

**Setting SCIENCES Titles  
According to the ISTE Guidelines  
with the ISTE Science Package**

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# Foreword

**Roger ROUSSEAU<sup>1</sup> and Christian SCHEEN<sup>2</sup>**

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The aim of this document is to describe how to use L<sup>A</sup>T<sub>E</sub>X in order to typeset books according to the ISTE SCIENCES guidelines and instructions to authors. The ISTE SCIENCES package contains a L<sup>A</sup>T<sub>E</sub>X document class file, a BibT<sub>E</sub>X Harvard bibliography style file, and a MakeIndex index style file. Index typesetting is made easier through a basic Bourne shell script and two associated awk (or gawk) filters. Of course, the use of this indexing mechanism is completely optional; everything is possible (but sometimes more involved) through the standard MakeIndex program that comes with every T<sub>E</sub>X system distribution. Finally, the ISTE SCIENCES package contains a Makefile script for the make utility; its use is also optional and makes it easy to keep the main target (namely, the final document in PostScript format) current, based on differences in the modification times of the T<sub>E</sub>X source files that the PostScript target is dependent on.

Let us stress that users of the ISTE SCIENCES package should definitely *not* use the L<sup>A</sup>T<sub>E</sub>X source files of this user's guide as the starting point of the L<sup>A</sup>T<sub>E</sub>X source files of any actual book. The ISTE SCIENCES package provides users with appropriate templates.

L<sup>A</sup>T<sub>E</sub>X itself is Leslie Lamport's generic typesetting system (Lamport 1994) that uses Donald E. Knuth's T<sub>E</sub>X formatting system (Knuth 1986) as its underlying engine. The main idea behind L<sup>A</sup>T<sub>E</sub>X is to let the user concentrate on the layout and the structure of the document rather than on formatting details. With this aim in mind, the L<sup>A</sup>T<sub>E</sub>X system adds an abstraction layer onto the plain T<sub>E</sub>X commands; the user is provided with high-level commands that make document typesetting easier. The L<sup>A</sup>T<sub>E</sub>X format contains a precompiled image of all these L<sup>A</sup>T<sub>E</sub>X commands, the T<sub>E</sub>X font metrics (".tfm") information for preloaded fonts, and a set of word-breaking hyphenation patterns for

each language that one might want to use. A number of excellent books on  $\LaTeX$  and related tools and techniques are available. In addition to the books by Knuth (Knuth 1986) and Lamport (Lamport 1994), let us refer to the introduction guide by Helmut Kopka and Patrick W. Daly (Kopka and Daly 2004), to the editions of the  $\LaTeX$  “companion” by Frank Mittelbach *et al.* (Goossens *et al.* 1994 ; Mittelbach *et al.* 2004), to the  $\LaTeX$  graphics “companion” by Michel Goossens *et al.* (Goossens *et al.* 1997), and to the  $\LaTeX$  Web “companion” by Michel Goossens *et al.* (Goossens *et al.* 1999). French-speaking users are moreover referred to the introduction guides by Christian Rolland (Rolland 1999) and Bernard Desgraupes (Desgraupes 2003).

### Typographic conventions

We use the standard typographic conventions throughout the document (see for instance (Mittelbach *et al.* 2004, p. 11-13)):

- programs (such as `MakeIndex`, `xindy`, `make`, `awk`, and `gawk`) and drivers (such as `dvips` and `ps2pdf`) are typeset in sans serif text font;
- scripts (such as `Makefile` and `Makeindex`) and so-called filters (such as `makeindex-pre.awk` and `makeindex-post.awk`) are typeset in monospaced typewriter text font;
- $\LaTeX$ ,  $\BibTeX$ , and `MakeIndex` classes and style files (such as `book.cls`, `chapterbib.sty`, `agsm.bst`, and `ouvrage-hermes.ist`) are typeset in sans serif text font;
- $\LaTeX$  commands and environments (such as `\makeindex` and `flushright`) are typeset in monospaced typewriter text font. Besides, environments are typeset in slanted shape font;
- place-holders (also known as meta-variables) are typeset in italic shape font between “ $\langle$ ” and “ $\rangle$ ” angle brackets (for instance,  $\langle text \rangle$ ).

### Bibliography

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# Introduction

**Roger ROUSSEAU<sup>1</sup> and Christian SCHEEN<sup>2</sup>**

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This document describes how to use  $\LaTeX$  in order to typeset books (namely, science books) according to the ISTE guidelines and instructions to authors, with the ISTE SCIENCES package. Many examples are given ( $\LaTeX$  source files templates, syntax of user commands and environments, etc.).

The ISTE SCIENCES package consists of the following files:

- the `ISTE_science.cls`  $\LaTeX$  document class file. It should be used instead of the `book.cls` standard  $\LaTeX$  document class file;
- the `agsm.bst` Bib $\TeX$  bibliography style file. It should drive the Bib $\TeX$  program in order to produce appropriate Harvard bibliography style;
- `frenchb.ldf` file is a language definition file;
- the `Makeindex` Bourne shell script. It can be used instead of the standard `MakeIndex` program, but this mechanism is completely optional; if it is used, it will automatically produce the desired index layout and it will properly sort out (French, etc.) words with diacritical signs (in alphabetical order). This script uses two filters written in the AWK language (namely the `makeindex-pre.awk` pre-processor and the `makeindex-post.awk` post-processor). It also uses the `ouvrage-hermes.ist` `MakeIndex` index style file; if you do not use the `Makeindex` script, this index style file shall drive the standard `MakeIndex` program that comes with every  $\TeX$  system distribution;
- the `Makefile` script. It can drive the `make` utility, but this mechanism is also completely optional; if it is used, it will automatically keep the final document (in PostScript format) current, based on differences in the modification times of the  $\TeX$  source files that the PostScript target is dependent on.

