

Writing a Thesis - Chapter by Chapter

Chapter 5

1

Several web sites deal with the problem of writing theses and give several suggestions for writing a good thesis.

However, it is mandatory that our students are to follow strictly the details given by UniMAP School of PG Studies for writing a thesis.

2

Arrangement

(A typical UniMAP Ph D/Master Thesis is to have)

- | | |
|--------------------------------------|-------------------------|
| 1. Title page | 10. Abstrak |
| 2. Permission to use | 11. Abstract |
| 3. Acknowledgement | 12. Chapters |
| 4. Certification | 13 Appendix |
| 5. Declaration | 14 References |
| 6. Table of contents | 15 List of Publications |
| 7. List of Figures | 16 Awards, Certificates |
| 8. List of Tables | |
| 9. List of Abbreviation / acronyms / | |
- (RADAR, AI, GUI are acronyms;
Conf., Seq., Prof., are Abbreviations)

3

Title of Thesis

- Last one to decide.
- Should not be very general
- Should be brief and also detailed.
- Should indicate the most important specific task you have undertaken
- No abbreviations or acronyms
- Give a few suggestions to your supervisor; he will choose the best.

4

Which to choose

- # On Robotic Map-building
- # On Robotic Map-building in an Unknown Area of Impossible Human entry
- # A New Method of Solving the Map-Building Problem
- # Application of Particle Swarm Optimization in Map-building Problems
- # Application of Particle Swarm Optimization in Mapping of objects in an Unknown Area of Impossible Human Entry

5

TABLE CONTENTS

- Before start writing the thesis, prepare a complete Table of Contents.
- Give a catchy title for every chapter ; give titles for every sections and subsections. Titles are to be self explanatory and brief. (Survey, Overview, Guided Tour, Review ...)
- Prepare all Figures and Tables in a separate file; and decide where exactly each Fig and Table will have to go in the thesis chapters, and sections.
- Make brief notes / points for which portions to go in which Section and sub section; make modifications till you are sure that nothing is missed.
- Consult your supervisor; prepare the final form of TABLE OF CONTENTS ; Follow this Table of contents while writing.

6

TABLE OF CONTENTS

- **Appendixes should have their respective titles.** (eg. Appendix A: MATLAB package for map building)
- **Strictly follow UniMAP guide lines of reference citations and reference listing; consistency is important.**
- **Don't forget to list the publications derived from your thesis; indicate any awards.**

7

OTHER LISTINGS

1 List of Figures,

Check page numbers

eg:

(Figure 7.9 Rule Diagram for conveyor rolling 118

Fig 7.9 must appear in page 118

2. List of Tables,

Check page numbers

3. List of Abbreviations and Acronyms:

Bring all abbreviations and Acronyms; nothing to be missed.
Listing is to be of : numerical order and then alphabetical order.

8

Table of Contents (Eg)

Title	i
Abstract	ii
Acknowledgement	iii
List of Figures	iv
1 Introduction	1
• 1.1 Problem statements	1
• 1.2 Objective	2
• 1.3 Report's outline	3
2 Literature Review	4
• 2.1 Wireless Power Transfer	5
• 2.2 Rectenna	8
• 2.3 Other components in Wireless Power Transfer	10

Table of Contents (con't)

3	Methodology	
• 3.1	Design of Antenna	13
• 3.2	Design of rectifier	15
• 3.3	Design of ac converter	17
• 3.4	Simulation tools	19
• 3.5	Measurements technique	21
4	Results and Discussion	24
• 4.1	Simulation result	
– 4.1.1	Antenna simulation	27
– 4.1.2	Rectifier simulation	30
– 4.1.3	Converter circuit simulation	33
• 4.2	Measurement results	
– 4.2.1	Antenna measurement	36
– 4.2.2	Rectifier measurement	38
– 4.2.3	Converter circuit measurement	40
• 4.3	Discussion	43

Table of Contents(con't)

5	Conclusions	45
• 5.1	Summary and Conclusion	45
• 5.2	Limitation	46
• 5.3	Recommendations for Future Work	47
	References	v
	Appendix A – Simulation Results	vi
	Appendix B – Components specification	vii

List of abbreviations and symbols

Abbreviations

RF	Radio Frequency
TNB	Tenaga Nasional Berhad
EMC	Electromagnetic Compatibility

Symbols

P	Power
I	Current
V	Voltage
R	Resistance
C	Capacitance
L	Inductance

List of Figures and Tables

	Pg
Figure 1.1 Rectenna	2
Figure 2.1 Schematic diagram of rectenna	5
..	
Table 4.1 Input voltage vs Output Power	50
...	

