

The `pageslts` package

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Abstract

This L^AT_EX package puts the labels `LastPage` (`\AddToHook{enddocument/afterlastpage}`, formerly `\AtEndDocument`) and `VeryLastPage` (also `\AddToHook{enddocument/afterlastpage}`, but formerly `\AfterLastShipout`) 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. When more than one page numbering scheme is used, these references do not give the total *number* of pages. For this case the label `LastPages` is introduced. Additionally, 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. This label can be referred to, too. Further labels are provided for special cases.

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).

`\pageref*` and `\lastpageref*`, for using `hyperref` but suppressing links, are supported. – The name of the `pageslts` package refers to `Last`, `Total`, and page numbering `Schemes` pages. `pagesLTS` was a former name of this package.

Right after `\begin{document}` a `\pagenumbering{...}` should be called – with the appropriate argument out of e.g.
`arabic` (Arabic numerals: 1, 2, 3, 4,...),
`roman` (Lowercase Roman numerals: i, ii, iii, iv,...), `Roman` (Uppercase Roman numerals: I, II, III, IV,...),
`alph` (Lowercase letters: a, b, c, d,...), `Alph` (Uppercase letters: A, B, C, D,...),
`fnsymbol` (Footnote symbols: *, †, ‡, §,...),
`gobble` (Maybe `\thispagestyle{empty}` is more useful?),
`silly` (from the `sillypage` package).

This package first started as a revision of the `lastpage` package of **Jeffrey P. Goldberg** (Thanks!), but then it was deemed necessary to provide a separate, enhanced package. After updates of the kernel and the package, `lastpage` now does what it is supposed to do.

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1 Introduction

This package puts the labels `LastPage` (`\AddToHook{enddocument/afterlastpage}`, formerly `\AtEndDocument`; same as the `LastPage` package) and `VeryLastPage` (also `\AddToHook{enddocument/afterlastpage}`, but formerly `\AfterLastShipout`) into the `.aux` file, allowing the user to refer to the last page of a document via `\lastpageref{LastPage}` and `\lastpageref{VeryLastPage}`. This might be particularly useful in places like headers or footers. When more than one page numbering scheme is used, these references do not give the total *number* of pages. For this case the label `LastPages` is introduced (similar to the label `TotPages` of the `TotPages` package, but the label `LastPages` is set later in the document). Additionally, 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. (See also L^AT_EX bug 3421: 3rd page is even (twoside, titlepage, abstract), <https://www.latex-project.org/cgi-bin/ltxbugs2html?category=LaTeX&responsible=anyone&state=anything&keyword=pagenumber&pr=latex%2F3421&search=>.) At the first page of the document a label `pagesLTS.0` is created. Also to this label it can be referred. Further labels are provided for special cases.

The `alphalph` package is supported, i.e. page numbers `alph` or `Alph` > 26 and `fnsymbol` > 9 can be used (with the according options set). Even zero or negative page numbers can be used with `arabic`, `alph`, `Alph`, and `fnsymbol` page numbering (with `alphalph` package and according options), and zero `roman` and `Roman` pages, too.

Right after `\begin{document}` a `\pagenumbering{...}` should be called – with the appropriate argument out of e.g.
arabic (Arabic numerals: 1, 2, 3, 4,...),
roman (Lowercase Roman numerals: i, ii, iii, iv,...), Roman (Uppercase Roman numerals: I, II, III, IV,...),
alph (Lowercase letters: a, b, c, d,...), Alph (Uppercase letters: A, B, C, D,...),
fnsymbol (Footnote symbols: *, †, ‡, §,...),
gobble (Maybe `\thispagestyle{empty}` is more useful?),
silly (from the [sillypage package](#)).

This package first started as a revision of the `lastpage` package of JEFFREY P. GOLDBERG (Thanks!), but then it became obvious that a replacement was needed to accomplish what this package does.

Trademarks appear throughout this documentation without any trademark symbol; they are the property of their respective trademark owner. There is no intention of infringement; the usage is to the benefit of the trademark owner.

logical page numbers **Tip:** For the display of the pdf file use **logical page numbers** together with `hyperref`!

- In Adobe Reader Continuos Release 2024.004.20272 enable:
Edit > Preferences > Categories: Page Display > Page Content and Information: Use logical page numbers
- Use the `hyperref` package with option `plainpages=false`.

The display will be e.g. “7 (7 of 9)”, or, in case of Roman instead of arabic numbers, “VII (7 of 9)”, and when different page numbers are used (see below) e.g. arabic after 10 Roman pages: “17 (27 of 30)”. Please try this with the compiled `pageslts-example` file!

2 Usage

Just load the package by placing

```
\usepackage[<options>]{pageslts}
```

in the preamble of your L^AT_EX source file and place a `\pagenumbering{...}` with appropriate argument (e.g. arabic, roman, Roman, fnsymbol, alph, or Alph) right behind `\begin{document}` (see subsection 2.3.1)!

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 labels `LastPage`, `VeryLastPage`, and `LastPages` (most times with `\pageref{...}`, but more save with `\lastpageref{...}`). In particular one can use the `fancyhdr` (<https://ctan.org/pkg/fancyhdr>) or `nccfancyhdr` (<https://ctan.org/pkg/nccfancyhdr>) package, or redefinitions of the page headings and footings to get a reference to the last page.

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

2.1 Options

`options` The `pageslts` package takes the following options:

2.1.1 pagecontinue

`pagecontinue` When option `pagecontinue=false` is **not** given (i.e. `pagecontinue` or `pagecontinue=true` or no `pagecontinue` option at all), at each `\pagenumbering{...}` command the number of the page will be continued with the page number following the last page of the same page numbering scheme. For example, if there are V Roman pages in the frontmatter, some arabic ones in the mainmatter, and then Roman ones again in the backmatter, the last ones will start with VI instead of I again.

If you want to start with I (or i, 1, a, A, *,...) again, set option `pagecontinue=false`. If you want to generally continue the numbers, but for some page numbering scheme do not want this, use `pagecontinue=true` and say `\setcounter{page}{1}` after `\pagenumbering{...}` for that page numbering scheme.

2.1.2 alphMult, AlphMulti, fnsymbolmult

The page number printed in `fnsymbol`¹ must be > 0 and < 10 and those printed in `alph`² and `Alph`³ must be > 0 and < 27 . After page Z L^AT_EX *should* continue with AA, AB, AC,... Some people prefer AA, BB, CC,..., but in hexadecimal it is $AA_{16} = 170_{10}$ and $171_{10} = AB_{16}$, whereas $BB_{16} = 187_{10}$. In any way it should continue at all (maybe even with a user option to choose between the two continuations), but instead only gives an error:

¹*, †, ‡, §, ¶, ||, **, ††, ‡‡

²a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z

³A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z

LaTeX Error: Counter too large
See the LaTeX manual or LaTeX Companion for explanation.
You've lost some text. Try typing <return> to proceed.
If that doesn't work, type X <return> to quit.

But thanks to the `alphalph` package these limitation no longer hold. With his `\erroralph` command now even negative or zero page “numbers” are possible.

Nevertheless, some \TeX capacity will be exceeded well before the 2147483647th page.

alphMult The string option `alphMult` takes three values: `ab`, `bb`, `0`:

ab After page `z`, the page “numbers” continue with `aa`, `ab`, `ac`, `ad`,..., and before `a` with `0`, `-a`, `-b`,..., `-z`, `-aa`, `-ab`,...

bb After page `z`, the page “numbers” continue with `aa`, `bb`, `cc`, `dd`,..., and before `a` with `0`, `-a`, `-b`,..., `-z`, `-aa`, `-bb`,...

0 (zero) The `pageslts` package does nothing, thus the user is free to define the page “numbers” after `z` and before `a`.
(But if the user does not do anything at all, the
LaTeX Error: Counter too large
will appear again.)

AlphMulti The string option `AlphMulti` takes three values: `AB`, `BB`, `0`:

AB After page `Z`, the page “numbers” continue with `AA`, `AB`, `AC`, `AD`,..., and before `A` with `0`, `-A`, `-B`,..., `-Z`, `-AA`, `-AB`,...

BB After page `Z`, the page “numbers” continue with `AA`, `BB`, `CC`, `DD`,..., and before `A` with `0`, `-A`, `-B`,..., `-Z`, `-AA`, `-BB`,...

0 (zero) The `pageslts` package does nothing, thus the user is free to define the page “numbers” after `Z` and before `A`.
(But if the user does not do anything at all, the
LaTeX Error: Counter too large
will appear again.)

fnsymbolmult When option `fnsymbolmult=false` is **not** given (but `fnsymbolmult` or `fnsymbolmult=true` or no `fnsymbolmult` option at all), after 5 (¶) the page “number” is continued with the doubled “number” of the first, second, third,... page (**, ††, ‡‡, §§, ¶¶), and after the tenth page the “number” is tripled (* * *, † † †,...). Compile the `pageslts-example.tex` and see the resulting pdf file.

Before * (page 1) the page “numbers” are continued with `0`, `-*`, `-†`,..., `-¶`, `-* * *`, `-† † †`,...

If this is not wanted, set option `fnsymbolmult=false`, and `pageslts` will do nothing and allow the user to change the page “number”.

(But if the user does not do anything at all, the

LaTeX Error: Counter too large
will appear again.)

2.1.3 romanMult, RomanMulti

romanMult The options `romanMult(=true)` and `RomanMulti(=true)` expand the `\roman` and `\Roman` page numbering scheme to values below one (`< 1`), i.e. `0`, `-i`, `-ii`, `-iii`, `-iv`,... and `0`, `-I`, `-II`, `-III`, `-IV`,..., respectively.

Again the \TeX capacity will be exceeded well before $\pm \text{MAX} = \pm 2147483647$. If the expansion below 1 is not wanted, set options `romanMult=false` and/or `RomanMulti=false`, and `pageslts` will do nothing and allow the user to change the page “number”. (But if the user does not do anything at all, \LaTeX will just ignore those values – not even a warning will be issued!)

2.1.4 Arabic page numbers

Arabic page numbers In L^AT_EX arabic (page) numbers are already possible between `-MAX...MAX`, where `MAX = 2147483647` (cf. the `alph` package), without any expansion necessary.

2.2 Labels

`pagesLTS.0` At the first page a label `pagesLTS.0` is created. If `\pagenumbering{...}` is used right after `\begin{document}`, this is much easier for the `pageslts` package (and chances for successful placing of all labels are much higher; cf. subsection 2.3.2).

`LastPage` `\AddToHook{enddocument/afterlastpage}` (formerly: `\AtEndDocument`) this package defines a label, `LastPage`, which the user can refer to with the `\lastpageref{LastPage}` command. In former times `\pageref{LastPage}` did not work when used together with the `hyperref` package and the `fnsymbol` page numbering scheme. This should work now.

`VeryLastPage` `\AddToHook{enddocument/afterlastpage}` (formerly: `\AfterLastShipout`) the label `VeryLastPage` is defined, which the user can also refer to with the `\lastpageref{VeryLastPage}` command. With the new kernel hooks `LastPage` as well as `VeryLastPage` point to the last page indeed.

`LastPages` When more than one page numbering scheme is used, neither `LastPage` nor `VeryLastPage` give the total **number** of pages. For example, `page number` for a document with VI+36 pages, both give “36” as reference to the last page. While this is correct, the total number of pages is 42, `number of pages` and this is given by the reference to `LastPages`: `\lastpageref{LastPages}` (note the “s” at the end). When the page number was manipulated by `\addtocounter{page}{...}` or `\setcounter{page}{...}`, `LastPages` ignores this. (At a page numbering change the page is automatically reset to one (without option `pagecontinue`). This is done by `\setcounter{page}{1}`, thus this is ignored, too.)

`totpages` `\pageref{totpages}` of the `totpages` package is similar to `\lastpageref{LastPages}`, but while the target for `\pageref{totpages}` is placed `\AtEndDocument`, the target for `\lastpageref{LastPages}` is placed in the hook `enddocument/afterlastpage`, therefore `\lastpageref{LastPages}` is safer to really get the total page number.

`\@abspage@last` Nowadays the kernel provides `\@abspage@last`, which contains the number of pages.

`\theCurrentPage` `\theCurrentPage` gives the current total/absolute page, in contrast to `\thepage`, which gives only the page *name* in the current page numbering scheme. For example, when there are Roman VII pages in the frontmatter and afterwards in the mainmatter you are at arabic page 9, then `\theCurrentPage` is 16, whereas `\thepage` is 9. When the page “number” (name) is manipulated by `\addtocounter{page}{...}` or `\setcounter{page}{...}`, `\theCurrentPage` ignores this. Because `CurrentPage` is a normal counter, you can also say e.g. `\Roman{CurrentPage}` to get the value in Roman page numbering scheme (e.g. VIII for 8).

`\theCurrentPageLocal` `\theCurrentPageLocal` gives the current (arabic) number of pages in the current page numbering scheme. `\thepage` and `\theCurrentPageLocal` are different e.g. when `\addtocounter{page}{...}` or `\setcounter{page}{...}` were used. `\theCurrentPageLocal` can be printed in other formats, e.g. `\roman{pagesLTS.current.local.roman}`, but probably it only makes sense if page numbering scheme and format are the same, e.g. `\Roman{pagesLTS.current.local.Roman}` or `\Alph{pagesLTS.current.local.Alph}`. `\arabic{pagesLTS.current.local....}` probably make sense even when combined with an-

other page numbering scheme. And this is exactly what `\theCurrentPageLocal` does:
`\def\theCurrentPageLocal{\arabic{pagesLTS.current.local.\pagesLTS@pnc}}.`

`pagesLTS.page numbering` If you want to refer to the last page of the first, second,... use of a page numbering scheme, you can refer to
`scheme . number` `pagesLTS.<page numbering scheme>.<number>`, e.g. `\lastpageref{pagesLTS.Roman.1}`, where `<number>` is the occurrence of the
page numbering scheme. For details please see page 9.

`\lastpageref` In former times for pages with the `fnsymbol` page numbering scheme, `\lastpageref{...}` instead of `\pageref{...}` had to be used.
`\lastpageref` can be used for all pages.

`\pagenumbering` 2.3 `\pagenumbering{...}`

2.3.1 If `\pagenumbering{...}` is not used

When the `pageslts` package is used, but `\pagenumbering{...}` (with an argument like `arabic`, `roman`, `Roman`, `fnsymbol`, `alph`, or `Alph`) is not used, there should be no problem, except that you might need more (!) compiler runs to get all references right, and some references might even be missing (see below). The `pageslts` package tries to determine the page numbering scheme at the first shipout, but success is not guaranteed. Thus please use `\pagenumbering{...}` at the beginning of your document!

Without `\pagenumbering{<something>}` (`<something>` e.g. = `arabic`) at the beginning of the document, the page numbers might be given in *arabic by (class) default*, but the `pageslts` package does not know about this without `\pagenumbering{arabic}`. –

The label `pagesLTS.0` is created at the first page even if no `\pagenumbering{...}` command is given. Maybe have a look at the `.aux` file after compiling your document to detect further labels (of other packages, too).

2.3.2 If `\pagenumbering{...}` is used once

`pagesLTS.0` At the first page a label `pagesLTS.0` is created. If `\pagenumbering{...}` is used right after `\begin{document}`, this is much easier for the `pageslts` package (and chances for successful placing of all labels are much higher).

2.3.3 If `\pagenumbering{...}` is used more than once

Everything from the preceding subsections applies and additionally the following:

When different page numbering schemes are used, e.g. Roman numbers for the frontmatter and arabic numbers for the mainmatter, please use `\pagenumbering{...}` for each of them! Even if you do this, the reference to neither the label `LastPage` nor the label `VeryLastPage` gives the **total** number of pages, but only the number of pages of the last used page numbering scheme (which could be exactly what you want, e.g. if you want to refer to the last page itself and do not want to give the total number of pages).

`LastPages` For remediation the label `LastPages` (with “s” at its end) is introduced. Please then refer to this label by `\lastpageref{LastPages}` instead of `LastPage` or `VeryLastPage`.

`pagesLTS.arabic` Additionally, 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, Alph, fnsymbol, silly, gobble,....
`pagesLTS.roman`
`pagesLTS.Roman` Additional page numbering schemes are unknown for `pageslts`, see [subsection 3.4 Using an unknown page numbering scheme](#).
`pagesLTS.alph`
`pagesLTS.Alph`
`pagesLTS.fnsymbol`
`pagesLTS.silly`
`pagesLTS.gobble`

2.3.4 If the same `\pagenumbering{...}` scheme is used more than once

Everything from the preceding subsections applies and additionally the following:

`pagecontinue` If the same page numbering scheme is used twice (or even more often) in one document (e.g. in the frontmatter Roman: I–V, in the mainmatter arabic: 1–20, and in the backmatter again Roman: VI–X), the second time it is used, the page numbering is either continued (option `pagecontinue` or `pagecontinue=true` or no option `pagecontinue`; the default) or reset to one (option `pagecontinue=false`). It is even possible to use a page numbering scheme more than twice.

`pagesLTS. page numbering scheme . number` If you want to refer to the last page of the first, second,... use of a page numbering scheme, page V in the example above, you can refer to `pagesLTS.<page numbering scheme>.<number>`, e.g. `\lastpageref{pagesLTS.Roman.1}`, where `<number>` is the occurrence of the page numbering scheme.

If you want to refer to the first page of a page numbering scheme, just place a label there, e.g.

```

\pagenumbering{Roman}
\section{Section title\label{RomanSection}}
  
```

(You know where you use `\pagenumbering{...}` and this is the `pageslts` package, not the `firstpage` package).

When you want to give the number of pages of each “sector” of the page numbering scheme, you can use

`pagesLTS. page numbering scheme . number .local.cnt` `\lastpages{<page numbering scheme>}{<number>}`, where `<page numbering scheme>` is e.g. Roman, arabic,... and `<number>` the “sector” number, e.g. `\lastpages{Roman}{2}`. (Internally, the counter has the format `pagesLTS.<page numbering scheme>.<number>.local.cnt`.)

If you used the page numbering scheme Roman for three times, you could say

```

Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}\newline
There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
\lastpages{Roman}{1}~pages in the first Roman sector
(\pageref{Roman} -- \lastpageref{pagesLTS.Roman.1}),\newline
\lastpages{Roman}{2}~pages in the second Roman sector
(\pageref{Roman2} -- \lastpageref{pagesLTS.Roman.2}), and\newline
\lastpages{Roman}{3}~pages in the third Roman sector
(\pageref{Roman3} -- \lastpageref{pagesLTS.Roman.3}).
  
```

to get

Last Roman page (pagesLTS.Roman): VIII
There are 8 pages with Roman numbers:
3 pages in the first Roman sector (I – III),
4 pages in the second Roman sector (IV – VII), and
3 pages in the third Roman sector (VIII – X).

(see e. g. the compiled pageslts-example file).

If you want to continue one page numbering scheme, but later on (third use of it, or for another page numbering scheme) want to reset the page number, just say `\setcounter{page}{1}` there.

In your document the code

```
\makeatletter
\renewcommand{\@evenfoot}%
  {\normalsize\slshape DRAFT \today\hfil \upshape page {\thepage} (\theCurrentPage) of\ %
   \lastpageref{pagesLTS.Roman} + \lastpageref{pagesLTS.arabic}\ = \lastpageref{LastPages} pages%
  }
\renewcommand{\@oddfoot}{\@evenfoot}
\makeatother
```

creates footers like

“DRAFT December 7, 2024 page V (5) of VII + 35 = 42 pages”

or

“DRAFT December 7, 2024 page 10 (17) of VII + 35 = 42 pages”

in the compiled document (cf. the pageslts-example file).

Code like

```
This book has \lastpageref{pagesLTS.Roman}+\lastpageref{pagesLTS.arabic} pages %
(\lastpageref{LastPages} pages in total).
```

produces output like

This book has X+85 pages (95 pages in total).

(when using the hyperref package, the references are even hyperlinked).

If `\addtocounter{page}{...}` or `\setcounter{page}{...}` have been used, the local version of `CurrentPage` can be used, `\theCurrentPageLocal`, see subsection [2.2](#).

2.4 papermas(s) package

There is a kind of an add-on to this package, the `papermas` package, which can be used to compute the number of sheets of paper needed to print a document (you can print more than one page of a document on one sheet of paper) as well as the approximate mass of the printout. <https://ctan.org/pkg/papermas>

3 A few warnings

3.1 Hyperref and repeated page numbers

When two (or more) different page numbering schemes are used, or the page number is reset, or for any other reason there are two pages with the same number (maybe in different format, e.g. 1 and I), and `hyperref` has not been configured right, this can cause problems. Use `hyperref` with `plainpages=false` and `pdfpagelabels=true`, and everything should be fine. More details can be found at <https://texfaq.org/FAQ-pdfpagelabels>.

3.2 showkeys package

When the `showkeys` package has been loaded in `draft` mode, in the margin for each label a box is displayed with the name of the label. `showkeys` accomplishes this by redefining `\label`, but `pageslts` does not always use `\label`, but sometimes writes directly into the `\jobname.aux`-file, and this is generally done after the according page has shipped out, therefore no box can be placed on the preceding page. At least `pageslts` gives a warning, that `showkeys` cannot present the respective label.

3.3 lastpage package

This package first started as a revision of the `lastpage` package of JEFFREY P. GOLDBERG (`jeffrey+news at goldmark dot org`), but then I deemed a replacement necessary to accomplish what this 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. It is also possible to load both packages (if recent versions are used).

3.4 Using an unknown page numbering scheme

While at the time of the latest revision of the `pageslts` package no other page numbering schemes (e.g. Greek, Hebraic) were known to the maintainer, this package in principle works with every scheme which is recognized by the original `\pagenumbering` command. But the `hyperref` package only then works with special page names, if the references to those pages are given in a certain way, thus the combination of a new page numbering scheme, the `hyperref` and the `pageslts` package might not work. – The `pageslts` package by itself also works with schemes, which the original `\pagenumbering{...}` does not recognize, but because the original `\pagenumbering{...}` is called by the `pageslts` package, this might cause an error. Especially if the last page uses this new page numbering scheme, you should check everything double (at least).

And if the number format is unknown to \LaTeX , the pages will have no number, and therefore cannot be referenced. You might be able to help yourself by using the `hyperref` package and manually placing `\phantomsectins` and `\label{...}`s or even `\hypertargets` and `\hrefs`.

4 Alternatives

There are similar packages, which do (or do not) similar things. 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. T_EX, L^AT_EX2e, ε-T_EX, L^AT_EX-format as recent as 2024-06-01 or newer), here is a list of some possible alternatives:

- 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.
- LastPage** - The `lastpage` package also provides the `LastPage` label (but not `VeryLastPage` or `LastPages`). If you only want this and/or have a quite limited amount of T_EX resources, you might want to use that package instead. It includes versions for older L^AT_EX-kernels and even for L^AT_EX2.09.
<https://ctan.org/pkg/lastpage>
- totpages** - The `totpages` package provides a `totpages` label similar to `LastPages`, but `\AtEndDocument` instead of hook `enddocument/afterlastpage`. Therefore you should stay with `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 (see [subsection 2.4](#)).
<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<sup>A</sup>T<sub>E</sub>X, 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).

