

The `lastpage` package

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Abstract

This L^AT_EX 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 from the kernel (`\@abspage@last`, `\thetotalpages`, `\PreviousTotalPages`), 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 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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1 Introduction

This L^AT_EX package puts the label `LastPage` (at end of the document via hook `enddocument/afterlastpage`, for older formats via `\AtEndDocument`, for L^AT_EX2.09 via redefining `\enddocument`) 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{\@oddfoot}{\@evenfoot}
\makeatother
```

creates footers like

“*DRAFT November 24, 2024* 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`, `\thetotalpages`, and `\PreviousTotalPages` (needing 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 L^AT_EX-format 2024-06-01 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 L^AT_EX 2_ε 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 L^AT_EX-format 2024-06-01 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 L^AT_EX 2_ε 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 L^AT_EX2.09 (!) 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`, `\thetotalpages`, and `\PreviousTotalPages`. 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`, `\thetotalpages`, and `\PreviousTotalPages` from the kernel are 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.

3.12 Other packages manipulating `\lastpage@putlabel`

The `revtex4` class redefines the `\lastpage@putlabel` command to place a label `LastPage`.

`\lastpage@putlabel` in the `lastpage` package was replaced by `\lastpage@putl@bel`, but the `LastPage` label could become defined more than once.

3.13 `\pagenumbering{fnsymbol}`

When using the foot-note-symbols as page numbers, it can be necessary to declare in the document's preamble:

```
\DeclareTextCommand{\textasteriskcentered}{PD1}{*}  
\DeclareTextCommand{\textdagger}{PD1}{†}  
% \DeclareTextCommand{\textdaggerdbl}{PD1}{‡} % seems to neither work nor be necessary  
\DeclareTextCommand{\textsection}{PD1}{§}  
\DeclareTextCommand{\textparagraph}{PD1}{¶}  
\DeclareTextCommand{\textbardbl}{PD1}{||}
```

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 your system has (e.g. $\text{T}_\text{E}\text{X}$, $\text{L}^{\text{A}}\text{T}_\text{E}\text{X}2\text{e}$, $\varepsilon\text{-T}_\text{E}\text{X}$, $\text{L}^{\text{A}}\text{T}_\text{E}\text{X}$ -format as recent as 2024-06-01 or newer), here is a list of some possible alternatives:

- `pageslts` - The `pageslts` package first started as a revision of this `lastpage` package, but I thought that an enhancement 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` (`\AddToHook{enddocument/afterlastpage}`, formerly `\AtEndDocument`; same as the `LastPage` package) and `VeryLastPage` (also `\AddToHook{enddocument/afterlastpage}`, but formerly `\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).

Further labels are provided for special cases.

<https://ctan.org/pkg/pageslts>

LaTeX-kernel - The number of pages is nowadays available via `\@abspage@last`, `\thetotalpages`, and `\PreviousTotalPages` 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 issues. (Is the total number of pages wanted? Or is the name of the last page sought?)
`\the\ReadonlyShipoutCounter` contains the number of currently shipped out pages, i.e. current page minus one.

totpages - The `totpages` package provides a `totpages` label similar to `LastPages`, but `\AtEndDocument` instead of hook `enddocument/afterlastpage` of the `pageslts` package. 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).

<https://ctan.org/pkg/totpages>

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).

<https://ctan.org/pkg/totalcount>

totcount - The `totcount` package provides the last value of a counter, thus also the value of the `page` counter. You do not get a hyperlink to the last page, only the numerical value of the last page name is given (i.e. X+72 pages gives 72 instead of 82 as total number of pages), and the number of pages can be changed for example by `\addtocounter`.

<https://ctan.org/pkg/totcount>

- `nofm` - “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 L^AT_EX, 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 (<https://CTAN.org>) location of a **working** (!) version, please send me an e-mail, thanks!
- `count1to` - The `count1to` package “sets `\count1` to `\count8` with the values of page to subparagraph. `\count9` is used to flag odd pages. ... [T]he code for the TotalPages label” (package manual, 2024-06-13) has been removed from the current package version.
<https://ctan.org/pkg/count1to>
- `zref` - The `zref` package “implements an extensible referencing system” (package manual, 2023-09-14).
<https://ctan.org/pkg/zref>
- `memoir` - The `memoir class` provides `\thelastpage` (page number printed on last page) and `\thelastsheet` (number of pages).
<https://ctan.org/pkg/memoir>

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

5 Example