ABSTRACT

- Most widely read by others; it is a resume' of thesis.
- Published in Abstracts of universities and national and international Abstracts; to be very carefully drafted; error free, no ambiguities.
- Best to write after completing thesis writing.
- The ABSTRACT is to have: Concise description of problem undertaken, necessity, your methodology and your final achievements.
- No references, Figures, Tables to be cited in the ABSTRACT ; No abbreviations; no equations.
- Preferably one page .
- BM version and BI versions are to be identical

14

Chapter 1 : Introduction

This should contain:

- A broader view of the problem undertaken
- How does your thesis important in the world of literature ?
- What is the motivation of undertaking this work ?
- What are the objectives ?
- Methodology
- Organisation of thesis

All the above are to be included; This chapter has to be interesting and generally understandable even to those who have only some introduction to the field of research

15

Chapter 1- Introduction

- Dissertation introduction helps you to understand the research need, purpose and how it has been taken. Dissertation introduction is usually the extended version of the abstract. But has more information about the rest of the dissertation as well. It contains :
 - Problem statements/ motivation/significant /usefulness of your project
 - Objectives with some elaboration
 - Report's outline

Organization of Chapter 1

- Introduction
- Problem statement/Significance of study
- Objective
- Scope
- Dissertation organization
- Examples

Problem statement

- Describe the problem that unsolved within spectrum of your study
- Must reflect the title of the dissertation
- From here you can deduce the objective

OBJECTIVES:

- Objectives should not be simply listed;
- Every objective and its importance in the research is to be briefly explained.
- Every objective is to be logically placed
- Not too many objectives; about 4-5 are adequate
- Usually, every chapter should meet at least one objective.
- One chapter can meet more than one objectives.

Objective

The aim of your dissertation. This will relate what outcome of the dissertation.

e.G

1. To develop a model/technique/....
2. To produce procedure/.....
3. To design a circuit/...
4. To Simulate a system/circuit...
5. To study the behavior of ...

*What is the outcome we want to produce: theory, product, techniques etc

Objective (Example)

1. To determine the suitable antenna for rectenna
2. To develop the RF to 5 V dc converter circuit for RF energy harvester

The first objective is to find the antenna can receives RF signal from base station operating at frequency 2GHz. ...

Thesis Organization :

- This should discuss what each chapter is about
- This should be listed with brief coverage.
- Logical placement of chapters are important
- Do not bring results, achievements or your conclusions in the "Thesis Organization".
- Indicate whether any important software package developed, packages used, and video clip attached etc , all at the end of this Section.

Report layout

- Chapter 1 is discussing on motivation of this project and objective of the project. Chapter 2 is on literature survey followed by the project methodology in Chapter 3. Chapter 4 is discussed on the results and lastly in Chapter 5 is the conclusion.

Other Chapters

- **Start with an INTRODUCTION section**
(This is to indicate the scope, objective, methods adopted, brief description how this chapter is connected to earlier Chapter(s).)
- **End with a CONCLUSION / SUMMARY**
(This section summarizes and brings important findings, results, limitations and brief description on how the later Chapter is connected).
- **Do not include too many Tables and Figures; also avoid specs tech details of equipment /components used**
(In such a case, open a few Appendixes to accommodate these)
- **Do not use ' I ' , ' you ' , etc.** (I have to tune the neural network to achieve four optimised outputs (active to passive voice)

OTHER CHAPTERS

- **Not too many sub-sections;**
up to 3 levels are adequate. (eg. 2.1, 2.1.1, 2.1.1.1)
- **Do not leave empty space**
(Empty space in a thesis page creates a doubt whether some thing is missing. If the Fig or Table is large for the empty space, bring the Fig / Table to next page and bring forward the portions of writing after the Figure/Table to the empty space.)
- **Define all variable and constants in an Equation** (one of the common mistake done by several students. In addition to defining the variables and constants, you should bring its importance in your write up)

25

OTHER CHAPTERS

Very important is the Grammar.

