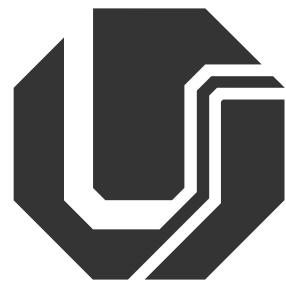


FEDERAL UNIVERSITY OF UBERLÂNDIA  
FACULTY OF ELECTRICAL ENGINEERING  
UNDERGRADUATE PROGRAM IN BIOMEDICAL ENGINEERING



AUTHOR

TITLE

UBERLÂNDIA, MG

2026

AUTHOR

TITLE

... presented to the Faculty of Electrical Engineering of the Federal University of Uberlândia as partial requirement for obtaining the degree of ... in Biomedical Engineering.

**Area:** Area

**Supervision:** Supervisor

UBERLÂNDIA, MG

2026

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## **Ata da Defesa**



## ACKNOWLEDGEMENTS

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## ABSTRACT

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**Keywords:** Keyword 1; Keyword 2; Keyword 3; Keyword 4; Keyword 5.

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# List of Abbreviations and Acronyms

**ApEn** Approximate Entropy

**IMU** Inertial Measurement Unit

**IPMDS** International Parkinson and Movement Disorder Society

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# Introduction

## 1.1 Problem formulation

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## 1.2 Relevance of the thesis

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### 1.3 The object of the research

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### 1.4 The aim of the thesis

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### 1.5 The objectives of the thesis

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## 1.6 Research methodology

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## 1.7 Scientific novelty of the thesis

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## 1.8 Practical value of the research findings

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## 1.9 Approval of the research findings

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## 1.10 Structure of the dissertation

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## Materials and Methods

### 2.1 Listed Items

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### 2.2 Numbered Items

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### 2.3 Nested enumeration numbering

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## 2.4 Equations

Approximate Entropy (ApEn) is described in Equation 2.1. Another example of an equation in L<sup>A</sup>T<sub>E</sub>X is Equation 2.2.

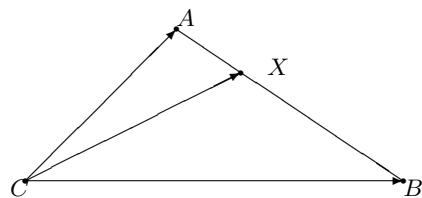
$$ApEn(m, r, N) = \begin{cases} \phi^m(r) - \phi^{m+1}(r), & \forall m \leq 0 \\ -\phi^1(r), & m = 0 \end{cases}, \quad (2.1)$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}. \quad (2.2)$$

L<sup>A</sup>T<sub>E</sub>X provides a wide range of symbols for mathematical notation, including Greek letters (Table 2.1), operators (Table 2.2), and special characters. These symbols are typically used within **math mode**, which can be activated using dollar signs (\$ ... \$) for inline expressions or double dollar signs (\$\$ ... \$\$) or environments like \[ ... \] for displayed equations.

## 2.5 Pictures

You can create geometric representations in L<sup>A</sup>T<sub>E</sub>X.



## 2.6 Code

You can insert scripts into your text.

Symbol	Command	Symbol	Command
$\alpha$	<code>\alpha</code>	$\beta$	<code>\beta</code>
$\gamma$	<code>\gamma</code>	$\delta$	<code>\delta</code>
$\epsilon$	<code>\epsilon</code>	$\zeta$	<code>\zeta</code>
$\eta$	<code>\eta</code>	$\theta$	<code>\theta</code>
$\iota$	<code>\iota</code>	$\kappa$	<code>\kappa</code>
$\lambda$	<code>\lambda</code>	$\mu$	<code>\mu</code>
$\nu$	<code>\nu</code>	$\xi$	<code>\xi</code>
$\o$ (omicron)	<code>\$o\$</code>	$\pi$	<code>\pi</code>
$\rho$	<code>\rho</code>	$\sigma$	<code>\sigma</code>
$\tau$	<code>\tau</code>	$\upsilon$	<code>\upsilon</code>
$\phi$	<code>\phi</code>	$\chi$	<code>\chi</code>
$\psi$	<code>\psi</code>	$\omega$	<code>\omega</code>
$\Gamma$	<code>\Gamma</code>	$\Delta$	<code>\Delta</code>
$\Theta$	<code>\Theta</code>	$\Lambda$	<code>\Lambda</code>
$\Xi$	<code>\Xi</code>	$\Pi$	<code>\Pi</code>
$\Sigma$	<code>\Sigma</code>	$\Upsilon$	<code>\Upsilon</code>
$\Phi$	<code>\Phi</code>	$\Psi$	<code>\Psi</code>
$\Omega$	<code>\Omega</code>		

