

FACULDADE DE ENGENHARIA DA UNIVERSIDADE DO PORTO

<Dissertation Title>

<Author's Full Name>



Mestrado em Engenharia Informática e Computação

Supervisor: Prof. <Name of the Supervisor>

July 25, 2025



<**Dissertation Title**>

<**Author's Full Name**>

Mestrado em Engenharia Informática e Computação

Approved in oral examination by the committee:

President: Prof. <Name of the Professor>

Referee: Prof. <Name of the Professor>

Referee: Prof. <Name of the Professor>

July 25, 2025

# Resumo

Este documento ilustra o formato a usar em dissertações na Faculdade de Engenharia da Universidade do Porto (FEUP). São dados exemplos de margens, cabeçalhos, títulos, paginação, estilos de índices, etc. São ainda dados exemplos de formatação de citações, figuras e tabelas, equações, referências cruzadas, lista de referências e índices. Este documento não pretende exemplificar conteúdos a usar. É usado o *Loren Ipsum* para preencher a dissertação. Lorem ipsum dolor sit amet, FEUP consectetur adipiscing elit. Etiam vitae quam sed mauris auctor porttitor. Mauris porta sem vitae arcu sagittis facilisis. Proin sodales risus sit amet arcu. Quisque eu pede eu elit pulvinar porttitor. Maecenas dignissim tincidunt dui. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Donec non augue sit amet nulla gravida rutrum. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nunc at nunc. Etiam egestas. Donec malesuada pede eget nunc. Fusce porttitor felis eget mi mattis vestibulum FEUP. Pellentesque faucibus. Cras adipiscing dolor quis mi. Quisque sagittis, justo sed dapibus pharetra, lectus velit tincidunt eros, ac fermentum nulla velit vel sapien. Vestibulum sem mauris, hendrerit non, feugiat ac, varius ornare, lectus. Praesent urna tellus, euismod in, hendrerit sit amet, pretium vitae, nisi. Proin nisl sem, ultrices eget, faucibus a, feugiat non, purus. Etiam mi tortor, convallis quis, pharetra ut, consectetur eu, orci. Vivamus aliquet. Aenean mollis fringilla erat. Vivamus mollis, purus at pellentesque faucibus, sapien lorem eleifend quam, mollis luctus mi purus in dui. Maecenas volutpat mauris eu lectus. Morbi vel risus et dolor bibendum malesuada. Donec feugiat tristique erat. Nam porta auctor mi. Nulla purus. Nam aliquam.

# Abstract

Here goes the abstract written in English. Should say the same.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed vehicula lorem commodo dui Faculdade de Engenharia da Universidade do Porto (FEUP). Fusce mollis feugiat elit. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec eu quam. Aenean consectetur odio quis nisi. Fusce molestie metus sed neque. Praesent nulla. Donec quis urna. Pellentesque hendrerit vulputate nunc. Donec id eros et leo ullamcorper placerat. Curabitur aliquam tellus et diam. Ut tortor. Morbi eget elit. Maecenas nec risus. Sed ultricies. Sed scelerisque libero faucibus sem FEUP. Nullam molestie leo quis tellus. Donec ipsum. Nulla lobortis purus pharetra turpis. Nulla laoreet, arcu nec hendrerit vulputate, tortor elit eleifend turpis, et aliquam leo metus in dolor. Praesent sed nulla. Mauris ac augue. Cras ac orci. Etiam sed urna eget nulla sodales venenatis. Donec faucibus ante eget dui. Nam magna. Suspendisse sollicitudin est et mi. Fusce sed ipsum vel velit imperdiet dictum. Sed nisi purus, dapibus ut, iaculis ac, placerat id, purus. Integer aliquet elementum libero. Phasellus facilisis leo eget elit. Nullam nisi magna, ornare at, aliquet et, porta id, odio. Sed volutpat tellus consectetur ligula. Phasellus turpis augue, malesuada et, placerat fringilla, ornare nec, eros. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Vivamus ornare quam nec sem mattis vulputate. Nullam porta, diam nec porta mollis, orci leo condimentum sapien, quis venenatis mi dolor a metus. Nullam mollis. Aenean metus massa, pellentesque sit amet, sagittis eget, tincidunt in, arcu. Vestibulum porta laoreet tortor. Nullam mollis elit nec justo. In nulla ligula, pellentesque sit amet, consequat sed, faucibus id, velit. Fusce purus. Quisque sagittis urna at quam. Ut eu lacus. Maecenas tortor nibh, ultricies nec, vestibulum varius, egestas id, sapien. Donec hendrerit. Vivamus suscipit egestas nibh. In ornare leo ut massa. Donec nisi nisl, dignissim quis, faucibus a, bibendum ac, diam. Nam adipiscing hendrerit mi. Morbi ac nulla. Nullam id est ac nisi consectetur commodo. Pellentesque aliquam massa sit amet tellus. Vivamus sodales aliquam leo.

# UN Sustainable Development Goals

The United Nations Sustainable Development Goals (SDGs) provide a global framework to achieve a better and more sustainable future for all. It includes 17 goals<sup>1</sup> to address the world's most pressing challenges, including poverty, inequality, climate change, environmental degradation, peace, and justice.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis.

