The varioref package

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Abstract

This package defines the commands \vref, \vpageref, \vrefrange, and \vpagerefrange for \LaTeX{} 2ε. \vref is similar to \ref but adds an additional page reference, like ‘on the facing page’ or ‘on page 27’ whenever the corresponding \label is not on the same page. The command \vpageref is a variation to \pageref with a similar functionality. The \v...range commands take two labels as arguments and produce strings which depend on whether or not these labels fall onto a single page or on different pages. Generated strings are customizable so that these commands are usable with various languages.

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1 Introduction

In many cases it is helpful when referring to a figure or table to put both a \ref and a \pageref command into the document especially when there are one or more pages between the reference and the object. Therefore some people use a command like

\newcommand{\fullref}[1]{\ref{#1} on page"\pageref{#1}}

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which reduces the number of key strokes, necessary to make such a complete reference. But since one never knows where the referenced object finally falls, using such a device may result in a page reference to the current page which is disturbing and therefore should be avoided.

2 The user interface

\vref The implementation of \vref below produces only a \ref when reference and \label are on the same page. It will additionally produce one of the strings ‘on the facing page’, ‘on the preceding page’, or ‘on the following page’, if label and reference differ by one and it will produce both \ref and \pageref when the difference is larger. The word ‘facing’ is used when label and reference both fall onto a double spread. However, if a special page numbering scheme is used instead of the usual arabic numbering (e.g., \pagenumbering{roman}) then there will be no distinction between one or many pages off.

\vpageref Sometimes one wants to refer only to page number and again such a reference should normally be suppressed if we are referring to the current page. For this purpose the package defines the \vpageref command. It will produce the same strings as \vref except that it doesn’t start with the \ref and except that it will produce the string that is saved in \reftextcurrent if label and reference fall onto the same page. By defining \reftextcurrent to produce “on this page” or something similar, we can avoid that

... see the example \vpageref{ex:foo} which shows ...

comes out as “... see the example which shows ...”, which could be misleading.

You can put a space in front of \vpageref it will be ignored if the command doesn’t produce any text at all.

But in fact \vpageref allows even more control. If has two optional arguments. With the first one, one can specify the text that should be used if label and reference fall on the same page. This is very helpful if both are near to each other, so that they may or may not be separated by a page break. In such a case we usually know (!) whether the reference is before or after the label so that we can say something like

... see the example \vpageref[above]{ex:foo} which shows ...

which will then come out as “... see the example above which shows ...” if we are still on the same page, but as “... see the example on the page before which shows ...” (or something similar depending on the settings of the \reftext..before commands) when there was a page break in the meantime.

One warning however, if you use \vpageref with the optional argument to refer to a figure or table, keep in mind that depending on the float placement parameters the float may show up on top of the current page and therefore before the reference even if it came after it in the source file.

But maybe you prefer to say “... see the above example” if example and reference fall onto the same page, i.e., reverse the word order. In fact, in some languages the word order automatically changes in that case. To allow for this variation the second optional argument can be used. It specifies the text preceding the generated reference if object and reference do not fall onto the same page. Thus one would write
... see the \vpageref[above example]{example}{ex:foo}
    which shows ...

\vref

This command is similar to \vref but it takes two mandatory arguments
denoting a range to refer to (e.g., a sequences of figures or a sequence of equations,
etc.). So if \texttt{fig:a} is your first figure in the sequence and \texttt{fig:c} your last you can write

... see figures \vrefrange{fig:a}{fig:c} ...

which would then be formatted as

... see figures 3.4 to 3.6 on pages 23–24 ...

or, if they happen to all fall onto the next page, as

... see figures 3.4 to 3.6 on the following page ...

i.e., the command is deciding what to say depending on where the two labels
are placed in relation to each other; it is essentially implemented using \vpagerefrange described below. The optional argument the command may take
is the text to use in case both labels are placed on the current page.

\vpagerefrange

This command is similar to \vpageref but takes two mandatory arguments
which are two labels denoting a range. If both labels fall onto the same page, the
command acts exactly like \vpageref (with a single label), otherwise it produces
something like “on pages 15–18” (see customization possibilities below). The
optional argument it may take is the text to use in case both labels are placed on
the current page.

\vrefpagenum

This macro is provided to allow the user to write their own small commands
which implement functions similar to those provided by the two previous com-
mands. It takes two arguments: the second is a label (i.e., as used in \label or
\ref) and the first is an arbitrary command name (make sure you use our own)
that receives the page number related to this label. So if you have two (or more)
labels you could retrieve their page numbers, compare them and then decide what
to print. For example, the following not very serious definition (also using the
ifthen package)

\newcommand\amusingversion[2]{%
    \vrefpagenum\firstnum{#1}%
    \vrefpagenum\secondnum{#2}%
    the definition%
    \ifthenelse{\equal\firstnum\secondnum}{%
        {s of \ref{#1} and \ref{#2} \vpageref{#1}}%
        { of \ref{#1} \vpageref{#1} and of \ref{#2} \vpageref{#2}}%
    }%
}

...\amusingversion{foo}{bar}

will print something like

...the definitions of 3 and 4 on the previous page

in the case both labels are on the same page but something like
the definition of 3 on the next page and of 4 on page 13

in case the are on different pages.