(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
3 \usepackage{lipsum}[2021-09-20]% v2.7
4 \usepackage[draft]{showkeys}[2024/05/23]% v3.21
5 %% Use final instead of draft to hide the keys. %%
6 \usepackage[pdfpagelabels=true,hyperindex=false]{hyperref}[2024-10-30]% v7.01k
7 \makeatletter
8 \@ifpackageloaded{hyperref}{% Hypertext links for LaTeX
9 \hypersetup{extension=pdf,%
10 plainpages=false,%
11 pdflang={en},%
12 pdftitle={pageslts package example},%
13 pdfauthor={H.-Martin Muench},%
14 pdfsubject={Example for the pageslts package},%
15 pdfkeywords={LaTeX, pageslts},%
16 pdfview=Fit,%
17 pdfstartview=Fit,%
18 pdfpagelayout=SinglePage,%
19 bookmarksopen=true%
20 }}{\usepackage{url}[2013/09/16]}% v3.4
21 \makeatother
22 \usepackage[pagecontinue=true,alphMult=ab,AlphMulti=AB,fnsymbolmult=true,%
23 romanMult=true,RomanMulti=true]{pageslts}[2024-12-07]% v2.0b
24 %% These are the default options. %%
25
26 \makeatletter
27 \renewcommand{\@evenfoot}%
28 {Page \thepage\ (\theCurrentPage; local: \theCurrentPageLocal) of %
29 \lastpageref{pagesLTS.roman}(\lastpageref{pagesLTS.roman.local}) + %
30 \ifpagesLTS@pagecontinue%
31 \lastpageref{pagesLTS.Roman}(\lastpageref{pagesLTS.Roman.local}) %
32 \else%
33 \{\lastpageref{pagesLTS.Roman.1}%
34 +\lastpageref{pagesLTS.Roman.2}%
35 +\lastpageref{pagesLTS.Roman.3}%
36 (\lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3})=%
37 \the\numexpr%
38 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
39 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
40 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
41 \relax\} %
42 \fi + %
43 \lastpageref{pagesLTS.arabic}(\lastpageref{pagesLTS.arabic.local}) + %
44 \lastpageref{pagesLTS.fnsymbol}(\lastpageref{pagesLTS.fnsymbol.local}) + %
```

```

45 \lastpageref{pagesLTS.alpha}\lastpageref{pagesLTS.alpha.local}) + %
46 \lastpageref{pagesLTS.gobble}\lastpageref{pagesLTS.gobble.local}) + %
47 \lastpageref{pagesLTS.Alpha}\lastpageref{pagesLTS.Alpha.local}) = %
48 \lastpageref{LastPages} pages.%
49 }
50 \renewcommand{\@oddfont}{\@evenfont}
51 \def\pagesLTSEXampleArabic{3}
52 \def\pagesLTSEXamplealph{23}
53 \makeatother
54 \setlength{\parindent}{0pt}
55 \listfiles
56 \begin{document}
57 \pagenumbering{roman}
58 %% Note the first \pagenumbering immediately behind \begin{document}! %%
59 %%\addtocounter{page}{-2} %%
60 \section*{Example for pageslts}
61 \addcontentsline{toc}{section}{Example for pageslts}
62 \markboth{Example for pageslts}{Example for pageslts}
63
64 This example demonstrates the most common uses of package\newline
65 \textsf{pageslts}, v2.0b as of 2024-12-07 (HMM);\newline
66 \url{https://ctan.org/pkg/pageslts}.\bigskip
67
68 The used options were \texttt{pagecontinue=true},
69 \texttt{alphMult=ab}, \texttt{AlphMulti=AB}, \linebreak
70 \texttt{fnsymbolmult=true},
71 \texttt{romanMult=true}, and \texttt{RomanMulti=true}
72 (the default\linebreak ones).~-- For more details please see the documentation!\bigskip
73
74 \label{keys} To hide the \pageref{keys}{\quad } use option
75 \texttt{final} instead of \texttt{draft} with the \textsf{showkeys}
76 package (or remove the package call from the preamble of
77 this document).\bigskip
78
79 \textbf{Hyperlinks or not:} If the \textsf{hyperref} package is loaded,
80 the references are also hyperlinked:\bigskip
81 \smallskip
82 Page \thepage\ (\theCurrentPage; local: \theCurrentPageLocal) of %
83 \lastpageref{pagesLTS.roman}\lastpageref{pagesLTS.roman.local}) + %
84 \makeatletter%
85 \ifpagesLTS@pagecontinue%
86 \lastpageref{pagesLTS.Roman}\lastpageref{pagesLTS.Roman.local}) %
87 \else%
88 \{\lastpageref{pagesLTS.Roman.1}%
89 +\lastpageref{pagesLTS.Roman.2}%
90 +\lastpageref{pagesLTS.Roman.3}%

```



```

91 (\lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
92 \the\numexpr%
93 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
94 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
95 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
96 \relax)\} %
97 \fi + %
98 \makeatother%
99 \lastpageref{pagesLTS.arabic}(\lastpageref{pagesLTS.arabic.local}) + %
100 \lastpageref{pagesLTS.fnsymbol}(\lastpageref{pagesLTS.fnsymbol.local}) + %
101 \lastpageref{pagesLTS.alph}(\lastpageref{pagesLTS.alph.local}) + %
102 \lastpageref{pagesLTS.Alph}(\lastpageref{pagesLTS.Alph.local}) = %
103 \lastpageref{LastPages} pages.\bigskip
104 If the \textsf{hyperref} package is loaded, but the hyperlinks of the
105 references shall be suppressed, \verb|\pageref*{...}|
106 and \verb|\lastpageref*{...}| can be used:\\[0.5\baselineskip]
107 Page \thepage\ (\theCurrentPage; local: \theCurrentPageLocal) of %
108 \lastpageref*{pagesLTS.roman}(\lastpageref*{pagesLTS.roman.local}) + %
109 \makeatletter%
110 \ifpagesLTS@pagecontinue%
111 \lastpageref*{pagesLTS.Roman}(\lastpageref*{pagesLTS.Roman.local}) %
112 \else%
113 \{\lastpageref*{pagesLTS.Roman.1}%
114 +\lastpageref*{pagesLTS.Roman.2}%
115 +\lastpageref*{pagesLTS.Roman.3}%
116 (\lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
117 \the\numexpr%
118 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
119 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
120 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
121 \relax)\} %
122 \fi + %
123 \makeatother%
124 \lastpageref*{pagesLTS.arabic}(\lastpageref*{pagesLTS.arabic.local}) + %
125 \lastpageref*{pagesLTS.fnsymbol}(\lastpageref*{pagesLTS.fnsymbol.local}) + %
126 \lastpageref*{pagesLTS.alph}(\lastpageref*{pagesLTS.alph.local}) + %
127 \lastpageref*{pagesLTS.Alph}(\lastpageref*{pagesLTS.Alph.local}) = %
128 \lastpageref*{LastPages} pages.\bigskip
129
130 \textbf{Trademarks} appear throughout this example without any
131 trademark symbol; they are the property of their respective
132 trademark owner. There is no intention of infringement; the
133 usage is to the benefit of the trademark owner.\bigskip
134
135 \textbf{Tip}: Use \textit{logical page numbers} for the display of the pdf
136 (in Adobe Reader Continuos Release 2024.004.20272:\newline

```

```

137 Edit $$ Preferences $$> Categories: Page Display $$>
138 Page Content and Information: Use logical page numbers)! \bigskip
139
140 You want negative page numbers? Not only arabic, but even roman,
141 Roman, alph, Alph or fnsymbol ones? No problem, e.\,g.\~just give a\newline
142 \verb|\addtocounter{page}{-1}\textit{some number}\verb|} in the
143 source code of this example file (or uncomment the prepared line)!
144 \newpage
145 \tableofcontents
146 \newpage%
147 \makeatletter%
148 \def\pagesLTS@tmpC{roman}%
149 \ifx\pagesLTS@pnc\pagesLTS@tmpC%
150 \else\pagenumbering{roman}%
151 %% in case the page numbering is changed before,
152 %% otherwise pagesLTS.current.local.roman on this page would be undefined
153 \fi%
154 \makeatother%
155 \section{roman}
156
157 (\texttt{roman} page numbering was started before,
158 because the page numbering scheme was needed to start at
159 the first page, of course.) \bigskip
160
161 First page (\verb|\lastpageref{pagesLTS.0}|):
162 \lastpageref{pagesLTS.0} \bigskip
163
164 The page (\verb|\thepage|): \thepage \bigskip
165
166 Current page (\verb|\theCurrentPage|),
167 i.\,e.\~counted continuously from the first\linebreak page): \theCurrentPage \bigskip
168 You can get this also in other formats:
169 \roman{CurrentPage}, \Roman{CurrentPage}, \arabic{CurrentPage},
170 \fnsymbol{CurrentPage}, \alph{CurrentPage}, \Alph{CurrentPage}.
171
172 CurrentPageLocal (\verb|\theCurrentPageLocal|),
173 i.\,e.\~counted continuously from the first page of the
174 current page numbering scheme (if option pagecontinue=false: sector)):
175 \theCurrentPageLocal\newline
176 You can get also this in other formats, too:
177 \roman{pagesLTS.current.local.roman}, \Roman{pagesLTS.current.local.roman},
178 \arabic{pagesLTS.current.local.roman}, \fnsymbol{pagesLTS.current.local.roman},
179 \alph{pagesLTS.current.local.roman}, \Alph{pagesLTS.current.local.roman},
180 but probably it only makes sense if page numbering scheme and format are
181 the same, e.\,g.\newline
182 \verb|\Roman{pagesLTS.current.local.Roman}| \newline

```

```

183 or \verb|\Alph{pagesLTS.current.local.Alph}|. \verb|\arabic{...}| could
184 make sense even if combined with another page numbering scheme.
185 And this is exactly what \verb|\theCurrentPageLocal| does:\newline
186 \nolinebreak{\verb|\def\theCurrentPageLocal{\arabic{pagesLTS.current.local.\pagesLTS@pnc}}|.}\bigskip
187
188 Last roman page (pagesLTS.roman): \lastpageref{pagesLTS.roman}{\hskip4em }
189 (There are \lastpageref{pagesLTS.roman.local} pages with roman numbers.)\bigskip
190
191 Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}{\hskip3em }%
192 \makeatletter%
193 \ifpagesLTS@pagecontinue%
194 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
195 \else%
196 (There are %
197 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
198 \the\numexpr%
199 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
200 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
201 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
202 \relax~pages with Roman numbers:\newline
203 \fi%
204 \makeatother%
205 \lastpages{Roman}{1}~pages in the first Roman sector
206 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
207 \lastpages{Roman}{2}~pages in the second Roman sector
208 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
209 \lastpages{Roman}{3}~pages in the third Roman sector
210 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\bigskip
211
212 When the option \texttt{pagecontinue=false} is used with the
213 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
214 point to the same page as before, but this will have a lower number.
215 And if that page number was also present in a preceding sector,
216 the link will go to that page. (Several pages with the same number\ldots)\newline
217 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
218 of pages in the last sector. To get the total number of Roman pages, %
219 \begin{verbatim}
220 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
221 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
222 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
223 \relax%
224 \end{verbatim}%
225 would be necessary.\bigskip
226
227 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }
228 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,

```

229 because an `\verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}` was used.)\bigskip  
230  
231 Last fnsymbol page (pagesLTS.fnsymbol): `\lastpageref{pagesLTS.fnsymbol}\newline`  
232 (better `\verb|\lastpageref{pagesLTS.fnsymbol}|` than just\newline  
233 `\verb|\pageref{pagesLTS.fnsymbol}|`!)\newline  
234 (There are `\lastpageref{pagesLTS.fnsymbol.local}` pages with fnsymbol numbers.)\bigskip  
235  
236 Last alph page (pagesLTS.alph): `\lastpageref{pagesLTS.alph}{\hskip4em }`  
237 (There are only `\lastpageref{pagesLTS.alph.local}` pages with alph numbers,  
238 because an `\verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}` was used.)\bigskip  
239  
240 Last Alph page (pagesLTS.Alph): `\lastpageref{pagesLTS.Alph}{\hskip4em }`  
241 (There are `\lastpageref{pagesLTS.Alph.local}` pages with Alph numbers.)\bigskip  
242  
243 Last page's `\textit{name}` (LastPage): `\lastpageref{LastPage}\bigskip`  
244  
245 Very last page's `\textit{name}` (VeryLastPage): `\lastpageref{VeryLastPage}\newline`  
246 (`\texttt{LastPage}` and `\texttt{VeryLastPage}` are now identical, because both are now done  
247 `\verb|\AddToHook{enddocument/afterlastpage}|` instead of formerly\newline  
248 `\verb|\AtEndDocument|` and `\verb|\AfterLastShipout|`, which were different.)\bigskip  
249  
250 Last page's `\textit{number}` (LastPages): `\lastpageref{LastPages}{\hskip3em }`  
251 (=total number of pages)  
252 `\newpage`  
253 `\pagenumbering{Roman}`  
254 `\section{Roman\label{Roman}}`  
255 `\subsection{Common Roman page numbering}`  
256  
257 First page (`\verb|\lastpageref{pagesLTS.0}|`):  
258 `\lastpageref{pagesLTS.0}\bigskip`  
259  
260 The page (`\verb|\thepage|`): `\thepage\bigskip`  
261  
262 Current page (`\verb|\theCurrentPage|`),  
263 i.\,e.\,e.~counted continuously from the first page): `\theCurrentPage\bigskip`  
264  
265 CurrentPageLocal (`\verb|\theCurrentPageLocal|`),  
266 i.\,e.\,e.~counted continuously from the first page of the  
267 current page numbering scheme (if option `pagecontinue=false: sector`): `\theCurrentPageLocal \bigskip`  
268  
269 Last roman page (pagesLTS.roman): `\lastpageref{pagesLTS.roman}{\hskip4em }`  
270 (There are `\lastpageref{pagesLTS.roman.local}` pages with roman numbers.)\bigskip  
271  
272 Last Roman page (pagesLTS.Roman): `\lastpageref{pagesLTS.Roman}{\hskip3em }%`  
273 `\makeatletter%`  
274 `\ifpagesLTS@pagecontinue%`

```

275 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
276 \else%
277 (There are %
278 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
279 \the\numexpr%
280 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
281 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
282 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
283 \relax~pages with Roman numbers:\newline
284 \fi%
285 \makeatother%
286 \lastpages{Roman}{1}~pages in the first Roman sector
287 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
288 \lastpages{Roman}{2}~pages in the second Roman sector
289 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
290 \lastpages{Roman}{3}~pages in the third Roman sector
291 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\bigskip
292
293 When the option \texttt{pagecontinue=false} is used with the
294 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
295 point to the same page as before, but this will have a lower number.
296 And if that page number was also present in a preceding sector,
297 the link will go to that page. (Several pages with the same number\ldots)\newline
298 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
299 of pages in the last sector. To get the total number of Roman pages, %
300 \begin{verbatim}
301 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
302 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
303 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
304 \relax%
305 \end{verbatim}%
306 would be necessary.
307 \pagebreak
308
309 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }
310 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,
311 because an \verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}| was used.)\bigskip
312
313 Last fnsymbol page (pagesLTS.fnsymbol): \lastpageref{pagesLTS.fnsymbol}\newline
314 (better \verb|\lastpageref{pagesLTS.fnsymbol}| than just\newline
315 \verb|\pageref{pagesLTS.fnsymbol}|!)\bigskip
316
317 (There are \lastpageref{pagesLTS.fnsymbol.local} pages with fnsymbol numbers.)\bigskip
318
319 Last alph page (pagesLTS.alph): \lastpageref{pagesLTS.alph}{\hskip4em }
320 (There are only \lastpageref{pagesLTS.alph.local} pages with alph numbers,

```

321 because an `\verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}` was used.)\bigskip  
322  
323 Last Alph page (pagesLTS.Alph): `\lastpageref{pagesLTS.Alph}{\hskip4em }`  
324 (There are `\lastpageref{pagesLTS.Alph.local}` pages with Alph numbers.)\bigskip  
325  
326 Last page's `\textit{name}` (LastPage): `\lastpageref{LastPage}`\bigskip  
327  
328 Very last page's `\textit{name}` (VeryLastPage): `\lastpageref{VeryLastPage}`\newline  
329 (`\texttt{LastPage}` and `\texttt{VeryLastPage}` are now identical, because both are now done  
330 `\verb|\AddToHook{enddocument/afterlastpage}` instead of formerly\newline  
331 `\verb|\AtEndDocument` and `\verb|\AfterLastShipout`, which were different.)\bigskip  
332  
333 Last page's `\textit{number}` (LastPages): `\lastpageref{LastPages}{\hskip3em }`  
334 (=total number of pages)  
335  
336 `\newpage`  
337 `\subsection{Last page of first Roman sector}`  
338 `\verb|\lastpageref{pagesLTS.Roman}` does `\textbf{not}`  
339 refer to this page (but there: `\lastpageref{pagesLTS.Roman}`).  
340 When a reference to this page is wanted,\newline  
341 `\verb|\lastpageref{pagesLTS.Roman.1}` can be used: `\lastpageref{pagesLTS.Roman.1}`.\bigskip  
342  
343 There are `\lastpages{Roman}{1}`~pages (`\verb|\lastpages{Roman}{1}`)  
344 in this first Roman sector.\newline  
345 The Roman page numbering scheme is continued later in section~\ref{Roman2})!  
346  
347 `\newpage`  
348 `\pagenumbering{arabic}`  
349 `\section{arabic}`  
350 `\subsection{Standard page numbering}`  
351  
352 First page (`\verb|\lastpageref{pagesLTS.0}`):  
353 `\lastpageref{pagesLTS.0}`\bigskip  
354  
355 The page (`\verb|\thepage`): `\thepage` \bigskip  
356  
357 Current page (`\verb|\theCurrentPage`),  
358 i.\,e.~counted continuously from the first page): `\theCurrentPage` \bigskip  
359  
360 `CurrentPageLocal` (`\verb|\theCurrentPageLocal`),  
361 i.\,e.~counted continuously from the first page of the  
362 current page numbering scheme (if option `pagecontinue=false: sector`): `\theCurrentPageLocal` \bigskip  
363  
364 Last roman page (pagesLTS.roman): `\lastpageref{pagesLTS.roman}{\hskip4em }`  
365 (There are `\lastpageref{pagesLTS.roman.local}` pages with roman numbers.)\bigskip  
366

```

367 Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}{\hskip3em }%
368 \makeatletter%
369 \ifpagesLTS@pagecontinue%
370 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
371 \else%
372 (There are %
373 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
374 \the\numexpr%
375 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
376 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
377 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
378 \relax~pages with Roman numbers:\newline
379 \fi%
380 \makeatother%
381 \lastpages{Roman}{1}~pages in the first Roman sector
382 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
383 \lastpages{Roman}{2}~pages in the second Roman sector
384 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
385 \lastpages{Roman}{3}~pages in the third Roman sector
386 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\bigskip
387
388 When the option \texttt{pagecontinue=false} is used with the
389 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
390 point to the same page as before, but this will have a lower number.
391 And if that page number was also present in a preceding sector,
392 the link will go to that page. (Several pages with the same number\ldots)\newline
393 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
394 of pages in the last sector. To get the total number of Roman pages, %
395 \begin{verbatim}
396 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
397 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
398 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
399 \relax%
400 \end{verbatim}%
401 would be necessary.
402 \pagebreak
403
404 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }
405 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,
406 because an \verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}| was used.)\bigskip
407
408 Last fnsymbol page (pagesLTS.fnsymbol): \lastpageref{pagesLTS.fnsymbol}\newline
409 (better \verb|\lastpageref{pagesLTS.fnsymbol}| than just\newline
410 \verb|\pageref{pagesLTS.fnsymbol}|!)\bigskip
411
412 (There are \lastpageref{pagesLTS.fnsymbol.local} pages with fnsymbol numbers.)\bigskip

```

```

413
414 Last alph page (pagesLTS.alph): \lastpageref{pagesLTS.alph}{\hskip4em }
415 (There are only \lastpageref{pagesLTS.alph.local} pages with alph numbers,
416 because an \verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}| was used.)\bigskip
417
418 Last Alph page (pagesLTS.Alph): \lastpageref{pagesLTS.Alph}{\hskip4em }
419 (There are \lastpageref{pagesLTS.Alph.local} pages with Alph numbers.)\bigskip
420
421 Last page's \textit{name} (LastPage): \lastpageref{LastPage}\bigskip
422
423 Very last page's \textit{name} (VeryLastPage): \lastpageref{VeryLastPage}\newline
424 (\texttt{LastPage} and \texttt{VeryLastPage} are now identical, because both are now done
425 \verb|\AddToHook{enddocument/afterlastpage}| instead of formerly\newline
426 \verb|\AtEndDocument| and \verb|\AfterLastShipout|, which were different.)\bigskip
427
428 Last page's \textit{number} (LastPages): \lastpageref{LastPages}{\hskip3em }
429 (=total number of pages)
430
431 \newpage
432 \thispagestyle{empty}
433 \subsection[Empty page style]{Also an empty page style is no problem %
434 for the current or total page count}
435
436 \bigskip
437
438 First page (\verb|\lastpageref{pagesLTS.0}|):
439 \lastpageref{pagesLTS.0}\bigskip
440
441 The page (\verb|\thepage|): \thepage \bigskip
442
443 Current page (\verb|\theCurrentPage|),
444 i.\,e.\,counted continuously from the first page): \theCurrentPage \bigskip
445
446 CurrentPageLocal (\verb|\theCurrentPageLocal|),
447 i.\,e.\,counted continuously from the first page of the
448 current page numbering scheme (if option pagecontinue=false: sector)): \theCurrentPageLocal \bigskip
449
450 Last roman page (pagesLTS.roman): \lastpageref{pagesLTS.roman}{\hskip4em }
451 (There are \lastpageref{pagesLTS.roman.local} pages with roman numbers.)\bigskip
452
453 Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}{\hskip3em }%
454 \makeatletter%
455 \ifpagesLTS@pagecontinue%
456 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
457 \else%
458 (There are %

```



```

459 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
460 \the\numexpr%
461 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
462 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
463 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
464 \relax~pages with Roman numbers:\newline
465 \fi%
466 \makeatother%
467 \lastpages{Roman}{1}~pages in the first Roman sector
468 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
469 \lastpages{Roman}{2}~pages in the second Roman sector
470 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
471 \lastpages{Roman}{3}~pages in the third Roman sector
472 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\newline
473
474 When the option \texttt{pagecontinue=false} is used with the
475 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
476 point to the same page as before, but this will have a lower page number.
477 And if that page number was also present in a preceding sector,
478 the link will go to that page. (Several pages with the same number\ldots)\newline
479 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
480 of pages in the last sector. To get the total number of Roman pages, %
481 \begin{verbatim}
482 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
483 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
484 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
485 \relax%
486 \end{verbatim}%
487 would be necessary.
488 \pagebreak
489
490 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }
491 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,
492 because an \verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}| was used.)\bigskip
493
494 Last fnsymbol page (pagesLTS.fnsymbol): \lastpageref{pagesLTS.fnsymbol}\newline
495 (better \verb|\lastpageref{pagesLTS.fnsymbol}| than just\newline
496 \verb|\pageref{pagesLTS.fnsymbol}|!)\bigskip
497
498 (There are \lastpageref{pagesLTS.fnsymbol.local} pages with fnsymbol numbers.)\bigskip
499
500 Last alph page (pagesLTS.alph): \lastpageref{pagesLTS.alph}{\hskip4em }
501 (There are only \lastpageref{pagesLTS.alph.local} pages with alph numbers,
502 because an \verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}| was used.)\bigskip
503
504 Last Alph page (pagesLTS.Alph): \lastpageref{pagesLTS.Alph}{\hskip4em }

```

505 (There are `\lastpageref{pagesLTS.Alph.local}` pages with Alph numbers.)`\bigskip`  
506  
507 Last page's `\textit{name}` (LastPage): `\lastpageref{LastPage}``\bigskip`  
508  
509 Very last page's `\textit{name}` (VeryLastPage): `\lastpageref{VeryLastPage}``\newline`  
510 (`\texttt{LastPage}` and `\texttt{VeryLastPage}` are now identical, because both are now done  
511 `\verb|\AddToHook{enddocument/afterlastpage}|` instead of formerly`\newline`  
512 `\verb|\AtEndDocument|` and `\verb|\AfterLastShipout|`, which were different.)`\bigskip`  
513  
514 Last page's `\textit{number}` (LastPages): `\lastpageref{LastPages}{\hskip3em }`  
515 (=total number of pages)  
516  
517 `\newpage`  
518 `\subsection[addtocounter, setcounter]{Neither %`  
519 `\texttt{\textbackslash addtocounter\{page\}}` nor %  
520 `\texttt{\textbackslash setcounter\{page\}}` is a problem for the %  
521 current or total page numbers}  
522  
523 (Here is an `\verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}|`  
524 in the source code.)  
525 `\addtocounter{page}{\pagesLTSexampleArabic}``\bigskip`  
526  
527 The page (from `\verb|\thepage|` command): `\thepage` `\bigskip`  
528  
529 Current page (from `\verb|\theCurrentPage|\ %`  
530 command), i.\,e.~counted continuously from the first page): `\theCurrentPage` `\bigskip`  
531  
532 `CurrentPageLocal` (from `\verb|\theCurrentPageLocal|\ %`  
533 command), i.\,e.~counted continuously from the first page of the  
534 current page numbering scheme (if option `pagecontinue=false: sector`): `\theCurrentPageLocal` `\bigskip`  
535  
536 Last page's number (LastPages): `\lastpageref{LastPages}{\hskip3em }`  
537 (= total number of pages)  
538  
539 `\newpage`  
540 `\pagenumbering{fnsymbol}`  
541 `\section{fnsymbol}`  
542  
543 Without option `\texttt{fnsymbolmult=true}` of the `\textsf{pageslts}` package  
544 (and the help of the `\textsf{alphalph}` package),  
545 after page~9 (`\textquotedblleft \ensuremath {\ddagger \dagger} \textquotedblright` )  
546 (and also for negative page numbers) there would just appear a  
547 `\begin{quote}`  
548 `\begin{verbatim}`  
549 LaTeX Error: Counter too large  
550 See the LaTeX manual or LaTeX Companion for explanation.