```
1 (*example)
2 \documentclass[british]{article}[2024/02/08]% v1.4n Standard LaTeX document class
3 \makeatletter
4 \usepackage[draft]{showkeys}[2024/05/23]% v3.21 Show cite and label keys (DPC, MH)
5 %%      Use final instead of draft to hide the keys. %%
6 \usepackage[pdfpagelabels=true,hyperindex=false]{hyperref}[2024-10-30]% v7.01k
7 \@ifpackageloaded{hyperref}{% Hypertext links for LaTeX
8 \hypersetup{extension=pdf,%
9 plainpages=false,%
10 pdflang={en},%
11 pdftitle={lastpage package example},%
12 pdfauthor={H.-Martin Muench},%
13 pdfsubject={Example for the lastpage package},%
14 pdfkeywords={LaTeX, lastpage},%
15 pdfview=Fit,%
16 pdfstartview=Fit,%
17 pdfpagelayout=SinglePage%
18 }}{\usepackage{url}[2013/09/16]}% v3.4 Verb mode for urls, etc.
19 \usepackage[lastpage][2024/11/24]% v2.1d Refers to last page's name (HMM; JPG)
20 \renewcommand{\@evenfoot}{%
21 \normalsize\slshape \today\hfil \upshape %
22 page \thepage{} of \pageref{LastPage}}
23 \renewcommand{\@oddfoot}{\@evenfoot}
24 \makeatother
25 \listfiles
26 \begin{document}
27 \pagenumbering{Roman}
28 \section*{Example for lastpage}
29 \markboth{Example for lastpage}{Example for lastpage}
30 This example demonstrates the use of package newline
31 \textsf{lastpage}, v2.1d as of 2024-11-24 (HMM; JPG).\newline
32 The package takes no options.\newline
33 For more details please see the documentation!\newline
34
35 \noindent \label{keys} To hide the \pageref{keys}{\quad } use option
36 \texttt{final} instead of \texttt{draft} with the \textsf{showkeys}
37 package (or remove the package call from the preamble of
38 this document).\newline
39
40 \textbf{Hyperlinks or not:} If the \textsf{hyperref} package is loaded,
41 the references are also hyperlinked:\newline
42 \smallskip
43 Last page's name (LastPage): \pageref{LastPage}\newline
44 \noindent If the \textsf{hyperref} package is loaded, but the hyperlinks
45 of the references shall be suppressed, \verb|\pageref*{...}|
46 can be used:\newline
47 \smallskip
48 Last page's name (LastPage): \pageref*{LastPage}\newline
49
50 \textbf{Trademarks} appear throughout this example without any
51 trademark symbol; they are the property of their respective
52 trademark owner. There is no intention of infringement; the
53 usage is to the benefit of the trademark owner.\newline
54
55 \textbf{Tip:} Use \textit{logical page numbers}
56 for the display of the pdf (in Adobe Acrobat Reader 2024.002.20895:
57 Edit >> Preferences >> Page Display >>
58 Page Content and Information: Use logical page numbers)!\newline
59
60 If you are more ambitious in respect to your aims with this package,
61 you might want to have a look at the \textsf{pageslts} package:\newline
```

```

62 \url{https://ctan.org/pkg/pageslts}.
63 \bigskip
64
65 \noindent The page (\verb|\thepage|): \thepage \newline
66 Last page's name (LastPage): \pageref{LastPage}
67 \newpage
68
69 \noindent The page (\verb|\thepage|): \thepage \newline
70 Last page's name (LastPage): \pageref{LastPage}
71
72 \bigskip
73
74 \noindent There was the question:
75
76 \begin{quote}
77 \begin{verbatim}
78 \documentclass{article}
79 \usepackage{hyperref}
80 \usepackage{lastpage}
81 \begin{document}
82 \ifnum\thepage=\pageref{LastPage} foo \else bar \fi
83 \end{document}
84 \end{verbatim}
85
86 producing the error
87 \textquotedblleft missing number, treated as zero\textquotedblright.
88 \end{quote}
89
90 \noindent \verb|\pageref| inserts a hyperlink, \verb|\pageref{LastPage}|
91 is not expandable and the code breaks.\newline
92 The code does not generally work even without hyperref.
93
94 \begin{quote}
95 \begin{verbatim}
96 \documentclass{article}
97 \usepackage{hyperref}
98 \usepackage{lastpage}
99 \pagenumbering{Roman}
100 \begin{document}
101 \addtocounter{page}{8}
102 \edef\here{\thepage}
103 \makeatletter
104 \ifx\here\lastpage@lastpage\relax foo\else bar\fi
105 \makeatother
106 \end{document}
107 \end{verbatim}
108 \end{quote}
109
110 \noindent does work (two compilations needed), because \verb|\lastpage@lastpage|
111 contains the name of the page, \mbox{example:}
112 \begin{verbatim}
113 Page \thepage{} is (not) page
114 \makeatletter\lastpage@lastpage\makeatother.
115 \end{verbatim}
116 prints:\newline
117 Page \thepage{} is (not) page
118 \makeatletter\lastpage@lastpage\makeatother.
119 \newline
120 This can be broken for example by \verb|\pagenumbering{fnsymbol}|
121 (because then \verb|\edef\here{\thepage}| does not work).
122 \newpage
123

```

