

The `coppe` document class

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Abstract

In this work, it is described the `coppe` document class as well as other files distributed by the COPPE \TeX project. This class is suitable for writing academic dissertations, thesis and qualifying exams according to the formatting rules of the Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering. The minimalist set of macro commands allows its users to concentrate most of their efforts on text composition rather than on the document layout.

1 Introduction

Writing documents in \LaTeX may be a laborious task when the authors have to prepare their manuscripts rigorously respecting formatting rules imposed by publishers. Regardless of difficulty, a lot of thesis presented to the Coordination of Graduate Studies and Research in Engineering of the Federal University of Rio de Janeiro (COPPE/UFRJ) is typeset in \LaTeX . This demand motivated the creation of the COPPE \TeX project, which tries to facilitate and encourage the use of \LaTeX within the COPPE/UFRJ scope.

The `coppe` document class is the main product of COPPE \TeX . It was designed to be clear and succinct. It enables the creation of dissertations, qualifying exams and thesis in a simple and automatic way. The main goal of the `coppe` class is to maintain authors strictly focused on text composition without worrying about margins sizes, line spacing, paper size, vertical and horizontal alignment, etc. The COPPE \TeX project comprehends also BIB \TeX and MakeIndex style files for creating lists of references, symbols and abbreviations. Although there aren't official guidelines to write qualifying exams, we provide this option just for convenience, as this exam is a requisite to obtain the DSc degree.

In which follows, it is described the user interface of the `coppe` class. Some details about using the style files cited above are also given. We use the term *thesis* to generally refer to dissertation, qualifying exam, and thesis itself.

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3 Support

We maintain a mailing list where users can send questions, comments, and bugs to. More details can be found at <http://coppetex.sourceforge.net/mailling-list.html>.

4 User interface

`\frontmatter` A thesis to be approved by the Academic Registry at COPPE/UFRJ must contain three-parts: *front*, *main* and *back* matters [1]. Each one of these parts is started by calling its corresponding macro `\frontmatter`, `\mainmatter` or `\backmatter`. The front matter of a thesis consists of front cover and face, cataloging page, dedication, acknowledgments, abstracts, table of contents, and lists of tables, algorithms, symbols and abbreviations. The main matter is just composed by chapters, while the back matter usually consists of bibliographic references, appendices and index.

You must invoke the `\frontmatter` macro immediately after the `\maketitle` one. The `\mainmatter` command comes right before the first chapter, and `\backmatter` must be typed before the list of references.

Front cover

This element was recently introduced by the Academic Registry. It is automatically constructed by the `\maketitle` command.

Front face

The front face is unnumbered. There, it is not allowed to use hyphenation [1]. It is constructed by calling `\maketitle`. Next, it is described the commands used to enter the information required to create it.

`\author` The `\author` command was redefined. Here, it takes two arguments: the author's first names and surname, e.g., `\author{First Names}{Surname}`. The words should be typed with only first letters in uppercase.

`\title` The macros `\title` and `\foreigntitle` are used to enter the titles of your monograph in the current and foreign languages. The default languages are Brazilian Portuguese and English. The `babel` package is automatically loaded by `coppe.cls`, so you do not need to load it again. The Brazilian Portuguese is the main language and the English is only required for the foreign abstract.

`\foreigntitle`

`\advisor` Every COPPE student is coordinated by at least one advisor. M.Sc. and D.Sc. students can have at most 2 and 3 advisors, respectively. Their names must be provided by issuing the command `\advisor` as below:

`\examiner`

```
\advisor{Title}{Advisor's Name}{Surname}{Degree}
\advisor{Title}{Second Advisor's Name}{Surname}{Degree}
\advisor{Title}{Third Advisor's Name}{Surname}{Degree}
```

The advisors are not necessarily members of the thesis examination board. Thus, it is required to enter the names of all examiners using the `\examiner` macro. The examiners' names are entered differently:

```

\examiner{Title}{First Examiner's Name Surname}{Degree}
\examiner{Title}{Second Examiner's Name Surname}{Degree}
...
\examiner{Title}{N-th Examiner's Name Surname}{Degree}

```

Remember that all names must be given before calling `\maketitle`.

\department The Alberto Luiz Coimbra institute is divided into 12 academic units: Biomedical Engineering (PEB), Civil Engineering (PEC), Electrical Engineering (PEE), Mechanical Engineering (PEM), Metallurgical and Materials Science Engineering (PEMM), Nuclear Engineering (PEN), Ocean Engineering (PENO), Energy Planning (PPE), Production Engineering (PEP), Chemical Engineering (PEQ), Systems Engineering and Computer Science (PESC), and Transportation Engineering (PET). You must specify your department using one of the above abbreviations, e.g., `\department{PEC}`.

\date This macro is used to set the month and year of defense. This information is required to create the front face, cataloging details page and abstracts. For example, October 2007 should be entered as `\date{10}{2007}`.

\keyword The keywords should describe the concentration areas of your work. You must provide them as follows:

```

\keyword{First Keyword}
\keyword{Second Keyword}
...
\keyword{N-th Keyword}

```

Usually, six words are enough.

Cataloging details

This page contains cataloging information useful for librarians. Fortunately, it is automatically generated from the data you entered at the time you call `\maketitle`. It is not needed in qualifying exams, though.

Dedication (optional)

\dedication This macro was added for convenience. The input text is placed at the right bottom of a blank page. It is emphasized and in normal size.

Abstracts

abstract As stated by the Academic Registry [1], abstracts must be in one page each. Still,
foreignabstract it is recommended that they should be only one paragraph long. They must be defined inside the environments `abstract` and `foreignabstract`.