The specific Sustainable Development Goals mentioned have the following names:

**SDG 7** Ensure access to affordable, reliable, sustainable and modern energy for all

**SDG 8** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

SGD	Target	Contribution	Performance Indicators and Metrics
7	7.1	Enhancing the efficiency of SCADA systems can help increase the reliability of solar energy production, facilitating universal access to clean energy.	Percentage of solar plants with improved ...
	7.2	Improving the management of solar plants helps enhance the efficiency and reliability of renewable energy ...	Increase in renewable energy share ...
8	8.1	Enhancing renewable energy infrastructure promotes resilience against climate-related hazards and supports sustainable energy sources.	Increase in resilience metrics ...

---

<sup>1</sup><https://sdgs.un.org/goals>

# Acknowledgements

Aliquam id dui. Nulla facilisi. Nullam ligula nunc, viverra a, iaculis at, faucibus quis, sapien. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Curabitur magna ligula, ornare luctus, aliquam non, aliquet at, tortor. Donec iaculis nulla sed eros. Sed felis. Nam lobortis libero. Pellentesque odio. Suspendisse potenti. Morbi imperdiet rhoncus magna. Morbi vestibulum interdum turpis. Pellentesque varius. Morbi nulla urna, euismod in, molestie ac, placerat in, orci.

Ut convallis. Suspendisse luctus pharetra sem. Sed sit amet mi in diam luctus suscipit. Nulla facilisi. Integer commodo, turpis et semper auctor, nisl ligula vestibulum erat, sed tempor lacus nibh at turpis. Quisque vestibulum pulvinar justo. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Nam sed tellus vel tortor hendrerit pulvinar.

Fusce gravida placerat sem. Aenean ipsum diam, pharetra vitae, ornare et, semper sit amet, nibh. Nam id tellus. Etiam ultrices.

<O Nome do Autor>

*“Our greatest glory is not in never falling, but in rising every time we fall”*

Confucius



# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Section Example . . . . .	1
1.2	Section Example . . . . .	2
1.3	Section Example . . . . .	2
1.4	Section Example . . . . .	3
1.5	Dissertation Structure . . . . .	3
<b>2</b>	<b>Chapter Example</b>	<b>4</b>
2.1	Introduction . . . . .	4
2.2	Section Example . . . . .	4
2.2.1	Subsection Example . . . . .	5
2.2.2	Subsection Example . . . . .	5
2.3	Summary . . . . .	6
<b>3</b>	<b>Chapter WITH Examples</b>	<b>7</b>
3.1	Introduction . . . . .	7
3.2	Section Example . . . . .	8
3.2.1	Subsection Example — Figures . . . . .	8
3.2.2	Subsection Example — Tables . . . . .	8
3.2.3	Subsection Example — SI . . . . .	9
3.2.4	Subsection Example — Acronyms . . . . .	10
3.3	Summary . . . . .	10
<b>4</b>	<b>Another chapter</b>	<b>11</b>
4.1	Section Example . . . . .	11
4.2	Section Example . . . . .	11
4.2.1	Subsection Example . . . . .	11
4.2.2	Subsection Example . . . . .	11
4.3	Section Example . . . . .	12
4.3.1	Subsection Example . . . . .	12
4.3.2	Subsection Example . . . . .	12
4.4	Section Example . . . . .	12
4.4.1	Subsection Example . . . . .	12
4.4.2	Subsection Example . . . . .	12
4.5	Listing example . . . . .	13
	<b>References</b>	<b>14</b>

<b>A</b>	<b> Lorem Ipsum</b>	<b>16</b>
A.1	What is <i>Lorem Ipsum</i> ? . . . . .	16
A.2	Where does <i>Lorem</i> come from? . . . . .	16
A.3	Why is <i>Lorem</i> used? . . . . .	17
A.4	Where can you find examples? . . . . .	17

# List of Figures

3.1	A figure, caption below . . . . .	8
-----	-----------------------------------	---

# List of Tables

3.1	A table, caption on top . . . . .	9
3.2	Physical Resources of FEUP . . . . .	9

# List of Acronyms

<b>AI</b>	Artificial Intelligence
<b>FEUP</b>	Faculdade de Engenharia da Universidade do Porto
<b>GPU</b>	Graphics Processing Unit
<b>ML</b>	Machine Learning
<b>NLP</b>	Natural Language Processing

# Chapter 1

## 2 Introduction

This document illustrates the format to be used for dissertations at FEUP. Examples of margins  
4 are given, headings, titles, pagination, index styles, etc. are given. It also gives examples of  
formatting citations, figures and tables, equations, cross-references, reference lists and indexes.  
6 This document is not intended to exemplify content to be used.

This first chapter illustrates the use of citations and references.

### 8 1.1 Section Example

As well as giving an example of how to use a quotation, the following paragraph introduces a  
10 reference that can be consulted, among many other interesting bibliographical references [11, 12].