You have to get the help of some websites

eg: www.drgrammar.org

First person has no place:

"I will describe" " Do not use.

Avoid self assessment

"My research is a major break through in the area of emotion determination" - Avoid such self assessment.

26

Chapter 2 -Literature Review

- This chapter explains that you are aware of the topic of your research. To develop the rationale of the logic of your report you must be assessing the topic and aspects of your dissertation research. Logic of the research may be inter-linked to many researches that have the relevance with this dissertation.
 - State of Art
 - State of Self

Con't

Review the pass work related to/within the spectrum of your study. From the literature find what are the problems that still unsolved. From here we can deduce the problem statement and objective of your dissertation. Literature review, problem statement and objectives are interrelated.

Comment on other people's work

- What are the advantages?
- What are lacking?
- What need to improve?
- What are the drawback?

Chapter 3. Methodology

In this chapter, the researcher is supposed to define the method and materials that have been used in the dissertation. If you have used any specific methods, processes or materials you will need to be clearly define it. There should be enough description in this chapter for another researcher to replicate it. If you a novelty in your design, technique , etc you have to address them properly to high your main contribution.

Methodology (con't)

- **Methodology** can be:
- "the analysis of the principles of methods, rules, and postulates employed by a discipline";^[1]
- "the systematic study of methods that are, can be, or have been applied within a discipline".^[1]
- the study or description of methods ^[2]
- *Method* can be defined as a systematic and orderly procedure or process for attaining some objective.
- Often there are different methods that we can use to investigate a *research* problem. Your *methodology* should make clear the reasons why you chose such method

Con't

- Methodology always involved a set of methods, techniques and tools .
- A tool is an instrument or apparatus that is necessary to the performance of some task
- Technique is a systematic procedure by which a complex or scientific task **is** accomplished
- This include design, analysis and measurement techniques

Design of experiments

- Practical (technique, procedure etc)
- Questionnaire (survey, interview, etc)
- Simulation (using software, matlab, special software)

Describe method of Data Collection

- Questionnaire Design
- Pretest, etc.
- How you collect the data
- What type of data
- Data collection equipment
- Calibration done
- Measuring setup

Chapter 4 Result and discussion

- Presenting data into more comprehensive form
 - graphs
 - tables.
- Data Analyses
 - Analyses
 - Produce trend, model etc
 - Verification
- Model Validation
 - Confirmation
 - Large Scale Implementation

Results and discussion(con't)

- Results can be depicted in the form of graphs, tables or other suitable forms.
- Do some analysis-comparison, trend, model deduction etc
- Discuss your results
- Draw some conclusion- This is very important

Last Chapter: CONCLUSION

- **Usually of two sections:**

- **Summary:** bring chapter wise concluding remarks; indicate whether all objectives have been met; descriptions are to be brief and interesting; bring important results, research findings, your conclusions and finally how your findings have an important place in the future literature.

- **Suggestions of Future research:**

This is to indicate that the research is sustained; List and briefly describe possible extensions and useful modifications; about 4 future research topics will be adequate.

37

Chapter 5 Conclusion

- Reporting Findings

- Summary of Novel Findings
- Discussion of Knowledge Boundary
- Conclusion
- Recommendation

- Future Work

Conclusion (Con't)

- Summary of your work and conclude the results you obtained.
- What are the limitations of your work
- Suggest future work based on work to be done to cope the limitation or to improve your work

Ending

- References /Bibliography
- Appendices
- Glossary

LIST OF REFERENCES

1. Strictly follow the guide lines given by School of PG Studies in (a) listing references and (b) citing references in the thesis write-up; NO COMPROMISE.
2. This consists of a list of materials that you have used during the writing process. (books, journals, reports, theses, conf proceedings, websites, etc, as published documents; avoid unpublished documents; do not bring materials of other languages not known to you)
3. Another purpose is to provide the information needed to allow a user to find a source.
4. All the references cited in the thesis write-up should appear in the reference listing
5. All the references appear in the list is to be cited at least once in the write-up.

