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Institute for Operations Research (IOR)
Nonlinear Optimization and Strategic Interaction
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Declaration of Originality

I truthfully affirm that I have written the thesis independently, that I have indicated all sources and aids used completely and accurately, and that I have marked everything that has been taken from the work of others unchanged or with modifications, and that I have observed the KIT Statutes for Safeguarding Good Scientific Practice as amended from time to time.

Date

Name

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1 Introduction

For a brief introduction to L^AT_EX we recommend

https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes.

You may use the *Overleaf* online editor whose website hosts the latter document, but this is optional.

The source code `template.tex` of the current document may be compiled, for example, by `pdflatex`.

The two-sided format of the thesis is required. This explains the preceding empty pages in the current PDF file.

2 A Section Heading

The formula $\inf_{x \in \mathbb{R}} f(x) = 0$ for $f(x) = e^x$ appears in the running text, but one may also display it separately:

$$\inf_{x \in \mathbb{R}} f(x) = 0.$$

It is possible to automatically assign equation numbers

$$\inf_{x \in \mathbb{R}} e^x = 0 \tag{1}$$

and to refer to them in the subsequent text: in (1) there is no $x \in \mathbb{R}$ with $e^x = 0$.

2.1 A Subsection Heading

The definitions, theorems etc. use special environments to which one may refer as well.

Definition 2.1 *In the following $M \subseteq \mathbb{R}^n$ denotes the feasible set of an optimization problem.*

With M as in Definition 2.1 one may consider the minimization of a function $f : M \rightarrow \mathbb{R}$. There the convex hull $\text{conv}(M)$ of M may play some role.

Note that equation numbers are always enclosed in parentheses, but environment numbers are not. The command `\eqref` automatically adds parentheses; otherwise, use `\ref`.

The environment name must always be written in the text before an environment number, in order to distinguish, for example, ‘Definition 2.1’ from ‘Section 2.1’.

There are also dedicated environments for figures and tables, as shown in Figure 1 on page 6.



Figure 1: The KIT Logo

2.2 Managing Reference Citations

When citing references, a distinction is primarily made between books or monographs, such as [4], and journal articles, such as [6]. Articles are often uploaded to a preprint server such as arXiv or Optimization Online before they are published in a journal, as in [3]. When citing websites, as in [2], the date of access should be specified. For a dissertation such as [1], which is published online, a URL may be provided. All entries in the reference list must be cited in the main text.

To add new references, you must create a corresponding entry in the external bibliography file `refs.bib`. It is recommended to use a bibliography management program. There, you can create a separate project for your thesis and save the references used there. The bibliography file can then be generated automatically from it. *Zotero* is an example of a cross-platform, open-source bibliography management program. The *Better BibTeX* plugin is very helpful for flexibly formatting the bibliography file.

To process the bibliography, this template uses the *biblatex* package, which requires *Biber* as its backend program. In the LaTeX editor, the default BibTeX command must therefore be replaced with Biber. This does not require much effort.

The post [5] explains the procedure for many common editors. To ensure that newly added references are displayed correctly, you must compile the

source file once, then run Biber, and then compile it again. In Overleaf, this happens automatically in the background. In other L^AT_EX editors, you can create a custom command that automatically performs these steps in sequence.

3 Conclusion

The thesis should be wrapped up with a summary or conclusion section.

References

- [1] A. Engau, “Domination and Decomposition Multiobjective Programming”, Clemson University, 2007, https://open.clemson.edu/all_dissertations/69.
- [2] H. Mittelman, *Decision tree for optimization software*, 2024, <https://plato.asu.edu/guide.html> (visited on 07/09/2025).
- [3] F. Neussel and O. Stein, *On image space transformations in multiobjective optimization*, Preprint, 2025, <https://optimization-online.org/?p=30125>.
- [4] S. Nickel, S. Rebennack, O. Stein, and K.-H. Waldmann, *Operations Research*, SpringerGabler, 2022.
- [5] StackExchange, *Biblatex with Biber: Configuring my editor to avoid undefined citations*, 2023, <https://tex.stackexchange.com/questions/154751/biblatex-with-biber-configuring-my-editor-to-avoid-undefined-citations> (visited on 07/10/2025).
- [6] O. Stein, “How to solve a semi-infinite optimization problem”, *European Journal of Operational Research* 223 (2012), pp. 312–320.