Lists of symbols and abbreviations (optional)

\abbrev The lists of symbols and abbreviations are optional, although highly recommended.
\syml It is a good practice to define a symbol/abbreviation in its first occurrence in the text. To define a symbol use `\syml{Symbol}{Symbol Definition}`, and for abbreviations `\abbrev{Abbreviation}{Abbreviation Definition}`. These

```

\makeloabbreviations
\makelosymbols
\printloabbreviations
\printlosymbols

```

commands are called *dummy*, since they don't output anything at the place they are executed, just an entry in the correspondent list.

These lists are lexicographically sorted by using the MakeIndex program, which is part of any L^AT_EX implementation. MakeIndex needs two commands to create a final sorted list: one which generates a list of entries and the other that indicates the position where the list will be printed out. To generate the lists of symbols and abbreviations, the `coppe` class provides the commands `\makeloabbreviations` and `\makelosymbols`, respectively. They must be called in the document preamble. The commands `\printlosymbols` and `\printloabbreviations` have to be invoked at the point where you want these lists appear, e.g., following the list of tables as showed in the example. Once you call `latex`, it will be created two files with extensions `abx` and `syx`, which contain MakeIndex input data. They must be processed with `makeindex` in order to get the lists correctly produced, redirecting the output to files with extension `lab` and `los` respectively:

```

makeindex -s coppe.ist -o example.lab example.abx
makeindex -s coppe.ist -o example.los example.syx

```

Note the `-s` option for specifying the style `coppe.ist`. Now, rerun `latex` twice to get the references solved and you are done.

References

It is well known that bibliography databases can be easily maintained with the aid of B^IB^T_EX. Thus, the COPPE_T_EX project designed two B^IB^T_EX styles, `coppe-plain.bst` and `coppe-unsrt.bst`. The `coppe-plain.bst` creates a list of references alphabetically sorted. The later is a numbered style, which sorts references by the order of citation. To use them, you have to select either `coppe-plain` or `coppe-unsrt` as the B^IB^T_EX style and include your B^IB^T_EX references without the `bib` extension, as in the following example:

```

\bibliographystyle{coppe-unsrt}
\bibliography{example}

```

Run in sequence L^AT_EX, B^IB^T_EX, and twice again L^AT_EX to resolve reference. These styles are `natbib` compatible. This means that you can freely issue the commands `\citet` and `\citep`, as well as any other `natbib` feature.

5 Class options

There are some options users can specify in order to customize the appearance of the output produced by the `coppe` class. These options can be passed to `coppe` as follows: `\documentclass[option1, option2]{coppe}`. In which follows, we give a brief description of all supported options.

dsc, msc, dscexam The `coppe` class is able to produce thesis, dissertations, and qualifying exams, which are enabled by the `dsc`, `msc`, and `dscexam` options, respectively.

pdftex, dvips Since the addition of a front cover with Minerva's picture, it is required to use a package to enable graphics inclusion. This requires the specification of a graphical driver for handling image files. You may choose between two standard graphical drivers, **pdftex** and **dvips**, just passing its name as a class option. Because the PDF is the leading format for publishing digital documents, COPPE_{TEX} loads the **pdftex** driver by default.

doublespacing The default line spacing is one-and-a-half. For enabling double spacing between lines, use the **doublespacing** option.

numbers The default citation style is the author-year scheme, which must be followed by the use of its corresponding BIB_{TEX} style, namely, the **coppe-plain.bst** file. For numbered citations, specify the option **numbers** to the **coppe** class. In this case, it is mandatory the use of **coppe-unsrt.bst**, as the bibliography style.

6 Quick, useful tips

Pictures. The default picture format of L^AT_EX is the Encapsulated PostScript (EPS). If you use pdf_{TEX}, the default format becomes the PDF, but you can equally load PNG files. For such, you must enter the name of your image file without extension, e.g., `\includegraphics{filename}`, and **pdftex** will firstly look for a file called **filename.pdf** and after for file **filename.png**.

Fonts. The default font in L^AT_EX is the Computer Modern. If you would like to try its enhanced version, consider using the **lmodern** package. To use Times, it is recommended to load the package **mathptmx**, rather than the deprecated **times**. There is also an enhanced Times version available with the **tgtermes** package. You can still use the Arial font face with the package **uarial**. Before including these packages you should call `\usepackage[T1]{fontenc}`. This command will tell L^AT_EX to use high-quality PostScript Type1 fonts.

Hyperref. When working with PDF's, there is the possibility to add extra information to the file as the author's name, document title, subject, keywords, etc. This is easily done with the **hyperref** package. It is also useful to enable hyperlinks. Fortunately, the **coppe** class loads **hyperref** by default and fills in all the document properties for you.

Printing. To get your work correctly printed, you must ensure that any page scaling option (e.g., fit or shrink to printable area) isn't enabled. This kind of option often comes in print dialogs of document visualization softwares.

