

Document Type

Title

Subtitle

Authors:

Name SURNAME, degree

Name SURNAME

Name SURNAME

Name SURNAME

Support:

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Updates

DD/MM/YYYY Author Name

- i. initial version

DD/MM/YYYY Author Name

- i. update

DD/MM/YYYY Author Name

- i. update 1
- ii. update 2
- iii. update 3

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Symbology

\mathcal{C} a class

\mathbb{R} a set

M a matrix

v a vector

Abbreviations

ANSI American National Standards Institutean abbreviation

1 Template overview

1.1 Document options

- document type:
 - “accept”
 - “article”
 - “book”
 - “handout”
 - “hh”
 - “letter”
 - “notes”
 - “poster”
 - “record”
 - “report” (default)
 - “slides”
 - “thesis”
- language:
 - “english”
 - “portuguese” (default)
- font size:
 - “10pt”
 - “11pt” (default)
 - “12pt”
- color:
 - “colorful” (default)
 - “grayscale”

1.2 Title items

- `\type{<the document type name>}`
- `\title{<the title>}`
- `\subtitle{<the subtitle>}`
- `\author[<position>]{<name>}{<surname>}`
- `\advisor[<position>]{<name>}{<surname>}`
- `\partner{<name>}{<figure>}`
- `\support{<name>}{<figure>}`
- `\date{<the date>}`
- `\local{<the local>}`

1.3 Document items

- `\copyrights{<the copyrights text>}`
- `\abstract{<the abstract text>}`
- `\ack{<the extra acknowledgement text>}`
- `\bib{<the bib-file name>}`
- `\update{<the date>}{<the author name>}{
 \item <the update 1 brief description>
 \item <the update 2 brief description>
 ...}`
- `\symbols{
 $<symbol>$ & <meaning>\\
 $<symbol>$ & <meaning>\\
 ...}`
- `\abbreviations{
 <abbreviation> & <meaning>\\
 <abbreviation> & <meaning>\\
 ...}`

1.4 Options for cleaning up document

- “nobackpage” for back page removal;
- “nosummary” for summary page removal;
- “nocopyright” for copyright text removal;
- “nouupdate” for update history section removal;
- “noindex” for remissive index section removal;
- “lean” for blank pages removal;
- “nofiglist” for list of figures removal;
- “notablist” for list of tables removal.

2 LaTeX elements

2.1 Sectioning

- `\chapter{<chapter name>}`
- `\section{<section name>}`
- `\subsection{<subsection name>}`
- `\subsubsection{<subsubsection name>}`
- `\paragraph{<paragraph name>}`

2.2 List Structures

2.2.1 Enumeration

The \LaTeX code

```
\begin{enumerate}
  \item first
  \begin{enumerate}
    \item first first
    \begin{enumerate}
      \item first first first
    \end{enumerate}
  \end{enumerate}
\end{enumerate}
\item second
\end{enumerate}
```

results in

- i. first
 - a. first first
 - 1. first first first
- ii. second

2.2.2 Description

The \LaTeX code

```
\begin{description}  
  \item [item] description  
  \item [item] description  
\end{description}
```

results in

item description

item description

2.2.3 Itemization

The \LaTeX code

```
\begin{itemize}  
  \item item  
  \begin{itemize}  
    \item subitem  
    \begin{itemize}  
      \item subsubitem  
    \end{itemize}  
  \end{itemize}  
\end{itemize}  
\item item  
\end{itemize}
```

results in

- item
 - subitem
 - subsubitem
- item

2.3 Theorems and proofs

2.3.1 Definition

The \LaTeX code

```
\begin{definition}[something]
  This is the definition of something.
\end{definition}
```

results in

Definition 1 (something). *This is the definition of something.*

2.3.2 Theorem

The \LaTeX code

```
\begin{theorem}[someone]
  This is the statement of someone's theorem.
\end{theorem}
\begin{proof}
  This is the proof of someone's theorem.
\end{proof}
```

results in

Theorem 1 (someone). *This is the statement of someone's theorem.*

Proof. This is the proof of someone's theorem. □

2.3.3 Lemma

The \LaTeX code

```
\begin{lemma}[someone]
  This is the statement of someone's lemma.
\end{lemma}
\begin{proof}
  This is the proof of someone's lemma.
\end{proof}
```

results in

Lemma 1 (someone). *This is the statement of someone's lemma.*

Proof. This is the proof of someone's lemma. □

2.3.4 Corollary

The \LaTeX code

```
\begin{corollary}[someone]
  This is the statement of someone's corollary.
\end{corollary}
```

results in

Corollary 1 (someone). *This is the statement of someone's corollary.*

2.4 Footnote

Foot notes are created with command “footnote” and they are reference by a superscripted number¹.