Though the ISTE SCIENCES package scrupulously respects each and every typesetting guideline required by ISTE SCIENCES, it does its utmost to achieve this aim without sacrificing compatibility with standard  $\LaTeX$  system commands and environments. You should therefore use those standard structures in the usual way, with the usual syntax and semantics (some have indeed been internally redefined in order to comply with specific ISTE SCIENCES guidelines, but this is transparent from the user's point of view).

However, there are a few cases where compliance could not be achieved through the redefinition of existing standard  $\LaTeX$  commands and environments. In that case, we provide the user with a new structure whose name always has an initial capital letter (this distinguishes new structures from standard ones). Here is the complete list of these new commands and environments (see also Table 1):

- the `\chapter` command. This is used to start a new chapter;
- the `\authorname` command. This is used for author names and affiliations;
- the `Figure` and `Table` environments. These are functionally similar to their standard counterparts (namely, the `figure` and `table` standard  $\LaTeX$  environments), but the caption and the label are now specified as the mandatory argument of the new environments. This mechanism controls the caption positioning;
- the `\Remark`, `\Example`, and `\Note` commands. These typeset a *short* text as a comment, an example, or a note. Actually, any similar inset may be designed with the `\GenericRemark` command;
- the `encadre` is a `Box` environment. This environment contains text inside a box and the caption is the same as for figures and tables;
- the `\encadrecaption` is a `Box` caption command;
- the `Remarks`, `Examples`, and `Notes` environments. These typeset a *longer* text (made up of two or more paragraphs) as a comment, an example, or a note;
- the `\Definition`, `\Theorem`, and `\Lemma` commands. These typeset text as a definition, a theorem, or a lemma. Actually, any similar inset may be designed with the `\GenericDefinition` command;
- the `\Publisher` command. This typesets (at the end of the book) a note intended for the ISTE in-house team.

We have also introduced some supplementary commands that will certainly be seldom used, but that can be a help to  $\text{\LaTeX}$  novices (see also Table 1):

- the `\DelayNewPage` and `\ForceNewPage` commands. These control  $\text{\TeX}$ 's page-breaking mechanism in the remaining problematic cases where  $\text{\TeX}$ 's decision is not satisfactory;
- the `\EqnCont` command. Within the `eqnarray` environment, this breaks a long equation into two lines and helps to stay in the type area;
- the `\AddToContents` command. This introduces some specific text in the table of contents;
- the `\CropMarksOn` and `\CropMarksOff` commands. These respectively activate and disable crop marks on output pages;
- the `\LargeFnRule` and `\SmallFnRule` commands. These respectively produce long (namely, 12 cm) and short (namely, 25 mm) footnote rules. These commands shall be used whenever a footnote exceptionally extends over two or more pages.

The ISTE SCIENCES package should be used in order to typeset SCIENCES books only (see section 1.1 for a definition). Although this user's guide is basically laid out as an edited science books. Authors should definitely *not* use the  $\text{\LaTeX}$  source files of this user guide as the starting point of the  $\text{\LaTeX}$  source files of any actual book. Instead, the `SCIENCE Template/` top-level directory holds appropriate templates of master  $\text{\LaTeX}$  source files. On the other hand, local excerpts from this user's guide may provide the user with examples of good typographic practice.

Chapter 1 describes structure commands. These commands shall be used in order to lay out any actual book; they structure the whole document and all its components ( $\text{\LaTeX}$  preamble, front matter, main matter, and back matter; these great subdivisions may then contain parts, chapters, sections, paragraphs, and all other components down to the smallest units). Chapter 2 describes new commands and environments that are introduced by the ISTE SCIENCES package through its `ISTE_science.cls`  $\text{\LaTeX}$  document class file. Excerpts from the ISTE SCIENCES guidelines and instructions to authors are given wherever appropriate. The final bibliography and the index have been produced respectively by the `BibTeX` program (with the mandatory `agsm.bst` style file) and by the suggested `Makeindex` Bourne shell script (with the mandatory `ouvrage-hermes.ist` style file and the optional `awk` utility and scripts).

Command or environment	Description	Scope
<code>\ChapterAuthor{}{}{}</code>	new chapter starts	all books
<code>\authorname{}{}{}</code>	typeset author name and affiliation	all books
<code>encadre</code>	Box environment	all books
<code>Figure[]{}{}</code>	control typesetting of floating figures	all books
<code>Table[]{}{}</code>	control typesetting of floating tables	all books
<code>\Remark{}{}</code>	typeset a small comment (single paragraph)	all books
<code>\Example{}{}</code>	typeset a small example (single paragraph)	all books
<code>\Note{}{}</code>	typeset a small note (single paragraph)	all books
<code>\GenericRemark{}{}{}</code>	define a new “comment-like” inset	all books
<code>Remarks</code>	typeset a longer comment	all books
<code>Examples</code>	typeset a longer example	all books
<code>Notes</code>	typeset a longer note	all books
<code>\Definition{}{}</code>	typeset a definition (italic shape)	all books
<code>\Theorem{}{}</code>	typeset a theorem (italic shape)	all books
<code>\Lemma{}{}</code>	typeset a lemma (italic shape)	all books
<code>\GenericDefinition{}{}{}</code>	define a new “definition-like” inset	all books
<code>\Publisher{}{}{}{}</code>	produce a note for the ISTE in-house team	optional
<code>\DelayNewPage{}{}</code>	control $\TeX$ ’s page breaks	optional
<code>\ForceNewPage</code>	control $\TeX$ ’s page breaks	optional
<code>\EqnCont</code>	break a long equation into two lines	optional
<code>\AddToContents{}{}{}{}</code>	introduce text in the table of contents	optional
<code>\CropMarksOn</code>	activate crop marks on output pages	optional
<code>\CropMarksOff</code>	disable crop marks on output pages	optional
<code>\LargeFnRule</code>	make long footnote rules	all books
<code>\SmallFnRule</code>	make short footnote rules	all books

**Table 1.** New structures introduced by the ISTE SCIENCES package

# 1

## Structure Commands

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This chapter describes the main commands that structure the whole book (L<sup>A</sup>T<sub>E</sub>X preamble, front matter, main matter, and back matter; these larger subdivisions may then contain parts, chapters, sections, paragraphs, and smaller components).

