

The `lastpage` package

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2023-03-07 v2.0a

Abstract

This \LaTeX package puts the label `LastPage` at the end of the document into the `.aux` file, allowing the user to refer to the last page of a document. This might be particularly useful in places like headers or footers. –

While this package allows for things like

“Page `\thepage{}` of `\pageref{LastPage}`” to get “Page 7 of 9” or “Page VII of IX”, the *number* of pages is nowadays available via `\@abspage@last` from the kernel, but when more than one page numbering scheme is used (for example pages I to X and then 1 to 10, thus number of pages “20”, but name of the last page “10”), or when or the `fnsymbol` page numbering scheme is used, or another package has output after this package, or the page numbers exceed a certain range, there might be problems, which can be solved by using the `pageslts` package instead.

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Note: At several places in this manual as alternative the `pageslts` package is “advertised”. The current version 2015/12/21 v1.2f of that package has not yet been updated to the new hook mechanism. In special cases (for example `\pagenumbering{fnsymbol}`) the current version of that package combined with a current \LaTeX -format fails. Together with about 80 other packages (small to large, public as well as private, some probably obsolete) it is in the update queue.

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1 Introduction

This L^AT_EX package puts the label `LastPage` (at end of the document) into the aux file, allowing the user to refer to the last page of a document via `\pageref{LastPage}`. This might be particularly useful in places like headers or footers.

This package was invented by **Jeffrey P. Goldberg**, and is now maintained by H.-MARTIN MÜNCH. A big “Thank you!” to JEFFREY P. GOLDBERG for granting this.

If you are more ambitious in respect to your aims with this package, you might want to have a look at the `pageslts` package (see section 4: Alternatives).

2 Usage

Just load the package placing

```
\usepackage{lastpage}
```

in the preamble of your source file (or `\input{lastpage.sty}` if `\usepackage` is unknown).

For example for various draft forms it is desirable to have a page reference to the last page, so that e.g. page footers can contain something like “page N of K ”, where N is the current page and K is the last page. Once the package is loaded, anywhere in the text references can be made to the label `LastPage`. In particular one can use the `fancyhdr` or `nccfancyhdr` package, or redefinitions of the page headings and footings to get a reference to the last page.

In your document the code

```
\makeatletter
\renewcommand{\@evenfoot}{%
  \normalsize\slshape DRAFT \today\hfil \upshape %
  page \thepage{} of \pageref{LastPage}}
\renewcommand{\@oddfont}{\@evenfoot}
\makeatother
```

creates footers like

“DRAFT March 7, 2023 page 7 of 9”

in the compiled document (cf. the `lastpage-example` file).

If the `hyperref` package is used, the references are hyperlinked to their aims. If these hyperlinks shall be suppressed, `\pageref*{...}` instead of `\pageref{...}` can be used.

The `lastpage` package does not provide the words “page” or “of”, but e.g. the `handout` class uses “of” in the definition of the footer. (In the `lastpage-example` also `\@evenfoot` is redefined, but it is not the `lastpage package` redefining this.) If you want to change “page” or “of” (e.g. to another language), you therefore have got to look in the used class/package(s)/preamble instead of in the `lastpage package`.

If the total *number* of pages of a document is needed, the kernel already gives this by `\makeatletter\@abspage@last\makeatother` (needs at least two compiler runs).

3 Some Warnings

3.1 `\AtEndDocument`

`\AtEndDocument` is not used by the `lastpagemodern.sty` version of the `lastpage` package, requiring `LATEX-format 2022-11-01` or newer. Instead `\AddToHook{enddocument/afterlastpage}` is used and the problem does not arise.

`lastpageclassic.sty` uses `\AtEndDocument` and `lastpage209.sty` redefines `\enddocument`. The last two cases are problematic:

The output of a `LATEX 2ε` run is not independent of the order in which the packages are loaded. It is often the case that the same formats for which one must put tables and figure at the end, are the ones in which endnotes are also required. If one wants to use `\AtEndDocument` here as well (as done for `\pageref{LastPage}`), then it is easy to get to three separate uses of `\AtEndDocument` (assuming one uses this for the endnotes as well). Clearly it is not safe for any package writer or user to assume that no material will follow what they put into `\AtEndDocument`. Therefore a message, which begins with `AED`, is included in every usage of `\AtEndDocument`. `lastpage` uses `\AtEndDocument{... \clearpage...}`, thus `\usepackage{lastpage}... \AtEndDocument{something}` will place *something* after the `\clearpage`. To place it earlier, use `\AtEndDocument{something}... \usepackage{lastpage}`. If the *something* is not known before `\usepackage{lastpage}`, you can use for example

```
...
\def\beforeLastpageClearpage{\relax}
\AtEndDocument{\beforeLastpageClearpage}
\usepackage{lastpage}
\begin{document}
...
\def\beforeLastpageClearpage{\textit{something}}%
...
\end{document}
```

(might need a protected and/or expanded `\def`). When `\clearpage` leads to some output, `\clearpage\textit{something}` instead of `\textit{something}` might be wanted.

3.2 Interaction with ancient versions of the `endfloat` package

`\AtEndDocument` is not used by the `lastpagemodern.sty` version of the `lastpage` package, requiring `LATEX-format 2022-11-01` or newer. Instead `\AddToHook{enddocument/afterlastpage}` is used and the problem does not arise.

The *ancient* version 2.0 (and earlier; 2.0 from 1992; current version at the time of updating this documentation: 2.7 from 2019) of the `endfloat` package actually redefined the `\enddocument` command, and so interfered drastically with the `LATEX 2ε` commands which make use of `\AtEndDocument`. If you want your `LastPage` to label the last page of these end floats, you need to load `lastpage` after loading `endfloat` (or use `VeryLastPage` from the `pageslts` package instead). If, on the other hand, you *want* `LastPage` to refer to the (not so) last page, exclusive of the floats at the end, then load in the reverse order. Independent from the order of `lastpage` and `endfloat`, you will still need a version of `endfloat` later than 2.0 from 1992.

Other `LATEX 2.09` (!) packages also seem to like to redefine `\enddocument`. In addition to the old `endfloat`, `harvard` comes to mind. All of these will need to be modified swiftly.

3.3 Page name instead of page number

When any page numbering scheme other than `arabic` is used at the page, which `\pageref{LastPage}` refers to, the *name* and not the *number* of the page is given. For example, `Alph` page numbering scheme and 10 pages will give J instead of 10, `Roman` page numbering scheme and 10 pages will give X instead of 10, and so on.

(The `pageslts` package puts `\lastpageref{LastPages}` (with `s` at the end) at your disposal for remediation.)

3.4 No write access to the aux file

Some packages (e.g. `tikz` and `selectp`) sometimes prevent the output to the `aux` file. In that case a warning is issued. This is no problem as long as there is another compilation run where the label to the last page can be placed via the `aux` file.

3.5 Wrong last page number with more than one page numbering scheme

When more than one page numbering scheme is used, `LastPage` does not give the total **number** of pages (even if `arabic` is the page numbering scheme of that page). For example, for a document with `VI+36` pages, it gives “36” as reference to the last page. While this is correct, the total number of pages is 42.

If the total *number* of pages of a document is needed, the kernel already gives this by `\makeatletter\@abspage@last\makeatother`. The `pageslts` package puts `\lastpageref{LastPages}` (with `s` at the end) at your disposal for remediation, giving the number of pages and linking to the last page, if linking is provided for example by the `hyperref` package.

3.6 `\addtocounter{page}{...}` and `\setcounter{page}{...}`

When the page number was manipulated by `\addtocounter{page}{...}` or `\setcounter{page}{...}`, `LastPage` does not give the total **number** of pages (even if `arabic` is the page numbering scheme of that page).

The `pageslts` package puts `\lastpageref{LastPages}` (with `s` at the end) at your disposal for remediation: `LastPages` ignores page number manipulation. Also `\@abspage@last` from the kernel is not influenced by page number manipulation.

3.7 Page number reset by `\pagenumbering{...}`

At a page numbering change the page number is reset to one. Therefore `LastPage` does not give the total **number** of pages (even if `arabic` is the page numbering scheme of that page). Furthermore, now two pages have the same name.

The `pageslts` package does not only put `\lastpageref{LastPages}` (with `s` at the end) at your disposal for remediation: `LastPages` also ignores page number manipulation. It furthermore offers the option `pagecontinue` to continue the page numbering, when `\pagenumbering{...}` is used.

3.8 Last pages of different page numbering schemes

`\pageref{LastPage}` refers to the (maybe not so) last page of the last page numbering scheme. References to the respective last page of the other page numbering schemes are not provided.

The `pageslts` package does this with labels `pagesLTS.<numbering scheme>`, where `<numbering scheme>` is e.g. `arabic`, `roman`, `Roman`, `alph`, or `Alph`. For `fnsymbol` please use `\lastpageref{pagesLTS.fnsymbol}` instead of `\pageref{pagesLTS.fnsymbol}`.

3.9 Current page

The command `\thepage` gives the **name** of the current page in the current page numbering scheme, which is different from the current total/absolute page number e.g. with a second page numbering scheme, `\addtocounter{page}{...}`, or `\setcounter{page}{...}`, and it will not be an arabic number at all, if the current page numbering scheme is not arabic.