Table 2.1 – Greek letters and their corresponding L<sup>A</sup>T<sub>E</sub>X commands.

### 2.6.1 R

The code below illustrates a code snippet in the R language (1).

```

1 # loading R package
2 library(ggplot2)
3
4 # data visualization
5 ggplot(mpg, aes(displ, hwy, colour = class)) +
6   geom_point()

```

### 2.6.2 Python

```

1 # libraries:
2 import numpy as np
3 import pandas as pd
4 import matplotlib.pyplot as plt
5 # creating the variables:
6 x = np.linspace(0,100)
7 y = x**2
8 # plotting

```

Symbol	Command	Symbol	Command
$\times$	<code>\times</code>	$\div$	<code>\div</code>
$\pm$	<code>\pm</code>	$\mp$	<code>\mp</code>
$\cdot$	<code>\cdot</code>	$*$	<code>\ast</code>
$\leq$	<code>\leq</code>	$\geq$	<code>\geq</code>
$\neq$	<code>\neq</code>	$\approx$	<code>\approx</code>
$\equiv$	<code>\equiv</code>	$\propto$	<code>\propto</code>
$\infty$	<code>\infty</code>	$\partial$	<code>\partial</code>
$\nabla$	<code>\nabla</code>	$\forall$	<code>\forall</code>
$\exists$	<code>\exists</code>	$\nexists$	<code>\nexists</code>
$\in$	<code>\in</code>	$\notin$	<code>\notin</code>
$\subseteq$	<code>\subseteq</code>	$\supseteq$	<code>\supseteq</code>
$\subset$	<code>\subset</code>	$\supset$	<code>\supset</code>
$\cup$	<code>\cup</code>	$\cap$	<code>\cap</code>
$\Rightarrow$	<code>\Rightarrow</code>	$\Leftrightarrow$	<code>\Leftrightarrow</code>
$\uparrow$	<code>\uparrow</code>	$\downarrow$	<code>\downarrow</code>

Table 2.2 – Common mathematical symbols and their corresponding L<sup>A</sup>T<sub>E</sub>X commands.

```
9 plt.plot(x, y, '-b')
```

### 2.6.3 SQL

```
1 SELECT
2     id,
3     name ,
4     age ,
5     sex ,
6     disease
7 FROM participants
8 ORDER BY 1000;
```

### 2.6.4 C

```
1 #include <stdio.h>
2
3 int main() {
4     printf("Hello, world!\n");
5     return 0;
6 }
```

### 2.6.5 Matlab

```

1 % sampling frequency (Hz)
2 fs = 1000;
3
4 % time vector (2 seconds)
5 t = 0:1/fs:2;
6
7 % signal frequency (Hz)
8 f_signal = 10;
9
10 % sinusoidal signal
11 signal = sin(2*pi*f_signal*t);
12
13 % additive white Gaussian noise
14 noise = 0.4 * randn(size(t));
15
16 % resulting noisy signal
17 x = signal + noise;

```

## 2.7 Algorithms

Algorithm 1 is an example.

