

L^AT_EX document class options

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Abstract

The standard document classes `article`, `report`, `book`, and `letter` accept a number of class options which allow high-level customization of a document. In this article, available options are introduced, the default for each document class is highlighted, and alternative, more flexible customizations are given.

1 Setting document class options

Options that differ from the default are passed to the document class through its optional argument field. Multiple options have to be separated by a comma. If contradictory options are set, the last option always overrides the previous ones. Moreover, if a non-existent option is set, L^AT_EX ignores it and generates a warning in the log.

```
\documentclass[option1,option2,...]{article}
```

2 Default options

Most default options are the same between different document classes, with a few exceptions. An overview of all the defaults is given in table 1 (below). As the `letter` class is fairly specific, several options don't apply and are therefore not implemented.

3 Paper size

L^AT_EX provides several predefined paper (page) sizes. The supported options: `a4paper`, `a5paper`, `b5paper`, `letterpaper`, `legalpaper`, and `executivepaper`.

The width and height for each of these page sizes is listed in table 2. The default depends on the T_EX distribution and/or system used. It is either `a4paper` or `letterpaper`.

The `geometry` package [3] implements additional page sizes. For example, with this package, all ISO standard formats are available, including ISO A0–A6, B0–B6, and C0–C6, specified as `a0paper`–`a6paper`,

Table 2: Measures of predefined page formats.

<i>Option</i>	<i>width</i>	<i>height</i>
<code>a4paper</code>	210 mm	297 mm
<code>a5paper</code>	148 mm	210 mm
<code>b5paper</code>	176 mm	250 mm
<code>letterpaper</code>	8.5 in	11 in
<code>legalpaper</code>	8.5 in	14 in
<code>executivepaper</code>	7.25 in	10.5 in

and so on. To use a geometry page format, the option is passed to the package directly, rather than to the document class. Any page format set in the document class is ignored. Besides these additional predefined formats, the package allows the user to define an arbitrary page size. Here is an example:

```
% A0 size:
\usepackage[a0paper]{geometry}

% Arbitrary page size:
\usepackage[paperwidth=5cm,paperheight=5cm]
{geometry}
```

4 Font size

Throughout the entire document, L^AT_EX uses the same font size, except for headings or if the font is changed locally through a macro, such as `\small` or `\large`. 10pt is the default for all classes. Three options are available: `10pt`, `11pt`, and `12pt`. If the default font size is changed, headings and macros change accordingly. Margins are also changed according to the font size.

For a larger range, the `extsizes` package [2] provides additional classes that support font sizes between 8pt–20pt.

5 One or two columns

All document classes use a single column layout by default (`onecolumn`). With the `twocolumn` option,

Table 1: Default document class option for standard document classes.

<i>Option</i>	<code>article</code>	<code>report</code>	<code>book</code>	<code>letter</code>
Paper size (system specific)	<code>a4paper/letterpaper</code>	<code>a4paper/letterpaper</code>	<code>a4paper/letterpaper</code>	<code>a4paper/letterpaper</code>
Font size	<code>10pt</code>	<code>10pt</code>	<code>10pt</code>	<code>10pt</code>
Number of columns	<code>onecolumn</code>	<code>onecolumn</code>	<code>onecolumn</code>	<code>onecolumn</code>
Margins	<code>oneside</code>	<code>oneside</code>	<code>twoside</code>	<code>oneside</code>
Title page	<code>notitlepage</code>	<code>titlepage</code>	<code>titlepage</code>	-
Chapter start page	-	<code>openany</code>	<code>openright</code>	-
Orientation	<code>portrait</code>	<code>portrait</code>	<code>portrait</code>	<code>portrait</code>
Formula options	(center; right label)	-	-	-
Draft or final	<code>final</code>	<code>final</code>	<code>final</code>	<code>final</code>

the page is horizontally divided, a layout frequently used by scientific journals. The `\linewidth` macro flexibly adapts to the new layout and is automatically set to the width of a single column. Therefore, `\linewidth` is convenient to make optimal use of the available space, for example when adding figures. `\textwidth`, on the other hand, remains unchanged and is equal to the total width of the text area.

In two-column mode, the `figure*` environment inserts a figure that spans both columns, and similarly `table*` for a full-width table. Consequently, `\linewidth` and `\textwidth` are identical within these starred environments. An example:

```
\documentclass[twocolumn]{article}
\usepackage{graphicx}
\begin{document}

\begin{figure*}[ht]
  \includegraphics[width=\linewidth]{myFigure}
  \caption{Figure spanning two columns.}
\end{figure*}

... text of document ...
\end{document}
```

The `multicol` package [9] provides support for two or more columns. With this package, it is also possible to mix different layouts within the same document.

6 Margins

The options `oneside` and `twoside` affect the width of the side margins. With `oneside`, which is the default for `article`, `report`, and `letter`, the margins on both sides of every page are equally wide. With `twoside`, L^AT_EX distinguishes between an inner and outer margin. The outer margin is substantially wider and switches between left and right. Even pages have their outer margin on the left, odd pages on the right. Most books follow this structure and so it should not come as a surprise that the `book` class default is `twoside`.

7 Title page

The `titlepage` option prints the title on a separate page. This is the default for `report` and `book`. On the other hand, `article` has `notitlepage` as its default, with the main text starting directly after the title. The `letter` class doesn't implement title page commands and therefore these options are altogether unavailable.