The `pageslts` package provides the command `\theCurrentPage` and for the current number of pages in the current page numbering scheme

`\theCurrentPageLocal`. The kernel already provides the number of pages, which have been shipped out, as `\the\ReadonlyShipoutCounter`. The current page is always `ReadonlyShipoutCounter + 1`.

3.10 First page

There is no special label at the first page. (This is the `lastpage` package, after all.) The `pageslts` package creates a label `pagesLTS.0` at the first page of the document.

3.11 Using the `fnsymbol` page numbering scheme

Using the `fnsymbol` page numbering scheme can result in problems!

When the page, where `\pageref{lastpage}` points at, is in `fnsymbol` page numbering scheme, this package might screw up – and quite totally for that, especially when used together with *very old* versions of the `hyperref` package (e.g. `hyperref` v6.80x as of 2010/04/17). When testing with version v6.83m as of 2012/11/06 everything seemed to worked fine, but this might not always be the case.

The `pageslts` package with `\lastpageref{lastpage}` and appropriate package options should cope even with this case.

3.12 Page counter overflow

“The ranges of supported counter values are more or less restricted. Only `\arabic` can be used with any counter value T_EX supports.

Presentation command	Supported domain	Ignored values	Error message ‘Counter too large’
<code>\arabic</code>	<code>-MAX..MAX</code>		
<code>\roman</code> , <code>\Roman</code>	<code>1..MAX</code>	<code>-MAX..0</code>	
<code>\alph</code> , <code>\Alph</code>	<code>1..26</code>	<code>0</code>	<code>-MAX..-1</code> , <code>27..MAX</code>
<code>\fnsymbol</code>	<code>1..9</code>	<code>0</code>	<code>-MAX..-1</code> , <code>10..MAX</code>

`MAX = 2147483647`

” (HEIKO OBERDIEK: The `alphalph` package, 2010/04/18, v2.3, first table, p. 2).

When *any* page is out of that range, there will be a counter overflow.

`lastpage` probably is not the right package to be asked to correct this anyway, but the `pageslts` package (with appropriate options) can do this.

3.13 Other packages manipulating `\lastpage@putlabel`

The `hyperref` package redefines the `\lastpage@putlabel` command, and the `revtex4` class redefines the `\lastpage@putlabel` command, and the `hyperref` package redefines the `\lastpage@putlabel` command, if the `revtex4` class is used, and the `pageslts` package “kills” the `\lastpage@putlabel` command, because that package uses more advanced labels.

In my humble opinion it would be preferably if one package (the original one, i.e. `lastpage`) would do the job right, all others packages would check for the version of that package, and if an old version is found, an error (or at least a warning) message about the use of an outdated package is given, and *then* as “last aid” the

command of the outdated package is redefined.

Therefore here none of the definitions or commands of the other packages is altered, but `\lastpage@putlabel` was replaced by `\lastpage@putl@bel`. Because `\lastpage@putlabel` is no longer called, now there should not be any double definitions of the `lastpage` label.

4 Alternatives

There are similar packages, which do (or do not) similar things (or even more). As I neither know what exactly you want to accomplish when using this package (e. g. page number vs. page name, hyperlinks or not), nor what resources you have (e. g. \TeX , \LaTeX 2 ϵ , ϵ - \TeX , \LaTeX -format as recent as 2022-11-01 or newer), here is a list of some possible alternatives:

- `pageslts` - **Note: The current version 2015/12/21 v1.2f of the `pageslts` package has not yet been updated to the new hook mechanism. In special cases (for example `\pagenumbering{fnsymbol}`) the current version of that package combined with a current \LaTeX -format fails. Together with about 80 other packages (small to large, public as well as private, some probably obsolete) it is in the update queue.**
- The `pageslts` package first started as a revision of this `lastpage` package, but it became obvious that a replacement was needed to accomplish what the `pageslts` package does. For backward compatibility, a label named `LastPage` is provided. Thus `\usepackage{lastpage}` can be replaced by `\usepackage[pagecontinue=false,alphMult=0,AlphMulti=0,fnsymbolmult=false,romanMult=false,RomanMulti=false]{pageslts}`, if the behaviour of the `lastpage` package should be simulated. The default options are `\usepackage[pagecontinue=true,alphMult=ab,AlphMulti=AB,fnsymbolmult=true,romanMult=true,RomanMulti=true]{pageslts}`. Benefits of `pageslts` package (with appropriate options) are:
- + Labels `LastPage` (`\AtEndDocument`) and `VeryLastPage` (`\AfterLastShipout`), allowing the user to refer to the (very) last page of a document.
 - + For example, when more than one page numbering scheme is used, the label `LastPages` gives the total *number* of pages.
 - + At the last page of each page numbering scheme a label `pagesLTS.<numbering scheme>` is placed, where `<numbering scheme>` is e. g. `arabic`, `roman`, `Roman`, `alph`, or `Alph`. For `fnsymbol` please use `\lastpageref{pagesLTS.fnsymbol}` instead of `\pageref{pagesLTS.fnsymbol}`.
 - + When the same numbering scheme is used twice, the page numbers are either reset to one or continued automatically, depending on the option given when the package is called.
 - + The command `\theCurrentPage` prints the current total/absolute page number – in contrast to `\thepage`, which gives only the page *name* in the current page numbering scheme. `\theCurrentPageLocal` gives the current number of pages in the current page numbering scheme. `\thepage` and `\theCurrentPageLocal` are different e. g. when `\addtocounter{page}{...}` or `\setcounter{page}{...}` were used.
 - + At the first page of the document a label `pagesLTS.0` is created.
 - + The `alphalph` package is supported, i. e. page numbers `alph` or `Alph` > 26 and `fnsymbol` > 9 can be used (with according options set). Even zero and negative page numbers can be used with `arabic`, `alph`, `Alph`, `roman`, `Roman`, and `fnsymbol` page numbering (with `alphalph` package and according options).

- + It is checked whether a (very) old `endfloat` package is in use. If it is, a warning or even an error message is given, depending on `endfloat` version.
- + A rerun warning is given, when labels have changed.

Further labels are provided for special cases.

- totpages** - The `totpages` package provides a `totpages` label similar to `LastPages` `\AtEndDocument` (instead of `\AfterLastShipout`, as done by `pageslts`). The `totpages` package additionally computes the number of paper sheets needed to (double) print the document (with one, two, three,... pages on one sheet of paper) (which can be achieved also with the `papermas` package, an extension of the `pageslts` package, which further allows to compute the mass of that printed version of the document, useful e. g. when sending it by mail to determine the postage).
- nofm.sty** - “There is a package `nofm.sty` available, but some versions of it are defective, and most don’t work with `fancyhdr` because they take over the complete page layout.” (PIET VAN OOSTRUM: Page layout in \LaTeX , March 2, 2004, section 16; `fancyhdr.pdf`)
`nofm` as of 1991/02/25 (without version number), available at <https://mirror.ctan.org/obsolete/macros/latex209/contrib/misc/nofm.sty>, does not work with e.g. `hyperref`, redefines `\enddocument` as well as `\@oddhead`, `\@evenhead`, `\@oddfoot`, and `\@evenfoot`.
 If you know the (CTAN) location of a **working** (!) version, please send an e-mail to the `lastpage` maintainer, thanks!
- countlto** - You may want to have a look at the `countlto` package.
- totalcount** - The `totalcount` package provides `\totalpages`. If there are only arabic page numbers consecutively running from 1 to the last page, this works. But for example
- ```
\documentclass{article}
\usepackage[page]{totalcount}
\pagenumbering{Roman}
\begin{document}
\addtocounter{page}{49}
Page \thepage{} of \totalpages
\end{document}
```
- prints “Page L of 50”, where the number of pages is one (and no hyperlink is provided to the last page even if `hyperref` is used).
- zref** - The `zref` package of HEIKO OBERDIEK requires  $\varepsilon$ - $\TeX$ . `lastpageclassic` does not require  $\varepsilon$ - $\TeX$ , but if you already have  $\varepsilon$ - $\TeX$  (and use `lastpagemodern`), you may also have a look at the extensive `zref` package, whether it suits your needs better (or additionally or whatsoever).
- memoir** - The `memoir class` provides `\thelastpage` (page number printed on last page) and `\thelastsheet` (number of pages).
- LaTeX-kernel** - The number of pages is nowadays available via `\@abspage@last` from the kernel, but when more than one page numbering scheme is used (for example pages I to X and then 1 to 10, thus number of pages “20”, but name of the last page “10”), or when or the `fnsymbol` page numbering scheme is used, or another package has output after this package, or the page numbers exceed a certain range, there might be problems.



(You programmed or found another alternative, which is available at [CTAN.org](https://ctan.org)? OK, send an e-mail to me with the name, location at [CTAN.org](https://ctan.org), and a short notice, and I will probably include it in the list above.)

About how to get those packages, please see subsection 7.1.