The user commands \vref, \vpageref, and \vpagerefrange all work by first removing any space on their left and then inserting some space of their own (\vref, for example, a nonbreakable space). That seemed like a good idea back then, but it has the disadvantage that you can’t use these macros in situations where you definitely do not want any space before the generated text. E.g., in situations like (\vref{foo} ...) you end up with a space after the open parenthesis.

Since it is too late to change the default behaviour I’ve added star versions \vref*, \vpageref*, \vpagerefrange* of the macros which do not add any space before the generated text (they do nevertheless remove space at the left).

A reference via \ref produces by default the data associated with the corresponding \label command (typically a number); any additional formatting has to be provided by the user. If, for example, references to equations are always to be typeset as “equation (number)”, one has to code “equation (\ref{key})”. With \labelformat the varioref package offers a possibility to generate such frills automatically. The command takes two arguments: the first is the name of a counter and the second is its representation when referenced. This means that for a successful usage, one has to know the counter name being used for generating the label, though in practice this should not pose a problem. The current counter number is picked up as an argument. Here are two examples:

\begin{verbatim}
\labelformat{section}{section~#1}
\labelformat{equation}{equation~(#1)}
\end{verbatim}

A side effect of using \labelformat is that, depending on the defined formatting, it becomes impossible to use \ref at the beginning of a sentence (if its replacement text starts with a lowercase letter). To overcome this problem varioref introduces the commands \Ref and \Vref that behave like \ref and \vref except that they uppercase the first token of the generated string.

To make \Ref or \Vref work properly the very first token in the second argument of \labelformat has to be a simple ASCII letter, otherwise the capitalization will fail or worse, you will end up with some error messages. If you actually need something more complicated in this place (e.g., an accented letter) you have to explicitly surround it with braces, to identify the part that needs to be capitalized. For example, for figure references in the Hungarian language you might want to write \labelformat{figure}{{‘a}bra~\thefigure}.

If you like to have \vref suppress the page number on pages where label and reference fall onto the same page, but prefer reference to page numbers otherwise then \vpagerefnump can be used. This macro hold the current page “number” when \vpageref and friends are executed. Thus, by defining, for example

\begin{verbatim}
\renewcommand\reftextfaceafter {on page~\thevpagerefnump}
\renewcommand\reftextfacebefore{on page~\thevpagerefnump}
\renewcommand\reftextafter  {on page~\thevpagerefnump}
\renewcommand\reftextbefore  {on page~\thevpagerefnump}
\end{verbatim}

textual references can be suppressed.
3 Multi-lingual usage

The package works well together with the babel system if it is loaded after the babel package, e.g., a document in English (default), French and German text could load the packages as follows:

\usepackage[ngerman,french,english]{babel,varioref}

(or in two separate lines if you prefer one \usepackage line per package). Depending on the current babel language \vref and friends would then generate strings in different languages. If the language options are given as global options to the document class then it is enough to use

\usepackage{babel,varioref}

to achieve the same effect.

If more than one language is specified with varioref then it will start using the last language selected. Switching of languages is managed through Babel; nevertheless all languages of interest need to be specified when varioref is loaded so that it can integrate their strings into the Babel system.

4 Customization

The package supports all options defined by the babel package to translate the fixed strings into other languages than English. (Some languages need updating, however—help is appreciated.) It also supports languages currently not in babel (those can only be used standalone, obviously); check the section on options later on.

You can also modify some or all of the strings by redefining the following commands after the package has been loaded. Backward references use \reftextbefore if the label is on the preceding page but invisible and \reftextfacebefore if it is one the facing page (i.e., if the current page number is odd). Similarly \reftextafter is used when the label comes on the next page but one has to turn the page and \reftextfaceafter if it is on the following but facing page.

In fact, \reftextface... is used only if the user or the document class specified two-sided printing.

Finally we have \reftextfaraway which is used whenever label and reference differ by more than one or when they aren’t numeric. This macro is a bit different because it takes one argument, the symbolic reference string so that one can make use of \pageref in its replacement text.

To allow a bit random variation in the generated strings one can use the command \reftextvario inside the string macros. It takes two arguments and selects one or the other for printing depending on the number of already seen \vref or \vpageref commands. As an example see the definitions of \reftextbefore etc. on page 8.

The commands \vrefrange and \vpagerefrange produce their text using two macros described below. By redefining them one can modify the results to accommodate special requirements.

They both take two mandatory arguments denoting the first and the last label of the range.
This macro produces text that describes the page range of the two labels, e.g.,
the default for English is “on pages~\pageref{#1}--\pageref{#2}”.

This macro produces text that describes the range of figures, tables, or whatever the labels refer to, the default for English is “\ref{#1} to~\ref{#2}”.

4.1 ... if Babel is used

If babel is being used then the above commands need to be changed using the Babel
mechanism, e.g.,

\addto\extrasngerman{%
\renewcommand\reftextfaceafter {auf der n"achsten Seite}%
... }

Otherwise babel will reintroduce its own defaults whenever the language is changed
(which happens in particular during \begin{document} where the main language is selected).

