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Universidade Federal de Minas Gerais
Graduate Program in Electrical Engineering
MACRO Research Group - Mechatronics, Control, and Robotics

A MINIMAL THESIS EXAMPLE

John Doe
Belo Horizonte, Brazil
2025

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Dissertation submitted to the Graduate Program in Electrical Engineering of Universidade Federal de Minas Gerais, in partial fulfillment of the requirements for the degree of Master in Electrical Engineering.

Advisor: Dr. Jane Smith
Co-advisor: Dr. Foo Bar

Belo Horizonte, Brazil
2025

To my family.

Acknowledgments

This is an acknowledgments. If you are using another language as main (not english), then you should use this command as following:

"\acknowledgments[Acknowledgments in your language]{Text}"

Abstract

This is the abstract in the first language. If you are using another language as main (not english), then you should use this command as following:

"\abstract[Abstract in your language]{Text}"

Resumo

Esse é um exemplo de abstract. Caso sua segunda língua não seja português, você deve usar o comando da seguinte forma:

"\abstractsecond[Abstract in second language]{Text}"

Contents

List of Figures

List of Tables

Acronyms

DOF Degrees of freedom.

UAV Unmanned aerial vehicle.

UFMG Universidade Federal de Minas Gerais.

Notation

$\mathbb{R}^n$	Euclidean space of dimension n.
$\|\cdot\|_F$	Frobenius norm.
$\mathbb{N}$	Set of natural numbers starting from zero or one depending on context.
$\mathbb{Z}$	Set of all integers, both positive and negative including zero.
$\mathbb{C}$	Set of complex numbers, represented as $a + bi$ where $a, b \in \mathbb{R}$.

1 Introduction

Para utilizar o pacote, simplesmente adicione o comando `\usepackage{macrothesis}` ao preâmbulo do seu documento. Não delete o arquivo `template/logo.pdf`, já que ele é utilizado para gerar a capa do documento.

1.1 Opções do pacote

O pacote `macrothesis` possui algumas opções que podem ser utilizadas para personalizar o documento. As opções disponíveis são:

- `noglossaries`: Desabilita o pacote `glossaries` que é utilizado para gerenciar acrônimos e notações. Esta opção é útil caso você deseje utilizar um pacote diferente para gerenciar acrônimos e notações ou caso você deseje utilizar outras opções para o pacote. É possível definir uma página de acrônimos e notações manualmente utilizando os comandos `\setnotationpage`.
- `nonatbib`: Desabilita o pacote `natbib` que é utilizado para gerenciar referências bibliográficas. Esta opção é útil caso você deseje utilizar um pacote diferente para gerenciar referências bibliográficas ou caso você deseje utilizar outras opções para o pacote.
- `nohyperref`: Desabilita o pacote `hyperref` que é utilizado para gerar links no documento. Esta opção é útil caso você deseje utilizar um pacote diferente para gerar links ou caso você deseje utilizar outras opções para o pacote.

- `dissertation`: Usa o termo “Dissertation” ao invés do padrão “Thesis”.
- `thesis`: Usa o termo “Thesis”. Não é necessário utilizar essa opção, pois é o padrão.
- `doctor`: Usa o título “Doctor” ao invés do padrão “Master”.
- `master`: Usa o título “Master”. Não é necessário utilizar essa opção, pois é o padrão.
- `firstlang=<lingua>`: Define a língua principal do documento. Por padrão, a língua principal é o inglês. As opções disponíveis são:
  english, american, USenglish, canadian, british, australian, newzealand, UKenglish, brazil, portuguese, german, ngerman, spanish, french.
- `secondlang=<lingua>`: Define a língua secundária do documento. As opções disponíveis são as mesmas. Por padrão, a língua secundária é `none`, o que significa que não há uma língua secundária.

Note que as opções de línguas somente automatizam os títulos como “Abstract”, “Resumo”, “Contents”, etc. É possível escrever o texto em outras línguas, desde que esses títulos sejam alterados manualmente. Alguns ambientes já possuem opções para alterar o título manualmente.

1.1.1 Uso do pacote `glossaries`

Caso deseje utilizar o pacote `glossaries`, você pode adicionar novos acrônimos e notações utilizando os comandos predefinidos `\newacronym{label}{sigla}{descrição}` e `\newnotation{label}{notação}{descrição}`, respectivamente. Por exemplo, o acrônimo Unmanned aerial vehicle (UAV) e a notação $\mathbb{R}^n$ foram adicionados utilizando esses comandos. Os acrônimos serão ordenados em ordem alfabética e as notações em ordem de definição.