## 5 Example

```

1 (*example)
2 \documentclass[british]{article}[2022/07/02]% v1.4n Standard LaTeX document class
3 \makeatletter
4 \@ifl@t@r\fmtversion{2022/11/01}{%
5 \AddToHook{enddocument/afterlastpage}[lastpage]{%
6 \message{^^JLaTeX Info: Executing hook 'enddocument/afterlastpage'.}}%
7 }{\AtEndDocument{\message{^^JLaTeX Info: Executing hook 'AtEndDocument'.}}%
8 }
9 \makeatother
10 \usepackage[draft]{showkeys}[2022/04/12]% v3.18 Show cite and label keys (DPC, MH)
11 %% Use final instead of draft to hide the keys. %%
12 \usepackage[hyperref][2023-02-07]% v7.00v Hypertext links for LaTeX
13 \hypersetup{extension=pdf,%
14 plainpages=false,%
15 pdfpagelabels=true,%
16 hyperindex=false,%
17 pdflang={en},%
18 pdftitle={lastpage package example},%
19 pdfauthor={H.-Martin Muench},%
20 pdfsubject={Example for the lastpage package},%
21 pdfkeywords={LaTeX, lastpage},%
22 pdfview=Fit,%
23 pdfstartview=Fit,%
24 pdfpagelayout=SinglePage%
25 }
26 %% If hyperref is not used, the url package
27 %% https://ctan.org/pkg/url
28 %% must be loaded for the \url used in this example:
29 %% \usepackage{url}
30 %% or just use \let\url\texttt for the one used url.
31 \usepackage[lastpage][2023-03-07]% v2.0a
32 \makeatletter
33 \renewcommand{\@evenfoot}{%
34 \normalsize\slshape \today\hfil \upshape %
35 page \thepage{} of \pageref{LastPage}}
36 \renewcommand{\@oddfoot}{\@evenfoot}
37 \makeatother
38 \listfiles
39 \begin{document}
40 \pagenumbering{Roman}
41 \section*{Example for lastpage}
42 \markboth{Example for lastpage}{Example for lastpage}
43 This example demonstrates the use of package\newline
44 \textsf{lastpage}, v2.0a as of 2023-03-07 (HMM; JPG).\newline
45 The package takes no options.\newline
46 For more details please see the documentation!\newline
47
48 \noindent \label{keys} To hide the \pageref{keys}{\quad } use option
49 \texttt{final} instead of \texttt{draft} with the \textsf{showkeys}
50 package (or remove the package call from the preamble of
51 this document).\newline
52
53 \textbf{Hyperlinks or not:} If the \textsf{hyperref} package is loaded,

```

```

54 the references are also hyperlinked:\newline
55 \smallskip
56 Last page's name (LastPage): \pageref{LastPage}\newline
57 \noindent If the \textsf{hyperref} package is loaded, but the hyperlinks
58 of the references shall be suppressed, \verb|\pageref*{...}|
59 can be used:\newline
60 \smallskip
61 Last page's name (LastPage): \pageref*{LastPage}\newline
62
63 \textbf{Trademarks} appear throughout this example without any
64 trademark symbol; they are the property of their respective
65 trademark owner. There is no intention of infringement; the
66 usage is to the benefit of the trademark owner.\newline
67
68 \textbf{Tip}: Use \textit{logical page numbers}
69 for the display of the pdf (in Adobe Acrobat Reader 2022.003.20322:
70 Edit $>$ Preferences $>$ Page Display $>$
71 Page Content and Information: Use logical page numbers)!\newline
72
73 If you are more ambitious in respect to your aims with this package,
74 you might want to have a look at the \textsf{pageslts} package:\newline
75 \url{https://ctan.org/pkg/pageslts}.
76 \bigskip
77
78 \noindent The page (\verb|\thepage|): \thepage \newline
79 Last page's name (LastPage): \pageref{LastPage}
80 \newpage
81
82 \noindent The page (\verb|\thepage|): \thepage \newline
83 Last page's name (LastPage): \pageref{LastPage}
84
85 \bigskip
86
87 \noindent There was the question:
88
89 \begin{quote}
90 \begin{verbatim}
91 \documentclass{article}
92 \usepackage{hyperref}
93 \usepackage{lastpage}
94 \begin{document}
95 \ifnum\thepage=\pageref{LastPage} foo \else bar \fi
96 \end{document}
97 \end{verbatim}
98
99 producing the error
100 \textquotedblleft missing number, treated as zero\textquotedblright.
101 \end{quote}
102
103 \noindent \verb|\pageref| inserts a hyperlink, \verb|\pageref{LastPage}|
104 is not expandable and the code breaks.\newline
105 The code does not generally work even without hyperref.
106
107 \begin{quote}
108 \begin{verbatim}
109 \documentclass{article}
110 \usepackage{hyperref}
111 \usepackage{lastpage}
112 \pagenumbering{Roman}
113 \begin{document}
114 \addtocounter{page}{8}
115 \edef\here{\thepage}

```

```

116 \makeatletter
117 \ifx\here\lastpage@lastpage\relax foo \else bar \fi
118 \makeatother
119 \end{document}
120 \end{verbatim}
121 \end{quote}
122
123 \noindent does work, because \verb|\lastpage@lastpage| contains the name
124 of the page, example:\newline
125 \verb|Page \thepage{} is page \makeatletter\lastpage@lastpage\makeatother.|\%
126 \newline
127 prints:\newline
128 Page \thepage{} is page \makeatletter\lastpage@lastpage\makeatother.%
129 \newline
130 This can be broken for example by \verb|\pagenumbering{fnsymbol}|.
131 \newpage
132
133 \noindent The page (\verb|\thepage|): \thepage \newline
134 Last page's name (LastPage): \pageref{LastPage}
135 \bigskip
136
137 With modern \LaTeX{} it is possible to say:
138 \begin{quote}
139 \begin{verbatim}
140 \NeedsTeXFormat{LaTeX2e}[2022-11-01]
141 \documentclass{article}
142 \pagenumbering{fnsymbol}
143 \begin{document}
144 \addtocounter{page}{8}%
145 \makeatletter%
146 \ExplSyntaxOn%
147 \xdef\test{\numexpr\the\g_shipout_readonly_int +1\relax}%
148 \ExplSyntaxOff%
149 \ifnum \@abspage@last = \test\relax%
150 This is the last page.%
151 \else%
152 This is not the last page
153 (or it is but \LaTeX{} needs another compilation run
154 to detect this).
155 \fi
156 \makeatother
157 \end{document}
158 \end{verbatim}
159 \end{quote}
160
161 \newpage
162 \section*{The End}
163 \noindent The page (\verb|\thepage|): \thepage \newline
164 Last page's name (LastPage): \pageref{LastPage}
165 \bigskip
166
167 To see the content of the \texttt{enddocument/afterlastpage}-hook
168 (for a recent \LaTeX-format!) use
169 \verb|\ShowHook{enddocument/afterlastpage}|.% without the \verb||, of course!
170 \end{document}
171 \end{example}

```

## 6 The implementation

`lastpage.sty` We first need to determine whether we are on  $\text{\TeX}$  2.09 or  $\text{\LaTeX}2\text{\epsilon}$ :

```
172 (*package)
173 %% Part of the "lastpage" package
174 %% loads either lastpage2.09.sty for TeX 2.09 or lastpage2e.sty for LaTeX 2e
175 %% with code from https://groups.google.com/g/comp.text.tex/c/-Qmhj1ZI4xM
176 \def\loadlastpage{\ProvidesPackage{lastpage}[2023/03/07 v2.0a lastpage: 2.09 or 2e? (HMM)]\re
177 \begingroup \expandafter \ifx \csname documentclass\endcsname\relax
178 \endgroup \expandafter \input{lastpage209.sty}
179 \else \endgroup \expandafter \loadlastpage
180 \fi
181 </package>
```

`lastpage209.sty` If we are on  $\text{\TeX}$  2.09 (really?!), we load the 2.09 version `lastpage209.sty`:

```
182 (*lastpage209)
183 %% Part of the "lastpage" package
184 %% FOR LaTeX 2.09 ONLY - FOR LaTeX 2e USE lastpage2e.sty
185 %% This is lastpage209.sty invented by Jeffrey P. Goldberg,
186 %% after Piet van Oostrum: Page layout in LaTeX, March 2, 2004, section 16; fancyhdr.pdf;
187 %% lastpage209.sty maintained by H.-Martin Muench.
188 \let\origenddocument=\enddocument%
189 \def\enddocument{\clearpage%
190 {\addtocounter{page}{-1}%
191 \immediate\write\@mainaux{\string\newlabel{LastPage}{\the page}}}%
192 }%
193 \addtocounter{page}{+1}%
194 \origenddocument%
195 }
196 </lastpage209>
```

`lastpage2e.sty` If `\documentclass` is known, we are in  $\text{\LaTeX}2\text{\epsilon}$  - but which one? For modern versions with  $\epsilon\text{-TeX}$  and hook management etc. we load version `lastpagemodern.sty`, otherwise `lastpageclassic.sty`. We start off by checking that we are loading into  $\text{\LaTeX}2\text{\epsilon}$  and announcing the name and version of this package.

```
197 (*lastpage2e)
198 %% Part of the "lastpage" package
199 \NeedsTeXFormat{LaTeX2e}[1994/12/01]
200 \ProvidesPackage{lastpage2e}[2023/03/07 v2.0a Decide which 2e lastpage version to use (HMM)]
201 \ifl@t@r\fmtversion{2022/11/01}{\RequirePackage{lastpagemodern}}{%
202 \RequirePackage{lastpageclassic}}
203 \message{^^J}
204 </lastpage2e>
```