8 Page orientation

All of the standard document classes produce documents in portrait orientation, by default. The option

`portrait` doesn't explicitly exist. However, there is a `landscape` option, which rotates the page by 90°, but keeps the dimensions of the text area and the margins, which is often undesired. The `geometry` package [3] provides a more convenient landscape option, where text area and margins are adapted accordingly.

```
\usepackage[landscape]{geometry}
```

The `lscap` [7] and `pdfscape` [10] packages implement the `landscape` environment, which changes the orientation locally, for one or several pages in an otherwise portrait document. In contrast to the `geometry` package, with these packages only the orientation of the text area is changed, while the margins and with them the header and footer remain in portrait mode. This environment is particularly useful for adding extra-wide figures or tables to a document. If pdf_TE_X is used for processing, `pdfscape` physically rotates any landscape oriented page, which makes it easier to read on screen. For example:

```
\documentclass{article}
\usepackage{pdfscape}
\begin{document}
\begin{landscape}
  % landscape oriented content
\end{landscape}
\end{document}
```

9 Chapter starting page

Chapters and other chapter-level headings are only available in the `report` and `book` classes. By default, a new chapter starts on the next page in `report` (`openany`), but always on an odd page in `book` (`openright`). As a consequence, in a `book` there might be a blank page between two consecutive chapters (if the previous chapter ended with an odd page number). `openany` and `openright` do not apply to `article` or `letter`.

10 Formula options `fleqn` and `leqno`

The `fleqn` and `leqno` options define how formulas are displayed. They are independent and so can be used together. The names are not especially self-explanatory — `fleqn` aligns formulas on the left, instead of the default centering; `leqno` prints the equation number on the left side instead of the (default) right.

For instance, consider the Cauchy-Schwartz inequality printed with the defaults: the formula is centered, with the equation number on the right.

$$|x, y|^2 \leq \langle x, x \rangle \cdot \langle y, y \rangle \quad (1)$$

With `fleqn`, the equation is left-aligned:

$$|x, y|^2 \leq \langle x, x \rangle \cdot \langle y, y \rangle \quad (2)$$

And with `leqno`, the equation number is placed left of the equation instead of right:

$$(3) \quad |x, y|^2 \leq \langle x, x \rangle \cdot \langle y, y \rangle$$

The `amsmath` package [1] provides more flexibility for equations. For example, it implements the `flalign` environment which was used here to illustrate left-alignment (equation 2).

11 Draft or final

All document classes have the `final` option preset. With `draft`, text or environments that reach into the margins are highlighted with a black square or bar. With that, it becomes easy to spot `Overfull \hbox` warnings in the document output.

Other packages also make use of these options and implement macros that behave differently in draft mode. For example, the `graphicx` bundle [4] replaces figures with a box that shows the file name instead of the figure. Document processing time can be drastically reduced when figures are not loaded. Two other examples: the `hyperref` [5] package removes all linking features from a document in draft mode, and `microtype` [8] disables its features altogether.

When `draft` is used for the overall document, specific packages can be still set to final mode by loading the package with the `final` option. This might sometimes be helpful to examine the package’s “final” behavior. An example:

```
\documentclass[draft]{article}
\usepackage[final]{graphicx}
```

The `ifdraft` package [6] implements commands to flexibly customize the behavior of `draft` and/or `final`. For example, in a thesis the author might like to omit the title page and content lists while he’s still working on the document. This is straightforward, using either the `\ifdraft` or `\iffinal` macro provided by the package:

```
\documentclass[draft]{report}
\usepackage{ifdraft}
\title{...}
\author{...}
\begin{document}
```

```
\ifdraft{% Draft: omit title/toc/lof/lot
}%
\maketitle
\tableofcontents\clearpage
\listoffigures\clearpage
\listoftables\clearpage
}
\end{document}
```

References

- [1] `amsmath` — AMS mathematical facilities for L^AT_EX. <http://www.ctan.org/pkg/amsmath>. Accessed: 2014-09-22.
- [2] `extsizes` — extend the standard classes’ size options. <http://www.ctan.org/pkg/extsizes>. Accessed: 2014-09-30.
- [3] `geometry` — flexible and complete interface to document dimensions. <http://www.ctan.org/pkg/geometry>. Accessed: 2014-09-22.
- [4] `graphicx` — enhanced support for graphics. <http://www.ctan.org/pkg/graphicx>. Accessed: 2014-09-28.
- [5] `hyperref` — extensive support for hypertext in L^AT_EX. <http://www.ctan.org/pkg/hyperref>. Accessed: 2014-09-28.
- [6] `ifdraft` — detect “draft” and “final” class options. <http://www.ctan.org/pkg/ifdraft>. Accessed: 2014-09-28.
- [7] `lscap` — place selected parts of a document in landscape. <http://www.ctan.org/pkg/lscap>. Accessed: 2014-09-30.
- [8] `microtype` — subliminal refinements towards typographical perfection. <http://www.ctan.org/pkg/microtype>. Accessed: 2014-09-28.
- [9] `multicol` — intermix single and multiple columns. <http://www.ctan.org/pkg/multicol>. Accessed: 2014-09-28.
- [10] `pdflscape` — make landscape pages display as landscape. <http://www.ctan.org/pkg/pdflscape>. Accessed: 2014-09-30.

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