```

124 \noindent The page (\verb|\thepage|): \thepage\newline
125 Last page's name (LastPage): \pageref{LastPage}
126 \bigskip
127
128 With modern \LaTeX{} it is possible to say:
129 \begin{quote}
130 \begin{verbatim}
131 \NeedsTeXFormat{LaTeX2e}[2024-06-01]
132 \documentclass{article}
133 \pagenumbering{fnsymbol}
134 \begin{document}
135 \addtocounter{page}{8}%
136 \ExplSyntaxOn%
137 \xdef\test{\numexpr\the\g_shipout_readonly_int +1\relax}%
138 \ExplSyntaxOff%
139 \ifnum\PreviousTotalPages=\test\relax%
140 This is the last page.%
141 \else%
142 This is not the last page
143 (or it is but \LaTeX{} needs another compilation run
144 to detect this).
145 \fi
146 \end{document}
147 \end{verbatim}
148 \end{quote}
149
150 \newpage
151 \section*{The End}
152 \noindent The page (\verb|\thepage|): \thepage\newline
153 Last page's name (LastPage): \pageref{LastPage}
154 \bigskip
155
156 To see the content of the \texttt{enddocument/afterlastpage}-hook
157 (for a recent \LaTeX-format!) use % without the \verb|, of course!
158 \verb|\ShowHook{enddocument/afterlastpage}|.
159 \end{document}
160 \end{example}

```

6 The implementation

`lastpage.sty` We first need to determine whether we are on $\text{T}_{\text{E}}\text{X}$ 2.09 or $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}2_{\text{e}}$. (That line, which is too long for the documentation, reads:
`\def\loadlastpage{\ProvidesPackage{lastpage}[2024/11/24 v2.1d lastpage: 2.09 or 2e? (HMM)]\relax\RequirePackage{lastpage2e}}.`)

```
161 (*package)
162 %% Part of the "lastpage" package
163 %% loads either lastpage2.09.sty for TeX 2.09 or lastpage2e.sty for LaTeX 2e
164 %% with code from https://groups.google.com/g/comp.text.tex/c/-Qmhj1ZI4xM
165 \def\loadlastpage{\ProvidesPackage{lastpage}[2024/11/24 v2.1d lastpage: 2.09 or 2e? (HMM)]\re
166 \begingroup \expandafter \ifx \csname documentclass\endcsname\relax
167 \endgroup \expandafter \input{lastpage209.sty}
168 \else \endgroup \expandafter \loadlastpage
169 \fi
170 </package>
```

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

```
171 (*lastpage209)
172 %% Part of the "lastpage" package
173 %% FOR LaTeX 2.09 ONLY - FOR LaTeX 2e USE lastpage2e.sty
174 %% This is lastpage209.sty invented by Jeffrey P. Goldberg,
175 %% after Piet van Oostrum: Page layout in LaTeX, March 2, 2004, section 16;
176 %% fancyhdr.pdf; lastpage209.sty maintained by H.-Martin Muench.
177 \let\origenddocument=\enddocument%
178 \def\enddocument{\clearpage%
179   {\addtocounter{page}{-1}%
180     \immediate\write\@mainaux{\string\newlabel{LastPage}{\the page}}}%
181   }%
182   \addtocounter{page}{+1}%
183   \origenddocument%
184 }
185 </lastpage209>
```

`lastpage2e.sty` If `\documentclass` is known, we are in $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}2_{\text{e}}$ – but which one? For modern versions with $\varepsilon\text{-T}_{\text{E}}\text{X}$ and hook management etc. we load version `lastpagemodern.sty`, otherwise `lastpageclassic.sty`. We start off by checking that we are loading into $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}2_{\text{e}}$ and announcing the name and version of this package.

```
186 (*lastpage2e)
187 %% Part of the "lastpage" package
188 \NeedsTeXFormat{LaTeX2e}[1994/12/01]
189 \ProvidesPackage{lastpage2e}[2024/11/24 v2.1d %
190 Decide which 2e lastpage version to use (HMM)]
191 \@ifl@t@r\fmtversion{2024/06/01}{\RequirePackage{lastpagemodern}}{%
192   \RequirePackage{lastpageclassic}}
193 \message{^^J}
194 </lastpage2e>
```

lastpageclassic.sty In case of older L^AT_EX-formats lastpageclassic.sty is loaded:

```
195 (*lastpageclassic)
196 %% Part of the "lastpage" package
197 \NeedsTeXFormat{LaTeX2e}[1994/12/01]
198 \ProvidesPackage{lastpageclassic}[2024/11/24 v2.1d %
199   Refers to last page's name (HMM; JPG)]
200 %% allows for things like "Page \thepage{} of \pageref{LastPage}"
201 %% to get "Page 7 of 9"
202
```

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

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

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

```
204 \gdef\lastpage@hyper{0}
205 \gdef\lastpage@nameref{0}
206 \gdef\lastpage@french{0}
207 \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.

```
208 \gdef\lastpage@firstpage{1}
209 \gdef\lastpage@lastpage{??}
210 \gdef\lastpage@lastpageHy{??}
211
```

`\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).

```
212 \AtBeginDocument{%
213   \@ifpackageloaded{endfloat}{%
214     \@ifpackagelater{endfloat}{1993/04/30}{\relax}{%
215       \PackageError{lastpage}{%
216         Incompatibility with outdated version of endfloat package}{%
217         lastpage is not fully compatible with a version\MessageBreak%
218         before 2.1 of the endfloat package,\MessageBreak%
219         because those versions redefined\MessageBreak%
220         the \string\enddocument\space command.}%
221       }}{%
222     \@ifpackageloaded{tikz}{\gdef\lastpage@tikz{1}}{%
223     \@ifpackageloaded{hyperref}{\gdef\lastpage@hyper{1}}{%
224     \@ifpackageloaded{nameref}{\gdef\lastpage@nameref{1}}{%
225     \@ifpackageloaded{french}{\gdef\lastpage@french{1}}{%
226     \@ifpackageloaded{frenchle}{\gdef\lastpage@french{1}}{%
227     \@ifpackageloaded{pagesLTS}{\gdef\lastpage@LTS{1}}{%
228     \@ifpackageloaded{pageslts}{\gdef\lastpage@LTS{1}}{%
```