`lastpageclassic.sty` In case of older  $\text{\LaTeX}$ -formats `lastpageclassic.sty` is loaded:

```
205 (*lastpageclassic)
206 %% Part of the "lastpage" package
207 \NeedsTeXFormat{LaTeX2e}[1994/12/01]
208 \ProvidesPackage{lastpageclassic}[2023/03/07 v2.0a Refers to last page's name (HMM; JPG)]
209 %% allows for things like "Page \the page{} of \pageref{LastPage}" to get "Page 7 of 9"
210
```

For comparisons, “one” is defined (`\@one` does not work for this).

```
211 \gdef\lastpage@one{1}
```

We define `\lastpage@hyper`, `\lastpage@nameref`, `\lastpage@french`, and `\lastpage@LTS` to be “0”.

```
212 \gdef\lastpage@hyper{0}
213 \gdef\lastpage@nameref{0}
214 \gdef\lastpage@french{0}
215 \gdef\lastpage@LTS{0}
```

We define `\lastpage@firstpage` to be “1”, and before re-definition via the .aux file, `\lastpage@lastpage` and `\lastpage@lastpageHy` are unknown.

```
216 \gdef\lastpage@firstpage{1}
217 \gdef\lastpage@lastpage{??}
218 \gdef\lastpage@lastpageHy{??}
219
```

`\AtBeginDocument` `\AtBeginDocument` we give a warning about ancient versions of the `endfloat` package. Then it is checked whether various packages are loaded. (`\ifpackageloaded` cannot be used later than `\AtBeginDocument`.) If this is the case, `\lastpage@<package abbreviation>` is defined as 1 (otherwise it stays 0).

```
220 \AtBeginDocument{%
221 \ifpackageloaded{endfloat}{%
222 \ifpackageolder{endfloat}{1993/04/30}{\relax}{%
223 \PackageError{lastpage}{%
224 Incompatibility with outdated version of endfloat package}{%
225 lastpage is not fully compatible with a version\MessageBreak%
226 before 2.1 of the endfloat package,\MessageBreak%
227 because those versions redefined\MessageBreak%
228 the \string\enddocument\space command.}%
229 }{}%
230 \ifpackageloaded{tikz}{\gdef\lastpage@tikz{1}}{}%
231 \ifpackageloaded{hyperref}{\gdef\lastpage@hyper{1}}{}%
232 \ifpackageloaded{nameref}{\gdef\lastpage@nameref{1}}{}%
233 \ifpackageloaded{french}{\gdef\lastpage@french{1}}{}%
234 \ifpackageloaded{frenchle}{\gdef\lastpage@french{1}}{}%
235 \ifpackageloaded{pagesLTS}{\gdef\lastpage@LTS{1}}{}%
236 \ifpackageloaded{pageslts}{\gdef\lastpage@LTS{1}}{}%
```

`\lastpage@putlabel`, used by older versions of this package, is redefined e.g. by `revtex`, `hyperref`, `frenchle`, and `PPRcorners`. While now `\lastpage@putlabel` is used instead, `revtex` or `hyperref` could also define a label `LastPage`, which then would be multiply defined. (Which is no big issue, if it is associated with the same page.) Therefore we define

```
237 \gdef\lastpage@putlabel{\relax}%
```

Because `\lastpage@putlabel` might be (re)defined later, depending on the order in which the packages are loaded, we will do this again `\AtEndDocument`.

```
238 }
239
```

`\lastpage@putlabel` This command does the writing of the label:

```
240 \newcommand{\lastpage@putlabel}{%
```

```
 \AtBeginDocument it is checked whether the hyperref package is loaded,
 \ifpackageloaded{hyperref}{\gdef\lastpage@hyper{1}}{}
 \ifpackageloaded cannot be used later than \AtBeginDocument.
 User SEBASTIAN BANK found and reported (Thanks!) a case, when this check is
 not sufficient. Using a class with
 \usepackage{lastpage}
 \AtBeginDocument{\usepackage{hyperref}}
```

leads to failed detection of the `hyperref` package, because `\AtBeginDocument` *first* the check for `hyperref` is performed, and *then* `hyperref` is loaded. As mentioned above, `\ifpackageloaded` cannot be used later, so here we do not check for the `hyperref` package again, but for its `\Hy@Warning` command. In version 1.2c of the `lastpage` package, it was checked for the `\hyperref` command, but as it turned out, `tcilatex` is defining that. If some other package or user is defining `\Hy@Warning`, `lastpage` will falsely assume, that `hyperref` has been loaded, but in my humble opinion, defining `\Hy@Warning` does not make sense and is bad style (except definition by the `hyperref` package itself, of course).

```

241 \@ifundefined{Hy@Warning}{% hyperref not loaded
242 }\gdef\lastpage@hyper{1}% hyperref loaded
243 }%

```

If the `pageslts` package is used, this `lastpage` package is not needed at all. The `LastPage` label would even be defined twice. Thus, if `pageslts` is used, here nothing is done:

```

244 \ifx\lastpage@LTS\lastpage@one%
245 \else%

```

Otherwise the label is set:

We have got to distinguish whether `hyperref` has been loaded or not:

```

246 \ifx\lastpage@hyper\lastpage@one%
247 \lastpage@putlabelhyper%
248 \else%

```

and also need to treat documents with `nameref` differently:

```

249 \ifx\lastpage@nameref\lastpage@one%
250 \lastpage@putlabelNR%
251 \else%

```

When those packages have not been loaded, we just write the simple label into the `aux` file (and store the value of the page):

```

252 \begingroup%
253 \addtocounter{page}{-1}%
254 \immediate\write\@auxout{\string\newlabel{LastPage}{{}\{the\page}}}%
255 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\the\page}}%
256 \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
257 \addtocounter{page}{+1}%
258 \endgroup%
259 \fi%
260 \fi%
261 \fi%
262 }
263

```

`\lastpage@putlabelhyper` When `hyperref` has been loaded, the label is set with the `\lastpage@putlabelhyper` command. If the `hyperref` package is used, but `page-anchors` are disabled, the hyperlinking will not work.

```

264 \newcommand{\lastpage@putlabelhyper}{%
265 \ifHy@pageanchor%
266 \else%
267 \PackageError{lastpage}{hyperref option pageanchor disabled}{%
268 The \string\pageref{LastPage} link doesn't work\MessageBreak%
269 using hyperref with disabled option 'pageanchor'.\MessageBreak%
270 }%
271 \fi%

```

Since the page has been put out, we are on the page *after* that page. We therefore subtract one from the page counter. (For the compiler, this is equal to `\advance\c@page\m@ne`, but for human readers of the code it is probably easier to understand.)

```

272 \begingroup%
273 \addtocounter{page}{-1}%

```

Simply using `\label` for `LastPage` would not work, because labels wait for the output routines to work, and there may be no more invocations of the output routines. To force the write out, we need to do an `\immediate` write into the `aux` file.

```

274 %% The following code is from the hyperref package %%
275 %% 2010/04/17 v6.80x; newer versions are available. %%

```

```

276 \let\@number\@firstofone%
277 \ifHy@pageanchor%
278 \ifHy@hypertextnames%
279 \ifHy@plainpages%
280 \def\Hy@temp{\arabic{page}}%
281 \else%
282 \Hy@unicodedefalse%
283 %% Code not from hyperref package: %%
284 %% The following lines are taken from the pageslts package, %%
285 %% which in turn got them from the hyperref package and %%
286 %% modified them. %%
287 %% Without the modification, after the first shipout "PD1" %%
288 %% is inserted each time |\pdfstringdef\Hy@temp{\thepage}| %%
289 %% is executed. %%
290 \ifnum \value{page}=1\relax%

```

We do not count the pages ourselves, and so they could have been changed by e. g. `\pagenumbering{...}`, `\addtocounter{page}{...}`, `\setcounter{page}{...}`. Thus the page might have the number one while not being the first page at all. Using the `everyshi` package would help, but this package should not require other packages. The `pageslts` package does a better handling, but requires some other packages.