“Like the Abstract, the Introduction should be written to engage the interest of the  
12 reader. It should also give the reader an idea of how the dissertation is structured, and  
in doing so, define the thread of the contents.” [12, chap. Introduction]

14 Lorem ipsum Lipsum [7] dolor sit amet, consectetur adipiscing elit. Sed eget nunc. Phasellus  
interdum, risus viverra mollis laoreet, felis justo iaculis ante, eget ornare purus augue non urna.  
16 Nam in magna. In a est. Phasellus a tellus vitae enim vehicula imperdiet. Etiam sit amet elit.  
In hac habitasse platea dictumst. Quisque eget turpis vel felis elementum tempus. Curabitur sit  
18 amet tortor id libero dapibus pretium. Integer mattis eros eu lorem. Duis erat tellus, porttitor sed,  
blandit eget, fringilla et, lacus. Phasellus tristique nibh nec orci. Mauris sed leo. Suspendisse  
20 fringilla tempor dolor. Donec sapien enim, congue in, porta et, sollicitudin in, quam. Curabitur  
semper, mauris ut vestibulum eleifend, diam ipsum tincidunt quam, et vestibulum velit mauris ut  
22 risus.

Sed eget libero. Nulla facilisi. Proin eget tortor. Morbi gravida. Donec arcu risus, blandit a,  
24 rutrum at, ornare ut, nisl. Etiam consectetur tortor eu odio. Etiam blandit molestie ligula. Nulla  
facilisi. Nam a augue non justo laoreet hendrerit. Nam aliquam, purus eu ultricies dictum, urna  
26 purus posuere neque, vel tempus tellus enim a arcu.

Pellentesque congue sapien in ligula. Nulla nec mi sed augue congue tristique. Cras pretium. Pellentesque lobortis, libero id adipiscing auctor, orci massa vehicula nulla, vel ullamcorper tortor ipsum ut elit. Morbi rhoncus, dui sed tristique volutpat, lorem felis euismod lorem, vel tristique nibh arcu vel eros. Nunc tempor. Sed et erat a tortor fermentum consequat. Cras varius nisl accumsan libero. Aliquam faucibus, justo ut pharetra blandit, est nibh ultrices est, vel facilisis quam lectus ut enim. Aliquam convallis, nibh non bibendum pharetra, nisl velit lobortis orci, ac ultrices neque sem viverra massa. Donec malesuada. Aliquam ligula. Fusce in nisl. Etiam lacinia est quis velit. Maecenas massa. Maecenas sed pede. Nulla sodales. Etiam vitae erat. Duis tristique sem sit amet libero. Ut a libero nec ligula tempus mattis.

## 1.2 Section Example

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Morbi sit amet nibh. Fusce faucibus, enim vel ultrices ornare, est mauris ultricies velit, vitae consequat sem erat vel nunc. Nam libero eros, mattis eget, sagittis nec, imperdiet at, sapien. Aliquam lacus. Aenean adipiscing nibh in orci. Aliquam vestibulum, elit at fringilla dignissim, metus diam lobortis urna, a laoreet nunc odio ac ipsum. Sed at urna. Integer vehicula fringilla augue. Nulla lacus eros, rhoncus sit amet, posuere ut, vehicula ac, nibh. Ut eleifend, eros eu placerat vehicula, justo turpis blandit dolor, eu tincidunt felis risus at ante. Aenean suscipit nisl eget eros. Ut laoreet libero eget enim. Cras tempus pellentesque felis. Vestibulum vitae erat ac nibh posuere eleifend.

Integer nec quam. Sed fermentum. Nunc vitae leo. Etiam sit amet quam. Nunc vestibulum massa in mauris. Duis eget nulla. Fusce ultricies arcu eu nibh volutpat feugiat. Maecenas urna pede, commodo quis, porta eu, bibendum elementum, pede. Sed eros massa, molestie eget, mattis non, rutrum ac, magna. Duis dui. Maecenas eget tortor ut dolor semper mattis. Maecenas auctor, tellus et ultricies tempor, elit est placerat lacus, in posuere mauris lorem et arcu.

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin sodales lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros. Etiam laoreet venenatis ipsum. In tellus odio, eleifend ac, ultrices vel, lobortis sed, nibh. Fusce nunc augue, dictum non, pulvinar sed, consectetur eu, ipsum. Vivamus nec pede. Pellentesque pulvinar fringilla dolor. In sit amet pede. Proin orci justo, semper vel, vulputate quis, convallis ac, nulla. Nulla at justo. Mauris feugiat dolor. Etiam posuere fermentum eros. Morbi nisl ipsum, tempus id, ornare quis, mattis id, dolor. Aenean molestie metus suscipit dolor. Aliquam id lectus sed nisl lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed scelerisque nisi nec sem.

## 1.3 Section Example

Integer nec quam. Sed fermentum. Nunc vitae leo. Etiam sit amet quam. Nunc vestibulum massa in mauris. Duis eget nulla. Fusce ultricies arcu eu nibh volutpat feugiat. Maecenas urna pede, commodo quis, porta eu, bibendum elementum, pede. Sed eros massa, molestie eget, mattis non,

rutrum ac, magna. Duis dui. Maecenas eget tortor ut dolor semper mattis. Maecenas auctor, tellus  
2 et ultricies tempor, elit est placerat lacus, in posuere mauris lorem et arcu.

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin  
4 sodales lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros. Etiam  
laoreet venenatis ipsum. In tellus odio, eleifend ac, ultrices vel, lobortis sed, nibh. Fusce nunc  
6 augue, dictum non, pulvinar sed, consectetur eu, ipsum. Vivamus nec pede. Pellentesque pulvinar  
fringilla dolor. In sit amet pede. Proin orci justo, semper vel, vulputate quis, convallis ac, nulla.  
8 Nulla at justo. Mauris feugiat dolor. Etiam posuere fermentum eros. Morbi nisl ipsum, tempus  
id, ornare quis, mattis id, dolor. Aenean molestie metus suscipit dolor. Aliquam id lectus sed nisl  
10 lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed scelerisque nisi nec sem.