5 Options

As mentioned above the package supports all standard options offered by the Babel
system to customize the strings produced, it may also have a few not supported by
babel, for a full list look in section 8.1 on page 8. In addition it offers the option
draft to turn error messages into warnings during development. The default
final produces error message when a generated string falls onto a page boundary
(see next section).

6 A few warnings

Defining commands like the ones described above poses some interesting problems.
Suppose, for example, that a generated text like ‘on the next page’ gets broken
across pages. If this happens it is very difficult to find an acceptable solution and
in fact can even result in a document that will always change from one state to an-
other (i.e., inserting one string, finding that this is wrong, inserting another string
on the next run which makes the first string correct again, inserting ...). The
current implementation of varioref therefore issues an error message whenever
the generated text is broken across page boundaries, e.g.,

\vref{table 5 on the current \langle page break \rangle page}

\vrefwarning

would would result in an error, which needs to be resolved by the user by replacing
the \vref command with an ordinary \ref just before the final run. This is not
completely satisfactory but in such case no solution really is. During document
preparation, while one is still changing the text, such error messages can be turned
into warnings by placing a \vrefwarning command in the preamble. This is
equivalent to specifying “draft” as an option to the package. \vrefshowererrors
ensures that varioref stops when detecting a possible loop. This is the default and
equivalent to specifying “final” as an option.

At the end final a warning: every use of \vref will internally generate two
macro names to keep track of the string positions within the document. As a
result you may run out of name space or main memory if you make heavy use of
this macro on a small \TeX installation. For this reason the primitive command
\fullref is also provided. This command can be used whenever you know for
sure that label and reference can't fall onto nearby pages.

7 The documentation driver file

The next bit of code contains the documentation driver file for \TeX, i.e., the file
that will produce the documentation you are currently reading. It will be extracted
from this file by the docstrip program.

\begin{verbatim}
\documentclass{ltxdoc}
\usepackage{multicol,varioref}
\GetFileInfo{varioref.sty}
\setlength\hfuzz{1pt} % ignore slight overfulls
\EnableCrossrefs
%\DisableCrossrefs % Say \DisableCrossrefs if index is ready
\RecordChanges % Gather update information
%\OnlyDescription % comment out for implementation details
\begin{document}
\DocInput{varioref.dtx}
\end{document}
\end{verbatim}

8 The implementation

The main implementation idea is to generate an internal label command for every
\vpageref and compare the page reference of this label with the page reference of
the user-requested label. Since this means one additional macro name for each use
of \vpageref or vref (which is implemented in terms of \vpageref) the memory
requirements of this package may be high in terms of main and macro name
memory. Since the information held in the internal labels is used only once one
could envision a different scheme if suitable primitives for this kind of “one place
information” would be provided by \LaTeX. This type of data structure is planned
for \LaTeXe but for the moment we have to live with the memory restrictions.

We start by checking if this file was already loaded. If not we identify the
current version. This is actually done at the top of the file, so we comment it out
here

\begin{verbatim}
\NeedsTeXFormat{LaTeX2e}[1994/06/01]
\ProvidesPackage{varioref} [filedate\space fileversion\space space
% \LaTeXe package for extended references (FMi)]
\vref@addto To support the use of babel we want to add the additional strings to the
\extras\langle language\rangle commands. Since \addto in the current implementation
of babel has a bug that does not allow to use arguments containing hashmarks we
do this by hand.
\end{verbatim}
8.1 Options

\vref@excuse

Excuse that we don’t know the strings for a certain language.

\vref@stringwarning

And we sometimes just don’t know some strings ...  

\reftextfaceafter
\reftextfacebefore
\reftextafter
\reftextcurrent

The options do set the macros that generate the textual strings. Note, that they do not start with a space, the space is already added in the main macro below.

Afrikaans option contributed by Danie Els (dnjels@sun.ac.za).

\DeclareOption{afrikaans}

{\vref@addto\extrasafrikaans{
\def\reftextfaceafter{op die \reftextvario{regterbladsy}{bladsy langsaan}}
\def\reftextfacebefore{op die \reftextvario{linkerbladsy}{bladsy langsaan}}
\def\reftextafter{op die \reftextvario{volgende bladsy}{bladsy hierna}}
}}
The Austrian defaults are the same as the German ones.

The Naustrian defaults are the same but needed for “Neue Rechtschreibung”.

Text for Basque defaults was contributed by Iñaki Larrañaga Murgoitio (aka dooteo) (<dooteo@euskalgnu.org>).
Text for the Bahasa Malaysia defaults was contributed by Bob Margolis 2005-12-02.

Notes: pada muka surat translates as “on the page” though BM has no definite (or indefinite) article; adjectives and other modifiers follow the noun (clause); bertentangan is “opposite” in the sense of “facing”; berikutnya is “next” (in this context – actually next-to-this, literally); berikutnya also translates as “following this” sebelumnya is “preceding”; also “previous” “ini” translates, literally, as “this” but is also used in the sense of current page.