```

551 You've lost some text. Try typing <return> to proceed.
552 If that doesn't work, type X <return> to quit.
553 \end{verbatim}
554 \end{quote}
555 Now the page numbers after 5 (\ensurermath {\mathparagraph }) are
556 continued with the doubled \textquotedblleft number\textquotedblright{} of
557 the first, second, third,\ldots\ page (\ensurermath {**},
558 \ensurermath {\dagger \dagger }, \ensurermath {\ddagger \ddagger },
559 \ensurermath {\mathsection \mathsection },
560 \ensurermath {\mathparagraph \mathparagraph }),
561 and after the tenth page the \textquotedblleft number\textquotedblright{} is
562 tripled (\ensurermath {***}, \ensurermath {\dagger \dagger \dagger },\ldots).
563 Page zero is named 0 and negative pages are just named like the positive ones
564 with addition of a minus \mbox{sign ($-$)}.)
565
566 \bigskip
567
568 For testing purposes, try:
569
570 \begin{small}
571 \begin{verbatim}
572 \documentclass{article}
573 \usepackage[plainpages=false,pageanchor=true,pdfpagelabels=true]{hyperref}
574 \usepackage{pageslts}
575 \pagenumbering{fnsymbol}
576 \begin{document}
577 First page.\newpage
578 \verb|\lastpageref{pagesLTS.0} | \lastpageref{pagesLTS.0} \par
579 \verb|\lastpageref{pagesLTS.0.local} | \lastpageref{pagesLTS.0.local} \par
580 \verb|\lastpageref{LastPage} | \lastpageref{LastPage} \par
581 \verb|\lastpageref{VeryLastPage} | \lastpageref{VeryLastPage} \par
582 \verb|\lastpageref{pagesLTS.fnsymbol.1} | \lastpageref{pagesLTS.fnsymbol.1} \par
583 \verb|\lastpageref{pagesLTS.fnsymbol.1.local} | \lastpageref{pagesLTS.fnsymbol.1.local} \par
584 \verb|\lastpageref{pagesLTS.fnsymbol} | \lastpageref{pagesLTS.fnsymbol} \par
585 \verb|\lastpageref{pagesLTS.fnsymbol.local} | \lastpageref{pagesLTS.fnsymbol.local} \par
586 \verb|\lastpageref{LastPages} | \lastpageref{LastPages} \par
587 \verb|\pagesLTSlastpage | \pagesLTSlastpage
588 \newpage
589 Last page.
590 \end{document}
591 \end{verbatim}
592 \end{small}
593 \newpage
594
595 First page (\verb|\lastpageref{pagesLTS.0}|):
596 \lastpageref{pagesLTS.0}\bigskip

```

```

597
598 The page (\verb|\thepage|): \thepage \bigskip
599
600 Current page (\verb|\theCurrentPage|),
601 i.\,e.~counted continuously from the first page): \theCurrentPage \bigskip
602
603 CurrentPageLocal (\verb|\theCurrentPageLocal|),
604 i.\,e.~counted continuously from the first page of the
605 current page numbering scheme (if option pagecontinue=false: sector)): \theCurrentPageLocal \bigskip
606
607 Last roman page (pagesLTS.roman): \lastpageref{pagesLTS.roman}{\hskip4em }
608 (There are \lastpageref{pagesLTS.roman.local} pages with roman numbers.)\bigskip
609
610 Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}{\hskip3em }%
611 \makeatletter%
612 \ifpagesLTS@pagecontinue%
613 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
614 \else%
615 (There are %
616 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
617 \the\numexpr%
618 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
619 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
620 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
621 \relax~pages with Roman numbers:\newline
622 \fi%
623 \makeatother%
624 \lastpages{Roman}{1}~pages in the first Roman sector
625 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
626 \lastpages{Roman}{2}~pages in the second Roman sector
627 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
628 \lastpages{Roman}{3}~pages in the third Roman sector
629 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\bigskip
630
631 When the option \texttt{pagecontinue=false} is used with the
632 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
633 point to the same page as before, but this will have a lower number.
634 And if that page number was also present in a preceding sector,
635 the link will go to that page. (Several pages with the same number\ldots)\newline
636 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
637 of pages in the last sector. To get the total number of Roman pages, %
638 \begin{verbatim}
639 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
640 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
641 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
642 \relax%

```



```

689 \textquotedblleft\Roman{pagesLTS.double.Roman}\textquotedblright{} in
690 case of option \texttt{pagecontinue}.\newline
691 If you want to start with \textquotedblleft I\textquotedblright{} all
692 over again, you will have two pages with the same name,
693 but nevertheless you can do this by using option \texttt{pagecontinue=false}
694 or a \verb|\setcounter{page}{1}|\ here (not demonstrated in this example file).\bigskip
695
696 There was the question: \textquotedblleft With option \verb|pagecontinue=false|,
697 how do I get the number of pages in each number block (e.\,g.\~in the first Roman section,
698 second Roman section, third Roman section) with just one command?\textquotedblright
699 \begin{verbatim}
700 \makeatletter%
701 \theCurrentPageLocal~of~\lastpageref*{%
702 pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc}.\pagesLTS@pnc}.local}%
703 \makeatother%
704 \end{verbatim}
705 provides this. Here: %
706 \makeatletter%
707 \theCurrentPageLocal~of~%
708 \lastpageref*{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc}.\pagesLTS@pnc}.local}\newline%
709 \makeatother%
710 for \verb|pagecontinue=true| is \verb|4 of 8| (including %
711 \makeatletter%
712 $\the\numexpr\csname c@pagesLTS.double.Roman\endcsname -1\relax$ %
713 from the first Roman section,
714 $\the\csname c@pagesLTS.double.Roman\endcsname\relax
715 =\the\numexpr\csname c@pagesLTS.double.Roman\endcsname -1\relax% first section
716 +1% first page of this second section
717 $, $\the\numexpr\csname c@pagesLTS.double.Roman\endcsname -1+%
718 \csname c@pagesLTS.Roman.2.local.cnt\endcsname\relax%
719 =\the\numexpr\csname c@pagesLTS.double.Roman\endcsname -1\relax+%
720 \the\numexpr\csname c@pagesLTS.Roman.2.local.cnt\endcsname\relax$)\newline
721 \makeatother%
722 and for \verb|pagecontinue=false| is \verb|1 of 5| .\bigskip
723
724 \verb|pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc}.\pagesLTS@pnc}.local| is:
725 \begin{description}
726 \item[-] \verb|pagesLTS| just identifies this counter to belong to the pageslts package.
727 \item[-] \verb|\pagesLTS@pnc| is the Current Page Numbering scheme, i.\,e.\~here it would be \verb|Roman|.
728 \item[-] \verb|\arabic{pagesLTS.pnc}.\pagesLTS@pnc| is the value of counter\newline
729 \verb|pagesLTS.pnc}.\pagesLTS@pnc| printed in arabic numbers (1, 2, 3, ...) -- see below.
730 \item[-] \verb|local|: Local there are 5 pages with Roman numbering in this example, globally there are
731 $3+5+4=12$~pages with Roman numbering in this example, and the local numbers are wanted.
732 \end{description}
733 The counter \verb|pagesLTS.pnc}.\pagesLTS@pnc| gives the number of the\newline
734 \verb|\pagesLTS@pnc| page numbering scheme currently used, i.\,e.\~we have consecutivly\newpage

```

```

735 \begin{verbatim}
736 pagesLTS.pnc.roman = 1
737 pagesLTS.pnc.Roman = 1
738 pagesLTS.pnc.arabic = 1
739 pagesLTS.pnc.fnsymbol = 1
740 pagesLTS.pnc.Roman = 2
741 pagesLTS.pnc.alph = 1
742 pagesLTS.pnc.Roman = 3
743 pagesLTS.pnc.Alph = 1
744 \end{verbatim}
745 So, \verb|pagesLTS.pnc.Roman| changes from 1 to 2 automatically
746 when doing the second \verb|\pagenumbering{Roman}|,
747 and changes from 2 to 3 for the third\newline
748 \verb|\pagenumbering{Roman}|.\bigskip
749
750 First page (\verb|\lastpageref{pagesLTS.0}|):
751 \lastpageref{pagesLTS.0}\bigskip
752
753 The page (\verb|\thepage|): \thepage \bigskip
754
755 Current page (\verb|\theCurrentPage|),
756 i.\,e.\,e.~counted continuously from the first page): \theCurrentPage \bigskip
757
758 CurrentPageLocal (\verb|\theCurrentPageLocal|),
759 i.\,e.\,e.~counted continuously from the first page of the
760 current page numbering scheme (if option pagecontinue=false: sector)): \theCurrentPageLocal \bigskip
761
762 Last roman page (pagesLTS.roman): \lastpageref{pagesLTS.roman}{\hskip4em }
763 (There are \lastpageref{pagesLTS.roman.local} pages with roman numbers.)\bigskip
764
765
766 Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}{\hskip3em }%
767 \makeatletter%
768 \ifpagesLTS@pagecontinue%
769 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
770 \else%
771 (There are %
772 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
773 \the\numexpr%
774 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
775 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
776 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
777 \relax~pages with Roman numbers:\newline
778 \fi%
779 \makeatother%
780 \lastpages{Roman}{1}~pages in the first Roman sector

```

781 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline  
782 \lastpages{Roman}{2}~pages in the second Roman sector  
783 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline  
784 \lastpages{Roman}{3}~pages in the third Roman sector  
785 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\bigskip  
786  
787 When the option \texttt{pagecontinue=false} is used with the  
788 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will  
789 point to the same page as before, but this will have a lower number.  
790 And if that page number was also present in a preceding sector,  
791 the link will go to that page. (Several pages with the same number\ldots)\newline  
792 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number  
793 of pages in the last sector. To get the total number of Roman pages, %  
794 \begin{verbatim}  
795 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%  
796 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%  
797 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%  
798 \relax%  
799 \end{verbatim}%  
800 would be necessary.\bigskip  
801  
802 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }  
803 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,  
804 because an \verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}| was used.)\bigskip  
805  
806 Last fnsymbol page (pagesLTS.fnsymbol): \lastpageref{pagesLTS.fnsymbol}\newline  
807 (\verb|\lastpageref{pagesLTS.fnsymbol}| -- never  
808 \verb|\pageref{pagesLTS.fnsymbol}|!)\newline  
809 (There are \lastpageref{pagesLTS.fnsymbol.local} pages with fnsymbol numbers.)\bigskip  
810  
811 Last alph page (pagesLTS.alph): \lastpageref{pagesLTS.alph}{\hskip4em }  
812 (There are only \lastpageref{pagesLTS.alph.local} pages with alph numbers,  
813 because an \verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}| was used.)\bigskip  
814  
815 Last Alph page (pagesLTS.Alph): \lastpageref{pagesLTS.Alph}{\hskip4em }  
816 (There are \lastpageref{pagesLTS.Alph.local} pages with Alph numbers.)\bigskip  
817  
818 Last page's \textit{name} (LastPage): \lastpageref{LastPage}\bigskip  
819  
820 Very last page's \textit{name} (VeryLastPage): \lastpageref{VeryLastPage}\newline  
821 (\texttt{LastPage} and \texttt{VeryLastPage} are now identical, because both are now done  
822 \verb|\AddToHook{enddocument/afterlastpage}| instead of formerly\newline  
823 \verb|\AtEndDocument| and \verb|\AfterLastShipout|, which were different.)\bigskip  
824  
825 Last page's \textit{number} (LastPages): \lastpageref{LastPages}{\hskip3em }  
826 (=total number of pages)\bigskip



```

827
828 \lipsum[1-6]
829
830 \newpage
831
832 \verb|\lastpageref{pagesLTS.Roman}| does \textbf{not}
833 refer to this page (but there: \lastpageref{pagesLTS.Roman})
834 for option \texttt{pagecontinue=true}. When a reference to this page is wanted,\newline
835 \verb|\lastpageref{pagesLTS.Roman.2}| can be used: \lastpageref{pagesLTS.Roman.2}.\newline
836 When the option \texttt{pagecontinue=false} is used with the
837 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
838 point to the same page as before, but this will have a lower number.
839 And if that page number was also present in a preceding sector,
840 the link will go to that page. (Several pages with the same number\ldots)\newline
841 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
842 of pages in the last sector. To get the total number of Roman pages, %
843 \begin{verbatim}
844 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
845 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
846 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
847 \relax%
848 \end{verbatim}%
849 would be necessary.\bigskip
850
851 There are \lastpages{Roman}{2}~pages (\verb|\lastpages{Roman}{2}|) in this
852 second Roman sector.\newline
853 The Roman page numbering scheme is continued later in section~\ref{Roman3})!
854
855 \newpage
856 \pagenumbering{alph}
857 \section{alph\label{alph}}
858
859 First page (\verb|\lastpageref{pagesLTS.0}|):
860 \lastpageref{pagesLTS.0}\bigskip
861
862 The page (\verb|\thepage|): \thepage \bigskip
863
864 Current page (\verb|\theCurrentPage|),
865 i.\,e.~counted continuously from the first page): \theCurrentPage \bigskip
866
867 CurrentPageLocal (\verb|\theCurrentPageLocal|),
868 i.\,e.~counted continuously from the first page of the
869 current page numbering scheme (if option pagecontinue=false: sector): \theCurrentPageLocal \bigskip
870
871 Last roman page (pagesLTS.roman): \lastpageref{pagesLTS.roman}{\hskip4em }
872 (There are \lastpageref{pagesLTS.roman.local} pages with roman numbers.)\bigskip

```

```

873
874 Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}{\hskip3em }%
875 \makeatletter%
876 \ifpagesLTS@pagecontinue%
877 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
878 \else%
879 (There are %
880 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
881 \the\numexpr%
882 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
883 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
884 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
885 \relax~pages with Roman numbers:\newline
886 \fi%
887 \makeatother%
888 \lastpages{Roman}{1}~pages in the first Roman sector
889 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
890 \lastpages{Roman}{2}~pages in the second Roman sector
891 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
892 \lastpages{Roman}{3}~pages in the third Roman sector
893 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }).\bigskip
894
895 When the option \texttt{pagecontinue=false} is used with the
896 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
897 point to the same page as before, but this will have a lower number.
898 And if that page number was also present in a preceding sector,
899 the link will go to that page. (Several pages with the same number\ldots)\newline
900 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
901 of pages in the last sector. To get the total number of Roman pages, %
902 \begin{verbatim}
903 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
904 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
905 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
906 \relax%
907 \end{verbatim}%
908 would be necessary.\bigskip
909
910 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }
911 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,
912 because an \verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}| was used.)\bigskip
913
914 Last fnsymbol page (pagesLTS.fnsymbol): \lastpageref{pagesLTS.fnsymbol}\newline
915 (better \verb|\lastpageref{pagesLTS.fnsymbol}| than just\newline
916 \verb|\pageref{pagesLTS.fnsymbol}|!)\bigskip
917
918 (There are \lastpageref{pagesLTS.fnsymbol.local} pages with fnsymbol numbers.)\bigskip

```

```

919
920 Last alph page (pagesLTS.alph): \lastpageref{pagesLTS.alph}{\hskip4em }
921 (There are only \lastpageref{pagesLTS.alph.local} pages with alph numbers,
922 because an \verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}| was used.)\bigskip
923
924 Last Alph page (pagesLTS.Alph): \lastpageref{pagesLTS.Alph}{\hskip4em }
925 (There are \lastpageref{pagesLTS.Alph.local} pages with Alph numbers.)\bigskip
926
927 Last page's \textit{name} (LastPage): \lastpageref{LastPage}\bigskip
928
929 Very last page's \textit{name} (VeryLastPage): \lastpageref{VeryLastPage}\newline
930 (\texttt{LastPage} and \texttt{VeryLastPage} are now identical, because both are now done
931 \verb|\AddToHook{enddocument/afterlastpage}| instead of formerly\newline
932 \verb|\AtEndDocument| and \verb|\AfterLastShipout|, which were different.)\bigskip
933
934 Last page's \textit{number} (LastPages): \lastpageref{LastPages}{\hskip3em }
935 (=total number of pages)
936
937 \newpage
938
939 Without option \texttt{alphMult=ab} of the \textsf{pageslts} (and the help of the
940 \textsf{alphalph} package), after page \textquotedblleft z\textquotedblright{} there
941 would just appear a
942 \begin{quote}
943 \begin{verbatim}
944 LaTeX Error: Counter too large
945 See the LaTeX manual or LaTeX Companion for explanation.
946 You've lost some text. Try typing <return> to proceed.
947 If that doesn't work, type X <return> to quit.
948 \end{verbatim}
949 \end{quote}
950 Now the page numbers are continued aa, ab, ac,\ldots\ (aa, bb, cc,\ldots\ is
951 also possible, see the \textsf{pageslts} documentation).\newline
952 To demonstrate this, we add a\newline
953 \verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}|\newline
954 in the source code here.
955
956 \addtocounter{page}{\pagesLTSexamplealph}
957
958 \bigskip
959
960 \lipsum[1-18]
961
962 \newpage
963 \pagenumbering{Roman}
964 \section{Roman - third time!\label{Roman3}}

```



```

1011 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
1012 \relax~pages with Roman numbers:\newline
1013 \fi%
1014 \makeatother%
1015 \lastpages{Roman}{1}~pages in the first Roman sector
1016 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
1017 \lastpages{Roman}{2}~pages in the second Roman sector
1018 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
1019 \lastpages{Roman}{3}~pages in the third Roman sector
1020 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\bigskip
1021
1022 When the option \texttt{pagecontinue=false} is used with the
1023 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
1024 point to the same page as before, but this will have a lower number.
1025 And if that page number was also present in a preceding sector,
1026 the link will go to that page. (Several pages with the same number\ldots)\newline
1027 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
1028 of pages in the last sector. To get the total number of Roman pages, %
1029 \begin{verbatim}
1030 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
1031 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
1032 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
1033 \relax%
1034 \end{verbatim}%
1035 would be necessary.\bigskip
1036
1037 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }
1038 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,
1039 because an \verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}| was used.)\bigskip
1040
1041 Last fnsymbol page (pagesLTS.fnsymbol): \lastpageref{pagesLTS.fnsymbol}\newline
1042 (better \verb|\lastpageref{pagesLTS.fnsymbol}| than just\newline
1043 \verb|\pageref{pagesLTS.fnsymbol}|!)\bigskip
1044
1045 (There are \lastpageref{pagesLTS.fnsymbol.local} pages with fnsymbol numbers.)\bigskip
1046
1047 Last alph page (pagesLTS.alph): \lastpageref{pagesLTS.alph}{\hskip4em }
1048 (There are only \lastpageref{pagesLTS.alph.local} pages with alph numbers,
1049 because an \verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}| was used.)\bigskip
1050
1051 Last Alph page (pagesLTS.Alph): \lastpageref{pagesLTS.Alph}{\hskip4em }
1052 (There are \lastpageref{pagesLTS.Alph.local} pages with Alph numbers.)\bigskip
1053
1054 Last page's \textit{name} (LastPage): \lastpageref{LastPage}\bigskip
1055
1056 Very last page's \textit{name} (VeryLastPage): \lastpageref{VeryLastPage}\newline

```

1057 `\texttt{LastPage}` and `\texttt{VeryLastPage}` are now identical, because both are now done  
1058 `\verb|AddToHook{enddocument/afterlastpage}|` instead of formerly `\newline`  
1059 `\verb|AtEndDocument|` and `\verb|AfterLastShipout|`, which were different.)`\bigskip`  
1060  
1061 Last page's `\textit{number}` (`LastPages`): `\lastpageref{LastPages}{\hskip3em }`  
1062 (`=`total number of pages)  
1063 `\newpage`  
1064 `\lipsum[1-3]`  
1065 `\newpage`  
1066  
1067 `\lastpageref{pagesLTS.Roman}` (`\verb|\lastpageref{pagesLTS.Roman}|`)  
1068 `\textbf{does}` refers to this page.`\newline`  
1069 Also `\verb|\lastpageref{pagesLTS.Roman.3}|`  
1070 give the right name of the page, but if `\verb|pagecontinue=false|` was chosen,  
1071 it might point to another page with the same name!  
1072 `\lastpageref{pagesLTS.Roman.3}.``\bigskip`  
1073  
1074 `\bigskip`  
1075  
1076 There are `\lastpages{Roman}{3}`~pages (`\verb|\lastpages{Roman}{3}|`) in this  
1077 third Roman sector.  
1078  
1079 `\newpage`  
1080 `\pagenumbering{gobble}`  
1081 `\section{gobble}`  
1082  
1083 Well. You can use `\verb|gobble|` as page numbering scheme. It gobbles the page numbers,  
1084 i.\,e.~there is no page number. Maybe `\verb|\thispagestyle{empty}|` is more useful?  
1085 Do not expect to be able to make working references to pages without page number,  
1086 and do expect to get  
1087 `\begin{verbatim}`  
1088 pdfTeX warning (ext4): destination with the same identifier  
1089 (name{page.}) has been already used, duplicate ignored  
1090 <to be read again>  
1091 `\end{verbatim}`  
1092  
1093 The page (`\verb|\thepage|`): `\thepage{}` (There is a nothing between two spaces there.)`\bigskip`  
1094  
1095 Current page (`\verb|\theCurrentPage|`),  
1096 i.\,e.~counted continuously from the first page): `\theCurrentPage` `\bigskip`  
1097  
1098 `CurrentPageLocal` (`\verb|\theCurrentPageLocal|`),  
1099 i.\,e.~counted continuously from the first page of the  
1100 current page numbering scheme (if option `pagecontinue=false`: sector): `\theCurrentPageLocal` `\bigskip`  
1101  
1102 There are `\lastpageref*{pagesLTS.gobble.local}` pages with gobbled numbers (i.\,e.~without numbers).