7 A simple example

```
1 \documentclass[dsc,pdftex,numbers]{coppe}
2 \usepackage[T1]{fontenc}
3 \usepackage{amsmath,amssymb}
4 \usepackage{lmodern}
```

```

6
7 \makelosymbols
8 \makeloabbreviations
9
10 \begin{document}
11 \title{T\'itulo da Tese}
12 \foreigntitle{Thesis Title}
13 \author{Nome do Autor}{Sobrenome}
14 \advisor{Prof.}{Nome do Primeiro Orientador}{Sobrenome}{D.Sc.}
15 \advisor{Prof.}{Nome do Segundo Orientador}{Sobrenome}{Ph.D.}
16 \advisor{Prof.}{Nome do Terceiro Orientador}{Sobrenome}{D.Sc.}
17
18 \examiner{Prof.}{Nome do Primeiro Examinador Sobrenome}{D.Sc.}
19 \examiner{Prof.}{Nome do Segundo Examinador Sobrenome}{Ph.D.}
20 \examiner{Prof.}{Nome do Terceiro Examinador Sobrenome}{D.Sc.}
21 \examiner{Prof.}{Nome do Quarto Examinador Sobrenome}{Ph.D.}
22 \examiner{Prof.}{Nome do Quinto Examinador Sobrenome}{Ph.D.}
23 \department{PEC}
24 \date{10}{2009}
25
26 \keyword{Primeira palavra-chave}
27 \keyword{Segunda palavra-chave}
28 \keyword{Terceira palavra-chave}
29
30 \maketitle
31
32 \frontmatter
33 \dedication{A algu\'em cujo valor \'e digno desta dedicat\'oria.}
34
35 \chapter*{Agradecimentos}
36
37 Gostaria de agradecer a todos.
38
39 \begin{abstract}
40
41 Apresenta-se, nesta tese, ...
42
43 \end{abstract}
44
45 \begin{foreignabstract}
46
47 In this work, we present ...
48
49 \end{foreignabstract}
50
51 \tableofcontents
52 \listoffigures
53 \listoftables
54 \printlosymbols
55 \printloabbreviations
56
57 \mainmatter
58 \chapter{Introdu{\c c}\~ao}
59

```

```

60 Segundo a norma de formata{\c c}\~ao de teses e disserta{\c c}\~oes do Instituto Alberto
61 Luiz Coimbra de P\os-gradua{\c c}\~ao e Pesquisa de Engenharia (COPPE), toda
62 abreviatura deve ser definida antes de utilizada.\abbrev{COPPE}{Instituto
63 Alberto Luiz Coimbra de P\os-gradua{\c c}\~ao e Pesquisa de Engenharia}
64
65 Do mesmo modo, \e imprescind\ivel definir os s\imbolos, tal como o conjunto dos
66 n\umeros reais $\mathbb{R}$ e o conjunto vazio $\emptyset$.
67 \symlbl{$\mathbb{R}$}{Conjunto dos n\umeros reais} \symlbl{$\emptyset$}{Conjunto
68 vazio}
69
70 \chapter{Revis\~ao Bibliogr\afica}
71
72 Para ilustrar a completa ades\~ao ao estilo de cita{\c c}\~oes e listagem de
73 refer\^encias bibliogr\aficas, a Tabela~\ref{tab:citation} apresenta cita{\c c}\~oes
74 de alguns dos trabalhos contidos na norma fornecida pela CPGP da COPPE,
75 utilizando o estilo num\erico.
76
77 \begin{table}[h]
78 \caption{Exemplos de cita{\c c}\~oes utilizando o comando padr\~ao
79 \texttt{\textbackslash cite} do \LaTeX e
80 o comando \texttt{\textbackslash citet},
81 definidos pelo pacote \texttt{natbib}.}
82 \label{tab:citation}
83 \centering
84 {\footnotesize
85 \begin{tabular}{|c|c|c|}
86 \hline
87 Tipo da Publica{\c c}\~ao & \verb|\cite| & \verb|\citet|\\
88 \hline
89 Livro & \cite{book-example} & \citet{book-example}\\
90 Artigo & \cite{article-example} & \citet{article-example}\\
91 Relat\oriorio & \cite{techreport-example} & \citet{techreport-example}\\
92 Relat\oriorio & \cite{techreport-exampleIn} & \citet{techreport-exampleIn}\\
93 Anais de Congresso & \cite{inproceedings-example} &
94 \citet{inproceedings-example}\\
95 S\eries & \cite{incollection-example} & \citet{incollection-example}\\
96 Em Livro & \cite{inbook-example} & \citet{inbook-example}\\
97 Disserta{\c c}\~ao de mestrado & \cite{mastersthesis-example} &
98 \citet{mastersthesis-example}\\
99 Tese de doutorado & \cite{phdthesis-example} & \citet{phdthesis-example}\\
100 \hline
101 \end{tabular}}
102 \end{table}
103
104 \chapter{M\etodo Proposto}
105 \chapter{Resultados e Discuss\~oes}
106 \chapter{Conclus\~oes}
107
108 \backmatter
109 \bibliographystyle{coppe-unsrt}
110 \bibliography{example}
111
112 \appendix
113 \chapter{Algumas Demonstra{\c c}\~oes}

```

```

114 \end{document}
115 \end{example}

```

8 Implementation

8.1 The ‘coppe.cls’ file

```

116 \class
117 \def\filename{coppe.dtx}
118 \def\fileversion{v2.1.1}
119 \def\filedate{2009/11/17}
120 \NeedsTeXFormat{LaTeX2e}[1995/12/01]
121 \ProvidesClass{coppe}[\filedate\ \fileversion\ COPPE Dissertations and Thesis]
122 \LoadClass[12pt,a4paper,oneside]{book}
123 \RequirePackage[sort&compress]{natbib}
124 \RequirePackage{hyphenat}
125 \RequirePackage{lastpage}
126 \RequirePackage{hyperref}
127 \RequirePackage[english,brazil]{babel}
128 \RequirePackage{ifthen}
129 \RequirePackage{graphicx}
130 \RequirePackage{setspace}
131 \RequirePackage{tabularx}
132 \RequirePackage{eqparbox}
133 \RequirePackage[a4paper, bindingoffset=0.0cm, vcentering=true, %
134 top=2.5cm, bottom=2.5cm, left=3.0cm, right=3.0cm]{geometry}
135 \def\CoppeTeX{{\rm C}\kern-.05em{\sc o}\kern-.025em p\kern-.025em
136 p\kern-.025em e}}\kern-.08em
137 T\kern-.1667em\lower.5ex\hbox{E}\kern-.125emX\spacefactor1000}

138 \newboolean{isdraft}
139 \newboolean{maledoc}
140 \setboolean{maledoc}{false}
141 \setboolean{isdraft}{false}
142 %
143 \DeclareOption{msc}{%
144 \newcommand{\@degree}{M.Sc.}
145 \newcommand{\@degree name}{Mestrado}
146 \newcommand{\local@degname}{Mestre}
147 \newcommand{\foreign@degname}{Master}
148 \newcommand\local@doctype{Disserta{\c c}{\~ a}o}
149 \newcommand\foreign@doctype{Dissertation}
150 }
151 \DeclareOption{dsceexam}{%
152 \newcommand{\@degree}{D.Sc.}
153 \newcommand{\@degree name}{Doutorado}
154 \newcommand{\local@degname}{Doutor}
155 \newcommand{\foreign@degname}{Doctor}
156 \setboolean{maledoc}{true}
157 \newcommand\local@doctype{Exame de Qualifica{\c c}{\~ a}o}
158 \newcommand\foreign@doctype{Qualifying Exam}
159 }
160 \DeclareOption{dsc}{%
161 \newcommand{\@degree}{D.Sc.}
162 \newcommand{\@degree name}{Doutorado}