2.5 Equations

- use “equation” or “align” to place a numbered equation;

$$f(x) = x_1 + \frac{x_3^3}{3} + \frac{x_5^5}{5}; \tag{1}$$

- use command “nonumber” to unnumber equations;
- use command “label” to assign a label to an equation;

$$\underset{x}{\text{minimize}} \quad f(x) \tag{2}$$

$$\text{subject to} \quad g(x) \leq 0 \tag{3}$$

$$h(x) = 0 \tag{4}$$

$$x \in \mathbb{R}^n; \tag{5}$$

- use command “eqref” or “autoref” to refer to a numbered equation through its label:

Example “eqref”: (2).

Example “autoref”: [Equation 2](#).

2.6 Table

- use command “tabular” to insert a table;
- use environment “table” to support caption and references;

¹This is a foot note. It is always positioned on the bottom of the column and page where its reference occurs. Long foot notes may have more than one text line.

- use command “caption” to write a table caption;
- use command “label” to assign a label to a table;

activity	month
	1 2
first	x
after line break	
second: two lines due to width	x
third	x
fourth	x

Table 1: A table.

- use command “autoref” to refer to a table through its label:
Example “autoref”: [Table 1](#).

2.7 Text styles

Special text mode set commands, ([Table 2](#)).

code	result
<code>\qm{a quoted tex}</code>	“a quoted tex”
<code>\code{a code text}</code>	“a code text”
<code>\textit{an italic text}</code>	<i>an italic text</i>
<code>\textbf{a bold face text}</code>	a bold face text
<code>\textbackslash</code>	\
<code>\%</code>	%
<code>\\$</code>	\$
<code>\&</code>	&

Table 2: Special text set commands.

2.8 Math commands

2.8.1 Special math set commands

code	result
<code>\set{R}</code>	\mathbb{R}
<code>\class{G}</code>	\mathcal{G}
<code>\nin</code>	\notin
<code>\card{\set{S}}</code>	$ \mathbb{S} $
<code>\floor{n}</code>	$\lfloor n \rfloor$
<code>\ceil{n}</code>	$\lceil n \rceil$

Table 3: Special math set commands.

2.8.2 Special math matrix commands

code	result
<code>\T{M}</code>	M^T
<code>\inv{M}</code>	M^{-1}
<code>\invT{M}</code>	M^{-T}
<code>\diag{M}</code>	$\text{diag}(M)$

Table 4: Special math matrix commands.

2.8.3 Special math function commands

code	result
<code>\e^{\pi}</code>	e^π
<code>\gradient f</code>	∇f
<code>\hessian f</code>	$\mathcal{H}f$
<code>\mi f(x)</code>	minimize $f(x)$
<code>\ma f(x)</code>	maximize $f(x)$
<code>\sto g(x) \leq 0</code>	subject to $g(x) \leq 0$

Table 5: Special math function commands.

2.8.4 Special math vector or complex commands

	code	result
	<code>\opt{x}</code>	x^*
	<code>\conj{z}</code>	z^*
	<code>\real{z}</code>	$\text{real}(z)$
	<code>\imag{z}</code>	$\text{imag}(z)$
	<code>\abs{z}</code>	$ z $
	<code>\norm{v}</code>	$\ v\ $
	<code>\mean_i v_i</code>	$\text{mean}_i v_i$
	<code>\dsum_{i=1}^n v_i</code>	$\sum_{i=1}^n v_i$
	<code>\dprod_{i=1}^n v_i</code>	$\prod_{i=1}^n v_i$

Table 6: Special math vector or complex commands.

2.9 Figure

- use command “`includegraphics`” to insert a figure;
 - no need to use file extensions;
 - supported files: PDF, EPS, PNG and JPG (search in this order);
- use environment “`figure`” to support caption and references;
 - use command “`caption`” to write a figure caption;
 - use command “`label`” to assign a label to a figure;



Figure 1: Figure 1

- use command “`autoref`” to refer to a figure through its label:
Example: [Figure 1](#).

