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Name of Supervisor I : M.Y. SUPERVISOR  
Date : MAY 4, 2021

Signature : \_\_\_\_\_  
Name of Supervisor II : M.Y. OTHER SUPERVISOR  
Date : MAY 4, 2021

Signature : \_\_\_\_\_  
Name of Supervisor III : M.Y. SUPERLONG NAMED SUPERVISOR  
Date : MAY 4, 2021

THE THESIS TITLE  
SECOND LINE (OPTIONAL)  
THIRD LINE (OPTIONAL)  
FOURTH LINE (OPTIONAL)

THE AUTHOR

A final year project report submitted in partial fulfilment of the  
requirements for the award of the degree of  
Bachelor of Science (Physics)

School of Electrical Engineering  
Faculty of Engineering  
Universiti Teknologi Malaysia

OCTOBER 2018

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Name	:	<hr/> THE AUTHOR <hr/>
Date	:	<hr/> MAY 4, 2021 <hr/>

## **DEDICATION**

This thesis is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time.

## **ACKNOWLEDGEMENT**

Acknowledgement

## **ABSTRACT**

A 1-page abstract is a *movie (thesis) trailer*. Avoid summarizing your Introduction chapter. Focus on the problem statement, hypothesis/objective, research approach, quantitative validation summary, and implication of your findings. For Ph.D., emphasize on original contributions.



## **ABSTRAK**

The Malay abstract is written as the sentence structure of the English abstract. All specific terms must be checked with Dewan Bahasa and Pustaka (<http://prpm.dbp.gov.my/>).

## TABLE OF CONTENTS

	<b>TITLE</b>	<b>PAGE</b>
	<b>DECLARATION</b>	<b>ii</b>
	<b>DEDICATION</b>	<b>iii</b>
	<b>ACKNOWLEDGEMENT</b>	<b>iv</b>
	<b>ABSTRACT</b>	<b>v</b>
	<b>ABSTRAK</b>	<b>vi</b>
	<b>TABLE OF CONTENTS</b>	<b>vii</b>
	<b>LIST OF TABLES</b>	<b>ix</b>
	<b>LIST OF FIGURES</b>	<b>x</b>
	<b>LIST OF ABBREVIATIONS</b>	<b>xi</b>
	<b>LIST OF SYMBOLS</b>	<b>xii</b>
	<b>LIST OF APPENDICES</b>	<b>xiii</b>
<b>CHAPTER 1</b>	<b>APPENDIX Q1 FROM UTM MANUAL</b>	<b>1</b>
1.1	Problem Background (Heading 2)	1
1.2	Problem Background	1
1.2.1	Problem Statement	2
1.2.2	Research Goal (Heading 3)	2
1.3	Research Objectives	3
<b>CHAPTER 2</b>	<b>INTRODUCTION</b>	<b>4</b>
2.1	Definition of thesis	4
2.2	Main steps in thesis/dissertation/report writing	5
<b>CHAPTER 3</b>	<b>THESIS STRUCTURE SHOWN AS A VERY LONG TITLE</b>	<b>7</b>
3.1	Thesis title (SPS guidelines)	7
3.2	Flow of arguments	7

3.2.1	Thesis	8
3.2.2	Abstract	8
3.2.3	Introducing your work	8
3.2.4	Discussion of the problem and state-of-the-art solutions to problem	8
3.2.5	Your proposed work	9
3.2.6	Validation of hypothesis	10
3.2.7	Take home message to readers	10
3.2.8	References to back up your statements	10
3.2.9	Appendices	11
3.3	Suggested order for writing	11
3.4	The revision journey	12
<b>CHAPTER 4</b>	<b>RESULTS AND DISCUSSION</b>	<b>13</b>
4.1	Graphic and Images	13
4.2	Floats	13
<b>CHAPTER 5</b>	<b>CONCLUSION</b>	<b>18</b>
5.1	Research Outcomes	18
5.2	Contributions to Knowledge	18
5.3	Future Works	18
	<b>REFERENCES</b>	<b>19</b>
	<b>LIST OF PUBLICATIONS</b>	<b>21</b>

## LIST OF TABLES

<b>TABLE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
Table 4.1	The role of statistical quality engineering tools and methodologies	14
Table 4.2	The role of statistical quality engineering tools and methodologies	15
Table 4.3	Feasible triples for highly variable Grid, MLMMH. Can include some context information (e.g. development software, test environment, procedure, limitations, assumptions, range of validity)	16