## 1.4 Section Example

12 Integer nec quam. Sed fermentum. Nunc vitae leo. Etiam sit amet quam. Nunc vestibulum massa  
in mauris. Duis eget nulla. Fusce ultricies arcu eu nibh volutpat feugiat. Maecenas urna pede,  
14 commodo quis, porta eu, bibendum elementum, pede. Sed eros massa, molestie eget, mattis non,  
rutrum ac, magna. Duis dui. Maecenas eget tortor ut dolor semper mattis. Maecenas auctor, tellus  
16 et ultricies tempor, elit est placerat lacus, in posuere mauris lorem et arcu.

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin  
18 sodales lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros. Etiam  
laoreet venenatis ipsum. In tellus odio, eleifend ac, ultrices vel, lobortis sed, nibh. Fusce nunc  
20 augue, dictum non, pulvinar sed, consectetur eu, ipsum. Vivamus nec pede. Pellentesque pulvinar  
fringilla dolor. In sit amet pede. Proin orci justo, semper vel, vulputate quis, convallis ac, nulla.  
22 Nulla at justo. Mauris feugiat dolor. Etiam posuere fermentum eros. Morbi nisl ipsum, tempus  
id, ornare quis, mattis id, dolor. Aenean molestie metus suscipit dolor. Aliquam id lectus sed nisl  
24 lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed scelerisque nisi nec sem.

## 1.5 Dissertation Structure

26 In addition to the introduction, this dissertation contains x more chapters.

In Chapter 2, the state of the art is described and related work is presented. Chapter 3, ipsum  
28 dolor sit amet, consectetur adipiscing elit.



## Chapter 2

### 2 Chapter Example

1 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a eros. Phasellus non nulla non  
4 massa venenatis convallis. In porta. Mauris quis magna.

#### 2.1 Introduction

6 Fusce risus mi, tristique eu, consectetur id, auctor sed, elit. Donec laoreet. Duis consectetur  
interdum libero Marinho, Viegas, and Lopes [9].

8 In euarcu. Fusce luctus diam eget lectus. Duis interdum lacus sed ligula. Proin vestibulum  
felis eget lacus. Vivamus vestibulum, tellus ut congue viverra, mauris lacus tempor turpis, eu  
10 congue nisi magna at dolor. Ut molestie vehicula libero. Praesent in neque sed risus tempus  
ornare. Donec hendrerit, erat eu semper aliquam, pede nulla dapibus risus, ut pretium orci pede et  
12 neque. Etiam eget tortor a metus convallis viverra. Quisque eget nisi sed orci facilisis interdum.  
Aliquam non felis.

#### 14 2.2 Section Example

*Scalable Vector Graphics* Curabitur ipsum tortor, ornare vitae, dapibus pretium, hendrerit sed,  
16 urna. [14].

18 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a eros. Phasellus non nulla  
non massa venenatis convallis. In porta. Mauris quis magna. IBM [5] and World Wide Web  
Consortium [13].

20 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec a eros. Phasellus non nulla  
non massa venenatis convallis. In porta. Mauris quis magna. Proin mauris eros, aliquet id, eleifend  
22 vitae, semper quis, erat. Aliquam id lectus non odio dignissim blandit. Vestibulum porttitor arcu  
ut ligula.

24 Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Phasel-  
lus bibendum, nulla eget varius aliquam, tortor nulla sollicitudin quam, vel vestibulum nisl magna  
26 at sem. Aliquam velit sapien, ultrices viverra, tempus quis, ultrices at, dui. Aliquam sit amet justo.

Quisque tristique, metus eu iaculis sagittis, urna leo bibendum diam, a ultricies sem diam a augue.  
2 Mauris consectetur, libero vel euismod tincidunt, nisi metus viverra ante, quis pretium sapien  
odio nec risus. Nunc semper auctor nulla<sup>1</sup>.

### 4 2.2.1 Subsection Example

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nunc eu nulla. Pellentesque vitae nibh  
6 ultrices quam iaculis convallis. Aliquam purus eros, varius eget, volutpat sodales, imperdiet nec,  
lacus *applets* [1].

8 Curabitur in elit sed sem rutrum posuere. Class aptent taciti sociosqu ad litora torquent per  
conubia nostra, per inceptos himenaeos [14].

10 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nunc eu nulla. Pellentesque vitae  
nibh ultrices quam iaculis convallis. Aliquam purus eros, varius eget, volutpat sodales, imperdiet  
12 nec, lacus. Curabitur in elit sed sem rutrum posuere. Class aptent taciti sociosqu ad litora torquent  
per conubia nostra, per inceptos himenaeos. Duis sem. Praesent ultricies odio vel sapien. Integer  
14 faucibus malesuada libero. Cras semper, dolor id ullamcorper varius, magna risus volutpat felis,  
id pellentesque nulla ante at erat. Integer sodales.