`\lastpage@putlabel`, used by older versions of this package, is redefined e.g. by `revtex`, `frenchle`, `PPRcorners`, and old versions of `hyperref`. While now `\lastpage@putl@bel` is used instead, `revtex` 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

```
229 \gdef\lastpage@putlabel{\relax}%
230 }
231
```

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

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

```
232 \newcommand{\lastpage@putl@bel}{%
```

```
    \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, tclatex 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).
```

```
233 \ifundefined{Hy@Warning}{% hyperref not loaded  
234   }\gdef\lastpage@hyper{1}% hyperref loaded  
235   }%
```

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:

```
236 \ifx\lastpage@LTS\lastpage@one%  
237 \else%
```

Otherwise the label is set:

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

```
238 \ifx\lastpage@hyper\lastpage@one%  
239   \lastpage@putlabelhyper%  
240 \else%
```

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

```
241 \ifx\lastpage@nameref\lastpage@one%  
242   \lastpage@putlabelNR%  
243 \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):

```
244 \begingroup%  
245   \addtocounter{page}{-1}%  
246   \immediate\write\@auxout{\string\newlabel{LastPage}{{}{\thepage}}}%  
247   \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%  
248   \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%  
249   \addtocounter{page}{+1}%  
250 \endgroup%  
251 \fi%  
252 \fi%  
253 \fi%  
254 }  
255
```

`\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. (The warning will also be shown, when only `\pageref*{LastPage}` is used (or neither one), but without messing with `\pageref` we cannot detect this.)

```

256 \newcommand{\lastpage@putlabelhyper}{%
257   \ifHy@pageanchor%
258   \else%
259     \PackageWarningNoLine{lastpage}{%
260       The \string\pageref{LastPage} link does not work\MessageBreak%
261       using hyperref with disabled option 'pageanchor'.\MessageBreak%
262       Better enable 'pageanchor' or use\MessageBreak%
263       \string\pageref*{LastPage} (not generating a link)%
264     }%
265   \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.)

```

266 \begingroup%
267   \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.

```

268 %% with code from \Hy@EveryPageAnchor of the hyperref package,
269 %% 2010/04/17 v6.80x; newer versions are available
270 \let\@number\@firstofone%
271 \ifHy@pageanchor%
272   \ifHy@hypertextnames%
273   \ifHy@plainpages%
274     \def\Hy@temp{\arabic{page}}%
275   \else%
276     \Hy@unicodedefalse%
277   \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. We will make a mistake here at most once:

```

278     \ifx \lastpage@firstpage\lastpage@one\relax%
279     \def\Hy@temp{\thepage}%
280     \gdef\lastpage@firstpage{0}%
281   \else%
282     \pdfstringdef\Hy@temp{\thepage}%
283   \fi%
284   \else%
285     \pdfstringdef\Hy@temp{\thepage}%
286   \fi%
287   \fi%
288   \else%
289     \def\Hy@temp{\the\Hy@pagecounter}%
290   \fi%
291 \fi%
292 \immediate\write\@auxout{%
293   \string\newlabel{LastPage}{{}{\thepage}}{%
294     \ifHy@pageanchor page.\Hy@temp\fi}}}%
295 }%

```


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

```

296 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
297 \ifHy@pageanchor%
298 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpageHy{\Hy@temp}}%
299 \else%
300 \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
301 \fi%

```

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

```

302 \addtocounter{page}{+1}%
303 \endgroup%
304 }
305

```

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

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

```

306 \newcommand{\lastpage@putlabelNR}{%
307 \begingroup%
308 \addtocounter{page}{-1}%
309 \immediate\write\@auxout{\string\newlabel{LastPage}{\thepage}}%
310 \immediate\write\@auxout{\string\xdef\string\lastpage@lastpage{\thepage}}%
311 \immediate\write\@auxout{\string\gdef\string\lastpage@lastpageHy{}}%
312 \addtocounter{page}{+1}%
313 \endgroup%
314 }
315

```

`\lastpage@filesptest` 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).

```

316 \newcommand{\lastpage@filesptest}[2]{%
317 \edef\lastpage@testa{#1}%
318 \edef\lastpage@testb{#2}%
319 \ifx\lastpage@testa\lastpage@testb%
320 \else%
321 \ifx\lastpage@tikz\lastpage@one\relax%
322 \PackageWarning{lastpage}%
323 {The lastpage package was not allowed to write to an\MessageBreak%
324 .aux file. This package does not work without access\MessageBreak%
325 to an .aux file.\MessageBreak%
326 It is OK if the .aux file was already updated\MessageBreak%
327 by a previous compiler run\MessageBreak%
328 and would not have changed anyway.\MessageBreak%
329 }%
330 \else%
331 \PackageError{lastpage}{No auxiliary file allowed}%
332 {The lastpage package was not allowed to write to an .aux file.\MessageBreak%
333 This package does not work without access to an .aux file.\MessageBreak%
334 Press Ctrl+Z to exit.\MessageBreak%
335 But it is OK if the .aux file was already updated\MessageBreak%
336 by a previous compiler run\MessageBreak%
337 and would not have changed anyway.}%