Text for brazil defaults was contributed by Alcino Dall Igna Junior (adij@di.ufpe.br).

Text for Breton defaults was contributed by Christian ROLLAND (Christian.Rolland@univ-brest.fr).
Text for Bulgarian defaults was contributed by Georgi Boshnakov (georgi.boshnakov@gmail.com).

\DeclareOption{bulgarian}{% 
  \vref@addto\extrasbulgarian{% 
    \def\reftextfaceafter {\cyrn\cyra\ 
      \reftextvario{\cyrs\cyrl\cyre\cyrd\cyrv\cyra\cyrshch\cyra\cyrt\cyra}{\cyrs\cyrl\cyre\cyrd\cyrv\cyra\cyrshch\cyra\cyrt\cyra}}\n
} 

Text for catalan defaults was contributed by Robert Fuster (rfuster@mat.upv.es).

\DeclareOption{catalan}{% 
  \vref@addto\extrascatalan{% 
    \def\reftextfaceafter {a la p\’agina seg\’uent} 
      \reftextfaceafter 
    \def\reftextfacebefore{a la p\’agina anterior} 
    \let\reftextafter \reftextfaceafter 
    \let\reftextbefore \reftextfacebefore 
    \def\reftextcurrent {en aquesta p\’agina} 
    \def\reftextfaraway#1{a la p\’agina ~\pageref{#1}} 
    \def\reftextpagerange#1#2{a les p\’agines ~\pageref{#1}--\pageref{#2}} 
    \def\reftextlabelrange#1#2{\ref{#1} a~\ref{#2}} 
  } 

} 

Text for croatian defaults was contributed by ˇSime Ungar (ungar@math.hr).

\DeclareOption{croatian}{% 
  \vref@addto\extrascroatian{% 
    \def\reftextfaraway#1{p\’agine ~\pageref{#1}} 
    \def\reftextpagerange#1#2{p\’agine ~\pageref{#1}--\pageref{#2}} 
    \def\reftextcurrent{p\’agina} 
    \def\reftextfaceafter {na str.~sljem} 
    \def\reftextfacebefore{na str.~preth.} 
    \let\reftextafter \reftextfaceafter 
    \let\reftextbefore \reftextfacebefore 
    \def\reftextfaraway#1{p\’agine ~\pageref{#1}} 
    \def\reftextpagerange#1#2{p\’agine ~\pageref{#1}--\pageref{#2}} 
    \def\reftextlabelrange#1#2{\ref{#1} \ref{#2}} 
  } 

}
Defaults for the Czech option provided by Milan Vancura <milan@suse.cz>.

Defaults for Danish provided by Torsten Martinsen (tmar91@kom.auc.dk). Further defaults by Ole Laursen (olau@hardworking.dk).

Default string for Dutch have been contributed by Frank Poppe (POPPE@SWOV.NL).

This option currently supports one additional string macro \refpagename so that you can easily change to bladzijde instead of pagina if you prefer this word for “page”. However, I will not guarantee that this will survive future versions of this package, so use it on your own risk (you can always update the full strings to be on the safe side).
Concerning the next defaults I received the following comment by Frederik Fouvy <fouvy@coli.uni-sb.de>: “In the Dutch options (where I can exert a proper language judgement ;-), ’t/m’ is not used in formal (scientific) texts. I would either use ‘-’ or ‘tot en met’ (the abbreviation written out). ”

The esperanto strings were suggested by Albert Reiner (<areiner@tph.tuwien.ac.at>).

The finnish strings were suggested by Matti Rintala (<bitti@cs.tut.fi>) and Hillevi Gavel (<Hillevi.Gavel@mdh.se>.)
There are no good variants for German (I think and still think but this is a matter of taste :-). The following definitions were recently suggested to me but since the original are in for a long time I don’t want to change them now since that could make a lot of documents change their formatting. If you fancy them, add a redefinition of the corresponding macro(s) to the preamble of your document.

\def\reftextfaceafter {auf der \reftextvario{gegen"uberliegenden}{anderen} Seite}\
\def\reftextfacebefore {auf der \reftextvario{gegen"uberliegenden}{anderen} Seite}\
\def\reftextafter {auf der \reftextvario{n"achsten}{folgenden} Seite}\
\def\reftextbefore {auf der \reftextvario{vorigen}{vorhergehenden} Seite}\
\def\reftextcurrent {\reftextvario{auf dieser}{diese} Seite}
The \german{} defaults are the same but needed for “Neue Rechtschreibung” (i.e., a different set of hyphenation patterns).

Defaults for \greek{} suggested by Apostolos Syropoulos (apostolo@obelix.ee.duth.gr).

Icelandic defaults suggested by Thorhallur Sverrisson (thorhs@basis.is).
Defaults for Italian suggested by Giovanni Pensa (pensa@dsi.unimi.it) with iTExnici.