---

**Algorithm 1** An algorithm with caption

---

**Require:**  $n \geq 0$

**Ensure:**  $y = x^n$

```

 $y \leftarrow 1$ 
 $X \leftarrow x$ 
 $N \leftarrow n$ 
while  $N \neq 0$  do
    if  $N$  is even then
         $X \leftarrow X \times X$ 
         $N \leftarrow \frac{N}{2}$  ▷ This is a comment
    else if  $N$  is odd then
         $y \leftarrow y \times X$ 
         $N \leftarrow N - 1$ 
    end if
end while

```

---

## 2.8 References

This template uses the ABNT standards to present the references. You can use the number style or the author-date style.

## Results

### 3.1 Figures

Figure 3.1 illustrates an example of a L<sup>A</sup>T<sub>E</sub>X figure.

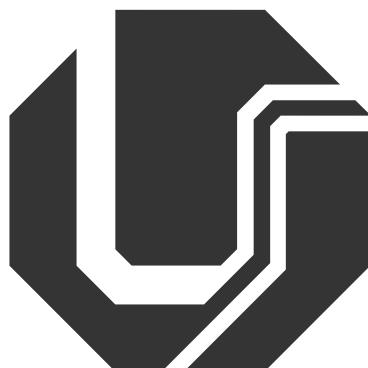
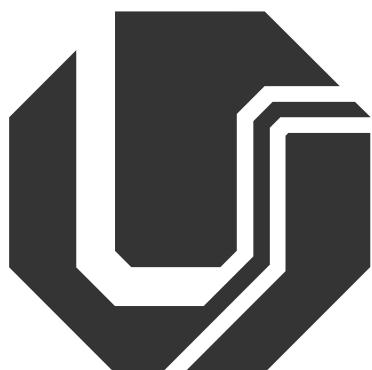
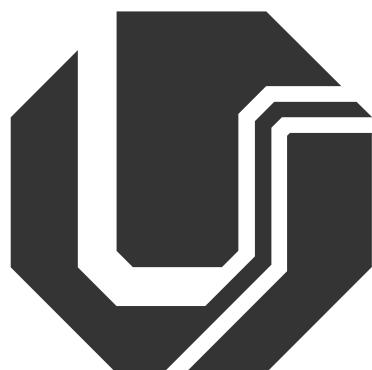


Figure 3.1 – Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

It is possible to insert several images in one figure, each one with its own reference and label, as shown in Figure 3.2. In this case, you can mention Figure 3.2a or Figure 3.2b.



(a) Caption1



(b) Caption 2

Figure 3.2 – Caption for this figure with two images.

## 3.2 Tables

Table 3.1 illustrates an example of a L<sup>A</sup>T<sub>E</sub>Xtable.

Table 3.1 – Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.

Variable 1	Variable 2	Variable 3	Variable 4
row 1 and column 1	row 1 and column 2	row 1 and column 3	row 1 and column 4
row 2 and column 1	row 2 and column 2	row 2 and column 3	row 2 and column 4

## Discussion

### 4.1 Part 1

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### 4.2 Part 2

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## Conclusion

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# References

- 1 R CORE TEAM. **R: A Language and Environment for Statistical Computing.** Vienna, Austria, 2021. Available from: <<https://www.R-project.org/>>.

# Glossary

## **Mechanoreceptor**

the specialized sensory receptors that respond to mechanical stimuli. They play a crucial role in the ability to sense and perceive touch, pressure, vibration, and other mechanical sensations.

## **Sensory receptors**

the cells specialised to respond to a particular type of external energy.

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## Supplementary Materials

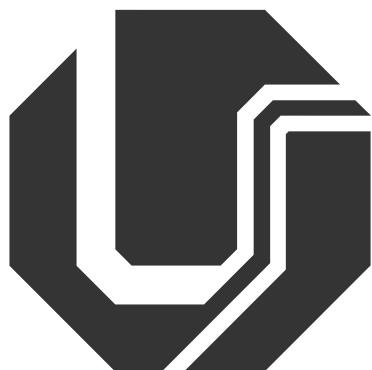


Figure A.1 – Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.