```

```

338   \fi%
339   \fi%
340 }
341

```

`\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.)

```

342 \newcommand{\lastpage@fileswtestHy}{%
343   \ifHy@pageanchor%
344   \lastpage@fileswtest{\Hy@temp}{\lastpage@lastpageHy}%
345   \else%
346     \lastpage@fileswtest{\empty}{\lastpage@lastpageHy}%
347   \fi%
348 }

```

`\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.

```

349
350 \AtEndDocument{%
351   \ifx\lastpage@LTS\lastpage@one%
352   \else%
353     \gdef\lastpage@putlabel{??}%
354     \ifx\lastpage@lastpage\lastpage@putlabel\relax%
355       \PackageWarning{lastpage}{Rerun to get the references right}%
356     \fi%
357   \fi%
358   \gdef\lastpage@putlabel{\relax}%

```

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

```

359   \if@filesw%

```

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

```

360   \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.

```

361   \@ifundefined{clearpage}{\relax}{\clearpage}%
362   \ifx\lastpage@french\lastpage@one% french or frenchle loaded
363     \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
364   \else% neither one loaded
365     \lastpage@putl@bel%
366   \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@fileswtest` and (if `hyperref` has been loaded) `\lastpage@fileswtestHy`.

```

367   \else%
368     \ifx\lastpage@LTS\lastpage@one%
369     \else%
370       \lastpage@fileswtest{\thepage}{\lastpage@lastpage}%
371       \ifx\lastpage@hyper\lastpage@one%
372         \lastpage@fileswtestHy%
373       \fi%
374     \fi%
375   \fi%
376 }

```

```

377 </lastpageclassic)

```

lastpagemodern.sty In case of a recent L^AT_EX-format, lastpagemodern.sty is loaded:

```
378 (*lastpagemodern)
379 %% Part of the "lastpage" package
380 \NeedsTeXFormat{LaTeX2e}[2024-06-01]
381 \ProvidesPackage{lastpagemodern}[2024-11-24 v2.1d %
382 Refers to last page's name (HMM; JPG)]
383 %% allows for things like "Page \thepage{} of \pageref{LastPage}"
384 %% to get "Page 7 of 9" or "Page VII of IX";
385 %% the NUMBER of pages is available via \@abspage@last, but with pages
386 %% for example I to X and then 1 to 10, the number of pages would be "20",
387 %% while the name of the last page is "10". Decide what you need/want!
388
```

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

```
389 \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.

```
390 \gdef\lastpage@firstpage{1}
391 \gdef\lastpage@lastpage{??}
392 \gdef\lastpage@lastpageHy{??}
393
```

\lastpage@IfNumericTF \lastpage@IfNumericTF was needed to determine whether a page number was numeric or not. Although it is no longer used, I am reluctant to remove it because it may have been used in other places in documents.

```
394 \newcommand\lastpage@gobbleminus[1]{\ifx-#1\else#1\fi}
```

which is from <https://texfaq.org/FAQ-isitanum>,

```
395 \newcounter{lastpagecount}
```

and similar to <https://tex.stackexchange.com/a/12811/17119>

```
396 \newcommand{\lastpage@IfNumericTF}[3]{%
397 \sbox\z@{\c@lastpagecount=0\lastpage@gobbleminus{#1}\relax}%
398 \ifdim\wd0>\z@\relax#3% is not numeric
399 \else#2% is numeric
400 \fi}
401
```

\AddToHook{begindocument/end} \lastpage@putlabel, used by older versions of this package, is/was redefined by other packages. While now \lastpage@putl@bel is used instead, other packages 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

```
402 \AddToHook{begindocument/end}{%
403 \IfPackageLoadedT{pageslts}{%
404 \PackageNoteNoLine{lastpage}{Packages pageslts and lastpage used.\MessageBreak%
405 lastpage is not necessary when loading pageslts}%
406 }%
407 \gdef\lastpage@putlabel{\relax}%
408 }
409
```

\protected@iwrite We need an \immediate\protected@write. Just \immediate\write had led to errors, for example when packages like babel-greek re-defined \roman (thanks to ULRIKE FISCHER for the report).

```
410 %% Code provided by Prof. Enrico Gregorio at https://tex.stackexchange.com/a/542425
411 \long\def\protected@iwrite#1#2#3{%
412 \begingroup%
413 #2%
414 \let\protect\unexpandable@protect%
```

```

415 \edef\reserved@a{\immediate\write#1{#3}}%
416 \reserved@a%
417 \endgroup%
418 \if@nobreak\ifvmode\nobreak\fi\fi%
419 }
420

```

`\lastpage@makeHy` Just once we need the page from `\@currentHpage` without any “page.”:

```

421 \newcommand{\lastpage@makeHy}{%
422 \gdef\lastpage@Hy{}%
423 \IfPackageLoadedT{hyperref}{%
424 \ifHy@pageanchor%

```

`\gdef\lastpage@Hy{}`, but that was already done at the beginning of this command.