\DeclareOption{italian}{
  {\vref@addto\extrasitalian{% 
    \def\reftextfaraway#1{\'{a} s\'{i}\{\dh\}u~\pageref{#1}}% 
    \def\reftextpagerange#1#2{\'{a} s\'{i}\{\dh\}um~\pageref{#1}--\pageref{#2}}% 
    \def\reftextlabelrange#1#2{\ref{#1} til~\ref{#2}}% 
  }%}
}

Defaults for Hungarian by Jeff Goldberg (jeffrey@goldmark.org). There is a problem with the use of the definite article a or az in Hungarian before expansions of \vref or \ref. The problem is that the word should be az if the number following would begin with a vowel if spelled out, and a if the number would begin with a consonant.

The option assumes that there is a command \aza defined which helps resolving this problem.¹

\DeclareOption{magyar}{
  {\vref@addto\extrasmagyar{% 
    \def\reftextafter {a k"o\-vet\-kez\H{o} ol\-da\-lon}% 
    \def\reftextbefore{az el\H{o}\-z\H{o} ol\-da\-lon}% 
    \def\reftextfaceafter {\reftextvario{a t\'u\ul}{ol\-da\-lon}}% 
    \def\reftextfacebefore{\reftextvario{a t\'u\ul}{ol\-da\-lon}}% 
    \def\reftextcurrent {ezen az ol\-da\-lon}% 
  }%}

The following suggested patch has not been added yet (pending changes in babel system).

¹This information is actually quite old but unfortunately never made it into varioref. In case any work has been undertaken to resolve this please inform the author about it.
The \AtBeginDocument needs to be executed when the option is processed and not inside the babel interface.
\AtBeginDocument{\providecommand\aza[1]{a/az%
 \PackageError{varioref}{% Proper definition for command \noexpand\aza missing%
 \{You need to (re)define the command \noexpand\aza that
 takes one argument (a number or a \noexpand\pageref command)
 and produces the string ‘a’ or ‘az’ depending on the argument
 value. It should also accept an optional argument (default ‘l’)
 to denote whether or not the string should be lowercase or
 uppercase.)}}
}
The Norwegian and ‘nynorsk’ translations have been provided by Dag F Langmyhr <dag@ifi.uio.no> and Karl Ove Hufthammer <huftis@bigfoot.com>.
\DeclareOption{norsk}{%}
\DeclareOption{nynorsk}{%}
The polish translations have been provided by Tomasz Michniewski <tomekm@ias.wat.waw.pl>. The use of the command \eob and \aob etc. requires appropriate definitions as provided, for example, by the babel system. This should probably be handled differently but it would require modifications in babel’s language support.
\DeclareOption{polish}{%}

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The Portuguese default text has been provided by José Carlos Oliveira Santos
jcsantos@fc.up.pt.

Updates to the default text for Romanian have been suggested by Florin Oprina
(<florin.oprina@gmail.com>).

The text for Russian was taken from the book in Russian by I. A. Kotel'nikov
and P. Z. Chebotaev, and adapted to the encoding-independent form by Vladimir
Volovich (<vvv@vsu.ru>).
\cyrsh\cyre\cyrs\cyrt\cyrv\cyru\cyryu\cyryu\cyrshch\cyre\cyrvshtrt}\%
{\cyrp\cyrp\cyrt\cyrv\cyru\cyryu\cyryu\cyrshch\cyre\cyrvshtrt}\%
\cyrs\cyrt\cyrr\cyra\cyri\cyrc\cyre}\
\def\reftextcurrent\{\cyrm\cyra\\cyrs\cyrt\cyrr\cyra\cyri\cyrc\cyre}\%
\def\reftextfaraway#1\{\cyrm\cyra\\cyrs.~\pageref{#1}}\%
\def\reftextpagerange#1#2\{\cyrm\cyra\\cyrs\cyrt\cyrr\cyra\cyri\cyrc\cyra~\pageref{#1}--\pageref{#2}}\%
\def\reftextlabelrange#1#2\{\cyrs~\ref{#1}~\cyrp~\ref{#2}}\%
}

The text for slovak defaults was contributed by Miroslav Sedivy (<miro@slovensko.com>).

\DeclareOption{slovak}
{\vref@addto\extrasslovak{\%
\def\reftextfaceafter\{na \reftextvario{proti\v lahlej}\%
{nasleduj\'u}cej\} strane}\%
\def\reftextfacebefore\{na \reftextvario{proti\v lahlej}\%
{predch\adzaj\u}cej\} strane}\%
\def\reftextafter\{na \reftextvario{nasleduj\u}cej\%
{\v dal\v sej} strane}\%
\def\reftextbefore\{na \reftextvario{predch\adzaj\u}cej\%
{predo\v slej} strane}\%
\def\reftextcurrent\{na tej\{trenutni\ strani\}%
\def\reftextfaraway#1\{na strane~\pageref{#1}}\%
\def\reftextpagerange#1#2\{na strane\'ach~\pageref{#1}--\pageref{#2}}\%
\def\reftextlabelrange#1#2\{\ref{#1} a\v z\ref{#2}}\%
}}

The text for slovene defaults was contributed by Roman Maurer (<roman.maurer@amis.net>).