## LIST OF FIGURES

<b>FIGURE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
Figure 2.1	As it goes	4
Figure 2.2	Thesis outline	6
Figure 4.1	Example of a figure. This is a long, very long, long long, long caption. You can give a shorter caption for the "list of figures" using the square bracket symbol.	14

## LIST OF ABBREVIATIONS

ANN	-	Artificial Neural Network
PC	-	Personal Computer
SVM	-	Support Vector Machine
UTM	-	Universiti Teknologi Malaysia
XML	-	Extensible Markup Language

## LIST OF SYMBOLS

$\gamma$	-	Whatever
$\sigma$	-	Whatever
$\varepsilon$	-	Whatever

## LIST OF APPENDICES

<b>APPENDIX</b>	<b>TITLE</b>	<b>PAGE</b>
Appendix A	Time-series Data	20



# CHAPTER 1

## APPENDIX Q1 FROM UTM MANUAL

### 1.1 Problem Background (Heading 2)

Video provides a powerful way to help you prove your point. When you click Online Video, you can paste in the embed code for the video you want to add. You can also type a keyword to search online for the video that best fits your document. To make your document look professionally produced, Word provides header, footer, cover page, and text box designs that complement each other. For example, you can add a matching cover page, header, and sidebar. *“For the first paragraph, use “Para 2 lines’ style”.*

Video provides a powerful way to help you prove your point. When you click Online Video, you can paste in the embed code for the video you want to add. You can also type a keyword to search online for the video that best fits your document. To make your document look professionally produced, Word provides header, footer, cover page, and text box designs that complement each other. For example, you can add a matching cover page, header, and sidebar. Click Insert and then choose the elements you want from the different galleries. Themes and styles also help keep your document coordinated. When you click Design and choose a new Theme, the pictures, charts, and SmartArt graphics change to match your new theme. *“For the last paragraph/single paragraph in the section, use ‘Para 4 lines’ style”.*

### 1.2 Problem Background

Video provides a powerful way to help you prove your point. When you click Online Video, you can paste in the embed code for the video you want to add. You can also type a keyword to search online for the video that best fits your document.

To make your document look professionally produced, Word provides header, footer, cover page, and text box designs that complement each other. For example, you can add a matching cover page, header, and sidebar. Click Insert and then choose the elements you want from the different galleries.

Themes and styles also help keep your document coordinated. When you click Design and choose a new Theme, the pictures, charts, and SmartArt graphics change to match your new theme. When you apply styles, your headings change to match the new theme. Save time in Word with new buttons that show up where you need them. To change the way a picture fits in your document, click it and a button for layout options appears next to it. When you work on a table, click where you want to add a row or a column, and then click the plus sign.

### **1.2.1 Problem Statement**

Themes and styles also help keep your document coordinated. When you click Design and choose a new Theme, the pictures, charts, and SmartArt graphics change to match your new theme. When you apply styles, your headings change to match the new theme. Save time in Word with new buttons that show up where you need them. To change the way a picture fits in your document, click it and a button for layout options appears next to it. When you work on a table, click where you want to add a row or a column, and then click the plus sign.

### **1.2.2 Research Goal (Heading 3)**

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### **1.3 Research Objectives**

## CHAPTER 2

### INTRODUCTION

This template conforms with the Universiti Teknologi Malaysia 2018 new requirement [1]. Students who wish to learn more on LyX should refer to documentations available here [2]. You do not need to know deep on LaTeX [3] to use this LyX template.

#### 2.1 Definition of thesis

*Thesis* (generic term, see also Figure 2.1) is a documented evidence of defined scope and length that a candidate is

- Understand relevant theoretical issues
- Technically competent
- Has critical-thinking ability
- Able to *conduct scholarly research*