```

1103
1104 \bigskip
1105
1106 For testing purposes, try:
1107
1108 \begin{small}
1109 \begin{verbatim}
1110 \documentclass{article}
1111 \usepackage[plainpages=false,pageanchor=true,pdfpagelabels=true]{hyperref}
1112 \usepackage{pageslts}
1113 \pagenumbering{gobble}
1114 \begin{document}
1115 First page.\newpage
1116 \verb|\lastpageref{pagesLTS.0} | \lastpageref{pagesLTS.0} \par
1117 \verb|\lastpageref{pagesLTS.0.local} | \lastpageref{pagesLTS.0.local} \par
1118 \verb|\lastpageref{LastPage} | \lastpageref{LastPage} \par
1119 \verb|\lastpageref{VeryLastPage} | \lastpageref{VeryLastPage} \par
1120 \verb|\lastpageref{pagesLTS.gobble.1} | \lastpageref{pagesLTS.gobble.1} \par
1121 \verb|\lastpageref{pagesLTS.gobble.1.local} | \lastpageref{pagesLTS.gobble.1.local} \par
1122 \verb|\lastpageref{pagesLTS.gobble} | \lastpageref{pagesLTS.gobble} \par
1123 \verb|\lastpageref{pagesLTS.gobble.local} | \lastpageref{pagesLTS.gobble.local} \par
1124 \verb|\lastpageref{LastPages} | \lastpageref{LastPages} \par
1125 \verb|\pagesLTSlastpage | \pagesLTSlastpage \par
1126 \newpage
1127 Last page.
1128 \end{document}
1129 \end{verbatim}
1130 \end{small}
1131 \newpage
1132
1133 \pagenumbering{Alph}
1134 \section{Alph}
1135
1136 First page (\verb|\lastpageref{pagesLTS.0}|):
1137 \lastpageref{pagesLTS.0}\bigskip
1138
1139 The page (\verb|\thepage|): \thepage \bigskip
1140
1141 Current page (\verb|\theCurrentPage|),
1142 i.\,e.\,counted continuously from the first page): \theCurrentPage \bigskip
1143
1144 CurrentPageLocal (\verb|\theCurrentPageLocal|),
1145 i.\,e.\,counted continuously from the first page of the
1146 current page numbering scheme (if option pagecontinue=false: sector): \theCurrentPageLocal \bigskip
1147
1148 Last roman page (pagesLTS.roman): \lastpageref{pagesLTS.roman}{\hskip4em }

```

```

1149 (There are \lastpageref{pagesLTS.roman.local} pages with roman numbers.)\bigskip
1150
1151 Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}{\hskip3em }%
1152 \makeatletter%
1153 \ifpagesLTS@pagecontinue%
1154 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
1155 \else%
1156 (There are %
1157 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
1158 \the\numexpr%
1159 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
1160 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
1161 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
1162 \relax~pages with Roman numbers:\newline
1163 \fi%
1164 \makeatother%
1165 \lastpages{Roman}{1}~pages in the first Roman sector
1166 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
1167 \lastpages{Roman}{2}~pages in the second Roman sector
1168 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
1169 \lastpages{Roman}{3}~pages in the third Roman sector
1170 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\bigskip
1171
1172 When the option \texttt{pagecontinue=false} is used with the
1173 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
1174 point to the same page as before, but this will have a lower number.
1175 And if that page number was also present in a preceding sector,
1176 the link will go to that page. (Several pages with the same number\ldots)\newline
1177 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
1178 of pages in the last sector. To get the total number of Roman pages, %
1179 \begin{verbatim}
1180 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
1181 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
1182 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
1183 \relax%
1184 \end{verbatim}%
1185 would be necessary.\bigskip
1186
1187 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }
1188 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,
1189 because an \verb|\addtocounter{page}{\pagesLTSexampleArabic\verb|}| was used.)\bigskip
1190
1191 Last fnsymbol page (pagesLTS.fnsymbol): \lastpageref{pagesLTS.fnsymbol}\newline
1192 (better \verb|\lastpageref{pagesLTS.fnsymbol}| than just\newline
1193 \verb|\pageref{pagesLTS.fnsymbol}|!)\newline
1194

```



1195 (There are `\lastpageref{pagesLTS.fnsymbol.local}` pages with fnsymbol numbers.)\bigskip  
1196  
1197 Last alph page (pagesLTS.alph): `\lastpageref{pagesLTS.alph}{\hskip4em }`  
1198 (There are only `\lastpageref{pagesLTS.alph.local}` pages with alph numbers,  
1199 because an `\verb|\addtocounter{page}{\pagesLTSexamplealph\verb|}` was used.)\bigskip  
1200  
1201 Last Alph page (pagesLTS.Alph): `\lastpageref{pagesLTS.Alph}{\hskip4em }`  
1202 (There are `\lastpageref{pagesLTS.Alph.local}` pages with Alph numbers.)\bigskip  
1203  
1204 Last page's `\textit{name}` (LastPage): `\lastpageref{LastPage}`\bigskip  
1205  
1206 Very last page's `\textit{name}` (VeryLastPage): `\lastpageref{VeryLastPage}`\newline  
1207 (`\texttt{LastPage}` and `\texttt{VeryLastPage}` are now identical, because both are now done  
1208 `\verb|\AddToHook{enddocument/afterlastpage}` instead of formerly\newline  
1209 `\verb|\AtEndDocument` and `\verb|\AfterLastShipout`, which were different.)\bigskip  
1210  
1211 Last page's `\textit{number}` (LastPages): `\lastpageref{LastPages}{\hskip3em }`  
1212 (=total number of pages)  
1213 `\newpage`  
1214  
1215 Without option `\texttt{alphMulti=AB}` of the `\textsf{pageslts}`  
1216 (and the help of the `\textsf{alphalph}` package), after page  
1217 `\textquotedblleft Z\textquotedblright{}` there would just appear~a  
1218 `\begin{quote}`  
1219 `\begin{verbatim}`  
1220 LaTeX Error: Counter too large  
1221 See the LaTeX manual or LaTeX Companion for explanation.  
1222 You've lost some text. Try typing <return> to proceed.  
1223 If that doesn't work, type X <return> to quit.  
1224 `\end{verbatim}`  
1225 `\end{quote}`  
1226 Now the page numbers are continued AA, AB, AC,\ldots\ (AA, BB, CC,\ldots\ is  
1227 also possible, see the `\textsf{pageslts}` documentation).\newline  
1228 This is not demonstrated here, but see section~\ref{alph}.  
1229 `\newpage`  
1230  
1231 `\section{silly}`  
1232 The sillypage package, `\url{https://ctan.org/pkg/sillypage}`, provides the  
1233 page\~numbering scheme `\verb|silly|`, which is not demonstrated here  
1234 but works with the pageslts package, i.\,e.\~the references  
1235 all show the right (page) number and link to the right page.\bigskip  
1236  
1237 This is `\textbf{not}` demonstrated here (discussing gobbled page numbers  
1238 is silly enough), but for testing purposes, try:  
1239  
1240 `\begin{small}`

```

1241 \begin{verbatim}
1242 \documentclass{article}
1243 \usepackage[plainpages=false,pageanchor=true,pdfpagelabels=true]{hyperref}
1244 \usepackage{pageslts}
1245 \usepackage{sillypage}
1246 \pagenumbering{silly}
1247 \begin{document}
1248 First page.\newpage
1249 \verb|\lastpageref{pagesLTS.0} | \lastpageref{pagesLTS.0} \par
1250 \verb|\lastpageref{pagesLTS.0.local} | \lastpageref{pagesLTS.0.local} \par
1251 \verb|\lastpageref{LastPage} | \lastpageref{LastPage} \par
1252 \verb|\lastpageref{VeryLastPage} | \lastpageref{VeryLastPage} \par
1253 \verb|\lastpageref{pagesLTS.silly.1} | \lastpageref{pagesLTS.silly.1} \par
1254 \verb|\lastpageref{pagesLTS.silly.1.local}| \lastpageref{pagesLTS.silly.1.local}\par
1255 \verb|\lastpageref{pagesLTS.silly} | \lastpageref{pagesLTS.silly} \par
1256 \verb|\lastpageref{pagesLTS.silly.local}| \lastpageref{pagesLTS.silly.local} \par
1257 \verb|\lastpageref{LastPages} | \lastpageref{LastPages} \par
1258 \verb|\pagesLTSlastpage | \pagesLTSlastpage \par
1259 \newpage
1260 Page \theCurrentPage\newpage
1261 Page \theCurrentPage\newpage
1262 Page \theCurrentPage\newpage
1263 Page \theCurrentPage\newpage
1264 Page \theCurrentPage\newpage
1265 Page \theCurrentPage\newpage
1266 Page \theCurrentPage\newpage
1267 Page \theCurrentPage\newpage
1268 Page \theCurrentPage\newpage
1269 Page \theCurrentPage\newpage
1270 Page \theCurrentPage\newpage
1271 Page \theCurrentPage\newpage
1272 Page \theCurrentPage : Last page.
1273 \end{document}
1274 \end{verbatim}
1275 \end{small}
1276 \newpage
1277
1278 \section{The End}
1279
1280 First page (\verb|\lastpageref{pagesLTS.0}|):
1281 \lastpageref{pagesLTS.0}\bigskip
1282
1283 The page (\verb|\thepage|): \thepage \bigskip
1284
1285 Current page (\verb|\theCurrentPage|),
1286 i.\,e.\,counted continuously from the first page): \theCurrentPage \bigskip

```

```

1287
1288 CurrentPageLocal (\verb|\theCurrentPageLocal|),
1289 i.\,e.~counted continuously from the first page of the
1290 current page numbering scheme (if option pagecontinue=false: sector): \theCurrentPageLocal \bigskip
1291
1292 Last roman page (pagesLTS.roman): \lastpageref{pagesLTS.roman}{\hskip4em }
1293 (There are \lastpageref{pagesLTS.roman.local} pages with roman numbers.)\bigskip
1294
1295 Last Roman page (pagesLTS.Roman): \lastpageref{pagesLTS.Roman}{\hskip3em }%
1296 \makeatletter%
1297 \ifpagesLTS@pagecontinue%
1298 (There are \lastpageref{pagesLTS.Roman.local}~pages with Roman numbers:\newline
1299 \else%
1300 (There are %
1301 \lastpages{Roman}{1}+\lastpages{Roman}{2}+\lastpages{Roman}{3}=%
1302 \the\numexpr%
1303 \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
1304 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
1305 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
1306 \relax~pages with Roman numbers:\newline
1307 \fi%
1308 \makeatother%
1309 \lastpages{Roman}{1}~pages in the first Roman sector
1310 (\pageref{Roman}{\hskip3em }-\lastpageref{pagesLTS.Roman.1}{\hskip3em }),\newline
1311 \lastpages{Roman}{2}~pages in the second Roman sector
1312 (\pageref{Roman2}{\hskip3em }-\lastpageref{pagesLTS.Roman.2}{\hskip3em }), and\newline
1313 \lastpages{Roman}{3}~pages in the third Roman sector
1314 (\pageref{Roman3}{\hskip3em }-\lastpageref{pagesLTS.Roman.3}{\hskip3em }.)\bigskip
1315
1316 When the option \texttt{pagecontinue=false} is used with the
1317 \textsf{pageslts} package, the \verb|\lastpageref{pagesLTS.Roman}| will
1318 point to the same page as before, but this will have a lower number.
1319 And if that page number was also present in a preceding sector,
1320 the link will go to that page. (Several pages with the same number\ldots)\newline
1321 The \verb|\lastpageref{pagesLTS.Roman.local}| will refer only to the number
1322 of pages in the last sector. To get the total number of Roman pages, %
1323 \begin{verbatim}
1324 \the\numexpr \csname c@pagesLTS.Roman.1.local.cnt\endcsname%
1325 +\csname c@pagesLTS.Roman.2.local.cnt\endcsname%
1326 +\csname c@pagesLTS.Roman.3.local.cnt\endcsname%
1327 \relax%
1328 \end{verbatim}%
1329 would be necessary.\bigskip
1330
1331 Last arabic page (pagesLTS.arabic): \lastpageref{pagesLTS.arabic}{\hskip5em }
1332 (There are only \lastpageref{pagesLTS.arabic.local} pages with arabic numbers,

```

```

1333 because an \verb|\addtocounter{page}{\pagesLTSexampleArabic\verb}| was used.)\bigskip
1334
1335 Last fnsymbol page (pagesLTS.fnsymbol): \lastpageref{pagesLTS.fnsymbol}\newline
1336 (better \verb|\lastpageref{pagesLTS.fnsymbol}| than just\newline
1337 \verb|\pageref{pagesLTS.fnsymbol}|!)\bigskip
1338
1339 (There are \lastpageref{pagesLTS.fnsymbol.local} pages with fnsymbol numbers.)\bigskip
1340
1341 Last alph page (pagesLTS.alph): \lastpageref{pagesLTS.alph}{\hskip4em }
1342 (There are only \lastpageref{pagesLTS.alph.local} pages with alph numbers,
1343 because an \verb|\addtocounter{page}{\pagesLTSexamplealph\verb}| was used.)\bigskip
1344
1345 Last gobble page (pagesLTS.gobble: \lastpageref{pagesLTS.gobble}{\hskip4em }
1346 Yes, there is neither page number nor link, because everything got gobbled.
1347 (There is \lastpageref*{pagesLTS.gobble.local} page with gobbled number (i.\,e.~without number).)\bigskip
1348
1349 Last Alph page (pagesLTS.Alph): \lastpageref{pagesLTS.Alph}{\hskip4em }
1350 (There are \lastpageref{pagesLTS.Alph.local} pages with Alph numbers.)\bigskip
1351
1352 Silly page numbers are possible but were not demonstrated in this example.
1353 \newpage
1354
1355 Last page's \textit{name} (LastPage): \lastpageref{LastPage}\bigskip
1356
1357 Very last page's \textit{name} (VeryLastPage): \lastpageref{VeryLastPage}\newline
1358 (\texttt{LastPage} and \texttt{VeryLastPage} are now identical, because both are now done
1359 \verb|\AddToHook{enddocument/afterlastpage}| instead of formerly\newline
1360 \verb|\AtEndDocument| and \verb|\AfterLastShipout|, which were different.)\bigskip
1361
1362 Last page's \textit{number} (LastPages): \lastpageref{LastPages}{\hskip3em }
1363 (=total number of pages)
1364 \end{document}
1365 \end{example}

```

## 6 The implementation

(This and the source code of the example file are the reasons for printing the documentation in landscape format instead of portrait.)

We start off by checking that we are loading into L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>, format version at least 2024-06-01, and announcing the name and version of this package.

```
1366 *package)
1367 \NeedsTeXFormat{LaTeX2e}[2024-06-01]
1368 \ProvidesPackage{pageslts}[2024-12-07 v2.0b Refers to special pages' numbers/names (HMM)]
1369
```

A short description of the pageslts package:

```
1370 %% Allows for things like\par
1371 %% |Page \thepage\ (\theCurrentPage; local: \theCurrentPageLocal) of %
1372 %% \lastpageref{pagesLTS.roman}(\lastpageref{pagesLTS.roman.local}) + %
1373 %% \lastpageref{pagesLTS.Roman}(\lastpageref{pagesLTS.Roman.local}) + %
1374 %% \lastpageref{pagesLTS.arabic}(\lastpageref{pagesLTS.arabic.local}) + %
1375 %% \lastpageref{pagesLTS.fnsymbol}(\lastpageref{pagesLTS.fnsymbol.local}) + %
1376 %% \lastpageref{pagesLTS.alph}(\lastpageref{pagesLTS.alph.local}) + %
1377 %% \lastpageref{pagesLTS.Alph}(\lastpageref{pagesLTS.Alph.local}) = %
1378 %% \lastpageref{LastPages} pages.|\par
1379 %% to get\par
1380 %% 'Page d (57; local: 4) of ii(2) + XX(20) + *(1) + 30(30) + e(5) + C(3) = 61 pages.'.
1381
```

For the handling of the options we use the kernel commands:

```
1382 \DeclareKeys[pagesLTS]
1383 {alphMult .store = \pagesLTS@alphMult ,
1384 alphMult .usage = preamble ,
1385 AlphMulti .store = \pagesLTS@AlphMulti ,
1386 AlphMulti .usage = preamble ,
1387 pagecontinue .if = pagesLTS@pagecontinue ,
1388 pagecontinue .usage = load ,
1389 romanMult .if = pagesLTS@romanMult ,
1390 romanMult .usage = load ,
1391 RomanMulti .if = pagesLTS@RomanMulti ,
1392 RomanMulti .usage = load ,
1393 fnsymbolmult .if = pagesLTS@fnsymbolmult ,
1394 fnsymbolmult .usage = load ,
1395 }
1396
1397 \SetKeys[pagesLTS]{alphMult=ab,AlphMulti=AB,pagecontinue=true,romanMult=true,romanMult=true,RomanMulti=true,fnsymbolmult=true}
1398
1399 \DeclareUnknownKeyHandler[pagesLTS]{%
1400 \PackageError{pageslts}{Unknown option "\CurrentOption"}{%
```

```

1401 LaTeX has been asked to set an option called\MessageBreak%
1402 '#1' \if\relax\detokenize{#2}\relax\else with value '#2'\fi\MessageBreak%
1403 but the package "pageslts" has not created an option with this name.\MessageBreak%
1404 Try typing <return> to proceed.\MessageBreak%
1405 If that doesn't work, type X <return> to quit.%
1406 }%
1407 }
1408
1409 \ProcessKeyOptions[pagesLTS]
1410

```

This package really does not work with an old L<sup>A</sup>T<sub>E</sub>X format without hooks, or without  $\varepsilon$ -T<sub>E</sub>X, or with a pagesLTS.sty file, or with version 2.0 from 1992 of the endfloats package, or hyperref from 2015 and so on. Assuming that nobody would combine those old things with a modern L<sup>A</sup>T<sub>E</sub>X format, we request a recent format and do not check for the rest.

```

1411 \@ifl@t@r{\fmtversion{2024-06-01}}{\PackageError{pageslts}{%
1412 LaTeX format 2024-06-01 or newer needed}{%
1413 Needed LaTeX format version: 2024-06-01 or newer.\MessageBreak%
1414 Found\space\space LaTeX format version: \fmtversion.\MessageBreak%
1415 Please update your TeX distribution!\MessageBreak%
1416 Loading of pageslts package is aborted.}
1417 \expandafter\endinput}
1418

```

The undolabl package (see subsection 7.1) is needed to overwrite labels, when the same page numbering scheme is used twice (or even more often).

```

1419 \RequirePackage{undolabl}[2024-12-05]
1420 \IfPackageLoadedTF{undolabl}{\IfPackageAtLeastF{undolabl}{2024-12-05}{%
1421 \PackageError{pageslts}{undolabl package version too old}{%
1422 Required version: 2024-12-05 v1.0n or newer.\MessageBreak%
1423 found version:\space\space\space\space\csname ver@undolabl.sty\endcsname.%
1424 }}{\PackageError{pageslts}{undolabl package not loaded}{%
1425 The undolabl package is required by pageslts but was not loaded.}%
1426 }
1427

```

For comparisons, zero, one, two and three are defined ( $\backslash z@$ ,  $\backslash @one$  and so on do not work for this) and for the page numbering scheme handling some definitions are made.

```

1428 \def\pagesLTS@zero{0}
1429 \def\pagesLTS@one{1}
1430 \def\pagesLTS@two{2}
1431 \def\pagesLTS@three{3}
1432 \def\pagesLTS@ab{ab}
1433 \def\pagesLTS@bb{bb}
1434 \def\pagesLTS@ABi{AB}
1435 \def\pagesLTS@BBi{BB}
1436

```

The traditional behaviour is a reset of the page number to one, each time the page numbering scheme changes. The option `pagecontinue` changes this to a continuation with the number/name following the last page number/name of the same page numbering scheme. The user is informed accordingly.

```

1437 \ifpagesLTS@pagecontinue
1438 \PackageNoteNoLine{pageslts}{Option pagecontinue enabled (maybe by default):\MessageBreak%
1439 The pageslts package will continue the page numbering,\MessageBreak%
1440 when the same page numbering scheme is used twice.\MessageBreak%
1441 If you do not want this, call pageslts with option\MessageBreak%
1442 pagecontinue=false (or use \string\setcounter{page}=1)}
1443 \else
1444 \PackageNoteNoLine{pageslts}{Option pagecontinue is false:\MessageBreak%
1445 The pageslts package was used, but the option\MessageBreak%
1446 pagecontinue was set to false.\MessageBreak%
1447 If you want the page numbers to be continued,\MessageBreak%
1448 when the same page numbering scheme is used twice,\MessageBreak%
1449 please call pageslts with option pagecontinue=true,\MessageBreak%
1450 otherwise the page number is reset to one each time\MessageBreak%
1451 the page numbering scheme is changed}
1452 \fi
1453

```

The page number printed in `alph` or in `Alph` page numbering scheme had to be  $> 0$  and  $< 27$ . Now the `alphalph` package allows to extend the numbering scheme (not only for pages). Because some users prefer `aa`, `ab`, `ac`, `ad`,... and some `aa`, `bb`, `cc`, `dd`,..., both schemes can be chosen via the options. The `fnsymbol` page numbering scheme was restricted to values  $> 0$  and  $< 10$ . The `alphalph` package allows to extend this page numbering scheme, too. Option `fnsymbolmult` can be chosen with the `pageslts` package. If no extension is wished (or another extension is wished and implemented manually), `pageslts` can be called with options set to 0 (zero) and false: `alphMult=0`, `AlphMulti=0`, `fnsymbolmult=false`.

```

1454 \ifx\pagesLTS@alphMult\pagesLTS@ab%
1455 \else
1456 \ifx\pagesLTS@alphMult\pagesLTS@bb%
1457 \else
1458 \ifx\pagesLTS@alphMult\pagesLTS@zero%
1459 \PackageNoteNoLine{pageslts}{%
1460 Option alphMult=0 found:\MessageBreak%
1461 The pageslts package was used, but the option\MessageBreak%
1462 alphMult was set to 0 (zero).\MessageBreak%
1463 If you want the page numbers to be extended\MessageBreak%
1464 after z, you have to organize this yourself now.\MessageBreak%
1465 For automatic continuation, please use the\MessageBreak%
1466 alphalph package and call pageslts\MessageBreak%
1467 with option alphMult=ab (for aa, ab, ac, ad,...) or\MessageBreak%
1468 with option alphMult=bb (for aa, bb, cc, dd,...)}
1469 \else
1470 \PackageError{pageslts}{Unknown option value}{%
1471 The pageslts package was used with option\MessageBreak%

```

```

1472 alphMult=\meaning\pagesLTS@alphMult .\MessageBreak%
1473 Only values 'ab', 'bb', and '0' (zero) are valid.\MessageBreak%
1474 Now the default 'ab' is being set.}
1475 \SetKeys[pagesLTS]{alphMult=ab}
1476 \fi
1477 \fi
1478 \fi
1479
1480 \ifx\pagesLTS@AlphMulti\pagesLTS@ABi%
1481 \else
1482 \ifx\pagesLTS@AlphMulti\pagesLTS@BBi%
1483 \else
1484 \ifx\pagesLTS@AlphMulti\pagesLTS@zero%
1485 \PackageNoteNoLine{pageslts}{%
1486 Option AlphMulti=0 found:\MessageBreak%
1487 The pageslts package was used, but the option\MessageBreak%
1488 AlphMulti was set to 0 (zero).\MessageBreak%
1489 If you want the page numbers to be extended\MessageBreak%
1490 after Z, you have to organize this yourself now.\MessageBreak%
1491 For automatic continuation, please use the\MessageBreak%
1492 alphas package and call pageslts\MessageBreak%
1493 with option AlphMulti=AB (for AA, AB, AC, AD,...) or\MessageBreak%
1494 with option AlphMulti=BB (for AA, BB, CC, DD,...)}
1495 \else
1496 \PackageError{pageslts}{Unknown option value}{%
1497 The pageslts package was used with option\MessageBreak%
1498 AlphMulti=\meaning\pagesLTS@AlphMulti .\MessageBreak%
1499 Only values 'AB', 'BB', and '0' (zero) are valid.\MessageBreak%
1500 The default 'AB' is set.}
1501 \SetKeys[pagesLTS]{AlphMulti=AB}
1502 \fi
1503 \fi
1504 \fi
1505

```

If `alph` or `Alph` or `fnsymbol` page numbers shall be continued, the `alphalph` package is required.

