

ROY LIAO

FUNDAMENTAL OF RK4IP



USED FOR MATLAB

Ultrafast Laser Lab

<http://ull.tju.edu.cn/>

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The titlepage reproduces an engraving of Maurits Cornelis Escher, titled *Plane Filling with Birds* (the picture is obtained from <http://www.mcescher.com/>).

ABSTRACT

demodemo

PREFACE

demodemodemo

ACKNOWLEDGEMENTS

I wish first of all to thank the members of the Staff of the Italian T_EX and L^AT_EX User Group, in particular Prof. Enrico Gregorio, for their invaluable aid during the writing of this work, the detailed explanations, the patience and the precision in the suggestions, the supplied solutions, the competence and the kindness. Thanks also to all the people who have discussed with me on the forum of the Group, prodigal of precious observations and good advices.

Finally, thanks to André Miede, for his wonderful ClassicThesis style, and to Daniel Gottschlag, who gave to me the hint for this original reworking.

CONTENTS

1	FUNDAMENTALS	1
1.1	Introduction	1
1.2	Use of the package	1
1.3	The style	2
1.4	New commands	2
1.5	Examples	2
2	THE CODE	5
	BIBLIOGRAPHY	11

1 | FUNDAMENTALS

This chapter introduces the (truly simple) basic notions of ArsClassica and presents its fundamental ideas and distinctive features.

1.1 INTRODUCTION

The ArsClassica package changes some typographical features of the ClassicThesis style, designed by André Miede [2, 3]. It allows to reproduce the layout of the \LaTeX guide *The Art of Writing with \LaTeX* [4] (in Italian) and of this document. The hint for this original reworking of ClassicThesis was given to me by Daniel Gottschlag.

1.2 USE OF THE PACKAGE

This package is shaped to be executed on a *complete* installation of Mi \TeX or T \TeX Live, and uses freely available fonts. It works with the KOMA-Script classes (scrreprt, scrbook and scrartcl) and requires the classicthesis package, *updated to the last version available (the 4.0)*. ArsClassica must be loaded *after* classicthesis:

```
\documentclass[\meta{\dots\unkern}]{scrreprt} % or scrbook or scrartcl

\usepackage[\meta{\dots\unkern}]{classicthesis}
\usepackage{arsclassica}

\begin{document}
\dots*
\end{document}
```

For example, this document has been produced with the following code:

```
\documentclass[10pt,a4paper,twoside,openright,titlepage,fleqn,%
             headinclude,footinclude,BCOR5mm,%
             numbers=noenddot,cleardoublepage=empty,%
             tablecaptionabove]{scrreprt}

\usepackage[\meta{\dots\unkern}]
\usepackage{subfig}
\usepackage[eulerchapternumbers,subfig,beramono,%
             eulermath,pdfspacing]{classicthesis}
\usepackage{arsclassica}

\begin{document}
\dots
\end{document}
```

It is recommended, but not compulsory, to use the options beramono, eulerchapternumbers and eulermath together with ArsClassica.

1.3 THE STYLE

The typographical style achieved with `ArsClassica` differs from `ClassicThesis` in the following points:

- use of Iwona font, by Janusz M. Nowacki, for the titles of the sectioning units of the document (chapters, sections, subsections, sub-subsections, paragraphs and subparagraphs), for the labels of description lists, for the headlines and the label of the captions (`ClassicThesis` does not use any sans serif font);
- customized chapter numbers;
- semi-transparent headlines; the headlines are separated from the page number by a small rule;
- captions with labels in boldface (`ClassicThesis` does not use any bold-face font);
- itemize lists with semi-transparent bullets.

The `ArsClassica` package is designed to provide a ready-to-use typographical style: therefore it has no loading option and it is *not* configurable or customizable in any way. If you change the previous settings, you will risk to destroy the balance of the style, so it is *highly recommended* to keep them unchanged.

One of the principles of \LaTeX is that it allows the author to take no interest in the typographical questions, permitting him to focus only the structure and the contents of the document. This fact should always be taken in consideration: using a style written by others, the user accepts all the typographical settings chosen for him by the author of the style, and he is not forced to study typography to fix the layout of his publications. This is the case of `ArsClassica` too: if you change its settings, you will deny this philosophy and, consequently, you must study (a lot of) typography to achieve acceptable results.

The style achieved with `ArsClassica` is *not* therefore configurable or customizable. The typographical style is something of very personal: if you like the package and find attractive the idea to take no interest in the problem of the style definition, then you will use `ArsClassica` with satisfaction; otherwise, if you have different needs or you are not satisfied with the layout of the package, then you should try other classes or packages, even building your own style.