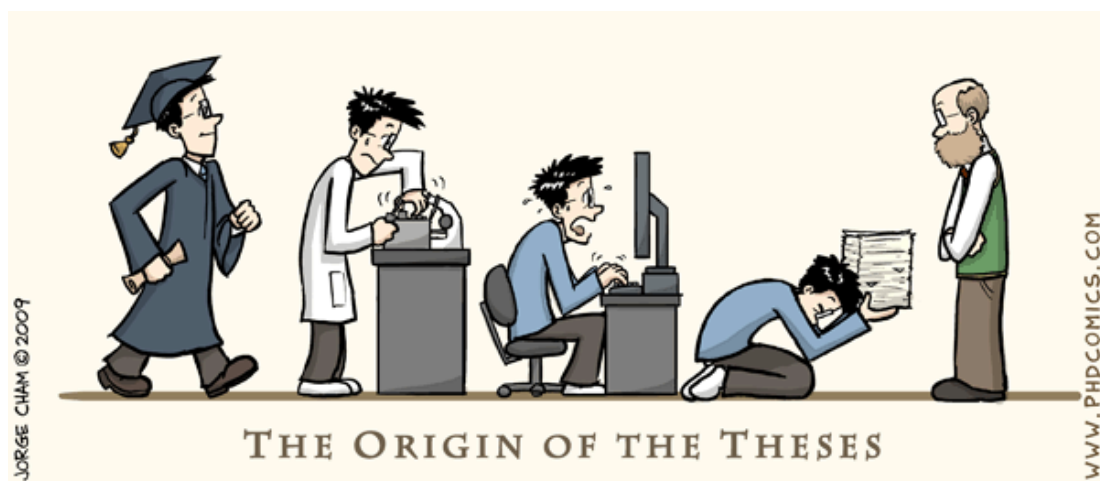


Figure 2.1 As it goes

Students have to write a scientific document of a defined scope and length to demonstrate the achievement. According to UTM nomenclature

- UG FYP - *report*
- Master by taughtcourse project - *project report*
- Master by taughtcourse and research (mixed-mode) - *dissertation*
- Master by research and PhD - *thesis*

Different degree level has different expectation

- Undergraduate report demonstrates the capacity to apply basic research skills in an area of interest. At this level, the focus is on gaining **broad competencies**.
- Masters thesis/dissertation/report demonstrates the capacity to apply advanced research skills (i.e. move **beyond basic** research skills) in an area of interest to a Master student is able to incorporate some critical insights in his/her study. At this level, the focus is on developing critical thinking in a subject area.
- PhD thesis demonstrates the capacity to apply **specialized** research skills (i.e. expert knowledge of a particular concept or method) in an area of interest so that a PhD student can make significant and original contribution to knowledge. At this level, the focus is on identifying a 'gap' in knowledge and addressing it, hence advancement in knowledge in a field of study.

## 2.2 Main steps in thesis/dissertation/report writing

- Plan/elaborate the outline
  - A *plot* for your thesis writing
  - Target: *logical story* for the document
  - Results
    - \* Stand-alone tables/graphs
    - \* Describe each, then number crunch

\* Use Appendices for detailed items

- Get feedback from the supervisor
- If you are writing in a language other than your mother language, consider getting specialized editing help

