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FORMAT

A THESIS

Presented to the Department of Electrical Engineering

California State University, Long Beach

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Electrical Engineering

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B.S., 2018, University of California, Irvine

May 2020

ABSTRACT

A list of keywords may be used as the last paragraph with first line indented and a heading as the first word or phrase in italics with a colon. The abstract should not be longer than two pages.

ACKNOWLEDGEMENTS

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If you have received funding for your research and the funding organization requires recognition, mention it on the acknowledgments page.

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LIST OF ABBREVIATIONS

Abbreviation	Description
IEEE	Institute of Electrical and Electronics Engineers
ASME	American Society of Mechanical Engineers

LIST OF WORKS

1. *Titles of Paintings, Sculptures, and Other Works of Art Use Italics and Headline Style Capitalization and Dimensions of the Piece Can Be Included at the End in Parentheses* (8.5 in. by 11 in.)

2. "Titles of Photographs Use Quotation Marks and Headline Style Capitalization and Dimensions of the Piece Can Be Included at the End in Parentheses" (40 cm by 40 cm)

3. Descriptions of the items depicted in a photograph of an untitled work or a photo of an element in the design of the exhibition can use headline style capitalization or sentence style capitalization; if a title or description takes up more than one line, indent all lines that follow the first line further so that words on those lines begin underneath words on the first line (rather than beginning flush with words on the first line)

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PREFACE

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CHAPTER 1

BASIC TYPESETTING

In these paragraphs, we will display examples for many common features in LaTeX. The code is shown in `main.tex` and the associated output in `main.pdf`. We assume you already know the basic syntactical structure of TeX with its commands and environments. If you are not familiar, it is recommended you read `intro to latex.pdf` provided in this package. We will start with the most basic examples of different fonts and styles.

Fonts and Styles

Bold font is made using the `\textbf` command. *Italic* font is made using the `\textit` command. <u>Underline</u> font is made using the `\underline` command. `Monospace/teletype` font is made using the `\texttt` command. Sans-serif font is made using the `\textsf` command.

Math

One of LaTeX's greatest strengths is its mathemetical typesetting. You can enter inline math $e^{i\pi}$. You can also have a math block.

$$f(x) = \int_{-\infty}^{\infty} g(x)\, \mathrm{d}x$$

You can have numbered equations with the `equation` environment.

$$\Phi(n) = \gamma^n + \Delta\gamma \cdot \vec{\zeta} \tag{1}$$

You can also align equations by using a `&` in the `align*` environment. Omitting the `*` will number each line.

$$h_1 = \mathbf{X}_1 + N$$

$$h_2 = \mathbf{X}_1 + N$$

$$\vdots$$

$$h_n = \mathbf{X}_n + N$$

Make sure you use the proper notation for your field. A common mistake is to italicize units in math mode. Units are supposed to be typset in a roman font because μm in italic means you are multiplying two variables and µm means your value is in micrometers. A similar mistake is often made for special functions. If you are using a multi-letter function such as sin() or floor(), it should not be italic for the same reason as before. To fix these issues, you can use the `\mathrm` command when in math mode to set your text as roman (or upright). Greek letters need to be specified as upright by prepending 'up' to the command, e.g., `$\upmu$`.

<div align="center">

Quotation marks

</div>

Quotes are written in latex using ` for opening and ´ for closing. They can be used for 'single' and "double" quotes alike.

<div align="center">

Lists

</div>

Bulleted lists are made with the `itemize` environment. Numbered lists are made with hte `enumerate` environment. They can be made hierrarchal by embedding another lists within. A bulleted list:

- First level

  - second level

A numbered list:

1. First level

    (a) second level

Code Listing

You can make a code block using the `verbatim` environment. Be mindful that unlike most TEXenvironments, it is senstive to spaces (but not tabs) at the beginning of lines so that you may indent your code.

```
class Fill:
  def __init__(self, color=BLACK, style='solid'):
    self.color = color
    self.style = style
```

Figures

Figures can be included using the `\includegraphics` command, and their placement and captioning can be configured using the `figure` environment. Generally, LATEXcan determine the best placement of your figure on the page itself, but you can give it a placement option of `h`, `t`, `b`, or `p` to place it here, on top, on bottom, or on its own page. Note that in `main.tex`, we have already set the graphics path with the `\graphicspath{ {Figures/ } }` command, which means it is always going to look in that folder for your figures.