1.4 NEW COMMANDS

The package offers the `\ctLaTeX`, `\ctLaTeXe` and `\ctTeX` commands, which allow to reproduce respectively the \LaTeX , $\text{\LaTeX}_{2\epsilon}$ and \TeX logos correctly written in Iwona.

1.5 EXAMPLES

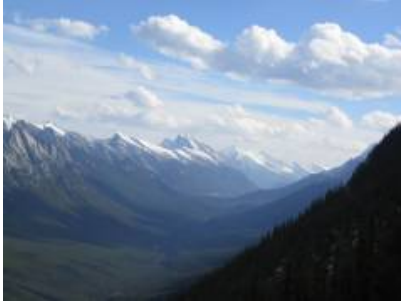
Note: The content of this chapter is just some dummy text. It is not a real language.



(a) Asia personas duo.



(b) Pan ma signo.



(c) Methodicamente o uno.



(d) Titulo debitas.

Figure 1: Tu duo titulo debitas latente.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

A subsection

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

A sub-subsection

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Table 1: Lorem ipsum dolor sit amet.

p	$\neg p$
V	F
F	V

A PARAGRAPH Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

MANE Lorem ipsum dolor sit amet, consectetur adipiscing elit.

TEKEI Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

FARES Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

2 | THE CODE

Announcement of the package and requirement for the necessary packages.

```
1 \NeedsTeXFormat{LaTeX2e}
2 \ProvidesPackage{arsclassica}[2012/02/21 v4.0 Customizing
   ClassicThesis (LP)]
3 \RequirePackage{classicthesis}
4 \RequirePackage{caption}
```

Use of Iwona as font sans serif.

```
5 \renewcommand{\sfdefault}{iwona}
```

Customized chapter numbers.

```
6 \let\chapterNumber\undefined
7 \ifthenelse{\boolean{@eulerchapternumbers}}{
8 {\newfont{\chapterNumber}{eurb10 scaled 5000}}%
9 {\newfont{\chapterNumber}{pplr9d scaled 5000}}
```

Small caps sans serif.

```
10 \ifthenelse{\boolean{@minionprospacing}}{%
11 {%
12   \DeclareRobustCommand{\spacedallcaps}[1]{\sffamily%
13     \textssc{\MakeTextUppercase{#1}}}%
14   \DeclareRobustCommand{\spacedlowsmallcaps}[1]%
15     {\sffamily\textssc{\MakeTextLowercase{#1}}}%
16 }{%
17   \ifthenelse{\boolean{@pdfspacing}}{%
18     {%
19       \microtypesetup{expansion=false}%
20       \DeclareRobustCommand{\spacedallcaps}[1]%
21         {\sffamily\textls[160]{\MakeTextUppercase{#1}}}%
22       \DeclareRobustCommand{\spacedlowsmallcaps}[1]%
23         {\sffamily\textls[80]{\scshape\MakeTextLowercase{#1}}}%
24     }{%
25       \RequirePackage{soul}
26       \sodef\allcapsspacing{\sffamily\upshape}%
27         {0.15em}{0.65em}{0.6em}%
28       \sodef\lowsmallcapsspacing{\sffamily\scshape}%
29         {0.075em}{0.5em}{0.6em}%
30       \DeclareRobustCommand{\spacedallcaps}[1]%
31         {\MakeTextUppercase{\allcapsspacing{#1}}}%
32       \DeclareRobustCommand{\spacedlowsmallcaps}[1]%
33         {\MakeTextLowercase{\textsc{
34           \lowsmallcapsspacing{#1}}}}%
35     }%
36 }
```

Semi-transparent headlines and page numbers in Iwona.

```

37 \renewcommand{\sectionmark}[1]{\markright{\textsc%
38 {\MakeTextLowercase{\thesection}} \spacedlowsmallcaps{#1}}}
39 \lehead{\mbox{\llap{\small\the page\kern1em\color{halfgray}%
40 \vline}%
41 \color{halfgray}\hspace{0.5em}\headmark\hfil}}
42 \rohead{\mbox{\hfil\color{halfgray}%
43 \headmark\hspace{0.5em}}}%
44 \rlap{\small{\color{halfgray}\vline}\kern1em\the page}}
45 \renewcommand{\headfont}{\normalfont\sffamily}
46 \renewcommand{\pnumfont}{\small\sffamily}