Não é necessário utilizar o comando `\gls{label}` (ou algo similar) para referenciar os acrônimos e notações, pois o pacote `macrothesis` irá automaticamente adicionar todos os acrônimos e notações à lista, independentemente de serem utilizados no texto ou não. Apesar disso, você **deve** definir um label único para cada acrônimo e notação.

Esses termos devem ser adicionados no preâmbulo (antes do `begin{document}`) da seguinte forma:

```
\newacronym{uav}{UAV}{Unmanned aerial vehicle}
\newacronym{dof}{DOF}{Degrees of freedom}
\newacronym{ufmg}{UFMG}{Universidade Federal de Minas Gerais}

\newnotation{Rn}{$\mathbb{R}^n$}{Euclidean space of dimension $n$}
\newnotation{frobnorm}{$\|\cdot\|_F$}{Frobenius norm}
```

```
\begin{document}
...
\end{document}
```

É possível adicionar as notações e acrônimos em arquivos separados, importando-se esses arquivos antes do preâmbulo utilizando

Note que o pacote `glossaries` será carregado por padrão com as opções `acronym` e `symbols`. Caso deseje modificar essas opções, você deve utilizar a opção `noglossaries` do pacote `macrothesis` e carregar o pacote `glossaries` manualmente.

1.1.2 Uso do pacote `natbib`

Caso deseje utilizar o pacote `natbib`, você pode utilizar os comandos `\citep{label}` para citações indiretas e `\citet{label}` para citações diretas. Por exemplo, a referência (Gallier and Quaintance, 2020) foi adicionada utilizando o comando `\citep{test}` e a referência Lee (2012) foi adicionada utilizando o comando `\citet{test}`.

O pacote `natbib` é carregado por padrão com as opções `authoryear` e `round`. Caso deseje modificar essas opções, você deve utilizar a opção `nonatbib` do pacote `macrothesis` e carregar o pacote `natbib` manualmente.

1.2 Uso do pacote `macrothesis`

O pacote `macrothesis` é utilizado para gerar a capa, a folha de rosto, a dedicatória, os agradecimentos, os resumos, a lista de figuras, a lista de tabelas, a lista de acrônimos, a lista de notações, e a bibliografia. Para utilizar o pacote, basta adicionar os comandos `\maketitlepage` e `\preamblepage` ao início do seu documento (nessa ordem).

Para alterar o título, o autor, o orientador, etc. do documento, você deve utilizar os comandos `\title{Título}`, `\author{Autor}`, `\advisorname{Orientador}`, etc. no preâmbulo. Por exemplo, para gerar a capa e a folha de rosto, você deve utilizar os comandos:

```
\title{A Minimal Thesis Example}
\author{John Doe}
\advisorname{Dr. Jane Smith}
\coadvisorname{Dr. Foo Bar}
\universityname{Universidade Federal de Minas Gerais}
\researchgroupname{MACRO Research Group - Mechatronics,
 Control, and Robotics}
\programname{Graduate Program in Electrical Engineering}
```

```
\locationname{Belo Horizonte, Brazil}
...
\begin{document}
\maketitlepage
\preamblepage
...
\end{document}
```

O comando `\coadvisorname{Coorientador}` é opcional e deve ser utilizado caso haja um coorientador. Para adicionar um segundo coorientador, você deve utilizar o comando da seguinte forma: `\coadvisorname[Segundo Coorientador]{Primeiro Coorientador}`.

Para adicionar a dedicatória, os agradecimentos, e os resumos, você deve utilizar os comandos:

- `\dedication{Dedicatória}`
- `\acknowledgments{Agradecimentos}`
- `\abstract{Resumo}`
- `\abstractsecond{Abstract}`

Por exemplo, para adicionar a dedicatória e os agradecimentos, você deve utilizar os comandos:

```
\dedication{To my family.}
\acknowledgments{
    Long and emotional text here...
}
\abstract{
    Abstract in english...
}
\abstractsecond{
    Resumo em português...
}
...
\begin{document}
\maketitlepage
\preamblepage
...
\end{document}
```

Caso necessário, é possível modificar o título das seções de abstracts e acknowledgments utilizando os comandos da seguinte forma: `\abstract[Título em sua língua]{Texto}` e `\acknowledgments[Título em sua língua]{Texto}`.

1.3 TODO

O pacote ainda está em desenvolvimento e algumas funcionalidades ainda não foram implementadas. Algumas das funcionalidades que ainda serão implementadas são:

- Traduzir automaticamente Dissertation/Thesis, Master/Doctor e o texto da capa;
- Somente mostrar a lista de figuras e a lista de tabelas caso haja figuras e tabelas no documento.
- Melhorar o visual das listas de acrônimos e notações.