```



```

163 \newcommand{\local@degname}{Doutor}
164 \newcommand{\foreign@degname}{Doctor}
165 \newcommand{\local@doctype{Tese}
166 \newcommand{\foreign@doctype{Thesis}
167 }
168 \DeclareOption{draft}{%
169 \setboolean{isdraft}{true}
170 \ClassWarning{coppe}{draft mode is ON}%
171 }
172 \DeclareOption{numbers}{%
173 \PassOptionsToPackage{numbers}{natbib}
174 }
175 \DeclareOption{pdftex}{%
176 \PassOptionsToPackage{pdftex}{hyperref,graphicx}
177 \PassOptionsToPackage{plainpages=false,pdfpagelabels}{hyperref}
178 }
179 \DeclareOption{dvips}{%
180 \PassOptionsToPackage{dvips}{hyperref,graphicx}
181 }

```

Here is the default one-and-a-half line spacing. Users can change to double spacing by passing the `doublespacing` option.

```

182 \onehalfspacing
183 \DeclareOption{doublespacing}{%
184 \doublespacing
185 }

```

```

186 \ProcessOptions\relax

```

`\university` Set the university name.

```

187 \newcommand\university[1]{%
188 \renewcommand\local@universityname{#1}
189 }
190 %
191 % \begin{macro}{\department}
192 % This macro is used to set the author's affiliation. There are twelve options
193 % which correspond to all academic units at COPPE/UFRJ. It defines the current
194 % and the foreign names of these units.
195 % \begin{macrocode}
196 \newcommand\department[1]{%
197 \ifthenelse{equal{#1}{PEB}}{
198 {\global\def\local@deptname{Engenharia Biom{\` e}dica}
199 \global\def\foreign@deptname{Biomedical Engineering}}{}
200 \ifthenelse{equal{#1}{PEC}}{
201 {\global\def\local@deptname{Engenharia Civil}
202 \global\def\foreign@deptname{Civil Engineering}}{}
203 \ifthenelse{equal{#1}{PEE}}{
204 {\global\def\local@deptname{Engenharia El{\` e}trica}
205 \global\def\foreign@deptname{Electrical Engineering}}{}
206 \ifthenelse{equal{#1}{PEM}}{
207 {\global\def\local@deptname{Engenharia Mec{\^ a}nica}
208 \global\def\foreign@deptname{Mechanical Engineering}}{}
209 \ifthenelse{equal{#1}{PEMM}}{
210 {\global\def\local@deptname{Engenharia Metal{\` u}rgica e de Materiais}
211 \global\def\foreign@deptname{Metallurgical and Materials Engineering}}{}
212 \ifthenelse{equal{#1}{PEN}}{

```

```

213     {\global\def\local@deptname{Engenharia Nuclear}
214     \global\def\foreign@deptname{Nuclear Engineering}}{}
215 \ifthenelse{equal{#1}{PEN0}}
216     {\global\def\local@deptname{Engenharia Oce{\~ a}nica}
217     \global\def\foreign@deptname{Ocean Engineering}}{}
218 \ifthenelse{equal{#1}{PPE}}
219     {\global\def\local@deptname{Planejamento Energ{' e}tico}
220     \global\def\foreign@deptname{Energy Planning}}{}
221 \ifthenelse{equal{#1}{PEP}}
222     {\global\def\local@deptname{Engenharia de Produ{\c c}{\~ a}o}
223     \global\def\foreign@deptname{Production Engineering}}{}
224 \ifthenelse{equal{#1}{PEQ}}
225     {\global\def\local@deptname{Engenharia Qu{\ ' i}mica}
226     \global\def\foreign@deptname{Chemical Engineering}}{}
227 \ifthenelse{equal{#1}{PESC}}
228     {\global\def\local@deptname{Engenharia de Sistemas e Computa{\c c}{\~ a}o}
229     \global\def\foreign@deptname{Systems Engineering and Computer Science}}{}
230 \ifthenelse{equal{#1}{PET}}
231     {\global\def\local@deptname{Engenharia de Transportes}
232     \global\def\foreign@deptname{Transportation Engineering}}{}
233 }

\title Used to enter the foreign title.
234 \renewcommand\title[1]{%
235     \global\def\local@title{#1}%
236 }

\foreigntitle Used to enter the foreign title.
237 \newcommand\foreigntitle[1]{%
238     \global\def\foreign@title{#1}%
239 }

\advisor Defines globally the title, name and academic degree of the advisor.
240 \newcount\@advisor\@advisor0
241 \newcommand\advisor[4]{%
242     \global\@namedef{CoppeAdvisorTitle:\expandafter\the\@advisor}{#1}
243     \global\@namedef{CoppeAdvisorName:\expandafter\the\@advisor}{#2}
244     \global\@namedef{CoppeAdvisorSurname:\expandafter\the\@advisor}{#3}
245     \global\@namedef{CoppeAdvisorDegree:\expandafter\the\@advisor}{#4}
246     \global\advance\@advisor by 1
247     \ifnum\@advisor>1
248         \renewcommand\local@advisorstring{Orientadores}
249         \renewcommand\foreign@advisorstring{Advisors}
250     \fi
251 }

\examiner
252 \newcount\@examiner\@examiner0
253 \newcommand\examiner[3]{%
254     \global\@namedef{CoppeExaminer:\expandafter\the\@examiner}{#1\ #2, #3}
255     \global\advance\@examiner by 1
256 }