Tables

Tables can be generated using the `tabular` environment, and their placement and captioning is configured with the `table` environment, like with figures. In the `tabular` environment, you provide a section parameter that configures your number ofcolumns, their text alignment, and vertical borders.

Citations and Cross-references

You can add citations [1] from [2] your `references.bib` file [3] using the `\cite` command [4]. You can also cross-reference equations, figures, and tables and many other items by giving
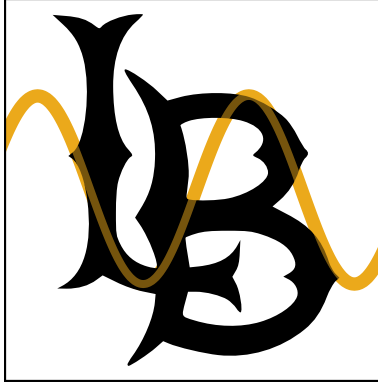
FIGURE 1. The CSULB logo partially superimposed over a sine wave. This extra text is a test of the caption behavior when there is a longer caption. Lorem ipsum dolor.

TABLE 1. An example of a table

Color	Radius, r [mm]	RMS Voltage, v [V]
Cyan	72.2	2.1
Magenta	45.2	5.5
Yellow	78.5	1.3
Black	33.3	6.9

them a custom label with the `\label` command, and using the `\ref` command to call them. Citations and references like this are very nice because you don't have to worry about item numbering and how it may change as you develop your document; you tell LATEXwhere you want it, and it will handle the numbering so it makes sense. And in PDF viewers, the cross-references are clickable intra-document links that will take you to the associated item. Figure 1. Table 1. Equation 1.

Footnotes

Footnotes can be placed with the `\footnote` command[1].

---

[1]This is a footnote but it's a very long footnote so that we can test the indent of the footnote text when it leads onto a second line at the bottom of the page.

CHAPTER 2

DUMMY TEXT

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer 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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First Level Subhead (section)

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purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Second Level Subheads (subsection)

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Third level subheads (subsubsection). Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

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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.

2.1   Example of First-Level Subheading With Hierarchical Numbering

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2.1.1   Example of a Second-Level Subheading With Hierarchical Numbering

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2.1.1.1 Example of a third-level subheading with hierarchical numbering. Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis.

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Non-hierarchical heading: Sed feugiat. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Ut pellentesque augue sed urna. Vestibulum diam eros, fringilla et, consectetuer eu, nonummy id, sapien. Nullam at lectus. In sagittis ultrices mauris. Curabitur malesuada erat sit amet massa. Fusce blandit. Aliquam erat volutpat. Aliquam euismod. Aenean vel lectus. Nunc imperdiet justo nec dolor. Sed feugiat. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Ut pellentesque augue sed urna. Vestibulum diam eros, fringilla et, consectetuer eu, nonummy id, sapien. Nullam at lectus. In sagittis ultrices mauris. Curabitur malesuada erat sit amet massa. Fusce blandit. Aliquam erat volutpat. Aliquam euismod. Aenean vel lectus. Nunc imperdiet justo nec dolor.

APPENDICES

APPENDIX A

AN EXAMPLE OF A SINGLE PART OF MULTIPLE APPENDICES

Some information that would go in the appendix.

APPENDIX B

ANOTHER EXAMPLE OF A SINGLE PART OF MULTIPLE APPENDICES

More information that would go in an appendix.

REFERENCES

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REFERENCES

[1] J. Doe, "The article title," *The Journal*, vol. 72, pp. 500—505, 2012.

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