2

Mathematical Background

2.1 Math

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. $\sin^2(\alpha) + \cos^2(\beta) = 1$. If you read this text, you will get no information $E = mc^2$. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$. This text should contain all letters of the alphabet and it should be written in of the original language. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$. There is no need for special content, but the length of words should match the language. $a\sqrt[n]{b} = \sqrt[n]{a^n b}$. Hello, here is some text without a meaning. $\mathrm{d}\Omega = \sin\vartheta \mathrm{d}\vartheta \mathrm{d}\varphi$. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. $\sin^2(\alpha) + \cos^2(\beta) = 1$. This text should contain all letters of the alphabet and it should be written in of the original language $E = mc^2$. There is no need for special content, but the length of words should match the language. $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$.

2.1.1 Abstract Algebra

Hello, here is some text without a meaning. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$. This text should show what a printed text will look like at this place. $a\sqrt[n]{b} = \sqrt[n]{a^n b}$. If you read this text, you will get no information. $\mathrm{d}\Omega = \sin\vartheta \mathrm{d}\vartheta\mathrm{d}\varphi$. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. $\sin^2(\alpha) + \cos^2(\beta) = 1$.

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{i=n} x_i = \frac{x_1 + x_2 + \ldots + x_n}{n}$$

Hello, here is some text without a meaning $E = mc^2$. This text should show what a printed text will look like at this place. $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$. If you read this text, you will get no information. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. $a\sqrt[n]{b} = \sqrt[n]{a^n b}$. This text should contain all letters of the alphabet and it should be written in of the original language. $\mathrm{d}\Omega = \sin\vartheta \mathrm{d}\vartheta\mathrm{d}\varphi$. There is no need for special content, but the length of words should match the language.

$$\int_0^\infty e^{-\alpha x^2}\mathrm{d}x = \frac{1}{2}\sqrt{\int_{-\infty}^{\infty} e^{-\alpha x^2}\mathrm{d}x \int_{-\infty}^{\infty} e^{-\alpha y^2}\mathrm{d}y} = \frac{1}{2}\sqrt{\frac{\pi}{\alpha}}$$

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. $\sin^2(\alpha) + \cos^2(\beta) = 1$. If you read this text, you will get no information $E = mc^2$. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$. This text should contain all letters of the alphabet and it should be written in of the original language. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$. There is no need for special content, but the length of words should match the language. $a\sqrt[n]{b} = \sqrt[n]{a^n b}$.

$$\sum_{k=0}^{\infty} a_0 q^k = \lim_{n\to\infty}\sum_{k=0}^{n} a_0 q^k = \lim_{n\to\infty} a_0 \frac{1-q^{n+1}}{1-q} = \frac{a_0}{1-q}$$

Hello, here is some text without a meaning. $\mathrm{d}\Omega = \sin\vartheta \mathrm{d}\vartheta\mathrm{d}\varphi$. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives

you information about the selected font, how the letters are written and an impression of the look. $\sin^2(\alpha) + \cos^2(\beta) = 1$. This text should contain all letters of the alphabet and it should be written in of the original language $E = mc^2$. There is no need for special content, but the length of words should match the language. $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$.

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-p \pm \sqrt{p^2 - 4q}}{2}$$

Hello, here is some text without a meaning. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$. This text should show what a printed text will look like at this place. $a\sqrt[n]{b} = \sqrt[n]{a^n b}$. If you read this text, you will get no information. $\mathrm{d}\Omega = \sin\vartheta \mathrm{d}\vartheta \mathrm{d}\varphi$. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. $\sin^2(\alpha) + \cos^2(\beta) = 1$.

$$\frac{\partial^2\Phi}{\partial x^2} + \frac{\partial^2\Phi}{\partial y^2} + \frac{\partial^2\Phi}{\partial z^2} = \frac{1}{c^2}\frac{\partial^2\Phi}{\partial t^2}$$

Hello, here is some text without a meaning $E = mc^2$. This text should show what a printed text will look like at this place. $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$. If you read this text, you will get no information. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. $a\sqrt[n]{b} = \sqrt[n]{a^n b}$. This text should contain all letters of the alphabet and it should be written in of the original language. $\mathrm{d}\Omega = \sin\vartheta \mathrm{d}\vartheta \mathrm{d}\varphi$. There is no need for special content, but the length of words should match the language.

Group Theory

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. $\sin^2(\alpha) + \cos^2(\beta) = 1$. If you read this text, you will get no information $E = mc^2$. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$. This text should contain all letters of the alphabet and it should be written in of the original language. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$. There is no need for special content, but the length of words should match the language. $a\sqrt[n]{b} = \sqrt[n]{a^n b}$.

3 Development

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

This is the second paragraph. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

4 Results

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

5 Conclusions

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

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