```

425 \def\lastpage@Hptest{Doc-Start}%
426 \ifx\lastpage@Hptest\@currentHpage\relax%
427 \gdef\lastpage@Hy{\@currentHpage}%
428 \else%
429 \edef\lastpage@Hptest{\@currentHpage}%
430 \ifx\lastpage@Hptest\empty\relax%

```

`\gdef\lastpage@Hy{}`, but that was already done at the beginning of this command.

```

431 \else%
432 \def\lastpage@Hptest{page.}%
433 \ifx\lastpage@Hptest\@currentHpage\relax
434 \def\lastpage@Hptest{\csname @fnsymbol\endcsname \c@page }%
435 \ifx\lastpage@Hptest\thepage\relax%
436 \ifnum\value{page}=3\else%
437 \PackageWarningNoLine{lastpage}{You should add a\MessageBreak
438 \string\DeclareTextCommand{...}{PD1}{...}\MessageBreak%
439 (see the lastpage package manual, 3.13 %
440 \string\pagenumbering{fnsymbol})\MessageBreak%
441 to your document's preamble}%

```

See [subsection 3.13: `\pagenumbering{fnsymbol}`](#), page 7.

```

442 \fi%
443 \fi%
444 \PackageWarningNoLine{lastpage}{%
445 \string\@currentHpage\space is\MessageBreak%
446 just "page." without number,\MessageBreak%
447 \string\lastpage@lastpageHy\space is now let empty}%

```

`\gdef\lastpage@Hy{}`, but that was already done at the beginning of this command.

```

448 \else%

```

`\@currentHpage` should be `page.<some number>`, `\lastpage@rmpage` removes the “page.”. Next compilation run, `\lastpage@lastpageHy` gets defined via the aux file. If we arrived at this place, but the definition is still empty, then `\@currentHpage` has some unexpected content.

```

449 \gdef\lastpage@Hy{\lastpage@rmpage{\@currentHpage}}%
450 \ifx\lastpage@lastpageHy\empty\relax%
451 \PackageWarningNoLine{lastpage}{%
452 \string\@currentHpage\space is\MessageBreak%
453 \meaning\@currentHpage\MessageBreak%
454 not beginning with "page.",\MessageBreak%
455 \string\lastpage@lastpageHy\space is now let empty}%
456 \fi%
457 \fi%
458 \fi%
459 \fi%
460 \fi%

```

```

461   }%
462  }
463

```

`\lastpage@rmpage` `\lastpage@rmpage` removes the “page.”.

```

464 %% Code provided by David Carlisle at https://tex.stackexchange.com/a/721877
465 \def\lastpage@rmpage#1{%
466   \expandafter\xlastpage@rmpage\expanded{#1}\xlastpage@rmpage page.%
467   \xlastpage@rmpage\xxlastpage@rmpage{#1}}
468 \def\xlastpage@rmpage #1page.#2\xlastpage@rmpage#3\xxlastpage@rmpage#4{%
469   \if$\detokenize{#1}$#2%\else#4
470   \fi}
471

```

`\else#4` means, that it did not start with `page.`, and whatever it is, we cannot use this `#4` for `\lastpage@Hy`.

`\lastpage@putl@bel` This command does the writing of the label. If the `hyperref` package is used, but `page-anchors` are disabled, the hyperlinking will not work. (The warning will also be shown, when only `\pageref*{LastPage}` is used (or neither `\pageref{LastPage}` nor `\pageref*{LastPage}`), but without messing with `\pageref` we cannot detect this.)

```

472 \newcommand{\lastpage@putl@bel}{%
473   \IfPackageLoadedT{hyperref}{%
474     \IfPackageAtLeastF{hyperref}{2024-10-30}{%
475       \PackageError{lastpage}{hyperref package version too old}{%
476         required version: 2024-10-30 or newer, found version:\MessageBreak%
477         \csname ver@hyperref.sty\endcsname\MessageBreak%
478         Update hyperref or use lastpageclassic.sty instead of\MessageBreak%
479         lastpagemodern.sty!}}%
480     \ifHy@pageanchor\else%
481       \PackageWarningNoLine{lastpage}{%
482         The \string\pageref{LastPage} link does not work\MessageBreak%
483         using hyperref with disabled option ‘pageanchor’.\MessageBreak%
484         Better enable ‘pageanchor’ or use\MessageBreak%
485         \string\pageref*{LastPage} (not generating a link)}%
486       \fi%
487   }%
488 \begingroup%

```

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.)

```

489   \addtocounter{page}{-1}%

```

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.

```

490   \IfPackageLoadedTF{pageslts}{% then pageslts writes the label for "LastPage".

```

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` protected write into the `aux` file.

```

491   }{\protected@iwrite\@auxout}{\string\newlabel{LastPage}{%
492     {\@currentlabel}{\thepage}{\@currentlabelname}%
493     {\IfPackageLoadedTF{hyperref}{\ifHy@pageanchor\@currentHpage\fi%
494       }\@currentHref}}%
495     {\@kernel@reserved@label@data}}%
496   }%
497 }%

```

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

```

498   \protected@iwrite\@auxout{}{%
499     \string\gdef\string\lastpage@lastpage{\thepage}}%
500   \lastpage@makeHy%
501   \protected@iwrite\@auxout{}{%
502     \string\gdef\string\lastpage@lastpageHy{\lastpage@Hy}}%

```

After the write-out 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@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).