16 Quisque sit amet odio. In at risus sit amet turpis interdum posuere. Maecenas iaculis vehicula  
sem. Ut leo arcu, malesuada vel, imperdiet id, dignissim a, purus. Duis eleifend, lectus non vene-  
18 natis dignissim, risus libero imperdiet mi, nec gravida massa libero sed mauris. Nullam lobortis  
libero non sapien. Integer convallis iaculis erat. Morbi dictum. Ut ultrices pellentesque velit. Cras  
20 ac ante. Etiam in neque tincidunt lacus gravida vehicula. Proin et nisi.

Vivamus non nunc nec risus tempor varius. Quisque bibendum mi at dolor. Aliquam con-  
22 sectetur condimentum risus. Aliquam luctus pulvinar sem. Duis aliquam, urna et vulputate  
tristique, dui elit aliquet nibh, vel dignissim magna turpis id sapien. Duis commodo sem id quam.  
24 Phasellus dolor. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos  
himenaeos.

### 26 2.2.2 Subsection Example

Loren ipsum dolor sit amet, consectetur adipiscing elit. Praesent sit amet sem. Maecenas  
28 eleifend facilisis leo. Vestibulum et mi. Aliquam posuere, ante non tristique consectetur, dui  
elit scelerisque augue, eu vehicula nibh nisi ac est. Suspendisse elementum sodales felis. Nullam  
30 laoreet fermentum urna.

Duis eget diam. In est justo, tristique in, lacinia vel, feugiat eget, quam. Pellentesque habitant  
32 morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac  
placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante  
34 ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis,  
condimentum sed, luctus in.

---

<sup>1</sup>Example of a footnote.

## **2.3 Summary**

- <sup>2</sup> Aliquam erat volutpat. Nunc pede ipsum, porttitor eu, bibendum non, bibendum nec, nisl. Maecenas eget mauris. Nullam pulvinar. Curabitur rutrum commodo est. Nam sapien pede, interdum
- <sup>4</sup> eu, accumsan ultrices, venenatis sit amet, tellus. Praesent ac ante bibendum enim varius suscipit. Donec enim. Proin nisi. Quisque libero turpis, varius ut, elementum vel, pulvinar sed, nunc.

## Chapter 3

## Chapter WITH Examples

Maecenas eleifend facilisis leo. Vestibulum et mi. Aliquam posuere, ante non tristique con-  
sectetuer, dui elit scelerisque augue, eu vehicula nibh nisi ac est. Suspendisse elementum sodales  
felis. Nullam laoreet fermentum urna.

### 3.1 Introduction

Pellentesque rutrum, sapien at viverra facilisis<sup>12</sup>:

$$CIF_1 : \quad F_0^j(a) = \frac{1}{2\pi i} \oint_{\gamma} \frac{F_0^j(z)}{z-a} dz \quad (3.1)$$

$$CIF_2 : \quad F_1^j(a) = \frac{1}{2\pi i} \oint_{\gamma} \frac{F_0^j(x)}{x-a} dx \quad (3.2)$$

Equação 3.2 lorem ipsum dolor sit amet, consectetur adipiscing elit. Suspendisse tincidunt  
viverra elit. Donec tempus vulputate mauris. Donec arcu. Vestibulum condimentum porta justo.  
Curabitur ornare tincidunt lacus. Curabitur ac massa vel ante tincidunt placerat. Cras vehicula  
semper elit. Curabitur gravida, est a elementum suscipit, est eros ullamcorper quam, sed cursus  
velit velit tempor neque. Duis tempor condimentum ante. Nam sollicitudin. Vestibulum adipisc-  
ing, orci eu tempor dapibus, risus sapien porta metus, et cursus leo metus eget nibh.

Pellentesque rutrum, sapien at viverra facilisis, metus eros blandit sem, quis dictum erat metus  
eget erat. Vivamus malesuada dapibus nulla. Maecenas nec purus. Suspendisse auctor mattis  
augue. Phasellus enim nisi, iaculis sit amet, pellentesque a, iaculis in, dui. Integer risus.

Curabitur ac massa vel ante tincidunt placerat. Curabitur gravida, est cras vehicula semper elit  
a elementum suscipit, est eros ullamcorper quam, sed cursus velit velit tempor neque. Duis tempor  
condimentum ante. Nam sollicitudin. Vestibulum adipiscing, orci eu tempor dapibus, risus sapien  
porta metus, et cursus leo metus eget nibh.

<sup>1</sup><https://en.wikipedia.org/wiki/Equation>

<sup>2</sup>[https://www.overleaf.com/learn/latex/Mathematical\\_expressions](https://www.overleaf.com/learn/latex/Mathematical_expressions)

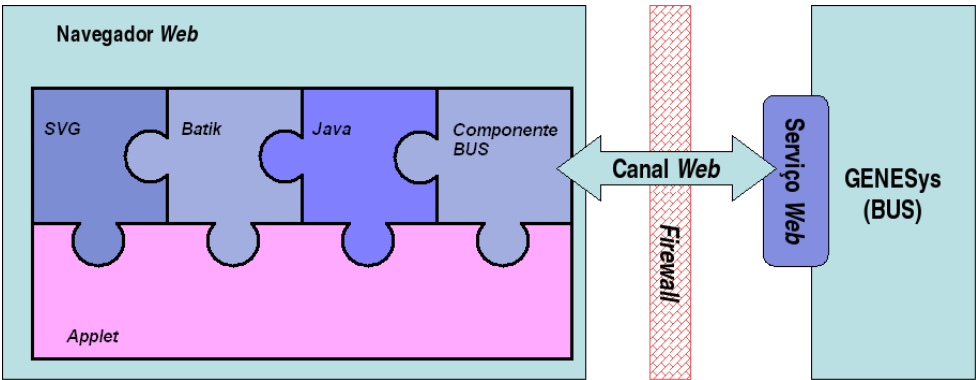


Figure 3.1: A figure, caption below

### 3.2 Section Example

2 Curabitur ac massa vel ante tincidunt placerat [16]:

- **Components** — Suspendisse auctor mattis augue *push*;
- **Praesent** — Sit amet sem maecenas eleifend facilisis leo;
- **Pellentesque** — Habitant morbi tristique senectus et netus.