We will make a mistake here at most once:

```

291 \ifx \lastpage@firstpage\lastpage@one\relax%
292 \def\Hy@temp{\thepage}%
293 \gdef\lastpage@firstpage{0}%
294 \else%
295 %% Code from hyperref package again: %%
296 \pdfstringdef\Hy@temp{\thepage}%
297 %% End of code from the hyperref package. %%
298 \fi%
299 %% The pageslts package would even check for fnsymbol page %%
300 %% numbering scheme and adapt the code correspondingly. %%
301 \else%
302 %% Code from hyperref package again: %%
303 \pdfstringdef\Hy@temp{\thepage}%
304 %% Code from pageslts package again: %%
305 \fi%
306 %% Code from hyperref package again: %%
307 \fi%
308 \else%
309 \def\Hy@temp{\the\Hy@pagecounter}%
310 \fi%
311 \fi%
312 \immediate\write\@auxout{%
313 \string\newlabel{LastPage}{\thepage}{\thepage}{\thepage}}%
314 \ifHy@pageanchor page.\Hy@temp\fi}}%
315 }%
316 %% End of code from the hyperref package. %%

```

We also save the values, so that we can later (next rerun) check, whether they have been saved in the aux file.

```

317 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
318 \ifHy@pageanchor%
319 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpageHy{\Hy@temp}}%
320 \else%
321 \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
322 \fi%

```

After the writeout we restore the page number again, since there might be other things still to be done.

```

323 \addtocounter{page}{+1}%

```

```

324 \endgroup%
325 }
326

```

`\lastpage@putlabelNR` The nameref package redefines `\label` to have five arguments instead of two, therefore

`\newlabel{LastPage}{\thePage}{\thepage}` instead of  
`\newlabel{LastPage}{\thePage}` must be used:

```

327 \newcommand{\lastpage@putlabelNR}{%
328 \begingroup%
329 \addtocounter{page}{-1}%
330 \immediate\write\@auxout{\string\newlabel{LastPage}{\thePage}{\thepage}}%
331 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
332 \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
333 \addtocounter{page}{+1}%
334 \endgroup%
335 }
336

```

`\lastpage@fileswtest` Later it will be determined whether it is allowed to write to the aux file. If it was *not* allowed, it is checked whether the label was already set via the aux file in some earlier compilation run. (There are packages where the document is compiled with access to the aux file, and then there is an additional compiler run, where the aux file cannot be changed, but in that run there is also no need to change it.) The tikz package is somewhat different, therefore we only give a warning instead of an error (and hope that there is another compiler run where the aux file can be written).

```

337 \newcommand{\lastpage@fileswtest}[2]{%
338 \edef\lastpage@testa{#1}%
339 \edef\lastpage@testb{#2}%
340 \ifx\lastpage@testa\lastpage@testb%
341 \else%
342 \ifx\lastpage@tikz\lastpage@one\relax%
343 \PackageWarning{lastpage}%
344 {The lastpage package was not allowed to write to an\MessageBreak%
345 .aux file. This package does not work without access\MessageBreak%
346 to an .aux file.\MessageBreak%
347 It is OK if the .aux file was already updated\MessageBreak%
348 by a previous compiler run\MessageBreak%
349 and would not have changed anyway.\MessageBreak%
350 }%
351 \else%
352 \PackageError{lastpage}{No auxiliary file allowed}%
353 {The lastpage package was not allowed to write to an .aux file.\MessageBreak%
354 This package does not work without access to an .aux file.\MessageBreak%
355 Press Ctrl+Z to exit.\MessageBreak%
356 But it is OK if the .aux file was already updated\MessageBreak%
357 by a previous compiler run\MessageBreak%
358 and would not have changed anyway.\MessageBreak%
359 }%
360 \fi%
361 \fi%
362 }
363

```

`\lastpage@fileswtestHy` When the hyperref package has been loaded, `\lastpage@lastpageHy` must be tested additionally. (And a `\newcommand` is needed, because `\ifHy@pageanchor` is not even defined when hyperref has not been loaded.)

```

364 \newcommand{\lastpage@fileswtestHy}{%
365 \ifHy@pageanchor%
366 \lastpage@fileswtest{\Hy@temp}{\lastpage@lastpageHy}%

```



```

367 \else%
368 \lastpage@filesptest{\empty}{\lastpage@lastpageHy}%
369 \fi%
370 }
371

```

`\AtEndDocument` `\AtEndDocument` we again (re)define `\lastpage@putlabel` to do nothing and check `\lastpage@lastpage`, whether it is still unchanged, which is OK for the first run only.

```

372 \AtEndDocument{%
373 \ifx\lastpage@LTS\lastpage@one%
374 \else%
375 \gdef\lastpage@putlabel{??}%
376 \ifx\lastpage@lastpage\lastpage@putlabel\relax%
377 \PackageWarning{lastpage}{Rerun to get the references right}%
378 \fi%
379 \fi%
380 \gdef\lastpage@putlabel{\relax}%

```

It is checked whether writing to files is allowed (otherwise, only an error message is issued and nothing is done).

```

381 \if@filesw%

```

We put in a `\message` to show, in what order things (which were called) are done (see subsection 3.1).

```

382 \message{^^JAED: lastpage setting LastPage^^J}%

```

After this we issue a `\clearpage` to put out all floats, which are still floating, and place the `LastPage` label. Sometimes `\clearpage` might be undefined.

```

383 \@ifundefined{clearpage}{\relax}{\clearpage}%
384 \ifx\lastpage@french\lastpage@one% french or frenchle loaded
385 \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
386 \else% neither one loaded
387 \lastpage@putl@bel%
388 \fi%

```

When writing to files is not allowed, nothing can be done. But when the label was already set via the aux file, nothing needs to be done. We check for this with `\lastpage@filesptest` and (if `hyperref` has been loaded) `\lastpage@filesptestHy`.

```

389 \else%
390 \ifx\lastpage@LTS\lastpage@one%
391 \else%
392 \lastpage@filesptest{\thepage}{\lastpage@lastpage}%
393 \ifx\lastpage@hyper\lastpage@one%
394 \lastpage@filesptestHy%
395 \fi%
396 \fi%
397 \fi%
398 }

```

```

399 </lastpageclassic>

```

lastpagemodern.sty     In case of a recent L<sup>A</sup>T<sub>E</sub>X-format, lastpagemodern.sty is loaded:

```
400 (*lastpagemodern)
401 %% Part of the "lastpage" package
402 \NeedsTeXFormat{LaTeX2e}[2022-11-01]
403 \ProvidesPackage{lastpagemodern}[2023-03-07 v2.0a Refers to last page's name (HMM; JPG)]
404 %% allows for things like "Page \thepage{} of \pageref{LastPage}"
405 %% to get "Page 7 of 9" or "Page VII of IX";
406 %% the NUMBER of pages is available via \@abspage@last, but with pages
407 %% for example I to X and then 1 to 10, the number of pages would be "20",
408 %% while the name of the last page is "10". Decide what you need/want!
409
```

For comparisons, “one” is defined (\@one does not work for this).

```
410 \gdef\lastpage@one{1}
```

We define \lastpage@firstpage to be “1”, and before re-definition via the .aux file, \lastpage@lastpage and \lastpage@lastpageHy are unknown.

```
411 \gdef\lastpage@firstpage{1}
412 \gdef\lastpage@lastpage{??}
413 \gdef\lastpage@lastpageHy{??}
414
```

\AddToHook{begindocument/end}     At begindocument/end we give a warning about ancient versions of the endfloat package.

```
415 \AddToHook{begindocument/end}{%
416 \IfPackageLoadedTF{endfloat}{%
417 \IfPackageAtLeastTF{endfloat}{1994/06/01}{\relax}{%
418 \PackageError{lastpage}{%
419 Incompatibility with outdated version of endfloat package}{%
420 lastpage is not fully compatible with a version\MessageBreak%
421 before 2.1 of the endfloat package,\MessageBreak%
422 because those versions redefined\MessageBreak%
423 the \string\enddocument\space command.}%
424 }{}}%
```

\lastpage@putlabel, used by older versions of this package, is redefined e.g. by revtex, hyperref, frenchle, and PPRcorners. While now \lastpage@putl@bel is used instead, revtex or hyperref could also define a label LastPage, which then would be multiply defined. (Which is no big issue, if it is associated with the same page.) Therefore we define

```
425 \gdef\lastpage@putlabel{\relax}%
```

Because \lastpage@putlabel might be (re)defined later, depending on the order in which the packages are loaded, we will do this again at the end of the document.

```
426 }
427
```

\lastpage@putl@bel This command does the writing of the label. If the pageslts package is used, this lastpage package is not needed at all. The LastPage label would even be defined twice. Thus, if pageslts is used, here nothing is done.

```
428 \newcommand{\lastpage@putl@bel}{%
429 \IfPackageLoadedTF{pageslts}{\relax}{%
```

Otherwise the label is set:

We have got to distinguish whether hyperref has been loaded or not:

```
430 \IfPackageLoadedTF{hyperref}{\lastpage@putlabelhyper}{%
```

and also need to treat documents with nameref differently:

```
431 \IfPackageLoadedTF{nameref}{\lastpage@putlabelNR}{%
```

When those packages have not been loaded, we just write the simple label into the aux file (and store the value of the page):

```

432 \begingroup%
433 \addtocounter{page}{-1}%
434 \immediate\write\@auxout{\string\newlabel{LastPage}{\thepage}}%
435 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
436 \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
437 \addtocounter{page}{+1}%
438 \endgroup%
439 }%
440 }%
441 }%
442 }
443

```

`\lastpage@putlabelhyper` When `hyperref` has been loaded, the label is set with the `\lastpage@putlabelhyper` command. If the `hyperref` package is used, but `page-anchors` are disabled, the hyperlinking will not work.

```

444 \newcommand{\lastpage@putlabelhyper}{%
445 \ifHy@pageanchor%
446 \else%
447 \PackageError{lastpage}{hyperref option pageanchor disabled}{%
448 The \string\pageref{LastPage} link does not work\MessageBreak%
449 using hyperref with disabled option 'pageanchor'.\MessageBreak%
450 }%
451 \fi%

```

Since the page has been put out, we are on the page *after* that page. We therefore subtract one from the page counter. (For the compiler, this is equal to `\advance\c@page\m@ne`, but for human readers of the code it is probably easier to understand.)

```

452 \begingroup%
453 \addtocounter{page}{-1}%