```

507 \newcommand{\lastpage@fileswtest}[2]{%
508   \edef\lastpage@testa{#1}%
509   \edef\lastpage@testb{#2}%
510   \ifx\lastpage@testa\lastpage@testb%
511   \else%
512     \IfPackageLoadedTF{tikz}{%
513       \PackageWarning{lastpage}%
514         {The lastpage package was not allowed to write to an\MessageBreak%
515           .aux file. This package does not work without access\MessageBreak%
516           to an .aux file.\MessageBreak%
517           It is OK if the .aux file was already updated\MessageBreak%
518           by a previous compiler run\MessageBreak%
519           and would not have changed anyway.\MessageBreak%
520         }%
521     }{\PackageError{lastpage}{No auxiliary file allowed}%
522       {The lastpage package was not allowed to write to an .aux file.\MessageBreak%
523         This package does not work without access to an .aux file.\MessageBreak%
524         Press Ctrl+Z to exit.\MessageBreak%
525         But it is OK if the .aux file was already updated\MessageBreak%
526         by a previous compiler run\MessageBreak%
527         and would not have changed anyway.\MessageBreak%
528       }%
529     }%
530   \fi%
531   }
532

```

`\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.)

```

533 \newcommand{\lastpage@fileswtestHy}{%
534   \ifHy@pageanchor%
535     \lastpage@fileswtest{\@currentHpage}{\@theH@page}%
536   \else%
537     \lastpage@fileswtest{\empty}{\lastpage@lastpageHy}%
538   \fi%
539   }
540

```

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.

```

541 \AddToHook{enddocument/afterlastpage}{%
542   \gdef\lastpage@putlabel{??}%
543   \ifx\lastpage@lastpage\lastpage@putlabel\relax%
544     \AddToHook{enddocument/info}{%
545       \PackageWarning{lastpage}{Rerun to get the references right}%
546     }%
547   \fi%
548   \gdef\lastpage@putlabel{\relax}%

```

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

```

549   \if@filesw%

```

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

```

550   \message{^^Jenddocument/afterlastpage (AED): lastpage setting LastPage.^^J}%
551   \IfPackageLoadedTF{french}{%
552     \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
553   }{\IfPackageLoadedTF{frenchle}{%
554     \addtocounter{page}{+1}\lastpage@putl@bel\addtocounter{page}{-1}%
555   }}{\lastpage@putl@bel%
556   }%
557   }%
558   \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.

```

559   \lastpage@fileswtest{\thepage}{\lastpage@lastpage}%
560   \IfPackageLoadedT{hyperref}{\lastpage@fileswtestHy}%
561   \fi%
562   }
563 </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_EXFormat L^AT_EX 2_ε: <https://www.CTAN.org>
- document class `ltxdoc`, 2024/02/08, v2.1j, <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_EX, <https://www.CTAN.org>
- package `lastpage`, 2024-11-24, v2.1d, <https://ctan.org/pkg/lastpage>

`lastpage209.sty` The `lastpage209.sty` for L^AT_EX 2.09 (i. e. each document using the `lastpage209` package) requires:

- T_EX-format L^AT_EX, v2.09
- package `lastpage209`, 2024-11-24, v2.1d, <https://ctan.org/pkg/lastpage>

and does not work with `hyperref`, which needs L^AT_EX 2e.

`lastpage2e.sty` The `lastpage2e.sty` for L^AT_EX 2_ε (i. e. each document using the `lastpage2e` package) requires:

- T_EX-format L^AT_EX 2_ε 1994/12/01 or newer, <https://www.CTAN.org>
- package `lastpage`, 2024-11-24, v2.1d, <https://ctan.org/pkg/lastpage>

`lastpageclassic.sty` The `lastpageclassic.sty` for L^AT_EX 2_ε (i. e. each document using the `lastpageclassic` package) requires:

- T_EX-format L^AT_EX 2_ε between 1994/12/01 and 2024-05-31, <https://www.CTAN.org>
- package `lastpage`, 2024-11-24, v2.1d, <https://ctan.org/pkg/lastpage>

and can use

- package `hyperref`, 2023-07-08, v7.01b, <https://ctan.org/pkg/hyperref> (probably also some older and newer versions)

`lastpagemodern.sty` The `lastpagemodern.sty` for L^AT_EX 2_ε (i. e. each document using the `lastpagemodern` package) requires:

- T_EX-format L^AT_EX 2_ε 2024-06-01 or newer, <https://www.CTAN.org>
- package `lastpage`, 2024-11-24, v2.1d, <https://ctan.org/pkg/lastpage>

and can use

- package `hyperref`, probably 2023-11-07 and newer (tested with: 2024-10-30 v7.01k), <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`, 2024-11-24, v2.1d, <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`, 2024-02-08, v1.4n, from classes: <https://ctan.org/pkg/classes>
- package `showkeys`, 2024-05-23, v3.21, <https://ctan.org/pkg/showkeys>
- package `hyperref`, 2024-10-30, v7.01k, <https://ctan.org/pkg/hyperref>

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 style file.
<code>lastpage209.sty</code>	The style file for L ^A T _E X2.09 only .
<code>lastpage2e.sty</code>	The style file to determine which 2e-style to use.
<code>lastpageclassic.sty</code>	The style file for older L ^A T _E X-formats.
<code>lastpagemodern.sty</code>	The style file for the recent L ^A T _E 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_EX:

```
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 \TeX distribution (\TeX Live, MiK \TeX , ...) relies on file name databases, you must refresh these. For example, \TeX Live users run `texhash` or `mktextlsr`.