```

`\author` It was redefined to allow the identification of the author's first names and surname.

```
257 \renewcommand\author[2]{%
258   \global\def\@authname{#1}
259   \global\def\@authsurn{#2}
260 }
```

`\date` This code enables makes easy to switch from dates in different languages.

```
261 \renewcommand\date[2]{%
262   \month=#1
263   \year=#2
264 }
```

`\local@monthname`

```
265 \newcommand\local@monthname{\ifcase\month\or
266   Janeiro\or Fevereiro\or Mar{\c c}o\or Abril\or Maio\or Junho\or
267   Julho\or Agosto\or Setembro\or Outubro\or Novembro\or Dezembro\fi}
```

`\foreign@monthname`

```
268 \newcommand\foreign@monthname{\ifcase\month\or
269   January\or February\or March\or April\or May\or June\or
270   July\or August\or September\or October\or November\or December\fi}
```

`\place` Used to enter the place of defense.

```
271 \newcommand\place[3]{%
272   \renewcommand\local@cityname{#1}
273   \renewcommand\local@statename{#2}
274   \renewcommand\local@countryname{#3}
275 }
```

`\keyword`

```
276 \newcounter{keywords}
277 \newcommand\keyword[1]{%
278   \global\@namedef{CoppeKeyword:\expandafter\the\c@keywords}{#1}
279   \global\addtocounter{keywords}{1}
280 }
```

`\frontmatter` The number of pages for both frontmatter and mainmatter printed in the cataloging details page is computed by means of simple L^AT_EX labels.

```
281 \renewcommand\frontmatter{%
282   \cleardoublepage
283   \@mainmatterfalse
284   \pagenumbering{roman}
285   \thispagestyle{empty}
286   \setcounter{page}{2}
287   \makefrontpage
288   \clearpage
289   \pagestyle{plain}
290   \ifthenelse{\boolean{maledoc}}{\}{\makecatalog}%
291 }
```

`\mainmatter`

```
292 \renewcommand\mainmatter{%
293   \immediate\write\@auxout{%
```

```

294     \string\newlabel{front:pageno}{\Roman{page}}{\page.\roman{page}}{}}
295 \cleardoublepage
296 \@mainmattertrue
297 \pagestyle{plain}
298 \pagenumbering{arabic}}

\backmatter

299 \renewcommand\backmatter{%
300   \if@openright
301     \cleardoublepage
302   \else
303     \clearpage
304   \fi}
305 %

\maketitle

306 \renewcommand\maketitle{%
307   \pagenumbering{alph}
308   \config@hypersetup
309   \begin{titlepage}
310     \begin{flushleft}
311       \setlength\baselineskip{0pt}
312       \setlength\parskip{1mm}
313       \makebox[20mm][c]{\includegraphics{minerva}}\par
314       \makebox[20mm][c]{\bf\sf\small COPPE/UFRJ}
315     \end{flushleft}
316     \begin{center}
317       \nohyphens{\MakeUppercase\local@title}\par
318       \vspace*{28mm}
319       \nohyphens{\@authname\ \@authsurn}\par
320     \end{center}
321     \vspace*{16mm}
322     \begin{flushright}
323       \begin{minipage}{80mm}
324         \frontcover@maintext
325       \end{minipage}\par
326       \vspace*{7.5mm}
327       \nohyphens{%
328         \begin{tabularx}{80mm}[b]{@{}l@{ }X@{}}
329           \local@advisorstring: &
330           \count1=0
331           \toks@={
332             \@whilenum \count1<\@advisor \do{%
333               \ifcase\count1 % same as \ifnum0=\count1
334                 \toks@=\expandafter{\csname CoppeAdvisorName:\the\count1%
335                   \expandafter\endcsname\expandafter\space%
336                   \csname CoppeAdvisorSurname:\the\count1\endcsname\\}
337               \else
338                 \toks@=\expandafter\expandafter\expandafter{%
339                   \expandafter\the\expandafter\toks@%
340                   \expandafter&\expandafter\space%
341                   \csname CoppeAdvisorName:\the\count1\expandafter\endcsname%
342                   \expandafter\space\csname CoppeAdvisorSurname:\the\count1\endcsname\\
343                 }%

