THE TITLE OF DISSERTATION GOES HERE: DOUBLE SPACED IF TITLE IS

LONG AND WRAPS AROUND

by

YOUR FULL LEGAL NAME HERE

A DISSERTATION

Presented to the Faculty of the Graduate School of the

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

In Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

in

MECHANICAL ENGINEERING

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D. F. Ling
Hardy Davidson

ABSTRACT

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ACKNOWLEDGMENTS

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TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

NOMENCLATURE

Symbol	Description
β	Angle of Attack
α	Change in Coupler Angle

1. INTRODUCTION

1.1. USING THE DISSERTATION TEMPLATE

This is where the main body of the dissertation begins. Note that the capitalization of your headings should be identical in the Table of Contents (TOC), so be sure to type 1st level headings and 2nd level subheadings in all caps, or use the "Change Case" option under the Font group to change them to "UPPERCASE." By default, Word's spellcheck will ignore words in all caps, so go to File > Options > Proofing and make sure "Ignore words in UPPERCASE" is not selected.

This text and all text within the body of the T/D uses "Style Body Text," which can be found on the Styles menu under the Home tab. You can click the dialog box launcher in the corner of the Styles group to view the full Styles menu. All headings, text, figure titles, and table titles within your document have been mapped to the Style formats and should be used throughout your T/D in order for the Table of Contents, figures, etc. to function correctly.

1.1.1. How to Use the Style Formats. This is a 3rd level subheading and is indented 0.5 in. over from the left margin. This heading is NOT in all capital letters; instead, the first letter of each major word is capitalized. The paragraph text begins immediately after the heading.

Because of the way Word handles styles, this subsection heading has to be manually adjusted. Word treats the entire line as Heading 3, but only the title should be bold. To do this, put two spaces after the period, and begin typing the first line of your body. Then, once you get to the second line, highlight from the first space following the

period to the end of the first line (level above), and turn off the bold and underline

properties. Once those are off, you then have to give a carriage return (press "Enter"), and

you should then be automatically placed into the Body Text style. Note that you must be

careful when using these carriage returns and be prepared to manually adjust. When you

press Enter at the end of the first line, your next line will automatically become indented.

Simply hit "Backspace" to remove the indentation.

The Styles to use for headings and titles are as follows:

- HEADING 0: all headings in the front matter (i – ix) that you want in the Table of

  Contents

- TOC Heading 1: only used for the "Table of Contents" heading to avoid having it

  appear within your TOC

- Heading 1: all major section headings, such as INTRODUCTION at the

  beginning of the current section

- Heading 2, Heading 3, etc.: all subsection headings follow in a like manner (see

  1.1 USING THE DISSERTATION TEMPLATE)

- Style Body Text: all body text

- Figure Title: all figure captions

- Table Title: all table titles

1.1.2. How to Use the Table of Contents. The TABLE OF CONTENTS, LIST

OF ILLUSTRATIONS, LIST OF TABLES, and NOMENCLATURE all work in a

similar manner. The TOC is automatically generated and uses the styles mentioned

above. They are already linked together, so once you get your T/D up and running, all

you have to do is right click in the TOC and click "Update Fields" (and "Update Entire

Table" if prompted) and your headings and page numbers automatically appear. However, note that for sections that use Heading 3 and beyond, you will have to modify the entry in the TOC to exclude the rest of the first line. Simply delete the text that is not part of your heading, and the space should automatically be filled with the dotted leader.

If your line in the TOC is missing the dotted leader between the heading and the page number, put your cursor before the page number and hit the "Tab" key. This should move your page number over to the right margin and add the dotted leader.

The LIST OF ILLUSTRATIONS (LI) and LIST OF TABLES (LT) work in a similar manner, except they use the styles "Figure Title" and "Table Title," respectively. Again, to update these, you will have to right-click the table and click "Update Field." You can leave the word "Figure" or "Table" at the start of each line or you can have the word appear above the list of numbers, but you should not have both.