```

Simply using `\label` for `LastPage` would not work, because labels wait for the output routines to work, and there may be no more invocations of the output routines. To force the write out, we need to do an `\immediate` write into the aux file.

```

454 %% The following code is from the hyperref package %%
455 %% 2010/04/17 v6.80x; newer versions are available. %%
456 \let\@number\@firstofone%
457 \ifHy@pageanchor%
458 \ifHy@hypertextnames%
459 \ifHy@plainpages%
460 \def\Hy@temp{\arabic{page}}%
461 \else%
462 \Hy@unicodedefalse%
463 %% Code not from hyperref package: %%
464 %% The following lines are taken from the pageslts package, %%
465 %% which in turn got them from the hyperref package and %%
466 %% modified them. %%
467 %% Without the modification, after the first shipout "PD1" %%
468 %% is inserted each time |\pdfstringdef\Hy@temp{\thepage}| %%
469 %% is executed. %%
470 \ifnum \value{page}=1\relax%

```

We do not count the pages ourselves, and so they could have been changed by e. g. `\pagenumbering{...}`, `\addtocounter{page}{...}`, `\setcounter{page}{...}`. Thus the page might have the number one while not being the first page at all. Using the (obsolete) `everyshi` package would help, but this package should not require other packages. The `pageslts` package does a better

handling, but requires some other packages.  
 We will make a mistake here at most once:

```

471 \ifx \lastpage@firstpage\lastpage@one\relax%
472 \def\Hy@temp{\thepage}%
473 \gdef\lastpage@firstpage{0}%
474 \else%
475 %% Code from hyperref package again: %%
476 \pdfstringdef\Hy@temp{\thepage}%
477 %% End of code from the hyperref package. %%
478 \fi%
479 %% The pageslts package would even check for fnsymbol page %%
480 %% numbering scheme and adapt the code correspondingly. %%
481 \else%
482 %% Code from hyperref package again: %%
483 \pdfstringdef\Hy@temp{\thepage}%
484 %% Code from pageslts package again: %%
485 \fi%
486 %% Code from hyperref package again: %%
487 \fi%
488 \else%
489 \def\Hy@temp{\the\Hy@pagecounter}%
490 \fi%
491 \fi%
492 \immediate\write\@auxout{%
493 \string\newlabel{LastPage}{\the\thepage}{\thepage}{%
494 \ifHy@pageanchor page.\Hy@temp\fi}{}}%
495 }%
496 %% End of code from the hyperref package. %%

```

We also save the values, so that we can later (next rerun) check, whether they have been saved in the aux file.

```

497 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
498 \ifHy@pageanchor%
499 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpageHy{\Hy@temp}}%
500 \else%
501 \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
502 \fi%

```

After the writeout we restore the page number again, since there might be other things still to be done.

```

503 \addtocounter{page}{+1}%
504 \endgroup%
505 }
506

```

`\lastpage@putlabelNR` The nameref package redefines `\label` to have five arguments instead of two, therefore

`\newlabel{LastPage}{\the\thepage}{\thepage}{\thepage}` instead of  
`\newlabel{LastPage}{\the\thepage}` must be used:

```

507 \newcommand{\lastpage@putlabelNR}{%
508 \begingroup%
509 \addtocounter{page}{-1}%
510 \immediate\write\@auxout{\string\newlabel{LastPage}{\the\thepage}{\thepage}{\thepage}}%
511 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
512 \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
513 \addtocounter{page}{+1}%
514 \endgroup%
515 }
516

```

`\lastpage@fileswtest` Later it will be determined whether it is allowed to write to the aux file. If it was *not* allowed, it is checked whether the label was already set via the aux file in some earlier compilation run. (There are packages where the document is compiled with access to the aux file, and then there is an additional compiler run, where the aux file cannot be changed, but in that run there is also no need to change it.) The `tikz` package is somewhat different, therefore we only give a warning instead of an error (and hope that there is another compiler run where the aux file can be written).

```

517 \newcommand{\lastpage@fileswtest}[2]{%
518 \edef\lastpage@testa{#1}%
519 \edef\lastpage@testb{#2}%
520 \ifx\lastpage@testa\lastpage@testb%
521 \else%
522 \IfPackageLoadedTF{tikz}{%
523 \PackageWarning{lastpage}%
524 {The lastpage package was not allowed to write to an\MessageBreak%
525 .aux file. This package does not work without access\MessageBreak%
526 to an .aux file.\MessageBreak%
527 It is OK if the .aux file was already updated\MessageBreak%
528 by a previous compiler run\MessageBreak%
529 and would not have changed anyway.\MessageBreak%
530 }%
531 }{\PackageError{lastpage}{No auxiliary file allowed}%
532 {The lastpage package was not allowed to write to an .aux file.\MessageBreak%
533 This package does not work without access to an .aux file.\MessageBreak%
534 Press Ctrl+Z to exit.\MessageBreak%
535 But it is OK if the .aux file was already updated\MessageBreak%
536 by a previous compiler run\MessageBreak%
537 and would not have changed anyway.\MessageBreak%
538 }%
539 }%
540 \fi%
541 }
542
```

`\lastpage@fileswtestHy` When the `hyperref` package has been loaded, `\lastpage@lastpageHy` must be tested additionally. (And a `\newcommand` is needed, because `\ifHy@pageanchor` is not even defined when `hyperref` has not been loaded.)

```

543 \newcommand{\lastpage@fileswtestHy}{%
544 \ifHy@pageanchor%
545 \lastpage@fileswtest{\Hy@temp}{\lastpage@lastpageHy}%
546 \else%
547 \lastpage@fileswtest{\empty}{\lastpage@lastpageHy}%
548 \fi%
549 }
550
```

`enddocument/afterlastpage` `enddocument/afterlastpage` we again (re)define `\lastpage@putlabel` to do nothing, but first use it to check whether `\lastpage@lastpage` is still unchanged, which is OK for the first run only.

```

551 \AddToHook{enddocument/afterlastpage}{%
552 \IfPackageLoadedTF{pageslts}{\relax}{%
553 \gdef\lastpage@putlabel{??}%
554 \ifx\lastpage@lastpage\lastpage@putlabel\relax%
555 \AddToHook{enddocument/info}{%
556 \PackageWarning{lastpage}{Rerun to get the references right}%
557 }%
558 \fi%
559 }%
560 \gdef\lastpage@putlabel{\relax}%

```

It is checked whether writing to files is allowed (otherwise, only an error message is issued and nothing is done).

```
561 \if@filesw%
```

We put in a `\message` to show, in what order things (which were called) are done.

```
562 \message{^^Jenddocument/afterlastpage: lastpage setting LastPage.^^J}%
563 \IfPackageLoadedTF{french}{%
564 \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
565 }\IfPackageLoadedTF{frenchle}{%
566 \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
567 }\lastpage@putl@bel%
568 }%
569 }%
570 \else%
```

When writing to files is not allowed, nothing can be done. But when the label was already set via the aux file, nothing needs to be done. We check for this with `\lastpage@fileswtest` and (if `hyperref` has been loaded) `\lastpage@fileswtestHy`.

```
571 \IfPackageLoadedTF{pageslts}{\relax}{%
572 \lastpage@fileswtest{\thepage}{\lastpage@lastpage}%
573 \IfPackageLoadedTF{hyperref}{\lastpage@fileswtestHy}{\relax}%
574 }%
575 \fi%
576 }
577 </lastpagemodern>
```

## 7 Installation

### 7.1 Downloads

Everything is available at <https://www.ctan.org>, but may need additional packages themselves.

- `lastpage.dtx` For unpacking the `lastpage.dtx` file and constructing the documentation it is required:
- T<sub>E</sub>XFormat L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>: <https://www.CTAN.org>
  - document class `ltxdoc`, 2022/06/22, v2.1i, <https://ctan.org/pkg/ltxdoc>
  - package `holtxdoc`, 2019/12/09, v0.30, <https://ctan.org/pkg/holtxdoc>
- `lastpage.sty` The `lastpage.sty` (i. e. each document using the `lastpage` package) requires:
- T<sub>E</sub>X, <https://www.CTAN.org>
  - package `lastpage`, 2023-03-07, v2.0a, <https://ctan.org/pkg/lastpage>
- `lastpage209.sty` The `lastpage209.sty` for L<sup>A</sup>T<sub>E</sub>X 2.09 (i. e. each document using the `lastpage209` package) requires:
- T<sub>E</sub>X-format L<sup>A</sup>T<sub>E</sub>X, v2.09
  - package `lastpage209`, 2023-03-07, v2.0a, <https://ctan.org/pkg/lastpage>
- and does not work with `hyperref`, which needs L<sup>A</sup>T<sub>E</sub>X 2e.
- `lastpage2e.sty` The `lastpage2e.sty` for L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> (i. e. each document using the `lastpage2e` package) requires:
- T<sub>E</sub>X-format L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 1994/12/01 or newer, <https://www.CTAN.org>
  - package `lastpage`, 2023-03-07, v2.0a, <https://ctan.org/pkg/lastpage>
- `lastpageclassic.sty` The `lastpageclassic.sty` for L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> (i. e. each document using the `lastpageclassic` package) requires:
- T<sub>E</sub>X-format L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> between 1994/12/01 and 2022/11/01, <https://www.CTAN.org>
  - package `lastpage`, 2023-03-07, v2.0a, <https://ctan.org/pkg/lastpage>
- and can use
- package `hyperref`, 2023-02-07, v7.00v, <https://ctan.org/pkg/hyperref>
- `lastpagemodern.sty` The `lastpagemodern.sty` for L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> (i. e. each document using the `lastpagemodern` package) requires:
- T<sub>E</sub>X-format L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 2022-11-01 or newer, <https://www.CTAN.org>
  - package `lastpage`, 2023-03-07, v2.0a, <https://ctan.org/pkg/lastpage>
- and can use
- package `hyperref`, 2023-02-07, v7.00v, <https://ctan.org/pkg/hyperref>
- `lastpage-example.tex` The `lastpage-example.tex` requires the same file as all documents using the `lastpage` package, i. e.
- package `lastpage`, 2023-03-07, v2.0a, <https://ctan.org/pkg/lastpage>  
(Well, it is the example file for this package, and because you are reading the documentation for the `lastpage` package, it can be assumed that you already have some version of it – is it the current one?)