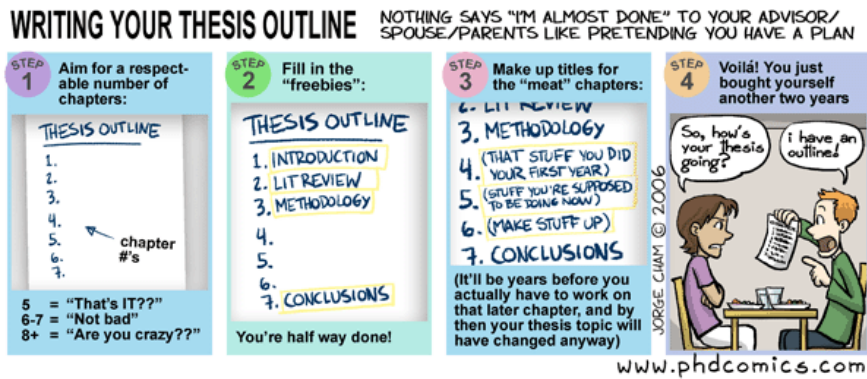


Figure 2.2 Thesis outline

## CHAPTER 3

### THESIS STRUCTURE SHOWN AS A VERY LONG TITLE

#### 3.1 Thesis title (SPS guidelines)

- Thesis title should be a concise description of the main focus and contribution of the research. It should not contain more than 15 words excluding grammatical words such as articles, conjunction and prepositions.
- To avoid redundancy, titles should not contain phrases which reflect research exercise such as “An investigation of ...”, “A preliminary study of ...”, “A study of ...”, “Analysis of ...”, “On the ...”, “Theory of ...”, “Some ,,”, and “Toward a ...”.
- Thesis title should not contain formulas, symbols or subscripts, Greek letters, or other non-alphabetical symbols. Word substitutes should be used instead.
- Thesis title should not contain acronyms or even acronyms in brackets unless the term is commonly used in the field of the study (eg: DNA, GPS). For example, “GIS” should be written as “Geographical Information System” and should not be written as “Geographical Information System (GIS)”.
- Thesis title should not contain punctuation such as colon “:”, semicolon “;”, etc. except commas “,” when necessary.

#### 3.2 Flow of arguments

Each thesis is unique and depends on the writer and the editor (your supervisor). There is no cast-on-stone and rigid thesis structure. The following example a good starting point:

### **3.2.1 Thesis**

Thesis title should be a concise description of the main focus and contribution of the research

### **3.2.2 Abstract**

- A short summary of the the thesis/dissertation/report
  - Describe the problem and the research approach
  - Emphasize the original contributions
  - A movie trailer and not a summary of thesis

### **3.2.3 Introducing your work**

- An overview of the problem
  - Problem motivation and why it is important
  - Problem definition highlight what had been done before and the research gap to be studied, worthy a (PhD, Master, or UG) degree
  - Your hypothesis or objective of the thesis
  - Organization of the thesis – you should guide the readers on what to expect next
- Make it readable by anyone

### **3.2.4 Discussion of the problem and state-of-the-art solutions to problem**

- Usually titled as Literature Review
- Not a literature survey in general, but rather a synthesis of the state-of-the-art related to the thesis!



- Can also include a background information – brief synthesis of the most relevant aspects related to the thesis in order to help the reader understand the context and the contributions coming from other disciplines.
- It can also be used to better motivate the research question.
- Identify gaps/limitations of existing state-of-the-arts
- Background & related work may overlap
  - \* Need to discuss related work at start to set the scene
  - \* Need to discuss related work at end to demonstrate your originality
  - \* But not cut and paste!
  - \* Exercise your synthesis and critic skills!
- Make the definitions precise, concise, and unambiguous.

### **3.2.5 Your proposed work**

- Usually entitled Methodology, but not necessary
- Here you develop your conceptual contribution, i.e. the central concept of your work
  - Discussion of the thesis and different perspectives of analysis of the research question
    - \* Definition of problem
    - \* Formulation of concepts, definitions, theories
  - Research design
    - \* Elaboration of frameworks, models, architectures
    - \* Methods and procedure, variables
    - \* May include description of a prototype system implementation and its use towards solving the research problem

- \* Can include some context information (e.g. development software, test environment, procedure, limitations, assumptions, range of validity)
- \* But not too many details!!!

### **3.2.6 Validation of hypothesis**

- Usually titled as Result and Discussion
- Describe experiment details that provide evidence in support of your thesis
  - Developing a prototype may not enough to validate the thesis – at most it is a proof of feasibility of your system
  - Validation is about collecting (enough) evidence to convince the other researchers about the validity of the thesis through
    - \* A proper (systematic) method
    - \* Organized argumentation (is important)
  - Analysis and concepts form the heart of the work
  - It must state what was learned, not only the facts that were gathered!

### **3.2.7 Take home message to readers**

- Summarize what was learned and how it can be applied
  - Include the broader implications of your results
  - Do not repeat word for word the abstract, introduction or discussion
  - Mention the possibilities for future research

### **3.2.8 References to back up your statements**

- If you make a statement, back it up with your own data or a reference

- All references cited in the text must be listed
- UTM supports either the numbering or author-year format
- Try to avoid inclusion of references as footnotes

### **3.2.9 Appendices**

- This is an optional part
  - It can include:
    - \* Implementation details
    - \* Detailed experiment data
  - May be important to
    - \* Convince the reader
    - \* Help others replicating the experiment
  - ... but are “boring” or too detailed to include in the main body of the thesis

### **3.3 Suggested order for writing**

- Begin by writing the chapters that describe your research (2,3, 4, and 5 in the above outline)
- Define all technical terms and make the definitions precise and formal
- After reading the main chapters to verify terminology, write the conclusions
- Write the introduction
- Complete with an abstract

### 3.4 The revision journey

- Revise them and start getting feedback
  - **think-plan-write-revise** cycles
- Get early feedback from colleagues
  - Starting with the key chapters
- Carefully revise those chapters before giving them to your supervisor
- When you have a complete draft
  - Consider 2 or 3 complete revision/editing iterations!
  - Could be more

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.1 Graphic and Images

A good thesis needs good diagrams/graphs/illustrations. Spend some time doing in properly. A good picture tells a thousand words.