### 1.1. SCIENCES Books

In accordance with the ISTE SCIENCES terminology, let us use the term *book* for any typeset document whose general layout is based on the notion of a chapter made up of several pages. Chapters may be gathered within larger parts, and they are subdivided with the help of smaller subtitles characterized by their level  $n$ . Subtitles of level 1 down to level 4 are allowed; in L<sup>A</sup>T<sub>E</sub>X, these correspond respectively to `\section` (level 1), `\subsection` (level 2), `\subsubsection` (level 3), and `\paragraph` (level 4) commands. According to the ISTE SCIENCES guidelines, level  $n \geq 5$  subtitles must not appear in any actual book; in L<sup>A</sup>T<sub>E</sub>X parlance, this means that authors should not use the `\subparagraph` (level 5) command (see Table 1.1).

**DEFINITION 1.1.**— In a SCIENCES book, each chapter is written by its own author or by its own group of authors. The book is coordinated by one or more book coordinators. Each chapter possesses its own specific bibliography section; the bibliography is typeset at the end of the chapter.

*The ISTE SCIENCES User Guide,*  
coordinated by Roger ROUSSEAU and Christian SCHEEN. © ISTE Editions 2019.

Command	Level	Automatic style
<code>\part</code>	-1	center on a special page
<code>\ChapterAuthor</code>	0	center
<code>\section</code>	1	upright shape, bold series
<code>\subsection</code>	2	italic shape, bold series
<code>\subsubsection</code>	3	italic shape
<code>\paragraph</code>	4	upright shape
<code>\subparagraph</code>	5	forbidden in ISTE SCIENCES books

**Table 1.1.** *L<sup>A</sup>T<sub>E</sub>X's standard sectioning commands*  
(*L<sup>A</sup>T<sub>E</sub>X levels coincide with ISTE SCIENCES levels*)

All books are laid out along three large subdivisions:

1) the *front matter* (`\frontmatter`) contains the title page, the table of contents, and small unnumbered chapters. These unnumbered chapters usually have no subtitles at all; therefore, one may include, for instance, a preface, a foreword, and a small introduction in the front matter;

2) the *main matter* (`\mainmatter`) contains all regular numbered chapters;

3) the *back matter* (`\backmatter`) contains the List of Authors and the index. These are all unnumbered chapters.

Chapter numbering is automatic and depends on its position amongst these subdivisions. For instance, a small introduction with few subtitles shall be placed in the front matter, where it will automatically be typeset as an unnumbered chapter. On the other hand, a longer and/or structured introduction shall be placed at the beginning of the main matter, where it will automatically be typeset as a regular numbered chapter (of course, its subtitles will automatically be numbered, too). In order to disable the appearance of an unnumbered chapter in the table of contents, one can use the starred form of the `\chapter` command (namely, `\chapter*{<Chapter Title>}`).

Commands that define the general layout of the book should be gathered in the master L<sup>A</sup>T<sub>E</sub>X source file that we describe below.

## 1.2. The master L<sup>A</sup>T<sub>E</sub>X source file

The master L<sup>A</sup>T<sub>E</sub>X source file defines the general layout of the book and consists of two parts: the preamble (between the `\documentclass` and the `\begin{document}` commands) and the document body (between the `\begin{document}` and the `\end{document}` commands). See Figure 1.1 for details.

The `\documentclass` command is given the `ISTE_science` mandatory parameter that specifies the name of the `ISTE_science.cls` document class, and the `<class`

```

\documentclass[<class options>]{ISTE_science}[2018/07/30]

% The LaTeX preamble may contain package loading commands and
% user-defined LaTeX commands and environments. The optional
% \usepackage, \newcommand, and \newenvironment commands shall
% be included here.

\title[%
Shortened Book Title]{%
Complete Book Title\\
with Optional Line Breaks}

\author{%
John \Name{Smith}\\ Paul \Name{Jones}}

\date{%
November~14, 2005}

\makeindex

\begin{document}
% The document body is described in another section.
\end{document}

```

**Figure 1.1.** General structure of the  $\text{\LaTeX}$  preamble

*options*) optional parameter that controls various specific aspects of document type-setting; available class options are described below.

### 1.3. Class options

The default behavior of the `ISTE_science.cls` document class makes it possible to typeset a SCIENCES books written in French, without crop marks, and without printing blank pages. According to the desired book type, the following class options will be used (see also Table 1.2):

- the `english` class option typesets a book written in English. The default behavior is to typeset a book written in French. This class option defines the basic language of the book. However, if specific chapters are not written in the basic language, these shall start with the `\selectlanguage{<language>}` language selection command;

- the `cropmarks` class option draws the page borders: a first rectangle corresponds to the text dimensions, and a taller one shows the page limits (after the trimming process). The default behavior is to disable crop marks. The final copy of a book shall not exhibit crop marks;
- the `allpages` class option prints out blank pages. The default behavior is to suppress the printing of blank pages. This class option enables the user to save printing (let us recall that chapters always start on odd pages). The final copy of a book shall enable the printing of blank pages.

Class option	Implied behavior	Default behavior
<code>english</code>	typeset a book in English	typeset a book in French
<code>cropmarks</code>	enable crop marks drawing	disable crop marks drawing <sup>†</sup>
<code>allpages</code>	enable blank pages printing <sup>†</sup>	disable blank pages printing

<sup>†</sup> Required behavior for the final copy.

**Table 1.2.** *Class options and their implied behavior*

Let us now consider the  $\text{\LaTeX}$  preamble details.