and additionally:

- class article, 2022/07/02, v1.4n, from classes: <https://ctan.org/pkg/classes>
- package showkeys, 2022/04/12, v3.18, <https://ctan.org/pkg/showkeys>
- package hyperref, 2023-02-07, v7.00v, <https://ctan.org/pkg/hyperref>

**endfloat** The `endfloat` package is not required, but because the `lastpage` package is incompatible with *ancient* versions of the `endfloat` package (see subsection 3.2), here the recent one (at the time of writing this documentation) is listed:

- package `endfloat`, 2019/04/15, v2.7, <https://ctan.org/pkg/endfloat>

**fancyhdr** Neither the `fancyhdr` nor the `nccfancyhdr` package is required (older versions of the `lastpage` package used its predecessor `fancyheadings`), but because they were mentioned, also they are listed here:

- package `fancyhdr`, 2022/11/09, v4.1, <https://ctan.org/pkg/fancyhdr>
- package `nccfancyhdr`, 2004/12/07, v1.1, <https://ctan.org/pkg/nccfancyhdr>

**count1to** As possible alternatives in section 4, Alternatives, there are listed (newer versions might be available):

- nofm**
  - totpages**
  - lastpage**
  - totalcount**
  - zref**
  - memoir**
- package `pageslts`, 2015/12/21, v1.2f, <https://ctan.org/pkg/pageslts>
- package `papermas`, 2011/08/22, v1.0h; the `papermas` package can be considered as kind of add-on to the `pageslts` package.  
<https://ctan.org/pkg/papermas>

- package `count1to`, 2009/05/24, v2.1, <https://ctan.org/pkg/count1to>
- package `nofm`, 1991/02/25, <https://mirror.ctan.org/obsolete/macros/latex209/contrib/misc/nofm.sty>, does not work with e. g. `hyperref`
- package `totpages`, 2005/09/19, v2.00, <https://ctan.org/pkg/totpages>
- package `totalcount`, 2018/01/21, v1.0a, <https://ctan.org/pkg/totalcount>
- package `zref`, 2022-04-07, v2.34, <https://ctan.org/pkg/zref>
- class `memoir`, 2022-11-17, 3.7.19, <https://ctan.org/pkg/memoir>.

**Oberdiek** All packages of the ‘`oberdiek`’ bundle (especially `holtxdoc` and `zref`) are also available in a TDS compliant ZIP archive:

**zref** <https://mirror.ctan.org/install/macros/latex/contrib/oberdiek.tds.zip>.

It is probably best to download and use this, because the packages in there are quite probably both recent and compatible among themselves.

**hyperref** `hyperref` is not included in that bundle and needs to be downloaded separately, <https://mirror.ctan.org/install/macros/latex/contrib/hyperref.tds.zip>.

**Münch** A hyperlinked list of my (other) packages can be found at <https://ctan.org/author/muench-hm>.



## 7.2 Package, unpacking TDS

**Package.** This package is available on <https://www.CTAN.org>.

<https://mirror.ctan.org/macros/latex/contrib/lastpage/lastpage.dtx>  
The source file.

<https://mirror.ctan.org/macros/latex/contrib/lastpage/lastpage.pdf>  
The documentation.

<https://mirror.ctan.org/macros/latex/contrib/lastpage/lastpage-example.pdf>  
The compiled example file, as it should look like.

<https://mirror.ctan.org/macros/latex/contrib/lastpage/README>  
The README file.

There is also a `lastpage.tds.zip` available:

<https://mirror.ctan.org/install/macros/latex/contrib/lastpage.tds.zip>  
Everything in TDS compliant, compiled format

which additionally contains

|                                   |                                                                                   |
|-----------------------------------|-----------------------------------------------------------------------------------|
| <code>lastpage.ins</code>         | The installation file.                                                            |
| <code>lastpage.drv</code>         | The driver to generate the documentation.                                         |
| <code>lastpage.sty</code>         | The <code>.sty</code> file.                                                       |
| <code>lastpage209.sty</code>      | The <code>.sty</code> file for L <sup>A</sup> T <sub>E</sub> X2.09 <b>only</b> .  |
| <code>lastpage2e.sty</code>       | The <code>.sty</code> file to determine which 2e-style to use.                    |
| <code>lastpageclassic.sty</code>  | The <code>.sty</code> file for older L <sup>A</sup> T <sub>E</sub> X-formats.     |
| <code>lastpagemodern.sty</code>   | The <code>.sty</code> file for the recent L <sup>A</sup> T <sub>E</sub> X-format. |
| <code>lastpage-example.tex</code> | The example file.                                                                 |

For required other packages please see the preceding subsection.

**Unpacking.** The `.dtx` file is a self-extracting `docstrip` archive. The files are extracted by running the `..dtx` through plain T<sub>E</sub>X:

```
tex lastpage.dtx
```

About generating the documentation see paragraph 7.4 below.

**TDS.** Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

```
lastpage.sty → tex/latex/lastpage.sty
lastpage209.sty → tex/latex/lastpage.sty
lastpage2e.sty → tex/latex/lastpage.sty
lastpageclassic.sty → tex/latex/lastpage.sty
lastpagemodern.sty → tex/latex/lastpage.sty
lastpage.pdf → doc/latex/lastpage.pdf
lastpage-example.tex → doc/latex/lastpage-example.tex
lastpage-example.pdf → doc/latex/lastpage-example.pdf
lastpage.dtx → source/latex/lastpage.dtx
```

If you have a `docstrip.cfg` that configures and enables `docstrip`'s TDS installing feature, then some files can already be in the right place, see the documentation of `docstrip`.

## 7.3 Refresh file name databases

If your T<sub>E</sub>X distribution (T<sub>E</sub>X Live, MiK<sub>T</sub>E<sub>X</sub>, ...) relies on file name databases, you must refresh these. For example, T<sub>E</sub>X Live users run `texhash` or `mktexlsr`.

## 7.4 Some details for the interested

**Unpacking with L<sup>A</sup>T<sub>E</sub>X.** The `.dtx` chooses its action depending on the format:

**plain T<sub>E</sub>X:** Run `docstrip` and extract the files.

**L<sup>A</sup>T<sub>E</sub>X:** Generate the documentation.

If you insist on using L<sup>A</sup>T<sub>E</sub>X for `docstrip` (really, `docstrip` does not need L<sup>A</sup>T<sub>E</sub>X), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{lastpage.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

**Generating the documentation.** You can use both the `.dtx` or the `.drv` to generate the documentation. The process can be configured by a configuration file `ltxdoc.cfg`. For instance, put the following line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with pdfL<sup>A</sup>T<sub>E</sub>X:

```
pdflatex lastpage.dtx
makeindex -s gind.ist lastpage.idx
pdflatex lastpage.dtx
makeindex -s gind.ist lastpage.idx
pdflatex lastpage.dtx
```

## 7.5 Compiling the example

The example file, `lastpage-example.tex`, can be compiled via

```
latex lastpage-example.tex
```

or (recommended)

```
pdflatex lastpage-example.tex
```

and will need at least two compiler runs to get all references right.

## 8 Acknowledgements

I (H.-MARTIN MÜNCH) would like to thank JEFFREY P. GOLDBERG (`jeffrey+news at goldmark dot org`) for inventing the `lastpage` package as well as for allowing me to update it. Further I would like to thank HEIKO OBERDIEK for providing a lot (!) of useful packages (from which I also learned everything I know about creating a file in `dtx` format, OK, say it: copying), and the `news:comp.text.tex` and `news:de.comp.text.tex` newsgroups for their help in all things T<sub>E</sub>X. Thanks for bug reports to ULRIKE FISCHER, SEBASTIAN BANK, JAMES HEDGES, MIKHAIL TITOV, and MICHAŁ HERMAN. Thanks to SVEN SIEGMUND for pointing out a necessary further explanation in the documentation.

## 9 History

[1994/06/17 v0.99a]

- First shot by JEFFREY P. GOLDBERG.

[1994/06/25 v0.1b]

- Last version number created by JEFFREY P. GOLDBERG.