41

References

References of the dissertation are all the quoted and sourced data such as journals, books, news, websites, articles, publications, statements, conferences etc... that are used in the dissertation. These references show the credibility of the dissertation

Harvard Style

- References should be ordered alphabetically according to the surname of the first author (use the editor name or the organisation name when the author name is absent)
- **3.2.1 Journal articles**
- Dicken, G.W., Leitheiser, R.L., Wetherbe, J.C. and Nechis, M. (1984) key information Systems Issues for the 1980's. MIS Quarterly, Vol.8, No. 3, September 1984, pp. 135 – 160.
- Gorry, G.A. and Scott-Morton, M.S. (1971). A Framework for Management Information Systems. Sloan Management review, Vol.13, No.1, Fall 1971, pp. 55 – 70.
- Gorry, G.A. and Scott-Morton, M.S. (1971b). A New Framework for Management Information Systems. Sloan Management review, Vol.13, No.2, Fall 1971, pp. 20 – 30.

Other references

- **3.2.2 Books or a report**
- Kroeber, D.W. and Watson, H.J. (1987). Computer-based information Systems: A Management Approach. Second Edition, Macmillan Publishing Company, New York, 1987.
- **3.2.3 Conference paper**
- Gouda, M.G. and Dayal, U. (1971). Optimal semijoin schedules for query processing in local distributed database systems. In Proceedings of ACM SIGMOD International Conference on the Management of Data, (Ann Arbor, Michigan, April 29 – May 1, 1980.) ACM, New York, 1981, pp. 164 – 165.
- **3.2.4 Manuals**
- IBM. (1984). Information Systems Planning Guide. Fourth Edition, July 1984.
- SPSS Inc. (1983). SPSS-X User's Guide. McGraw Hill Book Company, New York, 1983.

Con't

- **3.2.5 Unpublished reports and theses**
- Thorpe, A. (1982). Stability tests on a tender-price prediction model. M.Sc. Thesis, Loughborough University of Technology, UK.; 1982.
- **4. Others**
- In case you wrote a paper describing your B.Comp. Dissertation work for possible conference publication (up to 10 pages), you can include the paper in the B.Comp. Dissertation Appendix. In such case, the page limit for your final report is 55 pages plus 10 pages for the paper. Note that it is not obligatory for you to include a paper into your FYP Report.
- B.Comp.

Numbering Style

1. William C. Brown, 'The History of Power Transmission by Radio Wave' IEEE Trans. Microwave Theory and Techniques Vol32 No 9 Sept 1984
2. William C. Brown and E. Eugene Eves, 'Beamed Microwave Power Transmission and its Application to Space' IEEE Trans. On microwave Theory and Techniques, Vol 40 No 6 Jun 1992.
3. Yoshiyuki Fujino, Nobuyuki Kaya, Tsuyoshi Saka, 'Development of a C-band Rectenna for Microwave Power Transmission towards Space Robot' ,Acta Astronautica Vol50 pp 295-300, 2002.
4. Naoki Shinokawa, Yushi Miyata, Tomohiko Mitani, Naoki Niwa, Kenji Takagi, Ken-Chi Hamamoto, Satoshi Ujigawa, Jing-Ping Ao, Yusuo Ohno, ' New Application of Microwave Power Transmission for Wireless Power Distribution System in Building 978-1-4244-2642-3/08 @2002 IEEE Explore.
5. Yang Xuexia, Xu Junshu, Xu Deming, Xu Changlong, 'X-Band Circularly Polarized Rectennas for Microwave Power Transmission Applications' Journal of Electronic (China) Vol 25 No3 May 2008.

Appendices

There will be many tables, data, graphs; pictures that you want to include in the dissertation but due to the limitation of space or flow of content once can index them in the appendices. Material in the appendices is usually which supports the research of your dissertation

Glossary

- A **glossary**, also known as an **idioticon**, **vocabulary**, or **clavis**, is an alphabetical list of terms in a particular domain of knowledge with the definitions for those terms.

Citation of references

- When you quote other authors words or works, you must citing (refer to) the references otherwise it is considered as plagiarism.

You may acknowledge the source of information or ideas in various way

Harvard style

- The rectenna was first developed by Brown (1980)
- Many researches using dipole antennas for developing rectenna (Brown ,1980; Chang,1987)
- Many author .. (Brown and Adam 1980)
- More than three ... (Brown et.al 1980)

In numbering style just replaced by number.
E.g [1]

Citing example:

- Rajaratnam (2001, p. 1005) concludes that, 'The cost to the nation's health of working out of phase with our biological clocks is probably incalculable at present.'
- 'The cost to the nation's health of working out of phase with our biological clocks is probably incalculable at present' (Rajaratnam 2001, p. 1005).