\DeclareOption{slovene}
{\vref@addto\extrasslovene{\%
\def\reftextfaceafter\{na naslednji strani\}%
\def\reftextfacebefore\{na prej\{s\}nji strani\}%
\let\reftextafter\reftextfaceafter
\let\reftextbefore\reftextfacebefore
\let\reftextcurrent\reftextfaceafter
\def\reftextfaraway#1\{na strani~\pageref{#1}}%
\def\reftextpagerange#1#2\{na straneh~\pageref{#1}--\pageref{#2}}%
\def\reftextlabelrange#1#2\{od\ref{#1} do\ref{#2}}%
}}

Text for spanish defaults was contributed by Julio Sanchez (<jsanchez@gmv.es>) and Fernando Dobladez (<ferd@fuego.com>).

\DeclareOption{spanish}
{\vref@addto\extrasspanish{\%
\def\reftextfaceafter\{en la p\'agina siguiente\}%
\def\reftextfacebefore\{en la p\'agina anterior\}%
\let\reftextafter\reftextfaceafter
\let\reftextbefore\reftextfacebefore
\let\reftextcurrent\reftextfaceafter
\def\reftextfaraway#1\{en la p\'agina~\pageref{#1}}%
\def\reftextpagerange#1#2\{en las p\'aginas~\pageref{#1}--\pageref{#2}}%
\def\reftextlabelrange#1#2\{en\{el\} ref\{#1\} do\{la\} ref\{#2\}}%
The text for Swedish was contributed by Mats Dahlgren (matsd@sssk.se).

The text for Ukrainian defaults was contributed by Mykola Lyakhovich (<lyakhovich@mail.ru>).
We support français as an alternative to french since people might be used to it, but we discourage it.

\DeclareOption{francais}{%\typeout{Please use 'french' instead of 'francais'}}\ExecuteOptions{french}
\DeclareOption{germanb}{%\typeout{Please use 'german' instead of 'germanb'}}\ExecuteOptions{german}

During document preparation errors due to \vref are usually of not much interest. For this reason the draft option turns them into warnings by issuing a \vrefwarning command. The final option (default) stops with an error message when varioref detects a possible loop.

\DeclareOption{draft}{{\AtEndOfPackage\vrefwarning}}\DeclareOption{final}{{\AtEndOfPackage\vrefshowerrors} % the default

After all options are declared we execute the default option english to set up the defaults and then call \ProcessOptions* to handle any option passed to the package. The star form is used since we want to execute the options in the order they are given (in case this isn’t used together with the babel package).

\ExecuteOptions{english,final}\ProcessOptions* 8.2 Defining the main macros

\vr@cnt To generate new labels we use a counter and construct the internal label names by prefixing the current counter value with the string vr@. We need a \LaTeX counter to get \includes handled correctly.
\newcounter{vrcnt}

\vpageref The command \vpageref generates the appropriate string by first parsing the optional arguments (if any) and then compares the internal and the user label. This command should be robust since the user might put it anywhere.

We now start by scanning for a star which means: do not add a space in front of the generated text—ever.
\DeclareRobustCommand\vpageref{\ifstar
\@vpageref{\@vpageref[\reftextcurrent]}%  \let\vref@space\relax\vp@geref%
\let\vref@space\space\vp@geref}}
\def\vp@geref{\ifnextchar[%
The default for the first optional argument is the string hidden in the macro \reftextcurrent.
\vpageref{\@vpageref[\reftextcurrent]}%}
\vref@space A default for \vref@space. This isn’t really needed except in the case that somebody has hooked into the varioref interfaces at a lower level (which isn’t really supported, but…). So giving a default will prevent an error message in that case (and should hopefully produce the same behavior as before).
\let\vref@space\space
More parsing...

The default for the second optional argument is a space which is prefixed by \unskip to get rid of any leading space inserted already.

The \@@vpageref macro finally generates the references by comparing the value of an internal label with the value of the user label.

First it switches to horizontal mode if necessary and also removes any leading space.

Then it advances the counter \c@vrcnt by one which is used to generate internal label names.

Then it checks if for the current value of \c@vrcnt a label command was issued in the last run. If not it pretends that there was one with the value \{??}\{??}. Thereafter it stores the pageref value for this label in the macro \@tempa.

Here we check that the generated text is not going across a page boundary.

In version 1.0l the label string has been turned around so that the number comes first. This was done to allow easy explicit expansion of the number before it is passed to the \label command. In the babel system the argument of label was not expanded with the result that wrong label strings have been generated. This is a general problem that might need a completely different solution in babel but for now the change below (and in some other places in the code) should solve the problem for this special combination of packages.

These days we actually use \vref@label instead of \label as this avoids problems with Babel or amsmath redefining the latter command.