#### 4.2 Floats

- A float doesn't have a fixed location.
  - It can “float” forward or backward to wherever it fits best to get a high quality layout.
  - Caption as part of a float.
- Float Placement
  - h : try to place the float at the position where it is inserted
  - t : try to place the float at the top of the current page
  - b : try to place the float at the bottom of the current page
  - p : try to place the float at an own page



Figure 4.1 Example of a figure. This is a long, very long, long long, long caption. You can give a shorter caption for the “list of figures” using the square bracket symbol.

Table 4.1 The role of statistical quality engineering tools and methodologies

Temperature	Resonant Frequency	Q factor
13 mK $\pm$ 1 mK	16.93	811
40 mK $\pm$ 1 mK	16.93	817
100 mK $\pm$ 1 mK	16.93	815
300 mK $\pm$ 1 mK	16.93	806
500 mK $\pm$ 1 mK	16.93	811
800 mK $\pm$ 5 mK	16.93	814
1000 mK $\pm$ 5 mK	16.93	806

Table 4.2 The role of statistical quality engineering tools and methodologies

Temperature	Resonant Frequency	Q factor
13 mK $\pm$ 1 mK	16.93	811
40 mK $\pm$ 1 mK	16.93	817
100 mK $\pm$ 1 mK	16.93	815
300 mK $\pm$ 1 mK	16.93	806
500 mK $\pm$ 1 mK	16.93	811
800 mK $\pm$ 5 mK	16.93	814
1000 mK $\pm$ 5 mK	16.93	806

Table 4.3 Feasible triples for highly variable Grid, MLMMH. Can include some context information (e.g. development software, test environment, procedure, limitations, assumptions, range of validity)

<b>Time (s)</b>	<b>Triple chosen</b>	<b>Other feasible triples</b>
0	(1, 11, 13725)	(1, 12, 10980), (1, 13, 8235), (2, 2, 0), (3, 1, 0)
2745	(1, 12, 10980)	(1, 13, 8235), (2, 2, 0), (2, 3, 0), (3, 1, 0)
5490	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
8235	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
10980	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
13725	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
16470	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
19215	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
21960	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
24705	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
27450	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
30195	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
32940	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
35685	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
38430	(1, 13, 10980)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
41175	(1, 12, 13725)	(1, 13, 10980), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
43920	(1, 13, 10980)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
46665	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
49410	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
52155	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
54900	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
57645	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
60390	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
63135	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
65880	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
68625	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
71370	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
74115	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
76860	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)

Continued on next page



Table 4.3 – continued from previous page

<b>Time (s)</b>	<b>Triple chosen</b>	<b>Other feasible triples</b>
79605	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
82350	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
85095	(1, 12, 13725)	(1, 13, 10980), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
87840	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
90585	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
93330	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
96075	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
98820	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
101565	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
104310	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
107055	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
109800	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
112545	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
115290	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
118035	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
120780	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
123525	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)

## **CHAPTER 5**

### **CONCLUSION**

**5.1 Research Outcomes**

**5.2 Contributions to Knowledge**

**5.3 Future Works**

## REFERENCES

1. UTM Thesis Guideline, 2018. URL <http://sps.utm.my/wp-content/uploads/2018/08/Thesis-Preparation-05082018.pdf>.
2. LyX, 2013. URL <http://www.lyx.org>.
3. LaTeX Wikibook, 2013. URL <http://en.wikibooks.org/wiki/LaTeX>.

## Appendix A Time-series Data

Some data

## **LIST OF PUBLICATIONS**

### **Journal with Impact Factor**

1. Paper 1
2. Paper 2

### **Indexed Journal (SCOPUS)**

1. Paper 3

### **Non-Indexed Journal**

1. Paper 4

### **Indexed conference proceedings**

1. Paper 5

### **Non-Indexed conference proceedings**

1. Paper 6