#### 6 3.2.1 Subsection Example — Figures

Suspendisse elementum sodales felis in Figure 3.1 on page 8 is a floating figure.

8     Loren ipsum dolor sit amet, consectetur adipiscing elit. Praesent sit amet sem. Maecenas  
eleifend facilisis leo. Vestibulum et mi. Aliquam posuere, ante non tristique consectetur, dui elit  
10 scelerisque augue, eu vehicula nibh nisi ac est. Nullam laoreet fermentum urna.

Duis eget diam. In est justo, tristique in, lacinia vel, feugiat eget, quam. Pellentesque habitant  
12 morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac  
placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante  
14 ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis,  
condimentum sed, luctus in.

#### 16 3.2.2 Subsection Example — Tables

Suspendisse elementum sodales felis in Table 3.1 is a floating table.

18     Loren ipsum dolor sit amet, consectetur adipiscing elit. Praesent sit amet sem. Maecenas  
eleifend facilisis leo. Vestibulum et mi. Aliquam posuere, ante non tristique consectetur, dui  
20 elit scelerisque augue, eu vehicula nibh nisi ac est. Suspendisse elementum sodales felis. Nullam  
laoreet fermentum urna.

22     Duis eget diam. In est justo, tristique in, lacinia vel, feugiat eget, quam. Pellentesque habitant  
morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac  
24 placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante

Table 3.1: A table, caption on top

Iteration $k$ de $f(x_n)$				
$k$	$x_1^k$	$x_2^k$	$x_3^k$	comments
0	-0.3	0.6	0.7	-
1	0.47102965	0.04883157	-0.53345964	$\delta < \varepsilon$
2	0.49988691	0.00228830	-0.52246185	$\delta < \varepsilon$
3	0.49999976	0.00005380	-0.523656	$N$
4	0.5	0.00000307	-0.52359743	
$\vdots$	$\vdots$	$\ddots$	$\vdots$	
7	0.5	0.0	<b>-0.52359878</b>	$\delta < 10^{-8}$

ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis,  
condimentum sed, luctus in.

3.2.3 Subsection Example — SI

Always use the `siunitx` package<sup>3</sup> to write values, units, etc. according to the International System of Units convention rules and style conventions (see <https://physics.nist.gov/cuu/Units/checklist.html>).

For example: 50 kg, 15 °C, 20.01 ms<sup>-1</sup>, 120 kB s<sup>-1</sup>, 34 %, 289 300.00 €, 28.3 M€, 10 245.450 234.

Table 3.2 serves to exemplify the alignment in the columns with numbers, and has nothing to do with any numerical data associated with FEUP’s resources and investments in 2025.

Loren ipsum dolor sit amet, consectetur adipiscing elit. Praesent sit amet sem. Maecenas eleifend facilisis leo. Vestibulum et mi. Aliquam posuere, ante non tristique consectetur, dui elit scelerisque augue, eu vehicula nibh nisi ac est. Suspendisse elementum sodales felis. Nullam laoreet fermentum urna.

Duis eget diam. In est justo, tristique in, lacinia vel, feugiat eget, quam. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante

<sup>3</sup>Manual available at <https://ctan.org/pkg/siunitx>.

Table 3.2: Physical Resources of FEUP [3].

Some Values
2.3456
34.2345
−6.7835
90.473
5642.5
1.2 × 10 <sup>3</sup>
10 <sup>4</sup>

ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis,  
2 condimentum sed, luctus in.

### 3.2.4 Subsection Example — Acronyms

4 This section shows how to use the acronyms Artificial Intelligence (**AI**) and Machine Learning (**ML**). Later we can simply refer to **AI** or **ML** without expansion.

6 In modern technology, Natural Language Processing (**NLP**) plays a crucial role in virtual assistants and chatbots. We also rely on Graphics Processing Unit (**GPU**) hardware for deep learning  
8 models.

#### 3.2.4.1 Special use in titles as **FEUP**

10 Acronyms can also be made plural: **GPUs** are widely used in high-performance computing. Possessive forms are supported too: **AI's** impact on society is profound at Faculdade de Engenharia  
12 da Universidade do Porto (**FEUP**).

## 3.3 Summary

14 Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis.  
16 Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis, condimentum sed, luctus in.

## Chapter 4

## 2 Another chapter

Integer nec quam. Sed fermentum. Nunc vitae leo. Etiam sit amet quam. Nunc vestibulum massa  
4 in mauris. Duis eget nulla.