[1994/07/20 v0.1b (again)]

- Documentation updated by JEFFREY P. GOLDBERG.  
The main source code of the `lastpage` package 1994/07/20, v0.1b, was:

```
\NeedsTeXFormat{LaTeX2e}[1994/06/01]
\ProvidesPackage{lastpage}[1994/07/20 v0.1b
 LaTeX2e package for refs to last page number (JPG)]
\def\lastpage@putlabel{\addtocounter{page}{-1}%
 \immediate\write\@auxout{\string
 \newlabel{LastPage}{\thepage}}%
 \addtocounter{page}{1}}
\AtEndDocument{%
 \message{AED: lastpage setting LastPage}%
 \clearpage\lastpage@putlabel}%
\endinput
```

and then the `hyperref` package and the `revtex4` class even redefine `\lastpage@putlabel` (at least `hyperref` version 2012/11/06, v6.83m, and `REVTeX4` version 2010/07/25, v4.1r, still did this).

[2010/02/18 v1.1]

- Proposed `LastPages` label by H.-MARTIN MÜNCH on `news:comp.text.tex`, see e. g. [https://groups.google.com/g/comp.text.tex/c/Ad8pO2Rw\\_HY/m/8EfHqT1JBOQJ](https://groups.google.com/g/comp.text.tex/c/Ad8pO2Rw_HY/m/8EfHqT1JBOQJ); now available in the `pageslts` package.

[2010/07/29 v1.2a]

- Complete rewriting of the package; upgrade from `fancyheadings` to `fancyhdr` package, then removed the need for the `fancyhdr` package at all.
- Included `lastpage209.sty` for  $\LaTeX$  2.09.
- Replacement of `\filedate`, `-version`, `-name`,... because of  $\LaTeX$  bug 2705:  
Synopsis: Possible problem with `\fileversion` and `\filedate`  
<https://www.latex-project.org/cgi-bin/ltxbugs2html?category=LaTeX&responsible=anyone&state=anything&keyword=lastpage&pr=latex/2705>
- Example `lastpage-example.tex`.
- Alternatives listing (section 4).
- Listing of  $\TeX$  sources (subsection 7.1).
- Really a lot of details.
- Complete rewriting of the documentation.

- Everything in DTX framework.
- Included a `\CheckSum`. [Removed in v2.0a.]
- Complete rewriting of the README file.

#### [2010/08/12 v1.2b]

- Bug fix: `\@PackageInfoNoLine` is only available, if the `hyperref` package is loaded. (Bug reported by ULRIKE FISCHER, thanks!)
- Bug fix: `\ifHy@pageanchor` etc. do not work without `hyperref`, and `\else` related to `\ifHy@pageanchor` was wrongly associated with a preceding `\if`, and everything went wrong. Now everything should work again also without `hyperref`.
- Renamed `\lastpage@putlabel` to `\lastpage@putl@bel` to get rid of the conflicts with other classes and packages and resulting multiple definitions of the `lastpage` label.

#### [2010/08/23 v1.2c]

- Bug fix: Additionally to checking for the `hyperref` package `\AtBeginDocument`, when placing the `lastpage` label it is also checked for the `\hyperref` command, in case `hyperref` was not loaded at `\begin{document}` yet. (Bug reported by SEBASTIAN BANK, thanks!)  
[`lastpagemodern.sty` just uses `\IfPackageLoadedTF{hyperref}`.]
- Changed the `\unit` definition (got rid of an old `\rm`). [Removed in v2.0a.]
- Changed `\lastpage@puthyperlabel` to `\lastpage@putlabelhyper` analogous to `\pagesLTS@putlabelhyper` of the `pageslts` package.
- Updated version number and date of `pagesLTS` package (especially for the check for outdated versions). [Removed in v2.0a.]
- Removed wrong `%` from the driver file.

#### [2010/08/25 v1.2d]

- Bug fix: also `tcilatex` defines the `\hyperref` command, therefore for `hyperref` package detection this had to be changed to `\Hy@Warning`.  
[`lastpagemodern` just uses `\IfPackageLoadedTF{hyperref}`.]

#### [2010/09/12 v1.2e]

- JAMES HEDGES pointed out, that there was no instruction in the documentation about suppressing hyperlinks: added (also to the example).
- Diverse small changes.

#### [2010/09/24 v1.2f]

- Updated to version 2010/09/13 v6.81n of the `hyperref` package.
- New version of `REVTEX4` 2010/07/25, v4.1r, old problem.
- New version of `pagesLTS` package, 2010/09/22, v1.1k.
- Moved the package from `.../latex/muench/lastpage/...` to `.../latex/lastpage/...`

### [2011/02/01 v1.2g]

- Updated to version 2010/04/24 v0.19 of the `holtxdoc` package.
- New version of `pagesLTS` package, 2011/02/01, v1.1m.
- Updated to version 2010/12/16 v6.81z of the `hyperref` package.
- Minor details.

### [2011/07/03 v1.2h]

- The `holtxdoc` package was fixed, therefore the warning in `drv` could be removed. – Adapted the style of this documentation to new OBERDIEK `dtx` style.
- New versions of `pagesLTS`, `ulem`, `hyperref`, `papermas` packages.
- Corrected references in the README and manual.

### [2011/08/08 v1.2i]

- The `pagesLTS` package has been renamed to `pageslts`: 2011/08/08, v1.2a.
- Some details.

### [2011/08/31 v1.2j]

- Updated to  $\text{\TeX}$  Live 2011 (for compiling the documentation and example).
- New version of `papermas` package, 2011/08/22, v1.0h.
- Adapted for the use together with packages, which sometimes prevent writing to the `aux` file. (Bug reported by MIKHAIL TITOV.)

### [2011/09/01 v1.2k]

- Fixed `\thepage{}` to `\thepage{ }` , where there should be a space.
- New version of the `hyperref` package, 2011/08/19, v6.82h, but still problem with links to pages with page-“number” in `fnsymbol` pagenummering scheme. [Seems to be fixed since v6.83m as of 2012/11/06.]
- Documentation update about “No write access to the `aux` file”.
- New version of `regstats` package available.

### [2013/01/28 v1.2l]

- Updated to  $\text{\TeX}$  Live 2012 (for compiling the documentation and example).
- New versions of the packages `endfloat`, `holtxdoc`, `hypdoc`, `hyperref`, `pageslts`, `regstats`, `ulem`, and `zref` have become available.
- The `nameref` package redefines `\label` to have five arguments instead of two, therefore `\newlabel{LastPage}{\thepage}` instead of `\newlabel{LastPage}{\thepage}` must be used. (Bug reported at <https://tex.stackexchange.com/q/95541>, thanks to Michał Herman!) Fixed.

**[2015/03/29 v1.2m]**

- Updated to T<sub>E</sub>X Live 2014 (for compiling the documentation and example).
- Updates to really a lot of details in the documentation (manual & README).

**[2021/09/03 v1.2n]**

- Updates to the documentation (manual & README), to the example, and several small changes in code.
- This version has been archived at <https://web.archive.org/web/20230305193232/https://mirror.ctan.org/install/macros/latex/contrib/lastpage.tds.zip>.

**[2023-03-07 v2.0a]**

- Removed use of ulem.
- Removed `\unit`.
- `lastpage` should now determine automatically, whether to load its T<sub>E</sub>X 2.09 version, classic L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>-version, or modern version with  $\epsilon$ -T<sub>E</sub>X, hook-management etc.
- Converted to UTF-8.
- Updated to L<sup>A</sup>T<sub>E</sub>X format 2022-11-01.
- Extensive updates to the documentation (manual & README) and to the example.

When you find a mistake or have a suggestion for an improvement of this package, please send an e-mail to the maintainer, thanks! (Please see BUG REPORTS in the README.)

## 10 Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; plain numbers refer to the code lines where the entry is used.

| <b>Symbols</b>                                    |                                                                                      |
|---------------------------------------------------|--------------------------------------------------------------------------------------|
| <code>\@abspage@last</code> . . . . .             | 149, 406                                                                             |
| <b>A</b>                                          |                                                                                      |
| <code>\AddToHook\{begindocument/end\}</code> .    | <i>18</i>                                                                            |
| <code>\AtBeginDocument</code> . . . . .           | <u>220</u>                                                                           |
| <code>\AtEndDocument</code> . . . . .             | 7, <u>372</u>                                                                        |
| <b>C</b>                                          |                                                                                      |
| <code>\count1to</code> . . . . .                  | 8, <i>24</i>                                                                         |
| <b>E</b>                                          |                                                                                      |
| <code>\enddocument/afterlastpage</code> . . . . . | <i>21</i>                                                                            |
| <code>\endfloat</code> . . . . .                  | <i>24</i>                                                                            |
| <b>F</b>                                          |                                                                                      |
| <code>\fancyhdr</code> . . . . .                  | <i>24</i>                                                                            |
| <b>H</b>                                          |                                                                                      |
| <code>\holtxdoc</code> . . . . .                  | <i>24</i>                                                                            |
| <code>\Hy@pagecounter</code> . . . . .            | 309, 489                                                                             |
| <code>\hyperref</code> . . . . .                  | <i>24</i>                                                                            |
| <b>L</b>                                          |                                                                                      |
| <code>\lastpage</code> . . . . .                  | <i>24</i>                                                                            |
| <code>\lastpage-example.tex</code> . . . . .      | <i>23</i>                                                                            |
| <code>\lastpage.dtx</code> . . . . .              | <i>23</i>                                                                            |
| <code>\lastpage.sty</code> . . . . .              | <i>12, 23</i>                                                                        |
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