#### 1.4. $\text{\LaTeX}$ preamble

The  $\text{\LaTeX}$  preamble shall successively contain (see Figure 1.1):

- 1) optional package loading commands. For instance, one might want to use the `\usepackage[fleqn]{amsmath}` command in order to load advanced mathematical structures designed by the American Mathematical Society;
- 2) optional user-defined commands and environments. User-defined structures should be defined with the `\newcommand` and `\newenvironment`  $\text{\LaTeX}$  commands; one should not use plain  $\text{\TeX}$  commands (such as `\def`, etc.);
- 3) the `\title[⟨Shortened Book Title⟩]{⟨Complete Book Title⟩}` statement. The `⟨Shortened Book Title⟩` parameter is used as the running title on even pages and its length should not exceed 55 mm in 9 pt font size; the `ISTE_science.cls` document class raises a warning message when this condition is not met;
- 4) the `\author` statement. The `\Name` command distinguishes surnames from given names. The `\\` command separates the full names of successive authors. The example below shows the exact syntax;
- 5) the `\date{⟨version date⟩}` statement, as usual.

EXAMPLE.— The `\author` statement should be given as follows:

```
\author{%
  <Given name #1> {<Surname #1>}\textsuperscript{1} and
  <Given name #2> {<Surname #2>}\textsuperscript{2}}
```

## 1.5. Document body

Within the document body, the top-level structure commands are `\frontmatter`, `\mainmatter`, and `\backmatter`.

The contents of each chapter should be placed within one single dedicated file; chapter files should be included with the `\include` (not `\input`) command in the master  $\text{\LaTeX}$  source file. In the case of an edited collection, where each chapter has its own bibliography section, this requirement is mandatory.

Some unnumbered chapters such as the table of contents, the List of Authors and the index are produced by specific commands placed at appropriate positions in the master  $\text{\LaTeX}$  source file.

Figure 1.2 gives a rather complete example of the document body; see Figure 1.1 for its location within the whole master  $\text{\LaTeX}$  source file.

As already mentioned, authors should definitely *not* use the  $\text{\LaTeX}$  source files of this user’s guide as the starting point of the  $\text{\LaTeX}$  source files of any actual book; the `SCIENCE Template/` top-level directory holds suitable templates of master  $\text{\LaTeX}$  source files.

## 1.6. Front matter

The table of contents is the only mandatory component of the front matter; it is produced by the usual `\tableofcontents` command. The table of contents usually contains entries for all level 1 to level 3 subtitles. If page constraints come into play, it is possible to reduce the table of contents “depth” with the following command (that shall be placed in the preamble of the master  $\text{\LaTeX}$  source file):

```
\setcounter{tocdepth}{2}
```

Front matter chapters are unnumbered; moreover, the following behavior applies:

- chapters that use the `\chapter` command have an entry in the table of contents (for instance, `\chapter{Introduction}`);
- chapters that use the `\chapter*` command have no entry in the table of contents (for instance, `\chapter*{Preface}`).

```
\begin{document}

\frontmatter %-----

\maketitle
\include{preface}
\tableofcontents
\include{foreword}
\include{introduction}

\mainmatter %-----

\part[<Short Title for Part #1>]{<Complete Title for Part #1>}

\include{chapter1}
\include{chapter2}

\part[<Short Title for Part #2>]{<Complete Title for Part #2>}

\include{chapter3}
\include{chapter4}

\backmatter %-----

\bibliographystyle{agsm} %
\bibliography{bibtex-database} %
\printindex
\Publisher{01 23 45 67 89}{98 76 54 32 10}{user@provider.com}

\end{document}
```

**Figure 1.2.** General structure of the document body

## 1.7. Main matter

### 1.7.1. Book parts

Main matter chapters are numbered and may optionally be gathered within larger parts that are defined by the `\part[<Shortened Part Title>]{<Complete Part Title>}` command. The *<Shortened Part Title>* argument is optional. The *<Complete Part Title>*

argument is mandatory; it is possible to break the complete title into multiple lines with the help of the `\\` command.

EXAMPLE.— The `\part` statement shall be given as follows:

```
\part[%
ISTE SCIENCES Guidelines]{%
ISTE SCIENCES Guidelines\\
for Edited Collections}
```

### 1.7.2. *Book chapters*

Each chapter should be stated with the classic command, namely `\ChapterAuthor{⟨Book Title⟩}{⟨Complete Chapter Title⟩}{⟨Author name⟩}`. All the three arguments is mandatory. If its length exceeds 55 mm in 9 pt font size, then the *⟨Shortened Chapter Title⟩* argument will also be provided; it is used as the running title on odd pages. It is possible to break the complete title into multiple lines with the help of the `\\` command.

### 1.7.3. *Author and Affiliation*

In each chapter, the author and his or her affiliation should be stated with the command `\authorname{Author name}{Affiliation}`.

EXAMPLE.— The `\authorname` statement shall be given as follows:

```
\authorname{John Smith and Paul Jones}{Authors Affiliation}
```

### 1.7.4. *The bibliography*

#### 1.7.4.1. *Bib<sub>TEX</sub> bibliography databases*

The ISTE SCIENCES package includes the `agsm.bst` Bib<sub>TEX</sub> bibliography style file. It produces the ISTE SCIENCES variant of the standard `Harvard.bst` Bib<sub>TEX</sub> style file; its use is automatic and straightforward.

#### 1.7.4.2. *Bibliography sections in chapters*

The `chapterbib.sty` style file is automatically used in order to typeset one bibliography section per chapter. For proper operation of this style file, the contents of each chapter should be placed within one single dedicated file, and chapter files should be included with the `\include` (not `\input`) command in the master L<sup>A</sup>T<sub>E</sub>X source file.

The bibliography section should be typeset at the end of each chapter; this is actually a matter of two simple commands:

```
\bibliographystyle{agsm}  
\bibliography{BibTeX database file}
```

where `agsm[.bst]` is the mandatory BibTeX bibliography style file (the style file is the same for all chapters) and where `BibTeX database file[.bib]` is the file name of the relevant BibTeX database file (the database file is not necessarily the same for all chapters).

In order to produce each bibliography section, the BibTeX program should be run on each chapter file name.

## 1.8. Back matter

### 1.8.1. The glossary

The optional glossary should be introduced as an unnumbered back matter chapter. ISTE SCIENCES does not define typesetting guidelines for glossaries.

