$		
		$t = 0$	$t = 1$	$t = 2$	$t = 0$	$t = 1$	$t = 2$	$t = 0$	$t = 1$	$t = 2$
$dir = 1$										
c		0.0790	0.1692	0.2945	0.3670	0.7187	3.1815	-1.0032	-1.7104	-21.7969
c		-0.8651	50.0476	5.9384	-9.0714	297.0923	46.2143	4.3590	34.5809	76.9167
c		124.2756	-50.9612	-14.2721	128.2265	-630.5455	-381.0930	-121.0518	-137.1210	-220.2500
$dir = 0$										
c		0.0357	1.2473	0.2119	0.3593	-0.2755	2.1764	-1.2998	-3.8202	-1.2784
c		-17.9048	-37.1111	8.8591	-30.7381	-9.5952	-3.0000	-11.1631	-5.7108	-15.6728
c		105.5518	232.1160	-94.7351	100.2497	141.2778	-259.7326	52.5745	10.1098	-140.2130

Table 3.1: Caption

CHAPTER 4

TOPIC RESEARCH TWO

4.1 Introduction

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Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

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derit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

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Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus. Some more stuff about eigenvectors and eigenvalues. Something about eigen-decomposition.

4.1.1 Subsection Here to introduce you how to include figure(s) in LaTeX file

Please make sure you save and download you figure(s) in the same directory with your .tex file. The best type of figure is .pdf but you also can use .eps or .jpeg or .jpg. See the examples. Illustrate in this section.



Figure 4.1: A picture of the UPM logo using jpeg type of file looking the other way!

```
\begin{figure}[h!]
\centering
\includegraphics[width=0.5\textwidth]{upm.jpeg}
\caption{A picture of the UPM logo using jpeg type of file}
```

```

        looking the other way!}
\end{figure}

```



Figure 4.2: A picture of theUPM logo using pdf type of file looking the other way!

```

\begin{figure}[h!]
\centering
\includegraphics[width=0.5\textwidth]{uni.pdf}
\caption{A picture of theUPM logo using pdf type of file
        looking the other way!}
\end{figure}

```

We also can rotating the figures by using `sidewaysfigure` command.

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```

\begin{figure}[h]

```



Figure 4.3: Logo

```
\begin{sideways}
  \includegraphics[scale=0.2]{uni.pdf}
\end{sideways}
\centering
\caption[Caption]{Logo}
\label{pic:picture}
\end{figure}
```

Figure 4.4: Logo