```

Use of Iwona for the titles of sectioning units (chapters, sections, sub-sections, sub-subsections, paragraphs, subparagraphs) and for the labels of description lists.

```

47 \RequirePackage{titlesec}
48 % parts
49 \ifthenelse{\boolean{@parts}}%
50 {%
51 \titleformat{\part}[display]
52 {\normalfont\centering\large}%
53 {\thispagestyle{empty}\partname~\thepart}{1em}%
54 {\color{Maroon}\spacedallcaps}
55 }{\relax}
56 % chapters
57 \ifthenelse{\boolean{@linedheaders}}%
58 {%
59 \titleformat{\chapter}[display]%
60 {\relax}{\raggedleft{\color{halfgray}%
61 \chapterNumber\thechapter} \ \ }{0pt}%
62 {\titlerule\vspace*{.9\baselineskip}\raggedright%
63 \spacedallcaps}%
64 [\normalsize\vspace*{.8\baselineskip}\titlerule]%
65 }{%
66 \titleformat{\chapter}[block]%
67 {\normalfont\Large\sffamily}%
68 {\color{halfgray}\chapterNumber\thechapter%
69 \hspace{10pt}\vline} {10pt}%
70 {\spacedallcaps}}
71 % sections
72 \titleformat{\section}
73 {\normalfont\Large\sffamily}{\textsc%
74 {\MakeTextLowercase{\thesection}}}%
75 {1em}{\spacedlowsmallcaps}
76 % subsections
77 \titleformat{\subsection}
78 {\normalfont\sffamily}{\textsc{\MakeTextLowercase%
79 {\thesubsection}}}{1em}{\normalsize}
80 % subsubsections
81 \titleformat{\subsubsection}
82 {\normalfont\sffamily\itshape}{\textsc%
83 {\MakeTextLowercase{\thesubsubsection}}}%
84 {1em}{\normalsize\itshape}
85 % paragraphs

```

```

86 \titleformat{\paragraph}[runin]
87     {\normalfont\normalsize\sffamily}{\textsc%
88     {\MakeTextLowercase{\thechapter}}}%
89     {0pt}{\spacedlowsmallcaps}
90 % descriptionlabels
91 \renewcommand{\descriptionlabel}[1]{\hspace*{\labelsep}%
92 \bfseries\spacedlowsmallcaps{#1}}
93 \titlespacing*{\chapter}{0pt}{1\baselineskip}%
94 {2\baselineskip}
95 \titlespacing*{\section}{0pt}{2\baselineskip}%
96 {.8\baselineskip}[\marginparsep]
97 \titlespacing*{\subsection}{0pt}{1.5\baselineskip}%
98 {.8\baselineskip}[\marginparsep]
99 \titlespacing*{\paragraph}{0pt}{1\baselineskip}%
100 {1\baselineskip}
101
102 \newcommand\formatchapter[1]{%
103 \vbox to \ht\strutbox{
104 \setbox0=\hbox{\chapterNumber\thechapter\hspace{10pt}\vline\
105 }
106 \advance\hsize-\wd0 \advance\hsize-10pt\raggedright
107 \spacedallcaps{#1}\vss}}
108 \titleformat{\chapter}[block]
109     {\normalfont\Large\sffamily}
110     {\textcolor{halfgray}{\chapterNumber\thechapter}
111     \hspace{10pt}\vline\ }{10pt}
112     {\formatchapter}
113
114 \if@twoside%
115     \rofoot[\mbox{\makebox[0pt][l]{\kern1em\thepage}}]{\fi

```

Itemize lists with semi-transparent labels.

```

115 \renewcommand\labelitemi{\color{halfgray}$\bullet$}

```

Settings of captions.

```

116 \captionsetup{format=hang,font=small,labelfont={sf,bf}}
117 \captionsetup[table]{skip=\medskipamount}

```

Settings of hyperref.

```

118 \hypersetup{%
119     colorlinks=true, linktocpage=true, pdfstartpage=1,
120     pdfstartview=FitV, breaklinks=true, pdfpagemode=UseNone,
121     pageanchor=true, pdfpagemode=UseOutlines,%
122     plainpages=false, bookmarksnumbered,
123     bookmarksopen=true,%
124     bookmarksopenlevel=1,%
125     hypertexnames=true, pdfhighlight=/0,%
126     urlcolor=webbrown, linkcolor=RoyalBlue,
127     citecolor=webgreen,%
128     hyperfootnotes=false, pdfpagelabels,
129     pdfsubject={},%
130     pdfkeywords={},%
131     pdfcreator={pdfLaTeX},%