1.1.3. How to Add to the Nomenclature. Other tables such as for the NOMENCLATURE (NOM) are updated the same way as the TOC. However, to get a symbol to be added to the NOM, you must add a Field before the symbol. For example, suppose you wanted the symbol β to be added to the NOM. First, turn on the Show/Hide Paragraph Code button in the upper right corner of the Paragraph group in the Home tab. Then, press Ctrl + F9 to open up a Field tag. Inside the Field tag, you will type in the following:

{ TC "β Description Goes Here" \n \f NOM }

where inside the quotation marks, β is your symbol, followed by a tab and your description of the symbol. After the closing quotation mark, \n is used to suppress page numbers, and \f NOM links the entry to your Nomenclature section.

Try it out yourself by adding an entry for φ as "Golden Ratio Constant" and then updating your Nomenclature section. If done correctly, the new entry should be added between β and α.

The other way to insert a Field tag is to go to Insert > Quick Parts > Field. Then, in the Field Names box, scroll down and select TC, type the description for your symbol in the Text Entry box, check "Supresses page numbers," and press OK." After this, you will still need to define your symbol and link it to your Nomenclature. Turn on the Show/Hide button, then type your symbol inside your opening quotation mark and press the tab button once. Then, add \f NOM to the end of the entry. To show another example, show the codes on this: α.

The spacing in your Nomenclature will need to be manually adjusted to be fully correct. When adjusting tabs and spacing, make sure your changes are not being linked to your TOC.

1.1.4. Formatting Figures. Figures should be formatted as one below with plenty of space above and below the actual figure (four single spaces, or two carriage returns with double spacing). The title should be below the Figure and be designated with Figure x.y. where *x* is the number of the main section that the figure is in and *y* is the number of the figure in that section. For example, Section 1 could have Figures 1.1, 1.2, and 1.3. Then, Section 2 could have 2.1, 2.2, 2.3, and 2.4. Refer to figures like this: Figure 1.1 illustrates a classic four-bar linkage where R_1 is the ground link. Titles and captions should be identical in the main body and in the LI/LT. If your figure has multiple parts (such as a, b, etc.), you can include a common title before the individual descriptions in your main body and then use only the common title in your LI/LT.
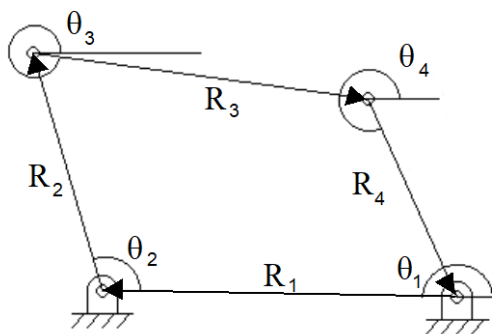
Figure 1.1. Example Four-Bar Linkage

Equations should be numbered throughout the T/D and should have one blank line before and after. Best practice is to introduce your equations before they appear, such as in Equation (1) and (2):

$$R_1 \cos\theta_1 + R_2 \cos\theta_2 + R_3 \cos\theta_3 + R_4 \cos\theta_4 = 0 \tag{1}$$

$$R_1 \sin\theta_1 + R_2 \sin\theta_2 + R_3 \sin\theta_3 + R_4 \sin\theta_4 = 0 \tag{2}$$

If your next line under an equation is a new paragraph, it should be indented. If it is within the same paragraph or the sentence continues after the equation (most commonly starting with "where"), then the line should not be indented.

Figure 1.2. Four-Bar Linkage – Crossed Configuration

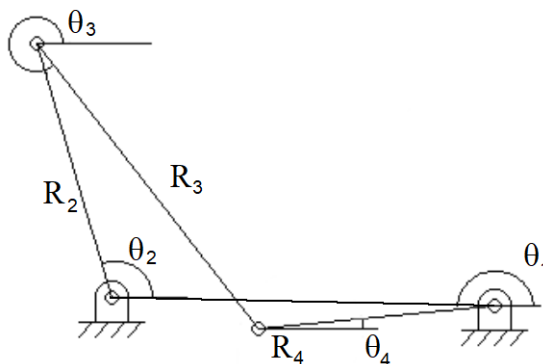**1.1.5. Formatting Tables.** Tables are formatted in much the same way as figures. The title is placed at the top, and four blank lines (or two double-spaced lines) are used above and below. Tables should be placed at the end of the paragraph where they are discussed. Table 1.1 is one such example.