```

```

344 \fi
345 \advance\count1 by 1}
346 \the\toks@
347 \end{tabularx}}\par
348 \end{flushright}
349 \vspace*{\fill}
350 \begin{center}
351 \local@cityname\par
352 \local@monthname\ de \number\year
353 \end{center}
354 \end{titlepage}
355 \global\let\maketitle\relax%
356 \global\let\and\relax}

357 \newcommand\makefrontpage{%
358 \begin{center}
359 \sloppy\nohyphens{\MakeUppercase\local@title}\par
360 \vspace*{7mm}
361 {\@authname\ \@authsur}\par
362 \end{center}\par
363 \vspace*{4mm}
364 \frontpage@maintext
365 \vspace*{8mm}
366 \noindent\local@approvedname:\par
367 \begin{center}
368 \begin{flushright}
369 \count1=0
370 \@whilenum \count1<\@examiner \do {
371 \vskip26\p@ \baselineskip12pt
372 \eqparbox{signature@list}{\hrulefill}\
373 \eqparbox{signature@list}{\protect\centering%
374 \ \ \ \csname CoppeExaminer:\the\count1 \endcsname\ \ \ }}\
375 \advance\count1 by 1}
376 \end{flushright}
377 \end{center}
378 \vspace*{\fill}
379 \frontpage@bottomtext}

380 \newcommand\config@hypersetup{%
381 \begin{group
382 % changes to \toks@ and \count@ are kept local;
383 % it's not necessary for them, but it is usually the case
384 % for \count1, because the first ten counters are written
385 % to the DVI file, thus you got lucky because of PDF output
386 \toks@={}% in this special case not necessary
387 \count@=0 %
388 \@whilenum\count@<\value{keywords}\do{%
389 % * a keyword separator is not necessary,
390 % if there is just one keyword
391 % * \csname CoppeKeyword:\the\count@\endcsname must be expanded
392 % at least once, to get rid of the loop depended \count@
393 \ifcase\count@ % same as \ifnum0=\count@
394 \toks@=\expandafter{\csname CoppeKeyword:\the\count@\endcsname}%
395 \else
396 \toks@=\expandafter\expandafter\expandafter{%

```

```

397     \expandafter\the\expandafter\toks@
398     \expandafter;\expandafter\space
399     \csname CoppeKeyword:\the\count@\endcsname
400   }%
401   \fi
402   \advance\count@ by 1 %
403 }%
404 \edef\x{\endgroup
405   \noexpand\hypersetup{%
406     pdfkeywords={\the\toks@}%
407   }%
408 }%
409 \x
410 \hypersetup{%
411   pdfauthor={\@authname\ \@authsur},
412   pdftitle={\local@title},
413   pdfsubject={\local@doctype\ de \@degree\ em \local@deptname\ da COPPE/UFRJ},
414   pdfcreator={LaTeX with CoppeTeX toolkit},
415   breaklinks={true},
416   raiseanchors={true},
417   pageanchor={true},
418 }}

```

`\makecatalog` When the document has illustrations, it is required to insert “: il;” between the number of pages of the textual part and the page dimension. We have created a label to flag the existence of lists of figures. It is checked to be undefined using the plain TeX command `\@isundefined` [7].

```

419 \newcommand\makecatalog{%
420   \vspace*{\fill}
421   \begin{center}
422     \setlength{\fboxsep}{5mm}
423     \framebox[120mm][c]{\makebox[5mm][c]{%
424       \begin{minipage}[c]{105mm}
425         \setlength{\parindent}{5mm}
426         \noindent\sloppy\nohyphens\@authsur,
427         \nohyphens\@authname\par
428         \nohyphens{\local@title/\@authname\ \@authsur. -- \local@cityname:
429         UFRJ/COPPE, \number\year.}\par
430         \pageref{front:pageno},
431         \pageref{LastPage}
432         p.\@ifundefined{r@cat:lofflag}{\pageref{cat:lofflag}} $29,7$cm.\par
433         % There is an issue here. When the last entry must be split between lines,
434         % the spacing between it and the next paragraph becomes smaller.
435         % Should we manually introduce a fixed space? But how could we know that
436         % a name was split? Is this happening yet?
437         \nohyphens{%
438         \begin{tabularx}{100mm}[b]{@{}l@{} }X@{}}
439         \local@advisorstring: &
440         \count1=0
441         \toks@={}
442         \@whilenum \count1<\@advisor \do{%
443         \ifcase\count1 % same as \ifnum0=\count1
444         \toks@=\expandafter{\csname CoppeAdvisorName:\the\count1%
445         \expandafter\endcsname\expandafter\space%

```

```

446         \csname CoppeAdvisorSurname:\the\count1\endcsname\\}
447     \else
448         \toks@=\expandafter\expandafter\expandafter{%
449             \expandafter\the\expandafter\toks@
450             \expandafter&\expandafter\space
451             \csname CoppeAdvisorName:\the\count1\expandafter\endcsname%
452             \expandafter\space\csname CoppeAdvisorSurname:\the\count1\endcsname\\
453         }%
454     \fi
455     \advance\count1 by 1}
456     \the\toks@
457 \end{tabularx}}\par
458 \nohyphens{\local@doctype\ ({\MakeLowercase\@degree\name}) --
459 UFRJ/COPPE/Programa de \local@deptname, \number\year.}\par
460 \bibname: p. \pageref{bib:begin} -- \pageref{bib:end}.\par
461 \count1=0
462 \count2=1
463 \nohyphens{\@whilenum \count1<\value{keywords} \do {%
464     \number\count2. \csname CoppeKeyword:\the\count1 \endcsname.
465     \advance\count1 by 1
466     \advance\count2 by 1}
467 I. \csname CoppeAdvisorSurname:0\endcsname,%
468 \ \csname CoppeAdvisorName:0\endcsname%
469 \ifthenelse{\@advisor>1}{\ \emph{et~al.}}{}}.
470 II. \local@universityname, COPPE, Programa de \local@deptname.
471 III. T{\ ' i}tulo.}
472 \end{minipage}}
473 \end{center}
474 \vspace*{\fill}}

```

\dedication

```

475 \newcommand\dedication[1]{
476     \gdef\@dedic{#1}
477     \cleardoublepage
478     \vspace*{\fill}
479     \begin{flushright}
480         \begin{minipage}{60mm}
481             \raggedleft \it \normalsize \@dedic
482         \end{minipage}
483     \end{flushright}}