### 1.8.2. List of Authors

The List of Author should be introduced as an unnumbered back matter chapter. ISTE Science does not define typesetting guidelines for List of Authors.

### 1.8.3. The index

The use of MakeIndex with L<sup>A</sup>T<sub>E</sub>X is described in reports by Pehong Chen and Michael A. Harrison (Chen and Harrison 1988) and by Leslie Lamport (Lamport 1987); this is also described, for instance, in the editions of the L<sup>A</sup>T<sub>E</sub>X “companion” (see (Goossens *et al.* 1994, p. 345-357) and (Mittelbach *et al.* 2004, p. 647-659)). The article by Chen and Harrison (Chen and Harrison 1988) is available as an electronic document coming with the MakeIndex distribution. Index preparation is a tedious and time-consuming task that is briefly addressed here.

#### 1.8.3.1. Index preparation

The process successively involves the following steps:

- 1) load the `makeidx.sty` L<sup>A</sup>T<sub>E</sub>X style file. This step is already automatically done in the `ISTE_science.cls` document class file;
- 2) put a `\makeindex` command in the preamble of the master L<sup>A</sup>T<sub>E</sub>X source file, before the `\begin{document}` statement;
- 3) put a `\printindex` command at the end of the master L<sup>A</sup>T<sub>E</sub>X source file, before the `\end{document}` statement;

4) put `\index` commands at appropriate locations in all  $\LaTeX$  source files;

5) run the MakeIndex program on the master raw index file. For example, if the master  $\LaTeX$  source file is `\langle master \rangle.tex`, run MakeIndex on `\langle master \rangle.idx` with the mandatory `ouvrage-hermes.ist` index style file.

However, the standard MakeIndex program that comes with every  $\TeX$  system distribution has the following shortcomings:

- 1) its support for non-English languages is rather weak; it is especially difficult to sort out words with (French, etc.) diacritical signs;
- 2) its output does not fully comply with the ISTE SCIENCES guidelines for indexes.

Here is a list of methods to solve the above difficulties:

1) use the standard MakeIndex program, but pay special attention to words with diacritical signs; for instance, here is the index entry for the French word *événement*:  
`\index{evenement@événement};`

2) the designer of the ISTE SCIENCES package (RR) has set up a pipeline-based system that successfully addresses all the above difficulties and successively involves the following steps:

a) pre-process the `\langle master \rangle.idx` raw index file produced by  $\LaTeX$ . This step calls the included `makeindex-pre.awk` filter written in the AWK language, and requires the `awk` or `gawk` program (this program is available under Unix, GNU/Linux, \*BSD, Mac OS X, and Microsoft Windows/Cygwin platforms),

b) run the standard MakeIndex program on the raw index file produced at step (a) with the mandatory `ouvrage-hermes.ist` index style file,

c) post-process the `\langle master \rangle.ind` index file produced at step (b). This step calls the included `makeindex-post.awk` filter written in the AWK language;

3) one of the authors of this document (CS) uses the `xindy` flexible indexing system (Mittelbach *et al.* 2004, p. 666-679). This program is available under Unix, GNU/Linux, OS/2, and Microsoft Windows platforms; it may be downloaded from the Comprehensive  $\TeX$  Archive Network mirrors (see <ftp://ftp.tex.ac.uk/tex-archive/support/xindy> for instance).

METHOD (1).— The standard MakeIndex program comes with every  $\TeX$  system distribution; the command line for method (1) above is as follows:

```
makeindex -c -l -s ouvrage-hermes.ist \langle master \rangle.idx
```

METHOD (2).— The included `Makeindex` Bourne shell script automatically produces a compliant index file according to method (2) above. This script requires a Bourne-compatible shell (this program is available under Unix, GNU/Linux, \*BSD, Mac OS X, and Microsoft Windows/Cygwin platforms). The command line for method (2) above is as follows:

Makeindex  $\langle master \rangle .idx$

METHOD (3).— See the second edition of the L<sup>A</sup>T<sub>E</sub>X “companion” by Frank Mittelbach *et al.* (Mittelbach *et al.* 2004, p. 666-679).

### 1.8.3.2. The `\index` command

The index has at most two levels and its presentation may merge two or more letters if they are underrepresented; Figure 1.3 illustrates both features.

<p><b>A</b></p> <p>algebra 292</p> <p>algorithm 155, 171</p> <p>@ sign 2</p> <p>...</p> <p><b>C</b></p> <p>Cauchy lemma 101</p> <p>    theorem 39, 95, 153</p> <p>cécité 1</p> <p>color 33</p> <p>    bright 19</p> <p>    cold 19</p> <p>    complementary 25, 49</p> <p>...</p>	<p><b>G, H</b></p> <p>geometry 76</p> <p>Gibbs (triangle of) 60, 180, 183, 189</p> <p>Goethe 18</p> <p>history of color 23</p> <p>hyper-tetrahedron 85</p> <p>...</p> <p><b>M</b></p> <p>macro-command 169, 230, 237, 292, 297, 302, 310</p> <p>mixing 31, 268</p> <p>    blue/white 55</p> <p>    chamber 86</p> <p>    ternary 69, 151, 160, 181, 188, 235, 245, 285</p> <p>...</p>
---	---

**Figure 1.3.** Excerpt from an index

The argument of an `\index` command contains the mandatory level 1 main entry, the optional level 2 subentry (*after* the “!” character), and the optional sort key (*before* the “@” character).