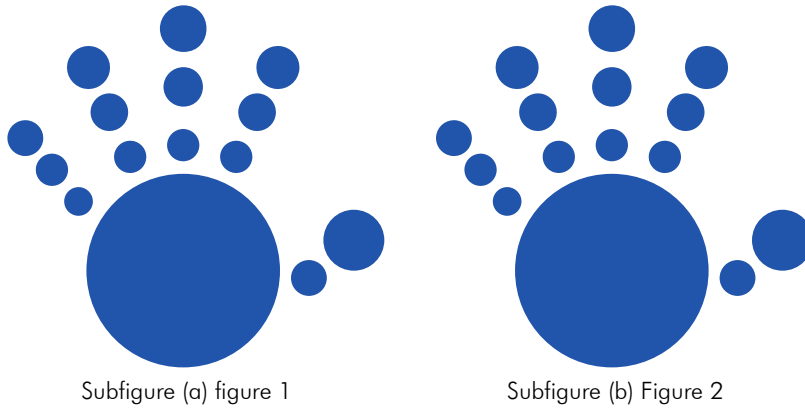


Figure 2: Figure 2

2.10 Codes

2.10.1 Python code

- use “pycode” for Python code

Writing code in \LaTeX document

```
\begin{pycode}
count = 0
while count < 5:
    print(count)
    count += 1 # comment
\end{pycode}
```

results in

```
count = 0
while count < 5:
    print(count)
    count += 1 # comment
```

2.10.2 Matlab Code

- use “mcode” for MATLAB code listings

Writing code in \LaTeX document

```
\begin{mcode}
function y = average(x)
    if ~isvector(x)
        error('Input must be a vector')
    end
    y = sum(x)/length(x);
end
\end{mcode}
```

results in

```
function y = average(x)
if ~isvector(x)
    error('Input must be a vector')
end
y = sum(x)/length(x);
end
```

2.11 Algorithm

- environments:
 - use “algorithm” to encapsulate input, output and code;
 - use “algorithmic” to encapsulate code.
- commands:
 - use “State” to start a new algorithm line;
 - use “Comment” to place a line comment;
 - use “gets” for attributions.
- keywords:
 - “For”, “EndFor”;
 - “If”, “Else”, “EndIf”;
 - “Return”, “Break”; “Continue”.

The \LaTeX code

```
\begin{algorithm}
\caption{Evaluation of sinus of a sum.}
\label{alg.Sinus}
\algorithminput{\$a\$ & first part \ \ \$b\$ & second part\ \}
\algorithmoutput{\$s\$ & sum of the two parts \ \ \$t\$ & sinus of the sum\ \}
\begin{algorithmic}[1]
\State \$s \gets a + b\$ \Comment{sum of input arguments}
\State \$t \gets 0\$
\For{\$i = 1, 2\dots\$}
\State \$t \gets t + (-1)^{i+1}\frac{s^{2i-1}}{(2i-1)!}$ \Comment{Taylor series for
sinus}
\EndFor
\State \Return \$s\$ and \$t\$
\end{algorithmic}
\end{algorithm}
```

results in

Algorithm 1 Evaluation of sinus of a sum.

Input

a first part
 b second part

Output

s sum of the two parts

t sinus of the sum

1: $s \leftarrow a + b$

▷ sum of input arguments

2: $t \leftarrow 0$

3: **for** $i = 1, 2, \dots$ **do**

4: $t \leftarrow t + (-1)^{i+1} \frac{s^{2i-1}}{(2i-1)!}$

▷ Taylor series for sinus

5: **end for**

6: **return** s and t

2.12 Page orientation

This is a page in landscape. The code for this is:

```
\begin{landscape}  
  \subsection{Page orientation}  
  This is a page in landscape. The code for this is:  
\end{landscape}
```

2.13 Bibliography

- use command “bib” in preamble to specify bib-file;
- use command “cite” to cite a reference as their authors;
Surname and Surname, 2017a.
Surname and Surname, 2017b.
- use command “citet” to cite a reference as a bracket;
[Surname and Surname, 2017a].
[Surname and Surname, 2017b].
- separate adjacent citations by commas;
[Surname and Surname, 2017a,b].

References

Surname, N. and Surname, N. (2017a). An article title. *The Journal*, pages 0--10.

Surname, N. and Surname, N. (2017b). *A book title*. The Publisher.