```

1506 \ifx\pagesLTS@alphMult\pagesLTS@zero\else\RequirePackage{alphalph}[2019/12/09]\fi
1507 \ifx\pagesLTS@AlphMulti\pagesLTS@zero\else\RequirePackage{alphalph}[2019/12/09]\fi
1508 \ifpagesLTS@fnsymbolmult\RequirePackage{alphalph}[2019/12/09]\fi
1509

```

For the roman page numbering scheme, it is just the choice of an extension by `pageslts` or not.

```

1510 \ifpagesLTS@romanMult
1511 \PackageNoteNoLine{pageslts}{Option romanMult enabled (maybe by default):\MessageBreak%
1512 The pageslts package will extend the page numbering\MessageBreak%
1513 of the roman scheme below i with\MessageBreak%
1514 0, -i, -ii, -iii, -iv,...\MessageBreak%

```



```

1515 If you do not want this, call pageslts with option\MessageBreak%
1516 romanMult=false}
1517 \else
1518 \PackageNoteNoLine{pageslts}{Option romanMult is set to false:\MessageBreak%
1519 The pageslts package was used, but the option\MessageBreak%
1520 romanMult was set to false.\MessageBreak%
1521 If you want the page numbering of the roman scheme\MessageBreak%
1522 to be extended below i,\MessageBreak%
1523 please call pageslts with option romanMult=true,\MessageBreak%
1524 otherwise zero and negative page numbers of the\MessageBreak%
1525 roman scheme will need to be defined otherwise}
1526 \fi
1527

```

Same for the Roman page numbering scheme.

```

1528 \ifpagesLTS@RomanMulti
1529 \PackageNoteNoLine{pageslts}{Option RomanMulti enabled (maybe by default):\MessageBreak%
1530 The pageslts package will extend the page numbering\MessageBreak%
1531 of the Roman scheme below I with\MessageBreak%
1532 0, -I, -II, -III, -IV,...\MessageBreak%
1533 If you do not want this, call pageslts with option\MessageBreak%
1534 RomanMulti=false}
1535 \else
1536 \PackageNoteNoLine{pageslts}{Option RomanMulti is set to false:\MessageBreak%
1537 The pageslts package was used, but the option\MessageBreak%
1538 RomanMulti was set to false.\MessageBreak%
1539 If you want the page numbering of the Roman scheme\MessageBreak%
1540 to be extended below i,\MessageBreak%
1541 please call pageslts with option RomanMulti=true,\MessageBreak%
1542 otherwise zero and negative page numbers of the\MessageBreak%
1543 Roman scheme will need to be defined otherwise}
1544 \fi
1545

```

For the footnotesymbol page numbering scheme, it is also just the choice of a extension by pageslts or not.

```

1546 \ifpagesLTS@fnsymbolmult
1547 \PackageNoteNoLine{pageslts}{Option fnsymbolmult enabled (maybe by default):\MessageBreak%
1548 The pageslts package will extend the page numbering\MessageBreak%
1549 of the footnotesymbol scheme using the alphalph\MessageBreak%
1550 package.\MessageBreak%
1551 If you do not want this, call pageslts with option\MessageBreak%
1552 fnsymbolmult=false}
1553 \else
1554 \PackageNoteNoLine{pageslts}{%
1555 Option fnsymbolmult is set to false:\MessageBreak%
1556 The pageslts package was used, but the option\MessageBreak%
1557 fnsymbolmult was set to false.\MessageBreak%

```

```

1558 If you want the page numbering of the footnotesymbol\MessageBreak%
1559 scheme to be extended using the alphalph package,\MessageBreak%
1560 please call pageslts with option fnsymbolmult=true,\MessageBreak%
1561 otherwise page numbers of the footnotesymbol scheme\MessageBreak%
1562 greater than nine will need to be defined otherwise}
1563 \fi
1564

```

Now defining some variables, place-holders, and abbreviations:

```

1565 \def\pagesLTS@pnc{0}
1566 \def\pagesLTS@called{0}
1567 \def\pagesLTS@fns{fnsymbol}
1568 \def\pagesLTS@alph{alph}
1569 \def\pagesLTS@Alph{Alph}
1570 \def\pagesLTS@gobble{gobble}
1571 \def\pagesLTS@silly{silly}
1572 \def\pagesLTS@rerun{0}
1573 \def\pagesLTS@esoFs{0}
1574 \def\pagesLTS@esovFs{0}
1575 \def\pagesLTS@esoSy{0}
1576 \def\pagesLTS@esovSy{0}
1577 \def\pagesLTS@esoGbl{0}
1578 \def\pagesLTS@esovGbl{0}
1579 \def\lastpageref{\lastpagereftxt}
1580 \def\pagesLTS@undolable{none}
1581 \def\pncmissing{0}
1582 \def\pagesLTS@messageNPN{%
1583 The pageslts package was used, but\MessageBreak%
1584 \string\pagenumbering \MessageBreak%
1585 was not called at the beginning of the document\MessageBreak%
1586 (maybe earlier or later).\MessageBreak%
1587 Please use \string\pagenumbering \MessageBreak%
1588 (with an argument like arabic, roman, Roman,\MessageBreak%
1589 fnsymbol, alph, Alph, gobble,\MessageBreak%
1590 or silly (requiring sillypage package))\MessageBreak%
1591 at the beginning of your document!\MessageBreak%
1592 Otherwise your document will probably compile,\MessageBreak%
1593 but the pageslts package might not be able\MessageBreak%
1594 to get all labels for the references\MessageBreak%
1595 to the respective pages right.\MessageBreak%
1596 }
1597

```

Defining some new counters (and doing related things):

```

1598 \newcounter{CurrentPage}
1599 \setcounter{CurrentPage}{1}
1600 \def\theCurrentPageLocal{\arabic{pagesLTS.current.local.\pagesLTS@pnc}}

```

The counter `pagesLTS.pagenr` is for saving into the `.aux` file the total page number of the last page.

```
1601 \newcounter{pagesLTS.pagenr}
1602 \setcounter{pagesLTS.pagenr}{1}
```

While generally `\pagesLTS@providecounter{pagesLTS.current.local.\pagesLTS@pnc}` is used, for the beginning of the document `pagesLTS.current.local.0` is predefined. (A `\pagesLTS@providecounter{pagesLTS.current.local.\pagesLTS@pnc}` could be used for this, too, but we know that `pagesLTS.current.local.0` was not defined, so we can just do the definition here.) And the first local page gets the number one.

```
1603 \newcounter{pagesLTS.current.local.0}
1604 \setcounter{pagesLTS.current.local.0}{1}
```

And the same again for `pagesLTS.pnc.0`.

```
1605 \newcounter{pagesLTS.pnc.0}
```

Also a scratch counter is defined, `\pagesLTSlastpage` and `\pagesLTSlastpageHy` are predefined (e.g. for computations in the first compilation run), and the obsolete `\pagesLTS.lastpage` points to the new `\pagesLTSlastpage`.

```
1606 \newcounter{pagesLTS.tmpcounter}
1607 \def\pagesLTSlastpage{1}
1608 \def\pagesLTSlastpageHy{1}
1609 \def\pagesLTS.lastpage{\pagesLTSlastpage}
1610
```

`\xroman` When `\roman{...}` is used with a value  $< 1$ , L<sup>A</sup>T<sub>E</sub>X just ignores this (see subsection 3.5). Here we provide a command `\xroman{...}` (expanded roman), which gives the usual `\roman` numbers (i, ii, iii, iv,...) for positive values, `-|...|` (i.e. -i, -ii, -iii, -iv,...) for negative values, and 0 for all other values (which should be zero).

```
1611 \newcommand{\xroman}[1]{%
1612 \ifnum\value{#1}>0%
1613 \roman{#1}%
1614 \else%
1615 \ifnum\value{#1}<0%
```

`\arabic{#1}` gives the arabic number of argument `#1`, which is negative here (for example `-7`), “-” puts another minus sign in front of it (for example `--7`), `\number` removes all unnecessary preceding zeros, plus and minus signs (for example `7`), `\romannumeral` turns it into a roman number (for example `vii`), and “-” puts the minus sign back in front of it (for example `-vii`).

```
1616 -\romannumeral\number-\arabic{#1}%
1617 \else%
1618 0%
1619 \fi%
1620 \fi%
1621 }
1622
```

`\XRoman` `\XRoman` does the same for uppercase `\Roman` numbers. `-\uppercase{\romannumeral\number-\arabic{#1}}` cannot be used, because the result in the example is `-\uppercase{vii}` and not `-VII`.<sup>4</sup> Therefore we have a look at L<sup>A</sup>T<sub>E</sub>X's own `\@Roman\FOOcounter`, `\def\@Roman#1{\expandafter\@slowromancap\romannumeral #1@}`, and use `\@slowromancap`, which is a fully expandable macro, to do the trick for this:

```

“\def\@slowromancap#1{\ifx @#1% then terminate
\else
\if i#1I\else\if v#1V\else\if x#1X\else\if l#1L\else\if
c#1C\else\if d#1D\else \if m#1M\else#1\fi\fi\fi\fi\fi\fi
\expandafter\@slowromancap
\fi
}” (2021/11/08 Version v1.1n LATEX Kernel File 21: ltcntrs.dtx Counters and Lengths).

```

```

1623 \newcommand{\XRoman}[1]{%
1624 \ifnum\value{#1}>0%
1625 \Roman{#1}%
1626 \else%
1627 \ifnum\value{#1}<0%
1628 -\expandafter\@slowromancap\romannumeral\number-\arabic{#1}@%
1629 \else%
1630 0%
1631 \fi%
1632 \fi%
1633 }
1634

```

`\pagesLTS@providecounter` We provide a way to create counters like

```

pagesLTS.pnc. page - pagesLTS.pnc.<page numbering scheme>, e.g. pagesLTS.pnc.Roman,
 numbering scheme
pagesLTS.double. page - pagesLTS.double.<page numbering scheme>, e.g. pagesLTS.double.Roman,
 numbering scheme
PageCurrentLocal. page - PageCurrentLocal.<page numbering scheme>, e.g. PageCurrentLocal.Roman,
 numbering scheme

```

for all page numbering schemes, even those not supported by the current original `\pagenumbering` (2020/12/05 Version v1.1a L<sup>A</sup>T<sub>E</sub>X Kernel File 33 ltpageno.dtx Page Numbering), which is

```

\countdef\c@page=0 \c@page=1
\def\cl@page{}
\def\pagenumbering#1{%
 \global\c@page \@ne \gdef\thepage{\csname @#1\endcsname
 \c@page}}

```

```

1635 \newcommand{\pagesLTS@providecounter}[1]{\@ifundefined{c@#1}{\newcounter{#1}}{}}

```

<sup>4</sup>This does not matter for the print out, but for the display of the logical page numbers as well as the `.aux` file.

The command `\pagesLTS@ifcounter` is obsolete, but if a document was compiled using an older version of the `pageslts` package, the command will still be in the `.aux` file. (Following code will be removed in some future version.)

```
1636 \NewCommandCopy{\pagesLTS@ifcounter}{\pagesLTS@providcounter}
1637 \AddToHook{begindocument}{%
```

This hook is executed after the `.aux` file has been read, so there should be no following `\pagesLTS@ifcounter`.

```
1638 \AddToHookWithArguments{cmd/pagesLTS@ifcounter/before}{%
1639 \PackageError{pageslts}{Old command \string\pagesLTS@ifcounter\space used}{Replace by \string\pagesLTS@providcounter.}%
1640 }%
1641 }
1642
```

`\lastpages` We provide a command to give the number of pages in a sector of a split page numbering scheme (see page 9, `pagesLTS.<page numbering scheme>.<number>.local.cnt`):

```
1643 \newcommand{\lastpages}[2]{%
1644 \pagesLTS@providcounter{pagesLTS.#1.#2.local.cnt}%
1645 \arabic{pagesLTS.#1.#2.local.cnt}%
1646 }
1647
```

`\pagesLTS@writelabel` At last defining the writing of a label:

```
1648 \newcommand{\pagesLTS@writelabel}[1]{%
1649 \addtocounter{page}{+1}%
```

`\addtocounter{page}{+1}` because `\pagesLTS@putlabel` includes an `\addtocounter{page}{-1}`, which is not necessary here.

Into the `.aux` file something like

```
\newlabel{pagesLTS.Roman}{{}{VIII}}{page.VIII}}
```

is written, thus `\lastpageref{pagesLTS.Roman}` prints VIII and links to `page.VIII`.

```
1650 \pagesLTS@putlabel{pagesLTS.#1}{\thepage}{1}%
```

`\addtocounter{page}{-1}` is skipped, because another `\pagesLTS@putlabel` follows.

```
1651 \ifx\pagesLTS@pnc\pagesLTS@zero%
```

i. e. if the current page numbering scheme is “0”, i. e. before the first `\pagenumbering{...}` command, do nothing,

```
1652 \else%
```

otherwise write into the `.aux` file something like

```
\newlabel{pagesLTS.arabic.local}{{}{6}}{page.9}}
```

thus `\lastpageref{pagesLTS.arabic.local}` prints 6 and links to `page.9`.

`\addtocounter{page}{+1}` is skipped, because we skipped the `\addtocounter{page}{-1}` above.

```
1653 \pagesLTS@putlabel{pagesLTS.#1.local}{\theCurrentPageLocal}{1}%
```

\addtocounter{page}{-1} immediately after the \pagesLTS@putlabel is skipped, because we do that outside of the \ifx \else \fi.

```
1654 \fi%
1655 \addtocounter{page}{-1}%
1656 }
1657
```

`\erroralphalph` `\erroralphalph` extends the “numbers” of counters to zero and negative values for representations usually not supporting this:

`\alphalph`, `\AlphAlph`, and `\fnsymbolmult` of the `alphalph` package.

`\alph`, `\Alph`, and `\fnsymbol` would not support “numbers” below one.

`\arabic` already supports negative numbers and zero.

`\roman` and `\Roman` support neither negative numbers nor zero, but are expanded in this package (`\xroman` and `\XRoman`), see page [51](#).

```
1658
1659 %% The following code is from Heiko Oberdiek [2010/04/18], %%
1660 %% expanding his alphalph package as of 2010/04/18, v2.3. (Thanks!) %%
1661 \newcommand*{\erroralphalph}[2]{%
1662 \ifnum\value{#2}>0%
1663 #1{\value{#2}}%
1664 \else%
1665 \ifnum\value{#2}<0%
1666 -#1{\expandafter\@gobble\the\value{#2}}%
1667 \else%
1668 0%
1669 \fi%
1670 \fi%
1671 }
1672 %% End of code from Heiko Oberdiek %%
1673 %% Check and Error/Warning messages have been moved to hook "shipout/foreground" %%
1674 %% because messages inside e.g. the \pageref command can cause trouble. %%
1675
```

`\expandPagenumbering` Here the `\erroralphalph` command is called with the appropriate arguments for each page numbering scheme.

```
1676
1677 \newcommand{\expandPagenumbering}[1]{%
1678 \let\OrigthePage\thePage%
1679 \def\pagesLTS@tmpC{arabic}%
1680 \ifx\pagesLTS@pnc\pagesLTS@tmpC%
```

`\arabic` already supports negative numbers and zero ( $-MAX \dots MAX$ , where  $MAX = 2\,147\,483\,647$ ).

```
1681 \else%
1682 \def\pagesLTS@tmpC{roman}%
1683 \ifx\pagesLTS@pnc\pagesLTS@tmpC%
1684 \ifpagesLTS@romanMult%
```

`\erroralphalph{\roman}{page}` cannot be used, because `-\roman{\expandafter@gobble\the\value{page}}` does not work. If option `romanMult` is not false, `\xroman` (see page 51) expands the usable roman page numbers to values below 1 (i, I, respectively), see subsection 2.1.3.

```
1685 \renewcommand*{\thePage}{\xroman{page}}%
1686 \fi%
1687 \else%
1688 \def\pagesLTS@tmpC{Roman}%
1689 \ifx\pagesLTS@pnc\pagesLTS@tmpC%
```

The same for `\Roman` page numbering, expanded by `\XRoman` (see page 51). When the `romanbar` package has been loaded, the page format is changed accordingly.

```
1690 \IfPackageLoadedTF{romanbarpagenumber}{%
1691 \ifpagesLTS@RomanMulti%
1692 \renewcommand*{\thePage}{\Roman@bar{\XRoman{page}}}%
1693 \else%
1694 \renewcommand*{\thePage}{\Roman@bar{page}}%
1695 \fi%
1696 }\ifpagesLTS@RomanMulti%
1697 \renewcommand*{\thePage}{\XRoman{page}}%
1698 \fi%
1699 }%
1700 \else%
1701 \ifx\pagesLTS@pnc\pagesLTS@alph%
```

`\alph` and `\Alph` page numberings are expanded to negative and zero values, and to values greater than “z” or “Z” with the `alphalph` package. – If `\pagesLTS@alphMult` was zero, nothing is done.

```
1702 \ifx\pagesLTS@alphMult\pagesLTS@ab%
1703 \renewcommand*{\thePage}{\erroralphalph{\alphalph}{page}}%
1704 \else%
1705 \ifx\pagesLTS@alphMult\pagesLTS@bb%
1706 \renewcommand*{\thePage}{\erroralphalph{\alphMult}{page}}%
1707 \fi%
1708 \fi%
```

```

1709 \else%
1710 \ifx\pagesLTS@pnc\pagesLTS@Alph%
1711 \ifx\pagesLTS@AlphMulti\pagesLTS@ABi%
1712 \renewcommand*{\thepage}{\erroralphalph{\AlphAlph}{page}}%
1713 \else%
1714 \ifx\pagesLTS@AlphMulti\pagesLTS@BBi%
1715 \renewcommand*{\thepage}{\erroralphalph{\AlphMult}{page}}%
1716 \fi%
1717 \fi%
1718 \else%
1719 \ifx\pagesLTS@pnc\pagesLTS@fns%

```

Same for \fnsymbol page numbers.

```

1720 \ifpagesLTS@fnsymbolmult%
1721 \renewcommand*{\thepage}{\erroralphalph{\fnsymbolmult}{page}}%
1722 \fi%
1723 \else%

```

For silly page numbers (from the sillypage package), \thepage is \csname @silly\endcsname \c@page, i.e. \@silly \c@page – no change needed.

```

1724 \ifx\pagesLTS@pnc\pagesLTS@silly%
1725 \else%

```

For gobble page numbers, \thepage is \csname @gobble\endcsname \c@page, i.e. \@gobble \c@page and \@gobble is \long\def \@gobble #1{, i.e. \thepage is {}. This is OK, but hyperref does not create links when there is no linktext. Thus we give \null as text for the page number, which prints as nothing but makes hyperref happy – although not happy enough yet: \null expands to \hbox {}, and hyperref complains

```

Package hyperref Warning: Token not allowed in a PDF string (Unicode):
(hyperref) removing ‘\hbox’ on input line <something>.

```

```

Package hyperref Warning: Token not allowed in a PDF string (PDFDocEncoding):
(hyperref) removing ‘\hbox’ on input line <something>.

```

To make hyperref extra happy, we tell it to not use \null as PDF string.

```

1726 \ifx\pagesLTS@pnc\pagesLTS@gobble%
1727 \IfPackageLoadedT{hyperref}{%
1728 \renewcommand*{\thepage}{\texorpdfstring{\null}{{}}}%
1729 \csname @gobble\endcsname \c@page}}%
1730 \else%

```

If the used page numbering scheme has not been recognized by the pageslts package so far, we can do nothing, and problems might result.

```

1731 \PackageError{pageslts}{unknown page numbering scheme}{%
1732 The pageslts package encountered the unknown\MessageBreak%
1733 page numbering scheme\MessageBreak%
1734 \meaning#1. \MessageBreak%

```



```

1735 If this is no typing mistake, it might work\MessageBreak%
1736 - or it might not work.\MessageBreak%
1737 \@ehc}%
1738 \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi%
1739 \let\pagesLTS@tmpC\undefined%
1740 }
1741

```

`\pagenumbering` To keep the original meaning of `\pagenumbering`:

```

1742 \NewCommandCopy{\OrigPagenumbering}{\pagenumbering}
1743

```

Now for the **new** version of the `\pagenumbering` command:

```

1744 \renewcommand{\pagenumbering}[1]{%

```

If the current page numbering scheme, `\pagesLTS@pnc`, and the requested page numbering scheme, `#1`, is the same one, nothing is done, otherwise the real action begins.

```

1745 \edef\pagesLTS@tmpA{#1}%
1746 \ifx\pagesLTS@pnc\pagesLTS@tmpA%
1747 \else%

```

If the requested page numbering scheme, `#1`, is `\pagesLTS@fns`, i. e. `fnsymbol`, the `counterpagesLTS.fnsymbol.local` is needed. If it does not exist yet, it is created here. Same for the `silly` and `gobble` page numbering schemes.

```

1748 \ifx\pagesLTS@tmpA\pagesLTS@fns%
1749 \pagesLTS@providecounter{pagesLTS.fnsymbol.local}%
1750 \fi%
1751 \ifx\pagesLTS@tmpA\pagesLTS@silly%
1752 \IfPackageLoadedF{sillypage}{\PackageError{pageslts}{%
1753 silly pagenumbering requested, sillypage package not loaded}{%
1754 When using \string\pagenumbering{silly},\MessageBreak%
1755 load the sillypage package.}}%
1756 \pagesLTS@providecounter{pagesLTS.silly.local}%
1757 \fi%
1758 \ifx\pagesLTS@tmpA\pagesLTS@gobble%
1759 \pagesLTS@providecounter{pagesLTS.gobble.local}%
1760 \fi%

```

The next code is executed, when we are at a page after the first one. This distinction is done for two reasons:

On the one hand, `\pagenumbering` could be called *before* `\begin{document}` (where the current page should not be greater than one), and on the other hand we go one page back to aim all references to that page. Obviously at the first page there is no going backward.

```

1761 \ifnum\value{CurrentPage}>1%
1762 \addtocounter{page}{-1}%
1763 \addtocounter{pagesLTS.current.local.\pagesLTS@pnc}{-1}%

```

For the case that the page numbering scheme is or will be split, like e. g. the Roman one in the `pageslts-example.tex`, a counter like `pagesLTS.Roman.1.local.count` (or `pagesLTS.Roman.2.local.count`, `pagesLTS.Roman.3.local.count`, ...) is introduced and set to the number of the local page.