Examples of level 1 entries are (see Figure 1.3):

```
\index{algebra}
\index{at sign@\texttt{"@} sign}
\index{cecite@c\'ecit\'e}
```

If one uses method (2) above, index entries may be written with explicit diacritical signs (provided they use ISO-Latin 1 coding):

```
\index{c\'ecit\'e}
```

An example of level 2 index entry *without* any specific entry for the common word is (see Figure 1.3):

```
\index{Cauchy!lemma}
\index{Cauchy!theorem}
```

An example of level 2 index entry *with* a specific entry for the common word is (see Figure 1.3):

```
\index{color!}
\index{color!bright}
\index{color!cold}
\index{color!complementary}
```

### 1.8.3.3. How to merge letters in the index

If an initial letter is missing or is underrepresented, the ISTE SCIENCES guidelines mention that this letter and an adjacent one should be merged into one common initial (see for instance the “G, H” initial in Figure 1.3). In order to automatically produce the desired result, one should modify the included `makeindex-post.awk` filter (the use of this filter requires the `awk` or `gawk` program). For instance, the following AWK code merges the “G” and “H” initial letters:

```
/\mkidxletter{G}/{ gsub(/\{G\}/,"{G, H}") ; print $0 ; next }
/\mkidxletter{H}/{ next }
```

In order to disable this feature, it is sufficient to comment out the relevant code lines (with the “#” character). On the other hand, the following AWK code merges the “I”, “J”, and “K” initial letters:

```
/\mkidxletter{I}/{ gsub(/\{I\}/,"{I, J, K}") ; print $0 ; next }
/\mkidxletter{J}/{ next }
/\mkidxletter{K}/{ next }
```

## 1.9. Automatic typesetting procedure

Using Bib<sub>T</sub><sub>E</sub>X and MakeIndex with L<sub>A</sub>T<sub>E</sub>X requires a number of successive L<sub>A</sub>T<sub>E</sub>X, Bib<sub>T</sub><sub>E</sub>X, and MakeIndex runs in order to get cross-references right. Figure 1.4 illustrates all the command lines that are required in the case of a *monograph* (we assume that the master L<sub>A</sub>T<sub>E</sub>X source file is `master.tex`).

In the case of an *edited collection*, the Bib<sub>T</sub><sub>E</sub>X command line of Figure 1.4 should be replaced by a Bib<sub>T</sub><sub>E</sub>X run on each chapter file name (the Bib<sub>T</sub><sub>E</sub>X program should be run once on each chapter that possesses a bibliography section).

The ISTE SCIENCES package includes a generic `Makefile` script that should be configured in order to drive the `make` program (this program is available under Unix, GNU/Linux, \*BSD, Mac OS X, and Microsoft Windows/Cygwin platforms). The `Makefile` script automates the whole typesetting procedure.

```
latex <master>.tex
bibtex <master>.aux
latex <master>.tex
latex <master>.tex
makeindex -c -l -s ouvrage-hermes.ist <master>.idx
latex <master>.tex
latex <master>.tex
dvips -t a4 <master>.dvi
```

**Figure 1.4.** The typesetting procedure

### 1.10. Bibliography

- Chen, P., Harrison, M.A. (1988). Index preparation and processing, *Software – Practice and Experience*, 19(9), 897–915.
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## 2

# Other Specific Commands

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This chapter describes the specific commands defined by the ISTE SCIENCES package. These new commands have been introduced in order to comply with special ISTE SCIENCES guidelines. Of course, other standard  $\text{\LaTeX}$  commands may be used in the usual way, with the usual syntax and semantics.

### 2.1. Floating figures and tables

In order to comply with the ISTE SCIENCES guidelines, one should use the new *Figure* and *Table* environments, not the standard  $\text{\LaTeX}$  *figure* and *table* environments; the syntax is slightly different.

#### 2.1.1. *An environment for figures*

All figures (namely, those produced directly by  $\text{\LaTeX}$  commands and those included with the `epsfig.sty` or `graphicx.sty` style file) should be typeset with the new *Figure* environment.

SYNTAX.— The *Figure* syntax is as follows:

```
\begin{Figure}[\langle place \rangle]{\langle text \rangle \label{\langle ref \rangle}}  
  [\includegraphics[...]{...} or \epsfig{...} commands]  
\end{Figure}
```

The arguments are as follows:

- $\langle place \rangle$  is the float placement specifier (“h” means *here if possible*, “t” means *top of page*, “b” means *bottom of page*, and “p” means *page of floats*);
- $\langle text \rangle$  is the complete text of the caption (if desired, one can use the `\` line-breaking command at appropriate places within  $\langle text \rangle$ );
- $\langle ref \rangle$  is the label internal key, for cross-references only. The `\label` command should be stated as part of the mandatory argument of the opening declaration.

There exists a number of commands that are able to crop, shrink or enlarge, and include (encapsulated) PostScript figure files:

- `\epsfig` (from the `epsfig.sty` style file) is described in (Goossens *et al.* 1994, p. 317-320), but may be considered obsolete;
- `\includegraphics` (from the `graphicx.sty` style file) is described in (Mittelbach *et al.* 2004, p. 613-628); it is strongly recommended.

EXAMPLE.— The following code produces Figure 2.1. It modifies the final height of the included figure; its width is computed automatically:

```
\begin{Figure}[!htbp]{\langle text \rangle \label{figA}}  
  \includegraphics[height=175pt]{12.example-figure.eps}  
\end{Figure}
```

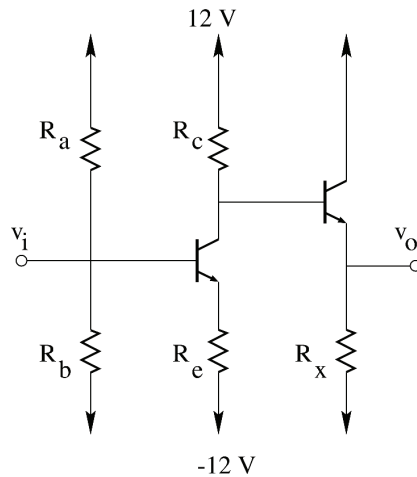
Users of the `epsfig.sty` style file might also want to use our `\EpsFigure` command. It adds two arguments to the aforementioned *Figure* environment: the first argument is the final height of the included figure; the second argument is the (EPS) file name. The following command produces the same result as the preceding code:

```
\EpsFigure[!htbp]{\langle text \rangle \label{figA}}%  
  {175pt}{12.example-figure.eps}
```

The final width of the included figure is computed automatically. If the height argument is empty, the original dimensions are used.