Table 1.1. Original STATUS Array for Example Mechanism

	Loop #	Vector numbers											
		1	2	3	4	5	6	7	8	9	10	11	12
Mag	1	0	0	0	0	9	9	9	9	9	9	9	9
Dir	1	1	1	1	0	9	9	9	9	9	9	9	9
Mag	2	9	9	9	9	0	0	1	0	9	9	9	9
Dir	2	9	9	9	9	1	1	0	0	9	9	9	9
Mag	3	0	9	9	9	9	9	9	9	0	0	1	0

1.2. MORE EQUATIONS AND FIGURES

Below are new example equations. Note that they are Equations (3) and (4):

$$\theta_3 = 2\tan^{-1}\left(\frac{-E \pm \sqrt{E^2 - 4DF}}{2D}\right) \tag{3}$$

$$\theta_4 = 2\tan^{-1}\left(\frac{-B \pm \sqrt{B^2 - 4AC}}{2A}\right) \tag{4}$$

this line continues the sentence, where you will normally define the symbols that you used within your equations, so the first word is not capitalized or indented.

Shown below is the third figure. Make sure that your punctuation and capitalization within your figure captions is consistent. If you decide to end your captions with a period, make sure to do so with all of them.
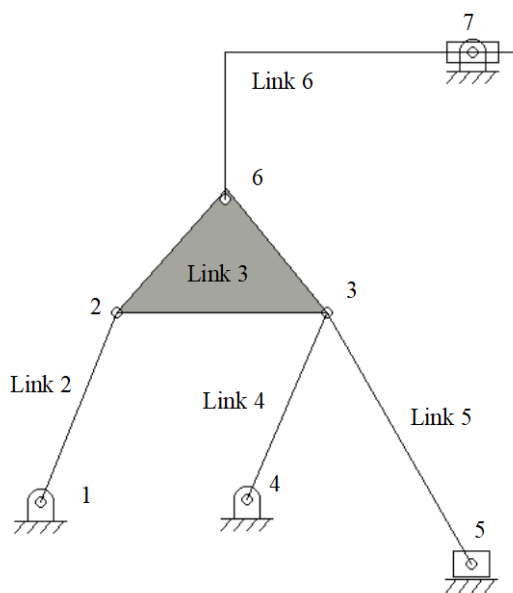
Figure 1.3. Example Mechanism

1.3. TIPS AND TRICKS FOR FORMATTING

This section will review helpful tips and tricks when using this template in order to achieve proper formatting. Note that this template was created for Word 2016; other versions of Word might vary.

1.3.1. Show/Hide Button. The Show/Hide button (¶) is located under the Home tab in the top right corner of the Paragraph group. This button will allow you to see non-printing characters such as spaces, tabs, carriage returns, and page breaks. If you are having formatting issues, turning on this button will help you identify the problem.

1.3.2. Spell Check. Be sure to check the spelling and grammar in your document periodically. If this is not turned on automatically, you can click on "Spelling & Grammar" under the Review tab to launch a review.

To change or update the settings of Word's Spell Check, go to File > Options > Proofing. Make sure "Ignore words in UPPERCASE" is turned off so that Word will still check the spelling in your headings. In the Proofing dialog box, you can also click on "Settings" next to "Writing Style" and select additional areas of grammar and style for Word to check.

1.3.3. Miscellaneous. While writing and formatting your document, the following is recommended:

- Save your document often and back up with multiple files.

- Set your text to "Left Align." Justified text is accepted, but will often lead to more formatting problems.

- Check your headings periodically. If you make a local change to a heading (such as single-spacing a long title), Word will sometimes link the changes to all your other headings in that Style. Pressing the Undo button once will remove the automatic update.