```

1764 \newcounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}%
1765 \setcounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}{%
1766 \value{pagesLTS.current.local.\pagesLTS@pnc}}%

```

If the page numbering scheme is `fnsymbol`, and if it *was* used before, from said counter the number of pages of the preceding uses of the same page numbering scheme, `pagesLTS.\pagesLTS@pnc.done`, is subtracted (same as for the other schemes, see below). The same is done for the `silly` and `gobble` page numbers.

```

1767 \ifx\pagesLTS@pnc\pagesLTS@fns%
1768 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}>1%
1769 \setcounter{pagesLTS.tmpcounter}{\numexpr\value{pagesLTS.pnc.\pagesLTS@pnc}-1\relax}%
1770 \addtocounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}{%
1771 -\value{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.tmpcounter}.local.count}}%
1772 \fi%
1773 \else%
1774 \ifx\pagesLTS@pnc\pagesLTS@silly%
1775 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}>1%
1776 \setcounter{pagesLTS.tmpcounter}{\numexpr\value{pagesLTS.pnc.\pagesLTS@pnc}-1\relax}%
1777 \addtocounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}{%
1778 -\value{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.tmpcounter}.local.count}}%
1779 \fi%
1780 \else%
1781 \ifx\pagesLTS@pnc\pagesLTS@gobble%
1782 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}>1%
1783 \setcounter{pagesLTS.tmpcounter}{\numexpr\value{pagesLTS.pnc.\pagesLTS@pnc}-1\relax}%
1784 \addtocounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}{%
1785 -\value{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.tmpcounter}.local.count}}%
1786 \fi%
1787 \else%

```

If the page numbering scheme is *neither* `fnsymbol` *nor* `silly` *nor* `gobble` and if the page numbering scheme was *not* used before, an unnumbered label is also written:

```

1788 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}<2%
1789 \pagesLTS@writelabel{\pagesLTS@pnc}%
1790 \fi%
1791 \fi%
1792 \fi%

```

For all page numbering schemes: If the page numbering scheme *was* used before, from said counter the number of pages of the preceding uses of the same page numbering scheme, `pagesLTS.\pagesLTS@pnc.done`, is subtracted – except if option `pagenumbering=false` has been chosen, because then the `pagenumbers` are reset anyway.

```

1793 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}>1%
1794 \ifpagesLTS@pagecontinue%
1795 \setcounter{pagesLTS.tmpcounter}{\numexpr\value{pagesLTS.pnc.\pagesLTS@pnc}-1\relax}%
1796 \pagesLTS@providcounter{pagesLTS.\pagesLTS@pnc.done}%
1797 \addtocounter{pagesLTS.\pagesLTS@pnc.done}{%
1798 \value{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.tmpcounter}.local.count}}%

```

```

1799 \addtocounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}{%
1800 -\value{pagesLTS.\pagesLTS@pnc.done}}%
1801 \fi%
1802 \fi%

```

A numbered label is written:

```

1803 \pagesLTS@writelabel{\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}}%

```

The values are written to the .aux file (if writing is allowed: `\if@filesw`), because they must be available at the beginning of the document:

```

1804 \if@filesw%
1805 \immediate\write\@auxout{\string
1806 \pagesLTS@providecounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.cnt}}%
1807 \edef\pagesLTS@tmpB{\arabic{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}}%
1808 \immediate\write\@auxout{\string
1809 \setcounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.cnt}{\pagesLTS@tmpB}}%
1810 \fi%
1811 \fi%

```

For further code for the case of `fnsymbol` please see below (`\lastpagereftext`, page 62).

The last page number is saved, in case the same page numbering scheme is continued later.

```

1812 \pagesLTS@providecounter{pagesLTS.double.\pagesLTS@pnc}%
1813 \setcounter{pagesLTS.double.\pagesLTS@pnc}{\value{page}}%

```

We went back one page, so we must go forward again:

```

1814 \addtocounter{pagesLTS.current.local.\pagesLTS@pnc}{+1}%
1815 \addtocounter{page}{+1}%

```

The page numbering scheme `\pagesLTS@pnc` is now set to the new one, given by the user as argument with the `\pagenumbering{...}` command:

```

1816 \xdef\pagesLTS@pnc{#1}%

```

If option `pagecontinue=false` was chosen, the local page count is reset to 1.

```

1817 \ifpagesLTS@pagecontinue%
1818 \else%
1819 \pagesLTS@providecounter{pagesLTS.current.local.\pagesLTS@pnc}%
1820 \setcounter{pagesLTS.current.local.\pagesLTS@pnc}{1}%
1821 \fi%

```

The new page numbering scheme is now started for real:

```

1822 \OrigPagenumbering{#1}%

```

If a page numbering scheme not known by the original `\pagenumbering{...}` command is used, an error will arise here - but maybe without error message.

If page numbering scheme `\alph`, `\Alph`, or `\fnsymbol` is used, `pageslts` extends the page numbers according to the given options, using the `alphalph` package. `\arabic` does not need any expansion. `\roman` and `\Roman` at least receive a definition for zero.

```

1823 \expandPagenumbering{#1}%

```

Counters like `pagesLTS.pnc.Roman` are introduced:

```
1824 \pagesLTS@providecounter{pagesLTS.pnc.\pagesLTS@pnc}%
```

The saved number of times, this page numbering scheme was used, is increased by one:

```
1825 \addtocounter{pagesLTS.pnc.\pagesLTS@pnc}{1}%
```

Now defining the counter `pagesLTS.double.\pagesLTS@pnc`, if it did not exist already, adding 1, because this is the first page of it (or another one, if the scheme is continued):

```
1826 \pagesLTS@providecounter{pagesLTS.double.\pagesLTS@pnc}%
```

```
1827 \addtocounter{pagesLTS.double.\pagesLTS@pnc}{1}%
```

The page number is continued, if the option `pagecontinue=false` is **not** set, otherwise it is reset to one. Note that neither the local nor the current counter are reset, as they contain the real *values* and not the *names* of the pages.

```
1828 \ifpagesLTS@pagecontinue%
```

```
1829 \setcounter{page}{\value{pagesLTS.double.\pagesLTS@pnc}}%
```

```
1830 \else%
```

```
1831 \setcounter{page}{1}%
```

```
1832 \fi%
```

If it does not exist already, the counter `pagesLTS.current.local.\pagesLTS@pnc` (e. g. `pagesLTS.current.local.Roman`) is created.

```
1833 \pagesLTS@providecounter{pagesLTS.current.local.\pagesLTS@pnc}%
```

If `pagesLTS.double.\pagesLTS@pnc` of the current page numbering scheme is equal to one, this is the first page of this page numbering scheme. Then `pagesLTS.current.local.\pagesLTS@pnc` (which was zero) is set to one.

```
1834 \ifnum\value{pagesLTS.double.\pagesLTS@pnc}=1%
```

```
1835 \setcounter{pagesLTS.current.local.\pagesLTS@pnc}{1}%
```

```
1836 \fi%
```

Otherwise, i. e. if `\value{CurrentPage}` is not  $> 1$ , i. e. before the first page has shipped out:

```
1837 \else%
```

```
1838 \ifx\pagesLTS@pnc\pagesLTS@zero\relax%
```

```
1839 \else%
```

`\pagenumbering{...}` has been called more than once before the end of the first page (probably in the preamble). Let us reset the earlier `\pagenumberings`, which should not have any effect anyway:

```
1840 \PackageNoteNoLine{pageslts}{%
```

```
1841 \string\pagenumbering\space used more than once before the end\MessageBreak%
```

```
1842 of the first page, maybe in the preamble.\MessageBreak%
```

```
1843 Resetting all unused page numbering schemes now}%
```

```
1844 \setcounter{pagesLTS.pnc.\pagesLTS@pnc}{0}%
```

```
1845 \setcounter{pagesLTS.double.\pagesLTS@pnc}{0}%
```

```
1846 \setcounter{pagesLTS.current.local.\pagesLTS@pnc}{0}%
```

```
1847 \fi%
```

The current page numbering scheme is defined by the argument of `\pagenumbering{...}`, which the user gave:

```
1848 \xdef\pagesLTS@pnc{#1}%
```

and the page numbering scheme set by the original page numbering command, which resets the page number to one, but at the first page continuation does not make sense.

```
1849 \OrigPagenumbering{#1}%
```

If a page numbering scheme is used, which is not known by L<sup>A</sup>T<sub>E</sub>X, an error might arise here – but maybe without error message.

If page numbering scheme `\alph`, `\Alph`, or `\fnsymbol` is used, `pageslts` extends the page numbers according to the given options, using the `alphalph` package. `\arabic` does not need any expansion. `\roman` and `\Roman` at least receive a definition for zero.

```
1850 \expandPagenumbering{#1}%
```

We are at the first page, so the page counters are set to one:

```
1851 \pagesLTS@providecounter{pagesLTS.pnc.\pagesLTS@pnc}%
1852 \setcounter{pagesLTS.pnc.\pagesLTS@pnc}{1}%
1853 \pagesLTS@providecounter{pagesLTS.double.\pagesLTS@pnc}%
1854 \setcounter{pagesLTS.double.\pagesLTS@pnc}{1}%
1855 \pagesLTS@providecounter{pagesLTS.current.local.\pagesLTS@pnc}%
1856 \setcounter{pagesLTS.current.local.\pagesLTS@pnc}{1}%
1857 \fi%
```

Whether `\pagenumbering{...}` is called in the preamble, in the `begindocument` hooks, right after `\begin{document}`, or somewhere in the document, we want to remember *whether* it was called at all:

```
1858 \gdef\pagesLTS@called{1}%
1859 \fi%
```

We do not need the temporary definitions any more.

```
1860 \let\pagesLTS@tmpA\undefined%
1861 \let\pagesLTS@tmpB\undefined%
1862 }
1863
```

`\lastpageref*` If `hyperref` is used, but (some) references to some last page shall not be hyperlinked, a command `\lastpageref*` (analogous to `\pageref*`) is needed. Therefore we define (analogous to `\HyPsd@pageref` from the `hyperref` package

```
1864 %% analogous to \HyPsd@pageref from the hyperref package:
1865 \def\lastpagereftxt#1{\pagesLTS@pageref#1*END}
1866
```

Macro `\pagesLTSpageref` checks, whether a star is present (analogous to `\HyPsd@@pageref` again from the `hyperref` package):

```
1867 \def\pagesLTS@@pageref#1*#2\END{%
1868 \ifx\#2\% no star
1869 \pagesLTS@@pageref{#1}%
1870 \else% star
1871 \expandafter\pagesLTS@@pagerefstar%
1872 \fi%
1873 }
1874
```

```

1875 \def\pagesLTS@@pageref#1{\lastpagereftext{#1}}
1876 \def\pagesLTS@@pagerefstar#1{\lastpagereftextstar{#1}}
1877

```

`\lastpagereftext` When `\lastpageref` is used somewhere inside the `txt` (text), i. e. not at the last page, it is defined as `\lastpagereftxt` (see above). When the page numbering scheme is `fnsymbol`, and the `hyperref` package has been loaded, a `hyperref` instead of a label is used for the reference to `pagesLTS.fnsymbol.local.\arabic{pagesLTS.fnsymbol.local}`. (And if the `pagesLTS.fnsymbol.local` counter did not exist yet, it is created here.)

```

1878 \newcommand{\lastpagereftext}[1]{%
1879 \def\pagesLTS@tmpA{#1}%
1880 \def\pagesLTS@tmpB{pagesLTS.fnsymbol.local}%
1881 \ifx\pagesLTS@tmpA\pagesLTS@tmpB%
1882 \pagesLTS@providcounter{pagesLTS.fnsymbol.local}%
1883 \IfPackageLoadedTF{hyperref}{%
1884 \href{\#pagesLTS.fnsymbol.local.\arabic{pagesLTS.fnsymbol.local}}{%
1885 {\arabic{pagesLTS.fnsymbol.local}}}%

```

When the page numbering scheme is `fnsymbol`, but the `hyperref` package has *not* been loaded, just the arabic number of the `pagesLTS.fnsymbol.local` counter is given (because there will be no hyperlink anyway).

```

1886 }{\arabic{pagesLTS.fnsymbol.local}}%
1887 \else%

```

Same for silly pagenummering:

```

1888 \def\pagesLTS@tmpB{pagesLTS.silly.local}%
1889 \ifx\pagesLTS@tmpA\pagesLTS@tmpB%
1890 \pagesLTS@providcounter{pagesLTS.silly.local}%
1891 \IfPackageLoadedTF{hyperref}{%
1892 \href{\#pagesLTS.silly.local.\arabic{pagesLTS.silly.local}}{%
1893 {\arabic{pagesLTS.silly.local}}}%
1894 }{\arabic{pagesLTS.silly.local}}%

```

and for gobble pagenummering:

```

1895 \else%
1896 \def\pagesLTS@tmpB{pagesLTS.gobble.local}%
1897 \ifx\pagesLTS@tmpA\pagesLTS@tmpB%
1898 \pagesLTS@providcounter{pagesLTS.gobble.local}%
1899 \IfPackageLoadedTF{hyperref}{%
1900 \href{\#pagesLTS.gobble.local.\arabic{pagesLTS.gobble.local}}{%
1901 {\arabic{pagesLTS.gobble.local}}}%
1902 }{\arabic{pagesLTS.gobble.local}}%

```

Otherwise just the common `\pageref` is applied:

```

1903 \else%
1904 \pageref{#1}%
1905 \fi%

```

```

1906 \fi%
1907 \fi%

```

We do not need the temporary definitions any more.

```

1908 \let\pagesLTS@tmpA\undefined%
1909 \let\pagesLTS@tmpB\undefined%
1910 }
1911

```

`\lastpagereftextstar` And the same for the starred version, where no hyperlink is generated:

```

1912 \newcommand{\lastpagereftextstar}[1]{%
1913 \def\pagesLTS@tmpA{#1}%
1914 \def\pagesLTS@tmpB{pagesLTS.fnsymbol.local}%
1915 \ifx\pagesLTS@tmpA\pagesLTS@tmpB%
1916 \pagesLTS@providecounter{pagesLTS.fnsymbol.local}%
1917 \arabic{pagesLTS.fnsymbol.local}%
1918 \else%
1919 \def\pagesLTS@tmpB{pagesLTS.silly.local}%
1920 \ifx\pagesLTS@tmpA\pagesLTS@tmpB%
1921 \pagesLTS@providecounter{pagesLTS.silly.local}%
1922 \arabic{pagesLTS.silly.local}%
1923 \else%
1924 \def\pagesLTS@tmpB{pagesLTS.gobble.local}%
1925 \ifx\pagesLTS@tmpA\pagesLTS@tmpB%
1926 \pagesLTS@providecounter{pagesLTS.gobble.local}%
1927 \arabic{pagesLTS.gobble.local}%

```

There is no `\pageref*` without `hyperref`.

```

1928 \else%
1929 \IfPackageLoadedTF{hyperref}{\pageref*{#1}}{\pageref{#1}}%
1930 \fi%
1931 \fi%
1932 \fi%
1933 \let\pagesLTS@tmpA\undefined%
1934 \let\pagesLTS@tmpB\undefined%
1935 }
1936

```

`\overrideLTSlabel` `\overridelabel` from the `undolabl` package just `\undonewlabels` a label and places a new `\label{#1}`, but we need to place a `\pagesLTS@putlabel{#1}{#2}`, therefore we need another command instead of (but somewhat similar to) `\overridelabel`:

```

1937 \newcommand\overrideLTSlabel[2]{%
1938 \@bsphack%
1939 \if@files*%
1940 \edef\pagesLTS@tmpC{#1}%
1941 \edef\pagesLTS@tmpD{pagesLTS.\pagesLTS@pnc.local}%
1942 \ifx\pagesLTS@tmpC\pagesLTS@tmpD%

```

```

1943 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}>1%
1944 \immediate\write\@auxout{\string\undonewlabel{#1}}\@overriddenmessage s{#1}%
1945 \else%
1946 \edef\pagesLTS@tmpD{fnsymbol}%
1947 \ifx\pagesLTS@pnc\pagesLTS@tmpD%
1948 \immediate\write\@auxout{\string\undonewlabel{#1}}\@overriddenmessage s{#1}%
1949 \fi%
1950 \edef\pagesLTS@tmpD{gobble}%
1951 \ifx\pagesLTS@pnc\pagesLTS@tmpD%
1952 \immediate\write\@auxout{\string\undonewlabel{#1}}\@overriddenmessage s{#1}%
1953 \fi%
1954 \edef\pagesLTS@tmpD{silly}%
1955 \ifx\pagesLTS@pnc\pagesLTS@tmpD%
1956 \immediate\write\@auxout{\string\undonewlabel{#1}}\@overriddenmessage s{#1}%
1957 \fi%
1958 \fi%
1959 \fi%
1960 \pagesLTS@putlabel{#1}{#2}{0}%
1961 \fi%
1962 \@esphack%
1963 }
1964

```

`\pagesLTS@EveryShipout` Because we cannot make references to pages with `fnsymbol` page “numbers” manually with `hyperref`, we use `\phantomsections` and refer to one of those. But because we do not know how many `\phantomsections` and `\section*`s are introduced by the user (or other packages; cf. L<sup>A</sup>T<sub>E</sub>X bug 2298: knowing level of `section*`, <https://www.latex-project.org/cgi-bin/ltxbugs2html?pr=latex/2298&introduction=yes&state=open>), we cannot refer to the last one as we did with the pages.

Therefore each page with `fnsymbol` page “number” receives a `\phantomsection` and a label, which includes a number increased by one for each page. This is done for `pagesLTS.fnsymbol.local.\arabic{pagesLTS.fnsymbol.cont}` as well as `pagesLTS.fnsymbol`, `pagesLTS.\pagesLTS@pnc`, and `pagesLTS.\pagesLTS@pnc.local`.

In case an older label already existed, it is overwritten by an `\overridelabel` command.

```

1965 \newcommand{\pagesLTS@EveryShipout}{%
1966 \begingroup%
1967 \ifx\pagesLTS@pnc\pagesLTS@fns%
1968 \pagesLTS@providcounter{pagesLTS.fnsymbol.cont}%
1969 \addtocounter{pagesLTS.fnsymbol.cont}{1}%
1970 \IfPackageLoadedT{hyperref}{\phantomsection%
1971 \hypertarget{pagesLTS.fnsymbol.local.\arabic{pagesLTS.fnsymbol.cont}}{}}%
1972 }%
1973 \ifnum\pagesLTS@esovFs=\pagesLTS@zero%
1974 \if@filesw\label{pagesLTS.fnsymbol}\fi%
1975 \pagesLTS@putlabel{pagesLTS.fnsymbol.local}{\theCurrentPageLocal}{0}%
1976 \else%
1977 \overridelabel{pagesLTS.fnsymbol}%

```



```

1978 \overrideLTSlabel{pagesLTS.fnsymbol.local}{\theCurrentPageLocal}%
1979 \fi%
1980 \else%

```

Same with silly page “numbers”:

```

1981 \ifx\pagesLTS@pnc\pagesLTS@silly%
1982 \pagesLTS@providecounter{pagesLTS.silly.cont}%
1983 \addtocounter{pagesLTS.silly.cont}{1}%
1984 \IfPackageLoadedT{hyperref}{\phantomsection%
1985 \hypertarget{pagesLTS.silly.local.\arabic{pagesLTS.silly.cont}}{}%
1986 }%
1987 \ifnum\pagesLTS@esovSy=\pagesLTS@zero%
1988 \if@filesw\label{pagesLTS.silly}\fi%
1989 \pagesLTS@putlabel{pagesLTS.silly.local}{\theCurrentPageLocal}{0}%
1990 \else%
1991 \overridelabel{pagesLTS.silly}%
1992 \overrideLTSlabel{pagesLTS.silly.local}{\theCurrentPageLocal}%
1993 \fi%
1994 \else%

```

and with gobble page “numbers”:

```

1995 \ifx\pagesLTS@pnc\pagesLTS@gobble%
1996 \pagesLTS@providecounter{pagesLTS.gobble.cont}%
1997 \addtocounter{pagesLTS.gobble.cont}{1}%
1998 \IfPackageLoadedT{hyperref}{\phantomsection%
1999 \hypertarget{pagesLTS.gobble.local.\arabic{pagesLTS.gobble.cont}}{}%
2000 }%
2001 \ifnum\pagesLTS@esovGbl=\pagesLTS@zero%
2002 \if@filesw\label{pagesLTS.gobble}\fi%
2003 \pagesLTS@putlabel{pagesLTS.gobble.local}{\theCurrentPageLocal}{0}%
2004 \else%
2005 \overridelabel{pagesLTS.gobble}%
2006 \overrideLTSlabel{pagesLTS.gobble.local}{\theCurrentPageLocal}%
2007 \fi%
2008 \else%
2009 \IfPackageLoadedT{hyperref}{\phantomsection}%
2010 \if@filesw%
2011 \overridelabel{pagesLTS.\pagesLTS@pnc}%
2012 \overrideLTSlabel{pagesLTS.\pagesLTS@pnc.local}{\theCurrentPageLocal}%
2013 \fi\fi\fi\fi%
2014 \endgroup%
2015 }
2016

```

ddToHookshipout/foreground At the end of each shipout, the following commands are executed:

```
2017 \AddToHook{shipout/foreground}{%
2018 \ifnum\value{page}>0%
2019 \else%
2020 \ifnum\value{page}=0%
2021 \PackageWarning{pageslts}{%
2022 Counter 'page' is zero!\MessageBreak%
2023 If the page numbering scheme is not arabic\MessageBreak%
2024 and further not extended\MessageBreak%
2025 (see Page counter overflow in the pageslts\MessageBreak%
2026 documentation), without other measures\MessageBreak%
2027 this will lead to a counter overflow.\MessageBreak%
2028 }%
2029 \else%
2030 \ifnum\value{page}<0%
2031 \PackageWarning{pageslts}{%
2032 Counter 'page' is negative: '\the\value{page}'!\MessageBreak%
2033 If the page numbering scheme is not arabic\MessageBreak%
2034 and further not extended\MessageBreak%
2035 (see Page counter overflow in the pageslts\MessageBreak%
2036 documentation), without other measures\MessageBreak%
2037 this will lead to a counter overflow.\MessageBreak%
2038 }%
2039 \else%
2040 \PackageError{pageslts}{Counter page has no recognized value}{%
2041 Counter 'page' does not have a recognized value:\MessageBreak%
2042 '\the\value{page}'\MessageBreak%
2043 \@ehd\MessageBreak%
2044 }%
2045 \fi%
2046 \fi%
2047 \fi%
```

If the `CurrentPage` is equal to one, this is the first shipout.

```
2048 \ifnum\value{CurrentPage}=1%
```

We check whether some page numbering scheme was defined by `\pagenumbering{...}` (as it should be!):

```
2049 \ifx\pagesLTS@called\pagesLTS@zero%
```

If it was not defined (i.e. `\pagesLTS@called` is zero), the user should be informed, that a `\pagenumbering{...}` is missing behind `\begin{document}`. Of course, it is possible that some package did some pages of output using the `begin{document}/end` hook. In that case, one `\pagenumbering{...}` before `\begin{document}` and one `\pagenumbering{...}` (with the same argument, of course!) behind `\begin{document}` could help somewhat. When `\PackageError` was used here, the error message was not written to the screen and the `.log`-file, but into the document. Therefore we just make a note to give the error message later (`\AddToHook{enddocument/afterlastpage}`). At that time unfortunately most of the document has already been compiled (or did not compile due to this error), but I do not know how to change that.