### 2.1.2. An environment for tables

Tables are typeset, as usual, with the *tabular*, *tabular\**, *tabularx*, and *array* L<sup>A</sup>T<sub>E</sub>X standard environments. Table structures shall then be placed inside our



**Figure 2.1.** Short captions (width  $w$  such that  $w < 36\text{ cm}$ ) are automatically centered on one, two, or three lines; the standard line-breaking command (namely, `\`) is available, but its use is optional. Long captions (width  $w$  such that  $w \geq 36\text{ cm}$ ), like the present one, are automatically justified

`Table` environment: it takes care of the required font size and sets the line thickness to 0.25 pt.

SYNTAX.— The `Table` syntax is as follows:

```
\begin{Table}[\langle place \rangle]{\langle text \rangle \label{\langle ref \rangle}}
  [table construction (with tabular, etc. environments)]
\end{Table}
```

where the float placement specifier  $\langle place \rangle$ , the complete text of the caption  $\langle text \rangle$ , and the label internal key  $\langle ref \rangle$  are used as in the case of a figure (see paragraph 2.1.1).

## 2.2. Special insets

### 2.2.1. Comments, examples, notes, and similar insets

Comments, examples, and notes should be typeset with our `\Remark{\langle text \rangle}`, `\Example{\langle text \rangle}`, and `\Note{\langle text \rangle}` commands; their mandatory argument  $\langle text \rangle$  holds the text of the comment, example, or note. Other similar insets should use the `\GenericRemark{\langle keyword \rangle}{\langle text \rangle}` command.

SYNTAX.— In order to typeset this “syntax” inset, the following command with appropriate  $\langle text \rangle$  argument should be used:

```
\GenericRemark{Syntax}{\langle text \rangle}
```

All these insets may contain several paragraphs; the vertical skip between paragraphs is adjusted automatically. Users who would rather typeset *environments* (and not *commands*) may use the *Remarks*, *Examples*, and *Notes* environments (paying special attention to the final letter “s”).

SYNTAX.— The *Remarks* syntax is as follows:

```
\begin{Remarks}  
  \langle paragraphs separated by blank lines \rangle  
\end{Remarks}
```

**REMARQUE.** Command names (`\Remark` and `\GenericRemark`) and environment names (*Remarks*) have been chosen so as to be unambiguous and compatible with the classical notion of a *commented code* in the T<sub>E</sub>X/L<sup>A</sup>T<sub>E</sub>X sense.

### 2.2.2. Definitions, theorems, lemmas, and similar insets

Definitions, theorems, and lemmas should be typeset with `\Definition{\langle text \rangle}`, `\Theorem{\langle text \rangle}`, and `\Lemma{\langle text \rangle}` commands; their mandatory argument `\langle text \rangle` holds the text of the definition, theorem, or lemma (the text is automatically typeset in italic shape). These insets are generally rather short; for this reason, environment-based counterparts are not provided. Other similar insets should use the `\GenericDefinition{\langle keyword \rangle}{\langle text \rangle}` command.

AXIOM.— In order to typeset this “axiom” inset, the following command with appropriate `\langle text \rangle` argument should be used:

```
\GenericDefinition{Axiom}{\langle text \rangle}
```

If one wishes to typeset several similar insets (for instance, several axioms), one should define a new command (for instance, the `\Axiom` command) in the preamble of the master L<sup>A</sup>T<sub>E</sub>X source file (next, any `\Axiom{\langle text \rangle}` command will produce the desired effect); for instance:

```
\newcommand{\Axiom}[1]{\GenericDefinition{Axiom}{#1}}
```

If one wishes to equip definitions, theorems, or lemmas with an automatic numbering, one should proceed according to the following example in the preamble of the master L<sup>A</sup>T<sub>E</sub>X source file:

```

\newcounter{statement}[chapter]
\renewcommand{\thestatement}{\thechapter.\arabic{statement}}
\newcommand{\NumberedStatement}[1]{%
  \refstepcounter{statement}%
  \GenericDefinition{Statement~\thestatement{}}{#1}}

```

STATEMENT 2.1.– The cross-references mechanism is available within numbered insets owing to the usual  $\LaTeX$  commands, namely `\label{<ref>}` and `\ref{<ref>}`.

STATEMENT 2.2.– Statement 2.2 proves Statement 2.1.

### 2.2.3. Quotes

The standard  $\LaTeX$  environment for extended quotes, namely `quote`, has been redefined; it automatically produces appropriate vertical skips, but its use remains standard.

## 2.3. The optional form for the ISTE in-house team

The `\Publisher` command is optional; it should be placed at the end of the book (after the index), where it will bring together some information (phone `<phone>`, fax `<fax>`, and email `<email>` of the book director, and various typesetting data) intended for the ISTE in-house team.

SYNTAX.– The `\Publisher` syntax is as follows:

```
\Publisher{<phone>}{<fax>}{<email>}
```

## 2.4. Exponents, indices, and numberings

Mathematical exponents and mathematical indices are typeset, of course, in mathematical mode. For instance, the Ricci curvature tensor is written as  $R^\beta_\delta \equiv R^{\mu\beta}_{\mu\delta}$  with the following code:

```
$R^{\beta}_{\delta} \equiv R^{\mu\beta}_{\mu\delta}$
```

Textual exponents should be typeset with the `\up` command and textual indices should be typeset with the `\down` command; examples are as follows:

- the code “`1\up{st}`” produces “1<sup>st</sup>”,
- the code “`H\down{2}SO\down{4}`” produces “H<sub>2</sub>SO<sub>4</sub>”.

Numberings should be typeset with various commands that are defined by the `babel.sty` style file<sup>1</sup>.

Some examples are as follows:

- the code “`\no{ }~2`” produces “no 2”,
- the code “`\No{ }~2`” produces “N° 2”,
- the code “`1\ier{ }`” produces “1<sup>er</sup>”,
- the code “`2\ieme{ }`” produces “2<sup>e</sup>”,
- etc.

