

MASTER THESIS

Your thesis title

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der Fakultät für Ingenieurwissenschaften
der Universität Duisburg-Essen (Campus Duisburg)

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Acknowledgments

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Abstract

This thesis template is based on the one from [GitHub repository of Systems Security Research Group University Duisburg-Essen](#)

Keywords— L^AT_EX

1 Introduction to L^AT_EX

L^AT_EX is a high-quality typesetting system; it includes features designed for the production of technical and scientific documentation. L^AT_EX is the de facto standard for the communication and publication of scientific documents [1].

At the very beginning of this template and short tutorial of using L^AT_EX, some basic commands are shown in the following section.

1.1 Basic commands and symbols

In L^AT_EX, the quotation marks are not recognized as in Microsoft Word or some other text-editing environment. If you type twice `"`, the output will be `"some quotation"`. Hence, one should use `` `` combined with `"` in L^AT_EX environment instead and the output will be `"some quotation"`. You can also check this in the source code.

In L^AT_EX, the “space” used in your code after a common command will not be shown as a space in the generated pdf-file. To add such a space, one should try to insert a `~` symbol to generate an extra space character in the text. For example, L^AT_EX is a typesetting system `~`, instead of L^AT_EXis a typesetting system.

There are some characters defined as special characters in L^AT_EX, e.g. `%`. To type such characters in the text, try to add a backslash before them (`\%` instead of `%`).

Sometimes it is necessary to add some number with units in the text, however the numbers and their units should not be divided into two different lines, hence try to use `{\,}` instead of “space” character in this case.

For example, you may write:

In 2017, the electricity generated by PV was roughly 38.4 TWh, while wind about 104 TWh [2].

However, it maybe better to write the sentence as:

In 2017, the electricity generated by PV was roughly 38.4 TWh, while wind about 104 TWh.

2 Using Mathematical Representations

L^AT_EX offers powerful support for mathematical representations.

Following are some equations from IEEE Standard 738-2012 [3], which are used here as example and to show some basic operation and L^AT_EX code to insert mathematical equations into your text.

If you want to insert a single equation (as the one shown in Formula 2.1), just create an “equation” environment and type the corresponding equation.

$$q_r = 17.8 \cdot D_0 \cdot \varepsilon \cdot \left[\left(\frac{T_{max} + 273}{100} \right)^4 - \left(\frac{T_a + 273}{100} \right)^4 \right] \quad W/m \quad (2.1)$$

Maybe you also want to explain meanings of the variables used in the equation, L^AT_EX offers a “tabbing” environment which can be used to align the variables and corresponding explanations. As an example, for the variables used in Formula 2.1, one may write:

where	D_0	is the conductor diameter,
	ε	is the emissivity of surface area,
	T_{max}	is the maximum operating temperature of the conductor,
	T_a	is the ambient temperature.

As shown above, to refer one variable or insert some mathematical expression in the text body, one may use $\{ \$ \$ \}$ to create a mathematical expression environment.

It is also useful to write some equations in one block (as shown in Formula 2.3), however to make the equations look better, you may align the equations with each other. For example in the exemplary equations, they are aligned to the equal symbol. To align text in L^AT_EX environment, the & symbol is used.

$$q_c+q_r = q_s + I^2 \cdot R(T_s) \quad (2.2)$$

$$I = \sqrt{\frac{q_c+q_r-q_s}{R(T_{max})}} \quad (2.3)$$

Similar to the \aligh environment, you may create equations with \subequations environment, which will create 2.4a and 2.4b instead of a new number for the second equation as in Formula 2.3 did.

$$q_{c1} = K_{angle} \cdot [1.01+1.35 \cdot N_{Re}^{0.52}] \cdot k_f \cdot (T_{max}-T_a) \quad W/m \quad (2.4a)$$

$$q_{c2} = K_{angle} \cdot 0.754 \cdot N_{Re}^{0.6} \cdot k_f \cdot (T_{max}-T_a) \quad W/m \quad (2.4b)$$

3 Text Structure

In a chapter it usually has several levels of sections and subsections to keep the contents well organized.

3.1 This is a new section

3.1.1 This is a new subsection

Although in \LaTeX , there is also a `\subsubsection` command which can generate an extra level of contents under subsection, it is not recommended to be used. The possible solution maybe:

A new paragraph

instead of

3.1.1.1 A subsubsection

It should be noticed that all font types and spacing before or after the titles can be customized in the `.cls` file.

3.1.2 Make a list

It is also quite often to list out some important points in the text.

- This is an unimportant entry
- This is another unimportant entry :D

4 Figure and Table

5 Citation and Bibliography

There are a lot of literature management software in the market, e.g. EndNote, Citavi, Mandelley, etc. Taking Citavi as example, one can add literature and reference sources into this software and exported all references into a bib-file, which can be read by \LaTeX and directly added into the generated pdf-file.

In this thesis template, the citation management package used is “biblatex”, hence in Citavi you should export the selected references by setting a “BibLaTeX” export filter. It should be noticed, that the time format supported in the package biblatex is the UTC time format, i.e. yyyy-MM-dd. Citavi also recognize different time formats, e.g. German format dd.MM.yyyy. However, problems may occur when one attempted to export such time format into a bib-file. Therefore, it is recommended to use UTC time format in Citavi and then export.

Each reference entry has a unique BibTeX key within your Citavi project, which can be directly used in \LaTeX environment with the command `\cite`. For example, type `\cite{Burger.20180508}`, the corresponding reference will be referred in the text [2].

6 Acronyms

It is rather handy to use acronyms or abbreviations in your thesis with \LaTeX . As defined in the file `acronyms.tex`, the first entry of `\newacronym` command is the key you entered to call the acronym, while the second one is the short-form of this acronym and the third one is long-form.

For example, an entry of acronym is defined as:

```
\newacronym{der}{DER}{Distributed Energy Resouce}
```

To refer the full version of this term for the first time, you may use `\gls{der}` to get Distributed Energy Resource (DER) as output, `\acrfull{der}` give the same result Distributed Energy Resource (DER) while `\acrshort{der}` for the short form DER and `\acrlong{der}` for the long form Distributed Energy Resource.

It is quite useful to refer an acronym with the plural form and it is quite simple to realize in \LaTeX — just add “pl” at the end of one command, e.g. `acrfullpl{der}`, and the output will be Distributed Energy Resources (DERs).

Bibliography

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