### 4.1 Section Example

6 Fusce ultricies arcu eu nibh volutpat feugiat. Maecenas urna pede, commodo quis, porta eu,  
bibendum elementum, pede.

### 8 4.2 Section Example

Sed eros massa, molestie eget, mattis non, rutrum ac, magna. Duis dui. Maecenas eget tortor ut  
10 dolor semper mattis. Maecenas auctor, tellus et ultricies tempor, elit est placerat lacus, in posuere  
mauris lorem et arcu.

#### 12 4.2.1 Subsection Example

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin sodales  
14 lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros.

#### 4.2.2 Subsection Example

16 Pellentesque pulvinar fringilla dolor. In sit amet pede. Proin orci justo, semper vel, vulputate quis,  
convallis ac, nulla. Nulla at justo. Mauris feugiat dolor. Etiam posuere fermentum eros. Morbi nisl  
18 ipsum, tempus id, ornare quis, mattis id, dolor. Aenean molestie metus suscipit dolor. Aliquam id  
lectus sed nisl lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed scelerisque nisi  
20 nec sem.



### 4.3 Section Example

2 Sed eros massa, molestie eget, mattis non, rutrum ac, magna. Duis dui. Maecenas eget tortor ut  
dolor semper mattis. Maecenas auctor, tellus et ultricies tempor, elit est placerat lacus, in posuere  
4 mauris lorem et arcu.

#### 4.3.1 Subsection Example

6 Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin sodales  
lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros.

#### 8 4.3.2 Subsection Example

Aliquam id lectus sed nisl lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed  
10 scelerisque nisi nec sem Khakipoor, Khani, and Karimian [6] and Liu et al. [8].

### 4.4 Section Example

12 Maecenas urna pede, commodo quis, porta eu, bibendum elementum, pede. Sed eros massa,  
molestie eget, mattis non, rutrum ac, magna. Duis dui. Maecenas eget tortor ut dolor semper  
14 mattis. Maecenas auctor, tellus et ultricies tempor, elit est placerat lacus, in posuere mauris lorem  
et arcu [2, 4, 10, 15].

#### 16 4.4.1 Subsection Example

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin sodales  
18 lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros.

#### 4.4.2 Subsection Example

20 Aliquam id lectus sed nisl lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed  
scelerisque nisi nec sem Khakipoor, Khani, and Karimian [6] and Liu et al. [8] scelerisque.

22 Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin  
sodales lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros. Etiam  
24 laoreet venenatis ipsum. In tellus odio, eleifend ac, ultrices vel, lobortis sed, nibh. Fusce nunc  
augue, dictum non, pulvinar sed, consectetur eu, ipsum. Vivamus nec pede.

## 4.5 Listing example

- 2 Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis.

Listing 4.1: Python example

```
4
1 # Take the user's input
2 words = input("Enter the text to translate to pig latin: ")
3 print(f"You entered: {words}")
4
5 # Break apart the words into a list
6 words = words.split(' ')
7
8
9 # Use a list comprehension to translate words greater than or equal to 3 characters
10 translated_words = [(w[1:] + w[0] + "ay") for w in words if len(w) >= 3 ]
11
12 # Print each translated word
13 for word in translated_words:
14     print(word)
```

- Listing 4.1 uis eget diam. In est justo, tristique in, lacinia vel, feugiat eget, quam. Pellentesque
- 20 habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante
- 22 ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis, condimentum sed, luctus in.

# References

- [1] Apache. *Batik SVG Toolkit Architecture*. Available at <http://xml.apache.org/batik/architecture.html#coreComponents>. 2005.
- [2] Liang Chang, Xin Zhao, and Jun Zhou. “ADAS: A High Computational Utilization Dynamic Reconfigurable Hardware Accelerator for Super Resolution”. In: *ACM Transactions on Reconfigurable Technology and Systems* 16.3 (June 2023), 47:1–47:22. ISSN: 1936-7406. DOI: 10.1145/3570927.
- [3] FEUP. *FEUP em Números 2023*. Disponível em [https://sigarra.up.pt/feup/pt/web\\_base.gera\\_pagina?p\\_pagina=258031](https://sigarra.up.pt/feup/pt/web_base.gera_pagina?p_pagina=258031). 2023.
- [4] Licheng Guo et al. “RapidStream 2.0: Automated Parallel Implementation of Latency-In-sensitive FPGA Designs Through Partial Reconfiguration”. In: *ACM Transactions on Reconfigurable Technology and Systems* 16.4 (Sept. 2023), 59:1–59:30. ISSN: 1936-7406. DOI: 10.1145/3593025.
- [5] IBM. *Program with SVG*. Available at <http://www-128.ibm.com/developerworks/xml/library/x-matters40/>. 2005.
- [6] Yosef Khakipoor, Farnaz Khani, and Ghader Karimian. “A Linear Implementation of the Hodgkin–Huxley Neuron Model on FPGA Considering Its Dynamics”. In: *Neural Processing Letters* (May 2023). ISSN: 1573-773X. DOI: 10.1007/s11063-023-11285-2.
- [7] Ipsum. *Lorem Ipsum*. 2008. URL: <http://www.lipsum.com/>.
- [8] Qiang Liu et al. “An Energy Efficient and Runtime Reconfigurable Accelerator for Robotic Localization”. In: *IEEE Transactions on Computers* 72.7 (July 2023), pp. 1943–1957. ISSN: 1557-9956. DOI: 10.1109/TC.2022.3230899.
- [9] Filipe Marinho, Paulo Viegas, and J. Correia Lopes. “SVG na Visualização de Sinópticos”. In: *XATA2006, XML: Aplicações e Tecnologias Associadas (Portalege, 9 e 10 de Fevereiro de 2006)*. Ed. by José Carlos Ramalho, J. Correia Lopes, and Alberto Simões. Universidade do Minho, 2006, pp. 99–112.
- [10] Matteo Monopoli et al. “Exploiting FPGA Dynamic Partial Reconfiguration for a Soft GPU-based System-on-Chip”. In: *2023 18th Conference on Ph.D Research in Microelectronics and Electronics (PRIME)*. June 2023, pp. 181–184. DOI: 10.1109/PRIME58259.2023.10161859.
- [11] Estelle M. Philips and Derek S. Pugh. *How to Get a PhD*. Fourth. Open University Press, 2005. ISBN: 0-335-21684-6.
- [12] Ming Tham. *Writing Research Theses or Dissertations*. University of Newcastle Upon Tyne. Available at <http://lorien.ncl.ac.uk/ming/dept/Tips/writing/thesis/thesis-intro.htm>. 2001.