```

```

132 pdfproducer={LaTeX with hyperref and ClassicThesis}%
133 }

```

Some fine adjustment when the minitoc package is used.

```

134 \@ifpackageloaded{minitoc}
135 {%
136     \MakeLowercase{\gdef\noexpand\ptctitle{\ptctitle}}
137     \MakeLowercase{\gdef\noexpand\mtctitle{\mtctitle}}
138     \MakeLowercase{\gdef\noexpand\stctitle{\stctitle}}
139     \setlength{\mtcindent}{0pt}
140     \renewcommand{\mtifont}{\normalsize\sffamily
141         \scshape\lsstyle}
142 }
143 {}

```

Definition of the `\ctLaTeX`, `\ctLaTeXe` and `\ctTeX` commands, which allow to reproduce respectively the \LaTeX , $\text{\LaTeX}_{2\epsilon}$ e \TeX logos correctly written in Iwona.

```

144 \def\@ppljLaTeX{{\upshape
145     \sbox\z@{\check@mathfonts\fontsize\sf@size\z@%
146     \math@fontsfalse\selectfont A}%
147     \sbox\tw@ T%
148     L\kern-.55\wd\z@
149     \vbox to\ht\tw@{\copy\z@\vss}%
150     \kern-.25\wd0
151     \@ctTeX}}
152 \def\@ppljTeX{{\upshape T\kern -.08em \lower .3ex\hbox{E}%
153 \kern -.08em X}}
154
155 \def\@ppljscLaTeX{{\upshape\scshape
156     \sbox\z@{\check@mathfonts\fontsize\sf@size\z@%
157     \math@fontsfalse\selectfont a}%
158     \sbox\tw@ t%
159     l\kern-.6\wd\z@
160     \vbox to\ht\tw@{\copy\z@\vss}%
161     \kern-.25\wd0
162     \@ctTeX}}
163 \def\@ppljscTeX{{\upshape\scshape t\kern -.085em
164 \lower .25ex\hbox{e}\kern -.085em x}}
165
166 \def\@iwonaLaTeX{{\upshape
167     \sbox\z@{\check@mathfonts\fontsize\sf@size\z@%
168     \math@fontsfalse\selectfont A}%
169     \sbox\tw@ T%
170     L\kern-.5\wd\z@
171     \vbox to\ht\tw@{\copy\z@\vss}%
172     \kern-.2\wd0
173     \@ctTeX}}
174 \def\@iwonaTeX{{\upshape T\kern -.12em \lower .3ex\hbox{E}%
175 \kern -.12em X}}
176
177 \def\@iwonascLaTeX{{\upshape\scshape
178     \sbox\z@{\check@mathfonts\fontsize\sf@size\z@%

```

```

179 \math@fontsfalse%
180 \selectfont a}%
181 \sbox\tw@ t%
182 l\kern-.5\wd\z@
183 \vbox to\ht\tw@{\copy\z@\vss}%
184 \kern-.2\wd0
185 \ctTeX}}
186 \def\@iwonascTeX{{\upshape\scshape t\kern -.1em
187 \lower .25ex\hbox{e}\kern -.1em x}}
188
189 \def\ct@sc{sc}
190 \def\ctTeX{\csname @\f@family\ifx\f@shape\ct@sc sc%
191 \fi TeX\endcsname}
192
193 \DeclareRobustCommand\ctLaTeX{%
194 \texorpdfstring{\textls[1]{\csname @\f@family\ifx%
195 \f@shape\ct@sc sc\fi LaTeX\endcsname}}{LaTeX}}
196 \DeclareRobustCommand\ctLaTeXe{%
197 \texorpdfstring{\textls[1]{\ctLaTeX\csname @\ifx%
198 \f@shape\ct@sc sc\fi twoe\endcsname}}{LaTeX2e}}
199
200 \def\@twoe{\kern.1em$\m@th2_{\textstyle\varepsilon}$}
201 \def\@sctwoe{\kern.15em$\m@th{\scriptscriptstyle2}%
202 _\varepsilon$}
203
204 \DeclareRobustCommand\ctTeX{%
205 \texorpdfstring{\textls[1]{\ctTeX}}{TeX}}
206
207 \def\toc@headingbkORrp{%
208 \def\toc@heading{%
209 \chapter*{\contentsname}%
210 \@mkboth{\spacedlowsmallcaps{\contentsname}}
211 {\spacedlowsmallcaps{\contentsname}}}}
212 \@ifclassloaded{scrreprt}{\toc@headingbkORrp}{}
213 \@ifclassloaded{scrbook}{\toc@headingbkORrp}{}

```


BIBLIOGRAPHY

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