## 2.5. Specific control commands

### 2.5.1. Controlling the page-breaking mechanism

Under rare problematic circumstances, it might be useful to enlarge specific pages by one or two lines and/or to force page breaks in order to coerce the  $\text{\TeX}$  typesetting engine into producing the desired presentation;  $\text{\LaTeX}$  commands `\enlargethispage` and `\pagebreak` would come in very handy in such a case.

The `ISTE_science.cls` document class introduces two more commands that are arguably easier to use:

- the `\DelayNewPage{<number>}` command enlarges the current page by a number of lines equal to its mandatory argument `<number>`. Sensible values are `<number> = 1` and `<number> = 2`;
- the `\ForceNewPage` command forces a page break at its location in the source code. It does not indent text at the start of the next page.

### 2.5.2. Controlling displayed mathematics

Numbered formulas are typeset by the usual *equation* and *eqnarray*  $\text{\LaTeX}$  environments. They automatically produce the required type of numbering (see the example of the Painlevé VI equation [2.1]).

Many long formulas need at least one possible break point and an associated line-breaking decision. The `\EqnCont` basic command may be used at any appropriate

---

1. The `ISTE_science.cls` document class automatically loads the `babel.sty` style file with the required style options.

$$\begin{aligned} \frac{d^2 u}{dx^2} = & \frac{1}{2} \left[ \frac{1}{u} + \frac{1}{u-1} + \frac{1}{u-x} \right] \left( \frac{du}{dx} \right)^2 - \left[ \frac{1}{x} + \frac{1}{x-1} + \frac{1}{u-x} \right] \frac{du}{dx} \\ & + \frac{u(u-1)(u-x)}{x^2(x-1)^2} \left[ \alpha + \frac{\beta x}{u^2} + \frac{\gamma(x-1)}{(u-1)^2} + \frac{\delta x(x-1)}{(u-x)^2} \right] \end{aligned} \quad [2.1]$$

This equation corresponds to the following code (it uses the `\EqnCont` command in order to split the right-hand side and it aligns both sides with ampersands):

$$\frac{\mathrm{d}^2 u}{\mathrm{d} x^2} = \frac{1}{2} \left( \frac{1}{\mathrm{d} u} + \frac{1}{u-1} + \frac{1}{u-x} \right) \left( \frac{\mathrm{d} u}{\mathrm{d} x} \right)^2 - \frac{1}{2} \left( \frac{1}{x} + \frac{1}{x-1} + \frac{1}{u-x} \right) \frac{\mathrm{d} u}{\mathrm{d} x} \frac{\mathrm{d} x}{\mathrm{d} u} \quad \text{EqnCont}$$

$$+ \frac{1}{2} \left( \frac{1}{u(u-1)(u-x)} \right) x^2 (x-1)^2 + \frac{\alpha}{2} + \frac{\beta x}{u^2} + \frac{\gamma (x-1)}{(u-1)^2} + \frac{\delta x}{(x-1)(u-x)^2}$$

$$\quad \text{right] \label{eqn:P-VI}}$$

### 2.5.3. Controlling the table of contents

The table of contents is produced automatically. However, it is sometimes necessary to add further information into the table of contents. Any direct hand-editing of the table of contents would of course be ill-advised:  $\text{\LaTeX}$  refreshes the `\langle master \rangle.toc` file each time it is run. The solution is to use the new `\AddToContents` command inside the source file itself: this ensures that these adjustments are automatically taken into account.

**SYNTAX.**— The `\AddToContents` syntax is as follows:

$$\backslash\text{AddToContents}\{\langle level\rangle\}\{\langle indent\rangle\}\{\langle text\rangle\}$$

where:

- $\langle level \rangle$  is the numerical level of the corresponding sectioning command (see Table 1.1 on page 10 for details, especially column 2);
- $\langle indent \rangle$  is a dimension corresponding to the total indentation from the left margin;
- $\langle text \rangle$  is the complete text that should appear in the table of contents. Fragile commands must be protected with the `\protect` command.

EXAMPLE.– Here is an example for the `\AddToContents` command:

```
\AddToContents{2}{10mm}{Further information}
```

#### 2.5.4. Controlling overruns

The generated `<master>.log` transcript file provides users with some valuable information dealing with the typesetting process. One important piece of information deals with underfull and overfull horizontal (`\hbox`) and vertical (`\vbox`) boxes. Underfull boxes are characterized by a “badness” number; overfull boxes are much more serious and are associated with the value of the overrun in points ( $1\text{ pt} = \frac{1}{72.27}$  in  $\approx 0.351\text{ mm}$ ). It is possible to visualize the overruns:

- the `cropmarks` class option (see section 1.3) draws the page limits and the text borders; this allows us to assess overruns. This class option acts at the level of the whole book;
- the `\CropMarksOn` and `\CropMarksOff` commands respectively activate and disable the crop marks plotting. These commands act at the local (page) level.

#### 2.5.5. Controlling footnote rules

As far as footnote rules are concerned, the ISTE SCIENCES guidelines are as follows:

- at the *start* of footnotes, the width of the footnote rule is equal to 25 mm (default value);
- whenever a footnote extends over more than one single page, the width of the *continuation* footnote rule is equal to 120 mm (exceptional value). Of course, the setting must be put back to normal (25 mm) as soon as the long footnote is over.

The `ISTE_science.cls` document class sets the default width of footnote rules to 25 mm. The `\LargeFnRule` command should be used whenever a footnote extends over more than a single page; this command must be located in the page where the footnote *continues* (not where the footnote *starts*<sup>2</sup>). Moreover, the `\SmallFnRule` command should be used as soon as the long footnote is over (on the next page); this command brings the setting back to normal.

---

2. In order to illustrate the point being made here, the `\LargeFnRule` command has been used on the current page even though this is not necessary (the footnote starts and ends on the same page).

## 2.6. Bibliography

- Chen, P., Harrison, M.A. (1988). Index preparation and processing, *Software – Practice and Experience*, 19(9), 897–915.
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