```

abstract This is a specialization of the abstract in the article standard class.

```

484 \newenvironment{abstract}{%
485     \clearpage
486     \thispagestyle{plain}
487     \abstract@toptext\par
488     \vspace*{8.6mm}
489     \begin{center}
490         \sloppy\nohyphens{\MakeUppercase\local@title}\par
491         \vspace*{13.2mm}
492         \@authname\ \@authsurn \par
493         \vspace*{7mm}
494         \local@monthname/\number\year
495     \end{center}\par

```

```

496 % Old style
497 % \vspace*{3mm}
498 \vspace*{\fill}
499 \noindent%
500 \begin{tabularx}{\textwidth}[b]{@{}l@{ }X@{}}
501 \local@advisorstring: &
502 \count1=0
503 \toks@={}
504 \@whilenum \count1<\@advisor \do{%
505 \ifcase\count1 % same as \ifnum0=\count1
506 \toks@=\expandafter{\csname CoppeAdvisorName:\the\count1%
507 \expandafter\endcsname\expandafter\space%
508 \csname CoppeAdvisorSurname:\the\count1\endcsname\\}
509 \else
510 \toks@=\expandafter\expandafter\expandafter{%
511 \expandafter\the\expandafter\toks@
512 \expandafter&\expandafter\space
513 \csname CoppeAdvisorName:\the\count1\expandafter\endcsname%
514 \expandafter\space\csname CoppeAdvisorSurname:\the\count1\endcsname\\}
515 }%
516 \fi
517 \advance\count1 by 1}
518 \the\toks@
519 \end{tabularx}\par
520 \vspace*{2mm}
521 \noindent\local@deptstring: \local@deptname\par
522 \vspace*{7mm}}{\vspace*{\fill}}

```

foreignabstract

```

523 \newenvironment{foreignabstract}{%
524 \clearpage
525 \thispagestyle{plain}
526 \begin{otherlanguage}{english}
527 \foreignabstract@toptext\par
528 \vspace*{8.6mm}
529 \begin{center}
530 \sloppy\nohyphens{\MakeUppercase\foreign@title}\par
531 \vspace*{13.2mm}
532 \@authname\ \@authsurn \par
533 \vspace*{7mm}
534 \foreign@monthname/\number\year
535 \end{center}\par
536 % Old style
537 % \vspace*{3mm}
538 \vspace*{\fill}
539 \noindent%
540 \begin{tabularx}{\textwidth}[b]{@{}l@{ }X@{}}
541 \foreign@advisorstring: &
542 \count1=0
543 \toks@={}
544 \@whilenum \count1<\@advisor \do{%
545 \ifcase\count1 % same as \ifnum0=\count1
546 \toks@=\expandafter{\csname CoppeAdvisorName:\the\count1%
547 \expandafter\endcsname\expandafter\space%

```



```

598         \MakeUppercase\listtablename}%
599         {\MakeUppercase\listtablename}%
600     \@starttoc{lot}%
601     \if@restonecol\twocolumn\fi
602 }

```

\printlosymbols

```

603 \newcommand\printlosymbols{%
604 \renewcommand\glossaryname{\listsymbolname}%
605 \@input@{\jobname.los}}

```

\makelosymbols

```

606 \def\makelosymbols{%
607     \newwrite\@losfile
608     \immediate\openout\@losfile=\jobname.syx
609     \def\symbbl{\@bsphack\begingroup
610         \@sanitize
611         \@wrlos}\typeout
612     {Writing index of symbols file \jobname.syx}%
613     \let\makelosymbols\@empty
614 }
615 \@onlypreamble\makelosymbols

616 \AtBeginDocument{%
617 \@ifpackageloaded{hyperref}{%
618     \def\@wrlos#1#2{%
619         \protected@write\@losfile{%
620             {\string\indexentry{[#1] #2|hyperpage}{\thepage}}}%
621         \endgroup
622         \@esphack}}}%
623     \def\@wrlos#1#2{%
624         \protected@write\@losfile{%
625             {\string\indexentry{[#1] #2}{\thepage}}}%
626         \endgroup
627         \@esphack}}}

```

\printloabbreviations

```

628 \newcommand\printloabbreviations{%
629 \renewcommand\glossaryname{\listabbreviationname}%
630 \@input@{\jobname.lab}}

```

\makeloabbreviations

```

631 \def\makeloabbreviations{%
632     \newwrite\@labfile
633     \immediate\openout\@labfile=\jobname.abx
634     \def\abbrev{\@bsphack\begingroup
635         \@sanitize
636         \@wrlab}\typeout
637     {Writing index of abbreviations file \jobname.abx}%
638     \let\makeloabbreviations\@empty
639 }
640 \@onlypreamble\makeloabbreviations

```

```

641 \AtBeginDocument{%
642 \ifpackageloaded{hyperref}{%
643   \def\@wrlab#1#2{%
644     \protected@write\@labfile{%
645       {\string\indexentry{[#1] #2|hyperpage}{\thepage}}%
646     \endgroup
647     \@esphack}}{%
648   \def\@wrlab#1#2{%
649     \protected@write\@labfile{%
650       {\string\indexentry{[#1] #2}{\arabic{page}}}%
651     \endgroup
652     \@esphack}}}

653 \newdimen\bibindent%
654 \setlength\bibindent{1.5em}%
655 \renewenvironment{thebibliography}[1]%
656   {\chapter*{\bibname}%
657    \addcontentsline{toc}{chapter}{\bibname}%
658    \immediate\write\@auxout{%
659      \string\newlabel{bib:begin}{\{\}\arabic{page}}{\page.\arabic{page}}{\}}}%
660   \list{\@biblabel{\@arabic\c@enumiv}}%
661     {\setlength{\labelwidth}{0ex}%
662      \setlength{\leftmargin}{9.0ex}%
663      \setlength{\itemindent}{-9.0ex}%
664      \advance\leftmargin\labelsep%
665      \@openbib@code%
666      \usecounter{enumiv}%
667      \let\p@enumiv\@empty%
668      \renewcommand\theenumiv{\@arabic\c@enumiv}}%
669   \sloppy%
670   \clubpenalty4000%
671   \@clubpenalty \clubpenalty%
672   \widowpenalty4000%
673   \sfcode'\.\@m}%
674   {\def\@noitemerr%
675     {\@latex@warning{Empty 'thebibliography' environment}}%
676     \immediate\write\@auxout{%
677       \string\newlabel{bib:end}{\{\}\arabic{page}}{\page.\arabic{page}}{\}}}%
678   \endlist}

679 \newenvironment{theglossary}{%
680   \if@twocolumn%
681     \@restonecoltrue\onecolumn%
682   \else%
683     \@restonecolfalse%
684   \fi%
685   \@mkboth{\MakeUppercase\glossaryname}%
686   {\MakeUppercase\glossaryname}%
687   \chapter*{\glossaryname}%
688   \addcontentsline{toc}{chapter}{\glossaryname}
689   \list{}
690   {\setlength{\listparindent}{0in}%
691    \setlength{\labelwidth}{1.0in}%
692    \setlength{\leftmargin}{1.5in}%
693    \setlength{\labelsep}{0.5in}%