7.4 Some details for the interested

Unpacking with \LaTeX . The `.dtx` chooses its action depending on the format:

plain \TeX : Run `docstrip` and extract the files.

\LaTeX : Generate the documentation.

If you insist on using \LaTeX for `docstrip` (really, `docstrip` does not need \LaTeX), 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 `pdf \LaTeX` :

```
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). Thanks to DAVID CARLISLE for the new code for `\lastpage@rmpage`. Thanks for bug reports go to ULRIKE FISCHER (several times), SEBASTIAN BANK, JAMES HEDGES, MIKHAIL TITOV, MICHAL HERMAN, MATTEO GAMBOZ, and JAMES SMALL. 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 (2012/11/06, v6.83m) even redefined `\lastpage@putlabel`; the `REVTeX4` class 2022-06-05, v4.2f, still does this.

[2010/02/18 v1.1]

- Proposed `LastPages` label by H.-MARTIN MÜNCH on [news:comp.text.tex](https://groups.google.com/g/comp.text.tex/c/Ad8pO2Rw_HY/m/8EfHqT1JB0QJ), see e. g. https://groups.google.com/g/comp.text.tex/c/Ad8pO2Rw_HY/m/8EfHqT1JB0QJ; 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 `\IfPackageLoadedT{hyperref}` and `\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.sty` 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 `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 `29_`, 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. [Fixed since v6.83m as of 2012/11/06.]
- Documentation update about “No write access to the `aux` file”.

[2013/01/28 v1.2l]

- Updated to T_EX 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}{\the page}` instead of `\newlabel{LastPage}{\the page}` must be used. (Bug reported at <https://tex.stackexchange.com/q/95541>, thanks to MICHAEL HERMAN!) Fixed.
[Since L^AT_EX release 2023-06-01 five arguments are standard.]

[2015/03/29 v1.2m]

- Updated to T_EX 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_EX 2.09 version, classic L^AT_EX 2_ε-version, or modern version with ϵ -T_EX, hook-management etc.
- Converted to UTF-8.
- Updated to L^AT_EX format 2022-11-01.
- Extensive updates to the documentation (manual & README) and to the example.

[2023-04-12 v2.0b]

- Bug fix: What should have been `}}{}` was `}{}}`. Thanks to MATTEO GAMBOZ!

[2023-07-24 v2.0c]

- Since L^AT_EX release 2023-06-01 labels have always five arguments.
- Removed the incompatibility warning regarding `endfloat` before 1994-06-01 (!) from `lastpagemodern.sty`.
- Replaced `\immediate\write` by a form of (pseudo-code!) `\immediate\protected@write`. (Thanks to ULRIKE FISCHER for the error report and solution!)
- Update of the `\lastpage@putl@bel` code to `hyperref` 2023-07-08, v7.01b, which now allows `fnsymbol` as page numbering scheme.

[2023-10-06 v2.0d]

- For plain arabic page numbers only, `lastpage` again writes the page number in a plain format in the label in the `aux` file, so that it can be extracted to perform calculations with it.

[2023-10-14 v2.0e]

- Replaced a `\PackageError` by `\PackageWarningNoLine` as suggested by ULRIKE FISCHER.

[2024-04-27 v2.1a]

- Utilizes the new `\@currentHpage` provided by the L^AT_EX-kernel.
- The issue with `\thepage` (former `\lastpage@nonnumeric` command) has been fixed at 2023-11-07, <https://github.com/latex3/hyperref/issues/303>.
- `\lastpage@IfNumericTF` is no longer needed, but has not been removed so as not to break older documents that use it in a different context.

[2024-07-03 v2.1b]

- The `beamer` class loads `hyperref` partially, so that `hyperref` is incorrectly detected as having been loaded. The defining operation for `\lastpage@Hy` has been changed to catch this and other different cases.

[2024-07-07 v2.1c]

- With help from DAVID CARLISLE `\lastpage@rmpage` no longer assumes `\@currentHpage` to begin with “page.”.

[2024-11-24 v2.1d]

- The `pageslts` package has been repaired, thus here the warnings are removed.
- Several small changes in documentation and `lastpagemodern.sty` because of the updates of L^AT_EX-format (to 2024-06-01), `hyperref` package (to 2024-10-30, v7.01k), and `pageslts` package (to 2024-11-20, v2.0a).
- Added a warning message about missing `\DeclareTextCommand{...}{PD1}{...}` (cf. [subsection 3.13](#): `\pagenumbering{fnsymbol}`, page 7).
- Documentation section about alternatives rewritten.

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.)

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