```
\begin{figure}[htb]
  \centering
  \begin{turn}{-90}
    \begin{minipage}{3in}
      \centering
      \includegraphics[scale=0.2]{uni.pdf}
      \caption{Logo}
      \label{fig:logo2}
    \end{minipage}
  \end{turn}
\end{figure}
```

There are many ways how to manipulat and rotating the figures.

4.2 New Section

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nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

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Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

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4.2.1 Another Subsection Here

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Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

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CHAPTER 5

CONCLUSION

5.1 Work Done

We now conclude the thesis with a summary of the main results presented in each chapter.

Chapter 3.

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Some more stuff about eigenvectors and eigenvalues. Something about eigen-decomposition.

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APPENDIX A

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Table A.1: Length* of fiber in coir sheets.

Fiber	Coir sheet										
	1	2	3	4	5	6	7	8	9	10	
1	8.6	3.8	10.6	7.4	4.8	6.3	9.6	11.7	7.6	8.8	
2	6.7	19.1	4.8	3.4	10.5	4.7	3.8	11.5	4.9	4.4	
3	5.8	3.6	10.6	7.8	3.9	3.1	9.0	9.0	5.9	5.0	
4	6.5	12.8	6.4	4.3	8.5	6.9	7.2	3.2	7.1	6.8	
5	5.2	4.6	7.2	3.7	4.7	2.7	7.4	2.4	2.4	4.8	
6	6.1	6.4	9.5	2.2	12.5	3.0	3.5	4.1	8.5	3.3	
7	4.8	12.5	8.5	3.6	1.8	7.0	7.1	3.4	4.0	4.9	
8	3.5	4.1	6.5	8.1	6.2	9.9	2.6	3.7	4.9	6.3	
9	2.7	12.2	5.4	3.6	3.5	5.1	4.9	6.6	2.4	8.5	
10	6.9	1.8	3.4	1.4	4.6	12.9	3.6	9.2	5.4	4.8	
11	4.8	11.4	10.9	1.4	3.4	14.1	12.0	2.5	3.5	6.3	
12	5.7	13.8	21.7 ^a	1.6	5.6	5.4	1.6	7.1	6.9	7.8	
13	4.9	13.2	7.3	6.5	3.0	5.0	8.8	3.5	7.3	12.0	
14	10.1	1.6	8.7	2.4	1.9	6.0	7.0	7.7	13.9	7.3	
15	6.9	8.5	6.6	3.2	2.2	5.7	5.0	10.7	8.7	5.3	
16	9.2	7.8	4.3	6.3	4.1	6.9	8.3	5.8	5.8	5.5	
17	5.6	7.1	4.7	4.0	3.9	9.8	3.1	7.4	2.9	3.0	
18	4.5	13.1	10.3	1.9	12.2	19.1	1.2	8.7	2.9	4.4	
19	7.9	7.4	3.4	5.8	4.8	4.3	10.5	6.1	5.6	4.7	
20	4.0	9.5	6.1	10.0	2.0	7.2	6.0	6.8	4.6	8.1	
21	3.8	12.5	10.5	2.1	5.3	5.1	2.2	5.9	6.8	6.8	
22	5.4	8.5	4.6	5.1	6.7	8.2	10.3	6.8	1.0 ^b	8.3	
23	3.5	5.7	6.3	7.6	3.5	3.0	7.2	4.9	4.6	6.4	
24	9.5	7.5	6.5	3.5	9.9	8.6	7.0	3.3	3.5	7.5	
25	5.4	5.4	3.6	2.7	4.1	3.2	5.0	8.7	2.3	10.9	
26	7.9	6.7	4.2	3.5	1.8	6.8	8.3	9.9	5.9	2.8	
27	6.4	8.5	7.6	11.0	1.6	3.6	3.3	4.7	1.6	3.5	
28	9.2	14.0	13.3	3.4	9.4	3.1	3.1	2.3	10.9	1.9	
29	7.0	9.9	9.8	7.7	4.1	7.9	2.2	1.4	4.4	8.8	
30	5.5	8.6	2.2	2.6	2.5	9.2	2.3	8.7	8.4	6.3	
Average	6.1	8.7	7.5	4.6	5.1	6.8	5.8	6.3	5.5	6.2	6.3

*Measurement is in centimeter.

a – Maximum.

b – Minimum.

BIODATA OF STUDENT

The student, **STUDENT NAME HERE**, was born in May 1985. Obtained his bachelor degree in Mathematics Education from Universiti Teknologi Malaysia in 2008. He then received a Master of Sciences, from the Institute for Mathematical Research, Universiti Putra Malaysia in 2010. He is currently enrolled a doctoral study in the area of Mathematical Cryptography. He also acts as the secretary of the Malaysian Society of Cryptology Research (MSCR). His research interest involves with designing asymmetric cryptosystems, mathematical cryptanalysis and provable security.

LIST OF PUBLICATIONS

The following are the list of publications that arise from this study.

Adnan, N.I.M., Adam, M.B., Ibrahim, N.A., Ishak, M.Y., & Azmai, M.N.A., (2016). Functional Data Analysis for Extreme Data. *Indian Journal of Science and Technology*, Vol 9(28), DOI:10.17485/ijst/2016/v9i28/97356, July 2016. ISSN 0974-5645.

Adnan, N.I.M., Adam, M.B., Ibrahim, N.A., Ishak, M.Y., & Azmai, M.N.A., (2017). Functional Extreme Rainfall Data In Petaling Jaya. *AIP Conf. Proceeding*. 1842, 030004, doi:10.1063/1.4982842.



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