- 2 [13] World Wide Web Consortium. *W3C — About SVG*. <http://www.w3.org/TR/SVG/intro.html/>. 2005.
- 4 [14] World Wide Web Consortium. *W3C — SVG Specification*. Available at <http://www.w3.org/TR/SVG11/>. 2005.
- 6 [15] Yifan Zhang et al. *CARMA: Context-Aware Runtime Reconfiguration for Energy-Efficient Sensor Fusion*. arXiv:2306.15748 [cs]. June 2023. DOI: [10 . 48550 / arXiv . 2306 . 15748](https://doi.org/10.48550/arXiv.2306.15748). URL: <http://arxiv.org/abs/2306.15748>.
- 8 [16] Debora J. Zukowski et al. “Metis: A Thin-Client Application Framework”. In: *Proceedings of the Third Conference on Object-Oriented Technologies and Systems* (1997), pp. 103–114.

# Appendix A

## 2 Lorem Ipsum

After the conclusions and bibliographical references, the text used to complete the dissertation is  
4 presented in this numbered annex.

### A.1 What is *Lorem Ipsum*?

6 *Lorem Ipsum* is simply dummy text of the printing and typesetting industry. Lorem Ipsum has  
been the industry's standard dummy text ever since the 1500s, when an unknown printer took  
8 a galley of type and scrambled it to make a type specimen book. It has survived not only five  
centuries, but also the leap into electronic typesetting, remaining essentially unchanged. It was  
10 popularised in the 1960s with the release of Letraset sheets containing Lorem Ipsum passages,  
and more recently with desktop publishing software like Aldus PageMaker including versions of  
12 Lorem Ipsum [7].

### A.2 Where does *Lorem* come from?

14 Contrary to popular belief, Lorem Ipsum is not simply random text. It has roots in a piece of  
classical Latin literature from 45 BC, making it over 2000 years old. Richard McClintock, a Latin  
16 professor at Hampden-Sydney College in Virginia, looked up one of the more obscure Latin words,  
consectetur, from a Lorem Ipsum passage, and going through the cites of the word in classical  
18 literature, discovered the undoubtable source. Lorem Ipsum comes from sections 1.10.32 and  
1.10.33 of “de Finibus Bonorum et Malorum” (The Extremes of Good and Evil) by Cicero, written  
20 in 45 BC. This book is a treatise on the theory of ethics, very popular during the Renaissance. The  
first line of Lorem Ipsum, “Lorem ipsum dolor sit amet. . .”, comes from a line in section 1.10.32.

22 The standard chunk of Lorem Ipsum used since the 1500s is reproduced below for those inter-  
ested. Sections 1.10.32 and 1.10.33 from “de Finibus Bonorum et Malorum” by Cicero are also  
24 reproduced in their exact original form, accompanied by English versions from the 1914 transla-  
tion by H. Rackham.

### A.3 Why is *Lorem* used?

- 2 It is a long established fact that a reader will be distracted by the readable content of a page  
when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less normal  
4 distribution of letters, as opposed to using “Content here, content here”, making it look like read-  
able English. Many desktop publishing packages and web page editors now use Lorem Ipsum  
6 as their default model text, and a search for “lorem ipsum” will uncover many web sites still in  
their infancy. Various versions have evolved over the years, sometimes by accident, sometimes on  
8 purpose (injected humour and the like).

### A.4 Where can you find examples?

- 10 There are many variations of passages of Lorem Ipsum available, but the majority have suffered  
alteration in some form, by injected humour, or randomised words which don’t look even slightly  
12 believable. If you are going to use a passage of Lorem Ipsum, you need to be sure there isn’t any-  
thing embarrassing hidden in the middle of text. All the Lorem Ipsum generators on the Internet  
14 tend to repeat predefined chunks as necessary, making this the first true generator on the Internet.  
It uses a dictionary of over 200 Latin words, combined with a handful of model sentence struc-  
16 tures, to generate Lorem Ipsum which looks reasonable. The generated Lorem Ipsum is therefore  
always free from repetition, injected humour, or non-characteristic words etc.