For more information on single-spacing headings, see Section 3. For information on how to use landscape pages for large tables or figures, see Appendix B.

1.3.4. Checklist. Be sure to check the following items before submitting a new version for format checking:

- Heading numbers are bold.

- "SECTION" and appendices are written into your TOC.

- Page numbers and headings in TOC have been updated.

- Capitalization and punctuation are consistent in all figures and tables.

- Spacing above and below headings is consistent. If your figure is right before a 2nd level heading, you may need to move your cursor to the blank line after the figure and change that line to single spacing.

Please refer to the official Missouri S&T Thesis & Dissertation Specifications for a full list of formatting requirements.

2. MISCELLANEOUS INFORMATION

2.1. THIS IS A SECOND LEVEL SUBHEADING

The following paragraphs demonstrate how to use a citation and a footnote. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Cras imperdiet non nisl et consequat. Donec ac ligula velit. Donec et erat bibendum, aliquam justo vitae, condimentum sem. Donec sit amet quam eu nisi viverra maximus nec eget lectus [1].

Donec rhoncus pretium enim, vel malesuada dui feugiat et. Etiam ultricies vel nunc ut venenatis.[1] The footnote is at the bottom of this page.

2.2. THIS IS ANOTHER SECOND LEVEL SUBHEADING

Note that there will always be an extra line of space before 2nd level headings. Below is a figure for this section. It is Figure 2.1, reflecting the first figure in Section 2.
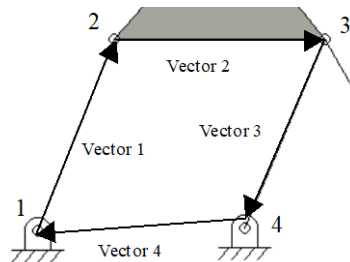

Figure 2.1. Vector Loop Decomposition of Loop 1

---

[1] Here's the text of the footnote.

This is the next line after Figure 2.1. Keep in mind that you should have the same space above and below a figure, and your page should not begin or end in an orphan line.

2.2.1. Third Level Heading. This is the first 3rd level heading of Section 2. Note the difference between this and the others. Remember that when you unbold the first line of your paragraph next to a 3rd or 4th level heading, do not highlight the last space, otherwise your heading number will be unbolded. If this happens, turn on the Show/Hide button, highlight the paragraph symbol at the end of the first line, and press bold. If this does not work, click on the number and change the entire first line back to your heading style, then try again to remove the bold on the first sentence.

2.2.2. Another Third Level Heading. This is the second 3rd level heading of Section 2. Remember that the first letter of every major word and any proper nouns (such as names of people or places) of a 3rd level heading is capitalized.

2.2.2.1. Fourth level heading. This is the first 4th level heading of Section 2**.** Note the difference between this and the others. Only the first letter of the first word of the heading and any proper nouns (such as names of people or places) are capitalized in a 4th level heading.

2.2.2.2. Another fourth level heading. This is the second 4th level heading of Section 2. Subheadings beyond the 4th level should be avoided, and bullet points used instead. Section 3 demonstrates how to format titles that are longer than one line and how they should appear in the TOC.

**3. THIS IS SECTION THREE WITH A VERY LONG HEADING THAT
NEEDS TO BE SINGLE SPACED**

3.1. HOW TO SINGLE-SPACE A LONG HEADING

To single-space a long 1st level heading, insert a soft carriage return at the end of the first line (Shift + Enter). Then, change to single spacing within the heading. This also makes the second line single spaced, so you will need to add in 12 pt of space after the last line of the heading. Double-check to make sure the spacing between your other headings is consistent; Word sometimes likes to automatically link the formatting.

3.1.1. Third Level Heading. Mauris faucibus, turpis vitae maximus imperdiet arcu velit iaculis libero, eu vestibulum sem velit vitae enim. Pellentesque lacus ex, lobortis a congue sit amet, vulputate eu velit. Pellentesque nunc arcu, aliquet in malesuada id, fringilla elementum lacus. Vestibulum rhoncus ipsum erat, non faucibus lorem dignissim eget.