```

2050 \gdef\pncmissing{1}%
We save the current value of the page,
2051 \setcounter{pagesLTS.tmpcounter}{\value{page}}%
determine the current page numbering scheme,
2052 %% Code from Andres L\{o}h, Universiteit Utrecht (NL) %%
2053 \def\extract#1{\expandafter\extract@ #1\END}%
2054 \def\extract@#1\csname @#2\endcsname#3\END{#2}%
2055 \edef\pagesLTS@tmpQ{\extract\thepage}%
2056 %% End of code from Andres L\{o}h %%

```

set the current page numbering scheme to 0 (because before the beginning of the document it should be 0),

```

2057 \def\pagesLTS@pnc{0}%

```

and then issue a `\pagenumbering` command with the determined page numbering scheme as argument:

```

2058 \pagenumbering{\pagesLTS@tmpQ}%

```

This resets the page to one (if option `pagecontinue=false` was chosen), but because we do not start a new page numbering scheme here but manifest a page numbering scheme, which the user forgot to define, the page number should not have been reset to one. (This is the first page, but maybe the user wants it to have page number 2024?) Therefore we revert this here and set the page number to its value, which was saved before the `\pagenumbering` command.

```

2059 \setcounter{page}{\value{pagesLTS.tmpcounter}}%
2060 \fi%

```

We are at the first page, so we put the label here.

```

2061 \pagesLTS@writelabel{0}%
2062 \fi%

```

If the current page numbering scheme `\pagesLTS@pnc` is `\pagesLTS@fns` (which is defined as `fnsymbol`), the label is set by `\pagesLTS@EveryShipout` (see just above), and `\pagesLTS@esovFs` is set to the (real) number (not the name) of this page numbering scheme, `\arabic{pagesLTS.fnsymbol.cont}`.

When no more pages with `fnsymbol` page “number” are shipped out, the value remains fixed and we have our reference to the last page of the `fnsymbol` page numbering range. (At least we will have that reference after some more work, see below).

```

2063 \ifx\pagesLTS@pnc\pagesLTS@fns%
2064 \pagesLTS@EveryShipout%
2065 \xdef\pagesLTS@esovFs{\arabic{pagesLTS.fnsymbol.cont}}%
2066 \else%

```

Same for silly page “number”:

```

2067 \ifx\pagesLTS@pnc\pagesLTS@silly%
2068 \pagesLTS@EveryShipout%
2069 \xdef\pagesLTS@esovSy{\arabic{pagesLTS.silly.cont}}%
2070 \else%

```

and for gobble page “number”:

```
2071 \ifx\pagesLTS@pnc\pagesLTS@gobble%
2072 \pagesLTS@EveryShipout%
2073 \xdef\pagesLTS@esovGbl{\arabic{pagesLTS.gobble.cont}}%
```

When another page numbering scheme was reused (in the example file Roman), we also need to apply `\pagesLTS@EveryShipout`, because otherwise we would get multiply defined labels.

```
2074 \else%
2075 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}>1%
2076 \pagesLTS@EveryShipout%
2077 \fi\fi\fi\fi%
```

The `CurrentPage` as well as the `pagesLTS.current.local.\pagesLTS@pnc` are advanced by one (because one page was shipped out and the next is about to begin).

```
2078 \addtocounter{CurrentPage}{1}%
2079 \addtocounter{pagesLTS.current.local.\pagesLTS@pnc}{1}%
2080 }
2081
```

We use some code from the `lastpage` package:

`\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`.

```
2082 %% Code provided by Prof. Enrico Gregorio at https://tex.stackexchange.com/a/542425
2083 \long\def\protected@iwrite#1#2#3{%
2084 \begingroup%
2085 #2%
2086 \let\protect\@unexpandable@protect%
2087 \edef\reserved@a{\immediate\write#1{#3}}%
2088 \reserved@a%
2089 \endgroup%
2090 \if@nobreak\ifvmode\nobreak\fi\fi%
2091 }
2092
```

`\pagesLTS@makeHy` Just once we need the page from `\@currentHpage` without any “page.” (`\pagesLTS@makeHy` is identical to `\lastpage@makeHy` except of the used namings – well, being identical depends on the versions of the packages):

```
2093 \newcommand{\pagesLTS@makeHy}{%
\gdef\pagesLTS@Hy{ }, but that was already done before this command.
2094 \xdef\pagesLTS@Hptest{Doc-Start}%
2095 \ifx\pagesLTS@Hptest\@currentHpage\relax%
2096 \gdef\pagesLTS@Hy{\@currentHpage}%
2097 \else%
2098 \edef\pagesLTS@Hptest{\@currentHpage}%
2099 \ifx\pagesLTS@Hptest\empty\relax%
```

then `\gdef\pagesLTS@Hy{}`, but that was already done before this command.

```
2100 \else%
2101 \edef\pagesLTS@Hptest{page.}%
2102 \ifx\@currentHpage\pagesLTS@Hptest\relax%
2103 \ifx\pagesLTS@pnc\pagesLTS@gobble%
2104 \PackageNoteNoLine{pageslts}{%
2105 With gobbled page numbers "\string\@currentHpage "\MessageBreak%
2106 is just "page." without number.\MessageBreak%
2107 "\string\pagesLTSlastpageHy " is now let empty}%
2108 \else%
2109 \PackageWarningNoLine{pageslts}{%
2110 \string\@currentHpage\space is just "page." without number.\MessageBreak%
2111 \string\pagesLTSlastpageHy\space is now let empty}%
2112 \fi%
```

then in both cases `\gdef\pagesLTS@Hy{}`, but that was already done before this command.

```
2113 \else%
```

`\@currentHpage` should be `page.<some number>`, `\pagesLTS@rmpage` removes the “page.”.

Next compilation run, `\pagesLTSlastpageHy` gets defined via the aux file. If we arrived at this place, but the definition is still empty, then `\@currentHpage` has some unexpected content.

```
2114 \gdef\pagesLTS@Hy{\pagesLTS@rmpage{\@currentHpage}}%
2115 \ifx\pagesLTSlastpageHy\empty\relax%
2116 \PackageWarningNoLine{pageslts}{%
2117 \string\@currentHpage\space is\MessageBreak%
2118 \meaning\@currentHpage\MessageBreak%
2119 not beginning with "page.",\MessageBreak%
2120 \string\pagesLTSlastpageHy\space is now let empty}%
2121 \fi\fi\fi\fi%
2122 }%
2123
```

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

```
2124 %% Code provided by David Carlisle at https://tex.stackexchange.com/a/721877
2125 \def\pagesLTS@rmpage#1{%
2126 \expandafter\xpagesLTS@rmpage\expanded{#1}\xpagesLTS@rmpage page.%
2127 \xpagesLTS@rmpage\xxpagesLTS@rmpage{#1}}
2128 \def\xpagesLTS@rmpage #1page.#2\xpagesLTS@rmpage#3\xxpagesLTS@rmpage#4{%
2129 \if$\detokenize{#1}$#2%\else#4
2130 \fi}
2131
```

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

`\pagesLTS@putlabel` Since the page has been put out, we are on the page after that page. We therefore subtract one from the page counter.

```
2132 \newcommand{\pagesLTS@putlabel}[3]{%
2133 \addtocounter{page}{-1}}%
```

When the `showkeys` package has been loaded in `draft` mode, in the margin for each label a box is displayed with the name of the label. `showkeys` accomplishes this by redefining `\label`, but `pageslts` does not use `\label`, but writes directly to the `\jobname.aux`-file, and this is generally done after the according page has shipped out, therefore no box can be placed on the preceding page. At least `pageslts` gives a warning, that `showkeys` cannot present the respective label.

```
2134 \IfPackageLoadedT{showkeys}{%
2135 \IfPackageLoadedWithOptionsF{showkeys}{final}{%
2136 \ifnum\value{pagesLTS.pagenr}<1%
2137 \PackageWarningNoLine{pageslts}{%
2138 Package showkeys without option final loaded,\MessageBreak%
2139 but label #1 on page \thepage\space(about \theCurrentPage)\MessageBreak%
2140 cannot be shown, because pageslts does not use \string\label,\MessageBreak%
2141 but writes directly to the \jobname.aux file}%
2142 \else%
2143 \PackageWarningNoLine{pageslts}{%
2144 Package showkeys without option final loaded,\MessageBreak%
2145 but label #1 on page \thepage\space(about \theCurrentPage\space of \arabic{pagesLTS.pagenr})\MessageBreak%
2146 cannot be shown, because pageslts does not use \string\label,\MessageBreak%
2147 but writes directly to the \jobname.aux file}%
2148 \fi%
2149 }%
2150 }%
2151 \IfPackageLoadedTF{hyperref}{%
```

Here the labels are set, if the `hyperref` package was loaded. Simply using `\label` would not work, because labels wait for the output routines to work, and there may not be any more invocations of the output routines. To force the write out we need to do an `\immediate write (\protected@iwrite)`.

```
2152 \ifHy@pageanchor\else%
```

If the `hyperref` package is used, but `pageanchors` are disabled, the hyperlinking will not work.

```
2153 \PackageWarningNoLine{pagesLTS}{%
2154 The \string\lastpageref{#1} link does not work\MessageBreak%
2155 using hyperref with disabled option 'pageanchor'.\MessageBreak%
2156 Better enable 'pageanchor' or use\MessageBreak%
2157 \string\lastpageref*{...} (not generating a link)%
2158 }%
2159 \fi%
```

If use of the `.aux`-file is allowed, the label for `LastPage` is written into that file, the page reference depending on the options, which where set for the `hyperref` package.

```

2160 \if@filesw%
2161 \begingroup%
2162 \protected@iwrite\@auxout{}\string\newlabel{#1}{%
2163 {\@currentlabel}{#2}{\@currentlabelname}%
2164 {\ifx\pagesLTS@pnc\pagesLTS@fns%
2165 \@currentHref%
2166 \else\ifx\pagesLTS@pnc\pagesLTS@silly%
2167 \@currentHref%
2168 \else\ifx\pagesLTS@pnc\pagesLTS@gobble%
2169 \@currentHref%
2170 \else\ifHy@pageanchor\@currentHpage\fi%
2171 \fi\fi\fi%
2172 }%
2173 {\@kernel@reserved@label@data}}}%
2174 \endgroup%
2175 \fi%
2176 }{%

```

If the `hyperref` package is not used, there will be no hyperlinks, and the label is written in the way of the `lastpage` package. But we must remember to undo the label first, if it already exists.

```

2177 \if@filesw%
2178 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}<2%
2179 \protected@iwrite\@auxout{}\string\newlabel{#1}{%
2180 {\@currentlabel}{#2}{\@currentlabelname}%
2181 {\@currentHref}{\@kernel@reserved@label@data}}}%
2182 }%
2183 \else%
2184 \edef\pagesLTS@tmpC{#1}%
2185 \edef\pagesLTS@tmpD{pagesLTS.\pagesLTS@pnc.local}%
2186 \ifx\pagesLTS@tmpC\pagesLTS@tmpD%
2187 \edef\pagesLTS@tmpC{#3}%
2188 \ifx\pagesLTS@tmpC\pagesLTS@one%

```

Only when the third argument of `\pagesLTS@putlabel` is 1, we do need to undo the label. Otherwise there is no label to undo, and the `undolabl` package would give an error.

```

2189 \immediate\write\@auxout{\string\undonewlabel{#1}}}%
2190 \fi%
2191 \fi%
2192 \protected@iwrite\@auxout{}\string\newlabel{#1}{%
2193 {\@currentlabel}{#2}{\@currentlabelname}%
2194 {\@currentHref}{\@kernel@reserved@label@data}}}%
2195 }%
2196 \fi%
2197 \fi%

```

```
2198 }%
```

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

```
2199 \addtocounter{page}{+1}%
2200 }
2201
```

`\pagesLTS@putlabels` `\pagesLTS@putlabels` writes labels and calls `\pagesLTS@putlabel{LastPages}{\theCurrentPage}{1}`.

```
2202 \newcommand{\pagesLTS@putlabels}{%
2203 \addtocounter{page}{-1}%
2204 \addtocounter{CurrentPage}{-1}%
2205 \addtocounter{pagesLTS.current.local.\pagesLTS@pnc}{-1}%
```

If `\pagenumbering{...}` has not been used, `\pagesLTS@pnc` is still zero (0, `\pagesLTS@zero`), and the according warning message is given.

```
2206 \ifx\pagesLTS@pnc\pagesLTS@zero%
2207 \PackageWarningNoLine{pagesLTS}{No page numbering scheme found:\MessageBreak%
2208 \pagesLTS@messageNPN}%
```

otherwise the numbered label is written, and if the page numbering scheme was not used before, also the unnumbered label is written.

```
2209 \else%
2210 \pagesLTS@writelabel{\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}}%
2211 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}<2%
2212 \ifx\pagesLTS@pnc\pagesLTS@fns%
2213 \else\ifx\pagesLTS@pnc\pagesLTS@silly%
2214 \else\ifx\pagesLTS@pnc\pagesLTS@gobble%
2215 \else\pagesLTS@writelabel{\pagesLTS@pnc}%
2216 \fi\fi\fi\fi\fi%
```

Before the label for the `LastPages` can be put, we must advance one page again, because `\pagesLTS@putlabel` itself goes back one page (and at its end forward again).

```
2217 \addtocounter{page}{+1}%
2218 \pagesLTS@putlabel{LastPages}{\theCurrentPage}{1}%
```

Here should follow a

```
\addtocounter{page}{-1},
```

but we have to remember to increase the page counters again, which were decreased at the start of this `\pagesLTS@putlabels` command, and that would include

```
\addtocounter{page}{+1},
```

therefore these two lines cancel each other and therefore they just can be skipped. But the other counters have to be increased again:

```
2219 \addtocounter{CurrentPage}{+1}%
2220 \addtocounter{pagesLTS.current.local.\pagesLTS@pnc}{+1}%
2221 }
2222
```



```
\AddToHook{begindocument/end} \AddToHook{begindocument/end}{...}:
```

```
2223 \AddToHook{begindocument/end}{%
```

Checking, whether lastpage and pageslts have both been loaded.

```
2224 \IfPackageLoadedT{lastpage}{%
```

```
2225 \PackageNoteNoLine{pageslts}{Packages lastpage and pageslts used:\MessageBreak%
```

```
2226 Are you sure that you want to load both packages?}%
```

```
2227 }%
```

It is checked whether the hyperref package, if loaded, is recent enough:

```
2228 \IfPackageLoadedTF{hyperref}{%
```

```
2229 \ProvideTextCommand{\textasteriskcentered}{PD1}{*}%
```

```
2230 \IfPackageAtLeastF{hyperref}{2024-10-30}{%
```

```
2231 \PackageError{pageslts}{hyperref package version too old}{%
```

```
2232 Required version: 2024-10-30 v7.01k or newer,\MessageBreak%
```

```
2233 found version:\space\space\space\space\csname ver@hyperref.sty\endcsname.}}%
```

```
2234 }{\PackageNoteNoLine{pageslts}{Package hyperref not loaded.\MessageBreak%
```

```
2235 pageslts would support hyperref.\MessageBreak%
```

```
2236 The page references will NOT be hyperlinked}%
```

```
2237 }%
```

Further it is checked whether the alphalph package has been loaded. If that is the case, the commands are defined accordingly.

```
2238 \IfPackageLoadedT{alphalph}{%
```

```
2239 \newalphalph{\AlphMult}[mult]{\@Alph}{26}%
```

```
2240 \newalphalph{\alphMult}[mult]{\@alph}{26}%
```

```
2241 \newalphalph{\fnsymbolmult}[mult]{\@fnsymbol}{5}%
```

```
2242 }%
```

It is checked whether writing to files is allowed. The pageslts package cannot be used without that! Some packages (e. g. tikz and selectp) sometimes prevent the output to the aux file. In that case a warning or an error message is issued. This is no problem as long as there is/was another compilation run where the labels can/could be processed via the aux file.

```
2243 \if@filesw%
```

```
2244 \else%
```

```
2245 \IfPackageLoadedTF{tikz}{%
```

```
2246 \PackageWarning{pageslts}{%
```

```
2247 {It was not allowed to write to an\MessageBreak%
```

```
2248 .aux file. This package does not work without access\MessageBreak%
```

```
2249 to an .aux file.\MessageBreak%
```

```
2250 It is OK if the .aux file was already updated\MessageBreak%
```

```
2251 by a previous compiler run\MessageBreak%
```

```
2252 and would not have changed anyway.\MessageBreak%
```

```
2253 }%
```

```
2254 }{\PackageError{pageslts}{No writing to auxiliary file allowed}%
```

```
2255 {It was not allowed to write to an .aux file.\MessageBreak%
```

```
2256 This package does not work without access to an .aux file.\MessageBreak%
```

```

2257 Press Ctrl+Z to exit.\MessageBreak%
2258 But it is OK if the .aux file was already updated\MessageBreak%
2259 by previous compiler runs\MessageBreak%
2260 and would not have changed anyway.\MessageBreak%
2261 (In that case just press Enter or Return\MessageBreak%
2262 to continue the compilation.)\MessageBreak%
2263 }%
2264 }%
2265 \fi%
2266 }
2267

```

We do check whether showkeys has been loaded (before pageslts!) in a mode to show the labels:

```

2268 \def\pagesLTS@skld{0}
2269 \IfPackageLoadedT{showkeys}{\IfPackageLoadedWithOptionsF{showkeys}{final}}{%
2270 \def\pagesLTS@skld{1}}%
2271 }%
2272

```

`\enddocument/afterlastpage}` `\AddToHook{enddocument/afterlastpage}` it is checked whether the showkeys package was loaded after the check performed before, in which case an error message is issued.

```

2273 \AddToHook{enddocument/afterlastpage}{%
2274 \IfPackageLoadedT{showkeys}{\IfPackageLoadedWithOptionsF{showkeys}{final}}{%
2275 \ifx\pagesLTS@skld\pagesLTS@one\relax%
2276 \else\PackageError{pageslts}{Package showkeys loaded after pageslts}{%
2277 The showkeys package with option "final" has been loaded\MessageBreak%
2278 after the pageslts package.\MessageBreak%
2279 Please first load showkeys and then pageslts}%
2280 \fi}%
2281 }%

```

We also give the error message about the missing (i.e. not found) page numbering scheme, which could not be given in hook `shipout/foreground`.

```

2282 \ifx\pncmissing\pagesLTS@one\relax%
2283 \PackageError{pageslts}{pagenumbering scheme missing}{\pagesLTS@messageNPN}%
2284 \fi%

```

Then we put in an info to show, in what order things (which were called) are done.

```

2285 \PackageInfo{pageslts}{enddocument/afterlastpage (AED): pageslts setting LastPage}%

```

After this we remember the page number (if `fnsymbol` or `silly` or `gobble`), and after that we place the `LastPage` label.

```

2286 \ifx\pagesLTS@pnc\pagesLTS@fns%
2287 \def\pagesLTS@tmpA{\arabic{pagesLTS.fnsymbol.local}}%
2288 \ifnum\pagesLTS@esoFs=\pagesLTS@tmpA%
2289 \gdef\pagesLTS@rerun{0}%
2290 \else%

```

```

2291 \gdef\pagesLTS@rerun{1}%
2292 \fi%
2293 \if@filesw%
2294 \immediate\write\@auxout{\string\gdef\string\pagesLTS@esoFs{\pagesLTS@tmpA}}%
2295 \fi%
2296 \else%
2297 \ifx\pagesLTS@pnc\pagesLTS@silly%
2298 \def\pagesLTS@tmpA{\arabic{pagesLTS.silly.local}}%
2299 \ifnum\pagesLTS@esoSy=\pagesLTS@tmpA%
2300 \gdef\pagesLTS@rerun{0}%
2301 \else%
2302 \gdef\pagesLTS@rerun{1}%
2303 \fi%
2304 \if@filesw%
2305 \immediate\write\@auxout{\string\gdef\string\pagesLTS@esoSy{\pagesLTS@tmpA}}%
2306 \fi%
2307 \else%
2308 \ifx\pagesLTS@pnc\pagesLTS@gobble%
2309 \def\pagesLTS@tmpA{\arabic{pagesLTS.gobble.local}}%
2310 \ifnum\pagesLTS@esoGbl=\pagesLTS@tmpA%
2311 \gdef\pagesLTS@rerun{0}%
2312 \else%
2313 \gdef\pagesLTS@rerun{1}%
2314 \fi%
2315 \if@filesw%
2316 \immediate\write\@auxout{\string\gdef\string\pagesLTS@esoGbl{\pagesLTS@tmpA}}%
2317 \fi\fi\fi\fi%
2318 \pagesLTS@putlabel{LastPage}{\thepage}{1}%

```

We do not need the temporary definition any more.

```

2319 \let\pagesLTS@tmpA\undefined%

```

The number of pages with the `fnsymbol` page numbering scheme, `\pagesLTS@esovFs`, and the number of pages with the `silly` page numbering scheme, `\pagesLTS@esovSy`, and the number of pages with the `gobble` page numbering scheme, `\pagesLTS@esovGbl`, are saved via the `.aux` file (if it is not zero, respectively):

```

2320 \if@filesw%
2321 \ifx\pagesLTS@esovFs\pagesLTS@zero\relax%
2322 \else%
2323 \immediate\write\@auxout{\string\pagesLTS@providcounter{pagesLTS.fnsymbol.local}}%
2324 \immediate\write\@auxout{\string\setcounter{pagesLTS.fnsymbol.local}{\pagesLTS@esovFs}}%
2325 \fi%
2326 \ifx\pagesLTS@esovSy\pagesLTS@zero\relax%
2327 \else%
2328 \immediate\write\@auxout{\string\pagesLTS@providcounter{pagesLTS.silly.local}}%
2329 \immediate\write\@auxout{\string\setcounter{pagesLTS.silly.local}{\pagesLTS@esovSy}}%
2330 \fi%

```

```

2331 \ifx\pagesLTS@esovGbl\pagesLTS@zero\relax%
2332 \else%
2333 \immediate\write\@auxout{\string\pagesLTS@providecounter{pagesLTS.gobble.local}}%
2334 \immediate\write\@auxout{\string\setcounter{pagesLTS.gobble.local}{\pagesLTS@esovGbl}}%
2335 \fi%
2336 \fi%

```

At the call of a `\pagenumbering{...}` command, everything for a split page numbering scheme is organized. For the last page numbering scheme, there is no `\pagenumbering{...}` command at the end, so we need to handle this here:

```

2337 \pagesLTS@providecounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}%
2338 \setcounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}{%
2339 \value{pagesLTS.current.local.\pagesLTS@pnc}}%

```

And we are one page after the last one (hook `enddocument/afterlastpage!`), so we go back one page.

```

2340 \addtocounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}{-1}%
2341 \ifnum\value{pagesLTS.pnc.\pagesLTS@pnc}>1%
2342 \setcounter{pagesLTS.tmpcounter}{\value{pagesLTS.pnc.\pagesLTS@pnc}}%
2343 \@tempcnta=\value{pagesLTS.tmpcounter}\relax%
2344 \loop%
2345 \ifnum\@tempcnta>1\relax%
2346 \addtocounter{pagesLTS.tmpcounter}{-1}%
2347 \addtocounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}{%
2348 -\value{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.tmpcounter}.local.count}}%
2349 \@tempcnta=\value{pagesLTS.tmpcounter}\relax%
2350 \repeat%
2351 \fi%
2352 \if@files%
2353 \immediate\write\@auxout{\string
2354 \pagesLTS@providecounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.cnt}}%
2355 \edef\pagesLTS@tmpA{\arabic{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.count}}%
2356 \immediate\write\@auxout{\string
2357 \setcounter{pagesLTS.\pagesLTS@pnc.\arabic{pagesLTS.pnc.\pagesLTS@pnc}.local.cnt}{\pagesLTS@tmpA}}%
2358 \fi%

```

We need to save (via the `.aux` file) the page name `\thepage` and the page number `\arabic{CurrentPage}` of the last page, in case the last page has `fnsymbol` page numbering scheme.