Quality of Thesis

- Conformance of obligations – no fraud ,not violate ethical rules, proper acknowledgement etc.
- Conformance of specification- format
- Conformance of requirement-structure, correct language, logic, proper scientific method etc
- Meeting expectation-sufficient innovation, knowledge deepness and broadness as MSc level.

FINALE

The following can easily spoil your reputation as a good researcher / Thesis writer:

- 1) **Many grammar, spelling, typo, paging, sentence formulation errors**
- 2) **Inconsistency in presentation**
- 3) **Non-legible figures and Tables and equations.**
- 4) **Not emphasizing your research findings**
- 5) **Too much of descriptions like a tutorial, that too in un-required areas.**
- 6) **Feeble analysis, very limited number of experiments,**
- 7) **Non-indication of real life applications**
- 8) **No sufficient descriptions about Figures and Tables**
- 9) **Missing references in the listing; citing wrong references; citing references not listed.**

53

Figures and Tables

- Figures and Tables must have Title.
- Title of the Figure is at the bottom of the Figure.
- Title of the Table is at the top of the Table.
- If a Figure is a graph, the x-axis and y-axis should be named. If more lines, legend should included.
- For plotting a graph, at least 5 points are needed.
- If Figure is taken from other sources, please cited the reference on the title.
- All Figures and Tables should be referred in the text. e.g Figure 1 shows the schematic circuit of rectenna comprises antenna and rectifier.
- Diagram and picture should label the parts

Figures (only more technical and scientific pictures should be included not simple one)

Example

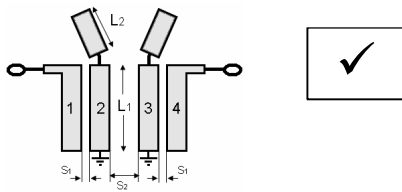
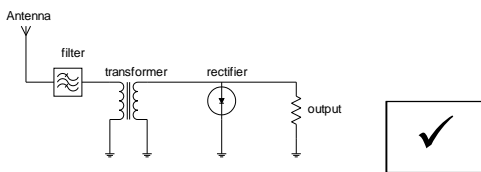


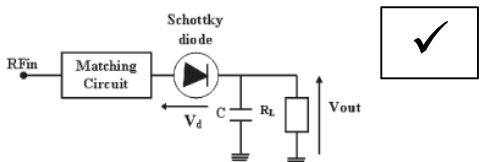
FIGURE 1 Coupled line microstrip bandpass filter

Circuit diagram



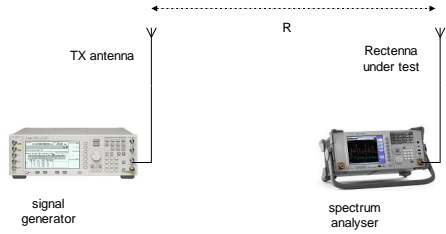
- Figure 1 Circuit diagram of rectifier

Circuit diagram



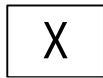
- Figure 1 Schematic circuit of Rectifier (Brown,1980)

Measuring setup



- Figure 1 Measuring setup

Components only

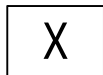


- Figure 1 A resistor



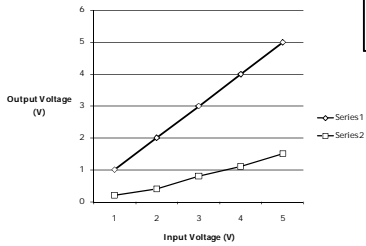
- Figure 2 A resistor

Equipment only



- Figure 1 Measuring Equipment

Graph



• Figure 4.4 Output voltage vs input voltage

Table's title should be on top

Table 1 Measured output data of rectenna

Input(mV)	Voltage (V)	Power (mW)
10	1	5
20	2	10
30	5	50
40	5	50
50	5	50



Avoid having a table with single row or column. If one row better just explain in the text

Table 1 Measured output data of rectenna

Input(mV)	Voltage (V)	Power (mW)
10	1	5



Thank you

64