3.1.2. Another Third Level Heading that Demonstrates Spacing of a Very Long Title. Note that long titles for 3rd and 4th level headings are kept double spaced in text but are still single spaced within the TOC.

3.1.2.1. Fourth level heading. Sed et dui a odio pharetra tempor aecenas pretium, erat vulputate ullamcorper malesuada, ex erat auctor mi, ut pharetra leo velit eget nisi. Mauris consequat at ante at pellentesque. Proin dignissim ipsum in orci laoreet, a pharetra nunc consequat. Nam quis lacinia neque. Sed et felis mauris. Fusce tempor semper tincidunt. Phasellus vehicula mauris vel purus gravida fermentum. Etiam tincidunt consectetur sagittis.

3.1.2.2. Another fourth level heading. In varius molestie leo massa lobortis donec suscipit, mi vel hendrerit dignissim, purus turpis euismod turpis, sodales fermentum eros magna a justo. Donec scelerisque felis eu orci efficitur, et lacinia risus rutrum.

3.2. ANOTHER SECOND LEVEL HEADING

It is important to remember never to have a Section 1 without a Section 2. Thus, you should not have Section 3.1 without also having Section 3.2.

The captions of tables with titles that are more than one line long should be single spaced, as shown in Figure 3.1.

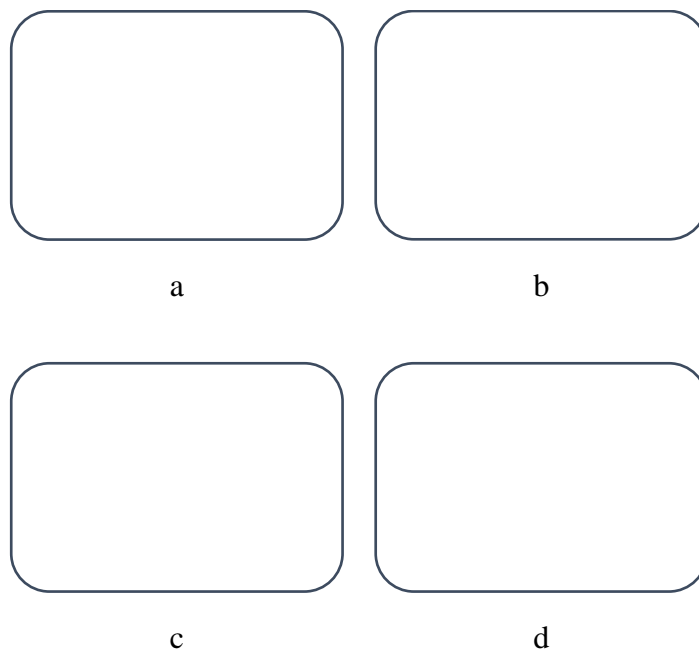a   b

c   d

Figure 3.1. Example of a Figure with Multiple Parts and a Very Long Title That Takes Up More Than One Line. a) Caption for Part A Goes Here. b) Caption for Part B Goes Here. c) Caption for Part C Goes Here. d) Caption for Part D Goes Here.

Click on the rectangle placed over the page number and change Shape Outline to "No Outline" under the Drawing Tools Format Tab. Now you can place the rectangle such that it hides the page number.

APPENDIX A.

TITLE OF FIRST APPENDIX

Put your appendix information here. Note that the format used here is for a T/D that has more than one appendix. The format for this is each appendix must have its own title sheet with the word APPENDIX, in uppercase letters, followed by an uppercase letter and centered on the page. You should then have two blank lines and then the TITLE of the appendix in uppercase letters. Do NOT include a page number on the appendix title page, but it is counted in the overall page count.

For a T/D with a single appendix, the word APPENDIX must be centered at the top of the page and the material should start on the same page. Note that there is NOT a letter distinction for this type. An example of a single appendix is shown on the thesis template.

Note that your appendices will have to be manually adjusted in the TOC. It will not link automatically, so you have to type in "APPENDICES," the titles, and write in the page numbers. For reference, see page vi.