```

2359 \addtocounter{page}{-1}%
2360 \def\pagesLTS@tmpA{\thepage}%
2361 \if@files%
2362 \protected@iwrite\@auxout{\string\gdef\string\pagesLTSlastpage{\pagesLTS@tmpA}}%
2363 \gdef\pagesLTS@Hy{}%
2364 \IfPackageLoadedT{hyperref}{\ifHy@pageanchor\pagesLTS@makeHy\fi}%
2365 \protected@iwrite\@auxout{\string\gdef\string\pagesLTSlastpageHy{\pagesLTS@Hy}}%
2366 \fi%
2367 \addtocounter{page}{+1}%
2368 \addtocounter{CurrentPage}{-1}%

```

```

2369 \edef\pagesLTS@tmpB{\arabic{CurrentPage}}%
2370 \if@files%
2371 \immediate\write\auxout{\string\setcounter{pagesLTS.pagenr}{\pagesLTS@tmpB}}%
2372 \fi%
2373 \addtocounter{CurrentPage}{+1}%

```

The `VeryLastPage` label is set here. Before the introduction of the hook mechanism in the kernel, `\lastpageref{VeryLastPage}` could point to a later page than `\lastpageref{LastPage}`. `LastPage` and `VeryLastPage` should now be identical, but for backward compatibility we keep both.

```

2374 \PackageInfo{pageslts}{enddocument/afterlastpage (AED): pageslts setting VeryLastPage}%
2375 \pagesLTS@putlabel{VeryLastPage}{\thepage}{1}%

```

The `LastPages` label is set here, and `\lastpageref{LastPages}` gives the total number of pages and points to the last page.

```

2376 \PackageInfo{pageslts}{enddocument/afterlastpage (AED): pageslts setting LastPages}%
2377 \pagesLTS@putlabels%
2378 \ifodd\pagesLTS@tmpB%
2379 \PackageNoteNoLine{pageslts}{Total number of pages is odd}%
2380 \else%
2381 \PackageNoteNoLine{pageslts}{Total number of pages is even}%
2382 \fi%
2383 }
2384

```

`\frontmatter` `\frontmatter` often contains `\pagenumbering`, but for some unknown reason there are problems when another `\pagenumbering` with different page numbering scheme has been used before on the same page. (This would not make any sense anyway, because one page can only have one page numbering scheme.) This problem does not occur when two `\pagenumbering` commands are used inside normal text. Thus we need to check whether `\frontmatter` has been defined, whether it changes the page numbering scheme, and whether the page numbering scheme before `\frontmatter` was initiated at the same page. With the hook mechanism it does not matter whether the command to be patched is defined.

```

2385 \AddToHook{cmd/frontmatter/before}{%
2386 \xdef\pagesLTS@FMBpncn{\pagesLTS@pnc}%
2387 \xdef\pagesLTS@FMBpncp{\arabic{pagesLTS.current.local.\pagesLTS@pnc}}%
2388 }
2389

```

At the beginning of the `\frontmatter` (FMB), we remember the current (c) page numbering (pn) scheme: its name (n) and page number (p). `\pagesLTS@FMBpncp` would be 1 if the according `\pagenumbering` command was used on the same page at the `\frontmatter`. At the end of the `\frontmatter` the named checks are performed and in case of the named problem an error message is given.

```

2390 \AddToHook{cmd/frontmatter/after}{%
2391 \xdef\pagesLTS@FMEpncn{\pagesLTS@pnc}%
2392 \ifx\pagesLTS@FMBpncn\pagesLTS@FMEpncn%
2393 \else%
2394 \ifx\pagesLTS@FMBpncn\pagesLTS@zero%
2395 \else%
2396 \ifx\pagesLTS@FMBpncp\pagesLTS@one%

```

```

2397 \PackageWarning{pageslts}{\string\pagenumbering\space before \string\frontmatter:\MessageBreak%
2398 Do not use \string\pagenumbering{\pagesLTS@FMBpncn} before \string\frontmatter\MessageBreak%
2399 on the same page!\MessageBreak%
2400 \string\frontmatter\space (re)defines the page numbering scheme to \pagesLTS@FMEpncn ,\MessageBreak%
2401 thus earlier use of \string\pagenumbering{\pagesLTS@FMBpncn} %
2402 on the same page is useless anyway\MessageBreak}%
2403 \fi%
2404 \fi%
2405 \fi%
2406 }
2407

```

`\AddToHook{enddocument/info}` The hook `enddocument/info` is even later:

“This hook is meant to receive code that write final information messages to the terminal. It follows immediately after the previous hook”

(Frank Mittelbach (2024-06-26): *L<sup>A</sup>T<sub>E</sub>X*’s hook management, `lthooks-code.pdf`, p. 27) `enddocument/afteraux`. Here it is used for a rerun hint.

For example if the page numbering scheme of the last page of the `pageslts-example.tex` file is changed to `fnsymbol` and two runs of `pdfLATEX` are done, `pdfLATEX` will be happy and will not complain about changed labels. But indeed, a third run is necessary and indicated by the warning message below.

```

2408 \AddToHook{enddocument/info}{%
2409 \ifx\pagesLTS@rerun\pagesLTS@one%
2410 \PackageWarningNoLine{pageslts}{Label(s) may have changed.\MessageBreak%
2411 Rerun to get cross-references right}%
2412 \fi%
2413 }
2414
2415 </package>

```

# 7 Installation

## 7.1 Downloads

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

`pageslts.dtx` For unpacking the `pageslts.dtx` file and constructing the documentation it is required:

- `TEX`Format L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 2024-06-01: <https://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>
- package `hypdoc`, 2023-10-26, v1.19, <https://ctan.org/pkg/hypdoc>
- package `geometry`, 2020/01/02, v5.9, <https://ctan.org/pkg/geometry>
- package `ulem`, 2019-11-18, no version number given, <https://ctan.org/pkg/ulem>

`pageslts.sty` The `pageslts.sty` for L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> ≥ 2024-06-01 (i. e. all documents using the `pageslts` package) requires:

- `TEX` Format L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 2024-06-01, <https://CTAN.org>
- package `undolabl`, 2023-02-14, v1.0m, <https://ctan.org/pkg/undolabl>
- package `kvoptions`, 2022-06-15, v3.15, <https://ctan.org/pkg/kvoptions>
- if any of the options `alphMult`, `AlphMulti`, or `fnsymbolmult` is used: package `alphalph`, 2019/12/09, v2.6, <https://ctan.org/pkg/alphalph>
- if `\pagenumbering{silly}` shall be used, the `sillypage` package must be loaded, 2023-07-23, v1.7, <https://www.ctan.org/pkg/sillypage>

`pageslts-example.tex` The `pageslts-example.tex` requires the same files as all documents using the `pageslts` package, and additionally:

- class `article`, 2024/02/08, v1.4n, from `classes.dtx`: <https://ctan.org/pkg/classes>
- package `alphalph`, 2019/12/09, v2.6, <https://ctan.org/pkg/alphalph>
- package `lipsum`, 2021-09-20, v2.7, <https://ctan.org/pkg/lipsum>
- package `showkeys`, 2024/05/23, v3.21, <https://ctan.org/pkg/showkeys>
- package `hyperref`, 2024-10-30, v7.01k, <https://ctan.org/pkg/hyperref>
- package `pageslts`, 2024-12-07, v2.0b, <https://ctan.org/pkg/pageslts>

(Well, it is the example file for this package, and because you are reading the documentation for the `pageslts` package, it can be assumed that you already have some version of it – is it the current one?)

**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://CTAN.org>.

<https://mirror.ctan.org/macros/latex/contrib/pageslts/pageslts.dtx>

The source file.

<https://mirror.ctan.org/macros/latex/contrib/pageslts/pageslts.pdf>

The documentation.

<https://mirror.ctan.org/macros/latex/contrib/pageslts/pageslts-example.pdf>

The compiled example file, as it should look like.

<https://mirror.ctan.org/macros/latex/contrib/pageslts/README>

The README file.

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

<https://mirror.ctan.org/install/macros/latex/contrib/pageslts.tds.zip>

Everything in TDS compliant, compiled format.

which additionally contains

|                                   |                                                  |
|-----------------------------------|--------------------------------------------------|
| <code>pageslts.ins</code>         | The <b>installation</b> file.                    |
| <code>pageslts.drv</code>         | The <b>driver</b> to generate the documentation. |
| <code>pageslts.sty</code>         | The <b>style</b> file.                           |
| <code>pageslts-example.tex</code> | The <b>example</b> 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  $\TeX$ :

```
tex pageslts.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):

|                                   |                                               |
|-----------------------------------|-----------------------------------------------|
| <code>pageslts.sty</code>         | → <code>tex/latex/pageslts.sty</code>         |
| <code>pageslts.pdf</code>         | → <code>doc/latex/pageslts.pdf</code>         |
| <code>pageslts-example.tex</code> | → <code>doc/latex/pageslts-example.tex</code> |
| <code>pageslts-example.pdf</code> | → <code>doc/latex/pageslts-example.pdf</code> |
| <code>pageslts.dtx</code>         | → <code>source/latex/pageslts.dtx</code>      |

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{pageslts.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 pageslts.dtx
makeindex -s gind.ist pageslts.idx
pdflatex pageslts.dtx
makeindex -s gind.ist pageslts.idx
pdflatex pageslts.dtx
```

### 7.5 Compiling the example

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

```
latex pageslts-example.tex
```

or (recommended)

```
pdflatex pageslts-example.tex
```

and will need *at least* (!) three 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. This `pageslts` package first started as a revision of the `lastpage` package, but a replacement was deemed necessary to accomplish what this package does. Further I would like to thank HEIKO OBERDIEK for providing the `\erroralphalph` command as well as a lot (!) of useful packages (from which I also got everything I know about creating a file in `dtx` format, OK, say it: copying), ULRICH DIEZ for his code for the `undolabl` package, which allows overwriting of labels, and ANDRES LÖH for the code to determine the current page numbering scheme. For bug reports I thank MICHAEL HERMAN, KWIKWI, JOSHUA ELLIS, and DR. CLEA F. REES. For telling me how to fix a bug (and for all his shared wisdom at <https://tex.stackexchange.com>) thanks go to PROF. ENRICO GREGORIO.

## 9 History

[1994/06/17, `lastpage`]

- `lastpage` v0.99a: First shot by JEFFREY P. GOLDBERG.

[1994/06/25, `lastpage`]

- `lastpage` v0.1b: Last version number created by JEFFREY P. GOLDBERG.

[1994/07/20, `lastpage`]

- `lastpage` 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}{\the\thepage}}%
 \addtocounter{page}{1}}
\AtEndDocument{%
 \message{AED: lastpage setting LastPage}%
 \clearpage\lastpage@putlabel}%
\endinput
```

and then `hyperref` and `revtex` even redefine `\lastpage@putlabel`.

## [2010/02/18, **lastpage**]

- `lastpage` v1.1: Proposed `LastPages` label by H.-Martin Münch on [news:comp.text.tex](https://groups.google.com/group/comp.text.tex/msg/4407493da9c747f0?dmode=source), see e. g. <https://groups.google.com/group/comp.text.tex/msg/4407493da9c747f0?dmode=source>; now available in this `pageslts` package.

## [2010/05/15 v1.0 **pagesLTS**]

- `pagesLTS` Complete rewriting of the package, so as to work with **more than one page numbering scheme**; using `\AtVeryEnd` for `VeryLastPage`; upgrade from `fancyheadings` to `fancyhdr` package, then removed the need for a `fancyhdr` package at all.
- Rewriting of the package, so as to work with the `fnsymbol` page numbering scheme (even on the last page).
- Introduction of `kvoptions` into this package.
- Check for incompatible `endfloat` package.
- `lastpage209.sty` for L<sup>A</sup>T<sub>E</sub>X209 .
- Replacement of `\filedate`, `-version`, `-name`,... because of L<sup>A</sup>T<sub>E</sub>X 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%2F2705&search=>
- `alphalph` support included.
- Page numbering extension `\erroralph` by HEIKO OBERDIEK included.
- (Page-) Numbering extension for `roman` and `Roman` numbers included.
- Incompatible, old `lastpage` package “killed”.
- Example `pagesLTS-example.tex` added.
- Alternatives listing (section 4).
- Listing of T<sub>E</sub>X sources (subsection 7.1).
- Complete rewriting of the documentation.
- Everything in DTX framework.
- New package name: `pagesLTS` for Last, Total, and page numbering Schemes pages.

## [2010/06/01 v1.1(a) **pagesLTS**]

- Abstract changed: Negative `roman` and `Roman` page numbers are now possible.
- Several typing mistakes have been corrected - both in the `style` file as well as in this documentation.

### [2010/06/03 v1.1b pagesLTS]

- Corrected a bug in `\XXRoman`, where `\roman` instead of `\Roman` had been used.
- New `papermas` package mentioned.

### [2010/06/24 v1.1c pagesLTS]

- `holtxdoc` warning in `drv` updated.
- Removed CRLF line endings from the `dtx` file.
- Corrected the location of the package at CTAN. (In this version TDS was still missing due to a packaging error.)
- Corrected Message format in `pagesLTS.ins`.

### [2010/07/15 v1.1d pagesLTS]

- Added the `\@ifclassloaded{revtex4}` code for `\lastpage@putlabel` (changed to `\pagesLTS@putlabelhyper`) from the `hyperref` package as comment.
- In the documentation added the explanation of the occurrence of multiply definitions of the `LastPage` label with `lastpage`, `pagesLTS`, `hyperref` package (in that order).
- Updated to (then) new version of `undolabl` package [2010/07/15] v1.0d, which uses `\undonewlabel` with only one instead of two arguments.
- Added a warning message, if `hyperref` and `pdfpages` were *both* used.

### [2010/07/29 v1.1e pagesLTS]

- Removed `lastpage209.sty`, because it is now contained in the `lastpage.dtx` file,  $v \geq 1.2a$ .
- Removed the `\@ifclassloaded{revtex4}` code for `\lastpage@putlabel`.
- Handling of `lastpage` package adapted to updated version 1.2(a).
- Corrected error in `lastpage` code [1994/07/20 v0.1b].
- Version handling for `undolabl` package updated.
- Included a `\Checksum`.

### [2010/08/08 v1.1f pagesLTS]

- Version 1.1e had a bug: `AlphaAlpha` was replaced by `alphalph` (because that package is named like this), but this was done also in commands and definitions - now reverted.

### [2010/08/12 v1.1g pagesLTS]

- Now the rerun warning is given *after* e.g. the `\listfiles`, increasing the chance of the user to read it.

### [2010/08/23 v1.1h pagesLTS]

- Renamed `\XXRoman` to `\XRoman`.
- Reduced the number of needed counters.
- Removed wrong `%` from the driver file.
- Changed the `\unit` definition (got rid of an old `\rm`).
- Without use of the `hyperref` package, labels of type `pagesLTS.<page numbering scheme>.local` became multiply defined. Now an `\undolabl` was inserted.

### [2010/08/25 v1.1i pagesLTS]

- Bug fix: `tcilatex` defines the `\hyperref` command, therefore for `hyperref` package detection this had to be changed to `\Hy@Warning`.

### [2010/09/12 v1.1j pagesLTS]

- Bug fix: `LATEX` issued a “Label(s) may have changed. Rerun to get cross-references right.”-warning, even if labels had not changed but were overwritten.
- Starred version of `\lastpageref` for suppressing hyperlinks introduced.
- A lot of details.

### [2010/09/22 v1.1k pagesLTS]

- When no `fnsymbol` pagenummering scheme is used, the respective counters are not defined, saving three counters.
- Moved the package from `.../latex/muench/pagesLTS/...` to `.../latex/pagesLTS/...`

### [2010/09/27 v1.1l pagesLTS]

- Bug fix: `\PackageError{pagesLTS}{pagenummering missing}{\pagesLTS@messageNPN }` had to be moved to the outside of `\EveryShipout`, because it wrote its message into the document instead to the screen and the `.log`-file.
- Updated to version 2010/04/24 v0.19 of the `holtxdoc` package.

### [2011/02/01 v1.1m pagesLTS]

- Added a new warning subsection about `hyperref` and repeated page numbers.
- Bug fix: Missing % after `-\romannumeral\number-\arabic{#1}` added.
- The (then) new version v2.4i of the `endfloat` package was then even older than 15 years.
- Put a warning in the documentation as well as in the `log`-file and at the screen during compilation about the `showkeys` package. (The labels of the `pagesLTS` package cannot be shown by the `showkeys` package.)
- Bug fix: In some situations a rerun warning was given even if no rerun was necessary.
- The option `alphMult` is now set to `ab` by default.
- The option `AlphMulti` is now set to `AB` by default.

### [2011/03/16 v1.1n pagesLTS]

- Bug fix: Handling of option `pagecontinue=false` changed. When `pagecontinue=false` was used, but also a `alphMult`, `AlphMulti`, `fnsymbolmult`, `romanMult` or `RomanMulti` option other than 0 or `false`, respectively, was used, the page numbering *was* continued/extended. Now a warning is issued in case of such option clash and `pagecontinue=false` is heeded, disabling all continuation.
- Bug fix: `\ProvidesPackage{pagesLTS}` contained an older date (2010/09/27 of v1.1l instead of 2011/02/01 of v1.1m).
- Bug fix: The `ulem` package is needed to generate the documentation from the `pagesLTS.dtx` file, but was not listed as necessary package.
- Bug fix: One reference to an outdated version of `undolabl` package, replaced by the (then) recent version.
- Some minor details.

### [2011/03/17 v1.1o pagesLTS]

- Documentation and ReadMe bug fix: This `pagesLTS` package is located at <https://ctan.org/pkg/pageslts> instead of `.../pagesLTS/`.
- There is a new (possible) alternative package, `totcount`, see section 4.
- Bug fix: There was a reference to `lastpage` 1994/07/20, v0.1b, instead of the current version.

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

- **Renamed the package from `pagesLTS` to `pageslts` (keeping family, prefix, internal commands,... as `pagesLTS`).**  
Added checking against double loading as `pagesLTS` and `pageslts`.
- The `holtxdoc` package was fixed (recent: 2011/02/04, v0.21), therefore the warning in `drv` could be removed.
- `\AtEndAfterFileList` from the (then) new version of the `atveryend` package, 2011/04/23, v1.7, by HEIKO OBERDIEK, is now used for the rerun hint instead of appending to `\@dofilelist`.
- Now defining 2: `\def\pagesLTS@two{2}` and 3: `\def\pagesLTS@three{3}`.
- Replaced `\texttt{\textbackslash...}` by `|\...|` in the `dtx` and by `\verb|\...|` in the example (where possible).
- When the `alphaph` package is needed, it is loaded via `\RequirePackage` instead of crashing with an error message.
- A lot of details (also in the documentation).

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

- Updated to T<sub>E</sub>X live 2012 (for compiling the documentation and example) and installed the available updates. Therefore I can no longer test whether `pageslts` works with earlier versions of L<sup>A</sup>T<sub>E</sub>X.
- Replaced `\let` by `\LetLtxMacro`.
- 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. (Bug reported at <https://tex.stackexchange.com/q/95541/6865>, thanks to Michał Herman!) Fixed. [Later in the kernel *all* labels got defined to have five arguments.]
- Updates to a lot of details, also in the documentation.

### [2014/01/19 v1.2c]

- Bug: missing loop, fix: inserted.
- Bug: when option `pagecontinue=false` was set, the extension of the page numbering schemes was disabled by mistake, fixed.
- Now using `\ltx@ifpackageloaded` from the `ltxcmds` package for checking (even after `\AtBeginDocument`) whether a package has been loaded.
- Bug: incompatibility with `lineno` because of a mistake in the redefined `\pagenumbering`, fixed. (Bug reported by KWIKWI, thanks!)
- Bug: When `\pagenumbering` preceded `\frontmatter` on the same page but with different argument than the `\pagenumbering`, which was inside `\frontmatter`, then some labelling got mixed up. (Also this bug reported by KWIKWI, thanks!) While this is not fixed automatically, now an appropriate error message is given. (Two different page numbering schemes on the same page make no sense anyway.)

### [2015/08/02 v1.2d]

- Updated to T<sub>E</sub>X Live 2015 (for compiling the documentation and example) and installed the available updates. Therefore I can no longer test whether pageslts works with earlier versions of L<sup>A</sup>T<sub>E</sub>X.
- A `ifundefinedorrelax` similar to the one from `scrbase.sty` of the KOMA script bundle as 2013/12/19 v3.12 is used now, without the need for  $\varepsilon$ -T<sub>E</sub>X.
- New versions of Adobe Reader and of some packages have become available.
- Changed the message (type) to be displayed if writing to files is disallowed (as pointed out by JOSHUA ELLIS, thanks!).
- Updates to several details, also in the documentation.

### [2015/08/17 v1.2e]

- Bug fix, see <https://tex.stackexchange.com/q/261445/6865>, thank you to PROF. ENRICO GREGORIO for providing the fix and to DR. CLEA F. REES for bringing this to my attention.

### [2015/12/21 v1.2f]

- Replaced `\next` with `\@pageslts@currname`.
- Bug fix, see <https://tex.stackexchange.com/q/140235/6865>. If the bug had been actually reported (instead of waiting until I see the question), I would have fixed it earlier, of course.
- Changed minor details like fixing urls in the manual.

### [2024-11-20 v2.0a]

- Kernel-updates broke the package, the package was repaired and updated to the new kernel-code; ports from `lastpage`.
- Removed `\unit`.
- Removed `\XXRoman` (deprecated at least since 2015).
- Removed code from/need for packages `prelim2e`, `ltxcmds`, `atveryend`, `etoolbox`, `everyshi`, `letltxmacro`, and `rerunfilecheck`.
- Removed checks for available  $\varepsilon$ -T<sub>E</sub>X, `endfloats` package from 1992, `pagesLTS` package from 2011, `hyperref` from 2015 etc.
- Renamed `\pagesLTS@ifcounter` to `\pagesLTS@providecounter`.
- Renamed `\pagesLTS.lastpage` to `\pagesLTSlastpage`.



[2024-12-07 v2.0b]

- Bug fix: `pagecontinue=false` did not reset everything always fully correct.
- Instead of requiring the `kvoptions` package, kernel commands are used.
- Now compatible with the `romanbarpagenumber` package, even independent of loading order.
- When more than one `\pagenumbering` command is given before the end of the first page (maybe in the preamble), all but the last `\pagenumbering` are ignored (as also  $\text{\LaTeX}$  would naturally do).
- The saved `\OrigPagenumbering` is used in both places now instead of the plain definition from the kernel, so any change before the `pageslts` package is taken into account.
- Changed the [section 4: Alternatives](#), mirroring the one from the current `lastpage` package.
- For cases when `\@currentHpage` is just `page.`, the warning text has been corrected.
- Page numbering scheme `silly` (from [sillypage package](#)) now works.
- Page numbering scheme `gobble` now works. (Is that silly?!)
- Added `\ProvideTextCommand{\textasteriskcentered}{PD1}{*}`.
- Missing `\if@filesw \fi` added.
- Recent `undolabl` package ( $\geq$  2024-12-05 v1.0n) required!

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

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