```

```

694 \setlength{\itemindent}{0in}}%
695 \sloppy}%
696 {\if@restonecol\twocolumn\fi%
697 \endlist}
698 %
699 \renewenvironment{theindex}{%
700 \if@twocolumn
701 \@restonecolfalse
702 \else
703 \@restonecoltrue
704 \fi
705 \twocolumn[\@makeschapterhead{\indexname}]}%
706 \@mkboth{\MakeUppercase\indexname}%
707 {\MakeUppercase\indexname}%
708 \thispagestyle{plain}\parindent\z@
709 \addcontentsline{toc}{chapter}{\indexname}
710 \parskip\z@ \@plus .3\p@\relax
711 \columnseprule \z@
712 \columnsep 35\p@
713 \let\item\@idxitem}
714 {\if@restonecol\onecolumn\else\clearpage\fi}
715 \newcommand\glossaryname{Glossary}
716 \newcommand\listabbreviationname{Lista de Abreviaturas}
717 \newcommand\listsymbolname{Lista de S{\` i}mbolos}
718 %
719 \newcommand\local@advisorstring{Orientador}
720 \newcommand\foreign@advisorstring{Advisor}
721 \ifthenelse{\boolean{maledoc}}{%
722 \newcommand\local@approvedname{Examinado por}%
723 }{%
724 \newcommand\local@approvedname{Examinada por}%
725 }
726 \newcommand\local@universityname{Universidade Federal do Rio de Janeiro}
727 \newcommand\local@deptstring{Programa}
728 \newcommand\foreign@deptstring{Department}
729 \newcommand\local@cityname{Rio de Janeiro}
730 \newcommand\local@statename{RJ}
731 \newcommand\local@countryname{Brasil}
732 %
733 \newcommand\frontcover@maintext{
734 \sloppy\nohyphens{\local@doctype\ de \@degreename\
735 \ifthenelse{\boolean{maledoc}}{apresentado}{apresentada}
736 ao Programa de P{\` o}s-gradua{\c c}{\~ a}o em \local@deptname,
737 COPPE, da \local@universityname, como parte dos requisitos
738 necess{\` a}rios {\` a} obten{\c c}{\~ a}o do t{\` i}tulo de
739 \local@degname\ em \local@deptname.}
740 }
741 %
742 \newcommand\frontpage@maintext{
743 \noindent {\MakeUppercase\local@doctype}
744 \ifthenelse{\boolean{maledoc}}{SUBMETIDO}{SUBMETIDA}
745 \sloppy\nohyphens{AO CORPO DOCENTE DO INSTITUTO ALBERTO LUIZ COIMBRA
746 DE P{\` O}S-GRADUA{\c C}{\~ A}O E PESQUISA DE ENGENHARIA (COPPE) DA
747 UNIVERSIDADE FEDERAL DO RIO DE JANEIRO COMO PARTE DOS REQUISITOS

```

```

748 NECESS{\` A}RIOS PARA A OBTEN{\c C}{\~ A}O DO GRAU DE
749 {\MakeUppercase\local@degname} EM CI{\^E}NCIAS EM
750 {\MakeUppercase\local@deptname.\par}}%
751 }
752 %
753 \newcommand\frontpage@bottomtext{%
754 \begin{center}
755 {\MakeUppercase{\local@cityname, \local@statename\ -- \local@countryname}}\par
756 {\MakeUppercase\local@monthname\ DE \number\year}
757 \end{center}}%
758 }
759 %
760 \newcommand\abstract@toptext{%
761 \noindent Resumo \ifthenelse{\boolean{maledoc}}{do}{da}
762 \local@doctype\ \ifthenelse{\boolean{maledoc}}{apresentado}{apresentada}
763 \sloppy\nohyphens{\` a} COPPE/UFRJ como parte dos requisitos
764 necess{\` a}rios para a obten{\c c}{\~ a}o do grau de
765 \local@degname\ em Ci{\^ e}ncias (\@degree)}
766 }
767 \newcommand\foreignabstract@toptext{%
768 \noindent \sloppy\nohyphens{Abstract of \foreign@doctype\ presented to
769 COPPE/UFRJ as a partial fulfillment of the requirements for the
770 degree of \foreign@degname\ of Science (\@degree)}
771 }
772 %
773 </class>
774 <*glossary>
775 actual '='
776 quote '!'
777 level '>'
778 delim_0 " , p. "
779 lethead_flag 0
780 headings_flag 0
781 preamble
782 "\n\\begin{theglossary}\n \\\makeatletter"
783 postamble
784 "\n \\\end{theglossary}\n"
785 </glossary>

```

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