Page number should not be present on appendix title pages. You can do this by inserting section breaks before and after, then unlinking the page number to previous pages and selecting "remove page number" from the appendix title page. Another easy way to do it is to draw a white rectangle without a border over the page number, as shown in the previous page.

APPENDIX B.

TITLE OF SECOND APPENDIX

You may want to put large figures or tables within your appendix rather than in the middle of your main body. Note that you can turn a page landscape for a figure or table, but your page number should be in the same spot as your other pages when the page is turned back to portrait. In other words, Word's automatic readjustment of page numbers on landscape pages will be incorrect. You will need to manually readjust the page number, or keep the page portrait and turn your figure sideways.

To turn a figure sideways: click the figure, then drag the arrow until it is in the right position. Note that this does not work for tables and graphs. You can insert a table or graph into a text box, turn the text box sideways, and then remove the border, but note that this will likely cause the program to slow if done multiple times.

To turn a page sideways: insert a section break before and after the page. It is easiest to put a box over the current page number (be sure to remove the border) and then insert a text box with the page number written in, then turn the text box sideways where the page number should be. Note that you will manually have to update the page number you have written in if the page location shifts.

Table B.1. Turning a Table Sideways

COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E
ROW 1				
ROW 2	2B	2C	2D	2E
ROW 3	3B	3C	3D	3E
ROW 4	4B	4C	4D	4E
ROW 5	5B	5C	5D	5E
ROW 6	6B	6C	6D	6E

Word automatically places
your page number here when
turning the page landscape

Table B.2. Turning a Page Sideways

COLUMN A ROW 1	COLUMN B	COLUMN C	COLUMN D	COLUMN E
ROW 2	2B	2C	2D	2E
ROW 3	3B	3C	3D	3E
ROW 4	4B	4C	4D	4E
ROW 5	5B	5C	5D	5E
ROW 6	6B	6C	6D	6E

This page number must
be manually updated if
page location changes

BIBLIOGRAPHY

[1]   J. McCardle and D. Chester, "Measuring an Asynchronous Processor's Power and Noise," Synopsys User Group Conference (SNUG), Boston, 2001.

[2]   C. L. Seitz, "System Timing," in *Introduction to VLSI Systems*, Addison-Wesley, pp. 218-262, 1980.

[3]   http://www.sce.carleton.ca/faculty/chinneck/thesis.html. Organizing Your Thesis, June 2004 (date mentioned here is the date on which the website was last visited).

OR

1.   J. McCardle and D. Chester, "Measuring an Asynchronous Processor's Power and Noise," *Synopsys User Group Conference (SNUG)*, Boston, 2001.

2.   C. L. Seitz, "System Timing," in *Introduction to VLSI Systems*, Addison-Wesley, pp. 218-262, 1980.

3.   http://www.sce.carleton.ca/faculty/chinneck/thesis.html. Organizing Your Thesis, June 2004 (date mentioned here is the date on which the website was last visited).

OR

ACI Committee 440, Guide for the Design and Construction of Concrete Reinforced with FRP Bars (440.1R-01), American Concrete Institute, Farmington Hills, Michigan, 2001, 41 pp.

Canny J, A Computational Approach to Edge Detection. IEEE Transactions PAMI 1986, Vol 10, pp. 679-698.

References can be formatted as a numbered list or alphabetically with a hanging indent. References that exceed one line must be single spaced within, so it might be easiest to single-space all text in your references and then add in text between new references (either by manually adding in carriage returns between each reference, or adding 24 pt of "after" spacing between paragraphs). Be sure to remove the blue text and underlines from your hyperlinks.

VITA

Provide information about yourself here. You must include your full legal name, Joseph Edward Miner. For privacy reasons, including your date of birth is not required. All degrees earned and year earned need to be included in the vita. Also include the degree and date of the current degree earned. The vita should be written in past tense.

Finally, remember to include a blank unnumbered flyleaf at the end for your document if you included one at the beginning.