Inside displays of the amsmath package the \label command is redefined which makes the test for loops incorrect if a \vref is used in, say, \intertext. So we test this condition first and only do the test if \label doesn’t have a special meaning. [This is no longer necessary as \label isn’t used any more]

If both points do not fall onto the same page with either issue an error or a warning message. However, we do no longer issue that warning now but wait until we are sure that both labels aren’t “far away” because in that case it doesn’t matter. So we just save that info in a macro now.
Same game for the user requested label; this time the page reference is saved in \thevpagerefnum.
\vrefpagenum\thevpagerefnum{#3}\
Now after the internal label has served its purpose it would be nice to free the memory it occupies by using something like
\global\expandafter\let\csname r\the\c@vrcnt @vr\endcsname\@empty
But this is not possible because it would result in getting ‘Labels may have changed...’ warnings for every run. Now we are ready to produce the textual strings. Since we have removed any leading space we now insert a space (unless this was the star form of the command) and then compare the two page references.
\vref@space\ifx\@tempa\thevpagerefnum
\unskip\else#1%\else#2%\fi
Now we check if the page number of the referenced object (stored in \thevpagerefnum is a single positive number.
\is@pos@number\thevpagerefnum{% If so, we check if the current position (stored in @tempa) is a positive number. If this is the case we assign this number to the counter register @tempcnta and add one to it.
\is@pos@number@tempa{
\advance@tempcnta\@ne\}
\advance@tempcnta\maxdimen)\%
Now we are ready to check if reference and object are on nearby pages. \thevpagerefnum will expand to the page number of the object (and we know that this is a number) and @tempcnta is either one higher than the reference
page or completely out of bounds. So if both represent the same value then the object lies one page after its reference.

635 \ifnum \thevpagerefnum = \@tempcnta
Thus if the object falls onto an odd page then the reference is on the facing even page (and so we insert \textfaceafter), otherwise the object can not be seen from the reference (and we in insert \textafter). Don’t be surprised if we are not using \thevpagerefnum in the check. Since \@tempcnta has the same value it is faster to use the register instead of parsing the macro contents anew.

636 \ifodd \@tempcnta
In fact we are going to use \textfaceafter only if we are doing two-sided printing, otherwise \textafter is always used. Since the value of \@twoside is evaluated before reading in packages we could do better (saving some tokens) by defining the current macro in dependence of this boolean.

637 \if@twoside
638 \textfaceafter
639 \else
640 \textafter
641 \fi
642 \else
643 \textfaceafter
644 \fi

If the object is not on the page following the reference we check if it is on the page before the reference. In \LaTeX this situation is not too common, for example with floats it normally does not occur, but of course it isn’t impossible if you more than one reference to the same object, or if you have back references to sections, theorems, etc. To test this we now subtract two from the current value of \@tempcnta (which was set to one higher as the reference page number). Note, that subtraction is also possible if the value was \maxdimen — we still get something that is much larger than any sensible page number.

645 \else
646 \advance \@tempcnta -2
If now \thevpagerefnum and \@tempcnta have the same value then the object lies one page before the reference.

647 \ifnum \thevpagerefnum = \@tempcnta
Again we have to check for odd or even pages to distinguish between the facing and the non-facing situation.

648 \ifodd \@tempcnta
649 \textbefore
650 \else
Again the \textfacebefore only if \@twoside evaluates to true.

651 \if@twoside
652 \textfacebefore
653 \else
654 \textbefore
655 \fi
656 \fi

If the above test also returns false then we have object and references on pages which are far away or don’t contain simple page numbers. Therefore we generate the \textfaraway string and drop any possible “looping warning” in
\vref@may@loop. Recall that this is a macro which has the user label as an argument.

\else
\let\vref@may@loop\relax \% added
\reftextfaraway{#3}\%
\fi
\fi
\}

We do the same if our first test (that the page with the object has a positive page number) turns out to be false.

\%
\let\vref@may@loop\relax \%added
\reftextfaraway{#3}}\%
\fi

Finally we generate the internal label so that it can be check on the next run. This means that we compare the position after the string with the position of the referenced object. There is one thing to note: to conserve space we locally make \@currentlabel empty since we are only interested in the page number value of this internal label.

These days we actually use \vref@label instead of \label as this avoids problems with Babel or amsmath redefining the latter command.
\vref@label{\the\c@vrcnt @vr}\%

Finally we run \vref@may@loop which is either \relax or generates a “may loop” warning or error as appropriate.
\vref@may@loop
}

\vref@label This macro is like \label in the kernel but without passing on \@currentlabel, \ie useful if all we are interested in is the page number. It also has the effect that it is unaffected by amsmath or Babel redefining the \label command.
\def\vref@label#1{\@bsphack
\protected@write\@auxout{}% \string\newlabel{#1}{{}{\thepage}}%
\@esphack}

\vpagerefnum This macro allows to define \reftextafter and friends to refer to the page number rather than producing a textual reference.
\let\thevpagerefnum\@empty

\vrefwarning When the \vref command detects a possible crossing over a page boundary it will call \vref@err to generate an error message. During document preparation one can turn such errors into warnings by issuing a \vrefwarning declaration.
\def\vrefwarning\def\vref@err\PackageWarning{varioref}}
\def\vrefshowerrors\def\vref@err##1\PackageError{varioref}{#1}{% Please check the pages in question. You might need to replace
\the\string\vref\MessageBreak
\or \noexpand\vpageref by a normal \noexpand\page)ref to
\stop LaTeX running forever.}}

\vref We start by scanning for a star form in which case we do not put any space before the generated text (only remove some).
And now we do the real work...

The use of \nobreakspace or ~ after the \unskip means that this command will always produce a normal space while something like \nobreak\space will react to settings of \nonfrenchspacing. Unfortunately the latter will also act in cases where one really wants a normal space, e.g., in Fig. \vref{..}, resulting in a large extra space after the dot. For this reason the first solution is used.

Above comments all refer to the earlier versions where there was no possibility to suppress the space at all. By now we have \vref* and \vpageref* to suppress the in internally generated space by redefining \vref@space appropriately.

That means we have have to use \vpageref and not the internal \@vpageref — otherwise we would pick up the “current” definition for \vref@space instead of setting it back to \space.

The utility macro \is@pos@number takes three arguments: a string that is tested for being a valid non-negative integer and the actions to be taken in case the test comes out true or false.

We start by passing the string to the macro \is@pos@num after prefixing it with a 0 and adding a space after it. To have a well-defined ending point we also add \@nil at the end.

Now we parse the enlarged string into a counter register. To get control back after everything that is regarded by \TeX as a number is put into that register we assign \is@pos@num@ to the \afterassignment token. Since the string started with 0, we can be sure that the register assignment will be carried out without an error message. In case of counter assignments leading zeros are discarded.

Now we have to check whether or not the whole string was parsed into that register or some remainder was left over. Since we have added a \@nil token at the very end we can use that to delimit the argument of \is@pos@num@. Note, that the added space in \is@pos@number above gets parsed away by the counter assignment. If it would be missing, and the full string would consist of a number, \TeX would try to replace \@nil by its definition to see if it would contain additional digits and thus we would be in trouble at this point.

Now we have to check if the argument is empty. We can do this with an \ifx (i.e., in an expandable way) since we know for sure that it can not start with \@nil.

Depending on the result we execute the second or third argument of the command \is@pos@number using a technique that removes the \else or \fi from the input
stream first, so that in principle input stream parsing could be done from within
the arguments.

\expandafter\@firstoftwo \else
\expandafter\@secondoftwo \fi}
\reftextvario
This macro gives a little bit of random variation in the text because the outcome
depends on the number of \vref commands seen before.

\def\reftextvario#1#2{\ifodd\c@vrcnt #1\else#2\fi}
\fullref
And here is the primitive command that always produces a \ref and a \pageref.

\def\fullref#1{\ref{#1} \reftextfaraway{#1}}

8.2.1 Supporting ranges

\vref@pagenum
This command takes a label as #1 extracts the page number associated with it
and saves the result in a csname which is passed as #1. If the label isn’t associated
with a page number it essentially associates it with ?? for both the label number
and the page, thus defining the label this way. This means that no label warning
is generated for this label in case it is undefined.

\def\vref@pagenum#1#2{\@ifundefined{r@#2}{\@namedef{r@#2}{{??}{??}}}{}%}
Extracting and saving the page number turned out to be a source of subtle bugs.
Initially it was done through an $\edef$ with a bunch of $\expandafter$ commands
inside. This posed a problem if the page number itself contained code which needed
protection (e.g., pr/4080) so this got changed to use $\protected@edef$. However,
that in turn failed with Babel (pr/4093) if the label contained active characters,
 e.g., a “:” in French. So now we use even more $\expandafter$ commands to avoid
any expansion other than what is absolutely required—I’m sure there is now a
simpler way to code this, but ... in fact we didn’t use enough initially resulting
in another bug (pr/4159):

\expandafter\expandafter\expandafter\vref@@pagenum\csname r@#2\endcsname{}\@nil#1%
702} }\def\vref@@pagenum#1#2#3\@nil#4{\def#4{#2}703}
\vrefpagenum
Same as the above but this time we generate a warning for undefined labels.

\def\vrefpagenum#1#2{\@ifundefined{r@#2}{\G@refundefinedtrue
\@latex@warning{Reference ‘#2’ on page \thepage \space
\underline{undefined}}}{%}
\vref@pagenum{#1}{#2}}
\vpagerefrange
\@vpagerefrange
\@svpagerefrange
If both labels refer to the same page then we produce a \vpageref. Otherwise we
produce the result of \reftextpagerange.

One could think of making this command even more clever by producing a
special string if the difference between the two page number is one (but this is not
done).

We need two versions to implement a star form:
And the same but using \vpageref:
\newcommand\@vpagerefrange[3]{\reftextcurrent\}{\vrefpagenum\@tempa{#2}}%\vrefpagenum\@tempb{#3}\ifx\@tempa\@tempb\vpageref*[{#1}]{#2}%\else\reftextpagerange{#2}{#3}\fi}

And here we put things together.
\newcommand\vpagerefrange{\@ifstar\@svpagerefrange\@vpagerefrange}

\vrefrange
\newcommand\vrefrange[3]{\reftextlabelrange{#2}{#3} \vpagerefrange{#1}{#2}{#3}}

8.3 An extension of counter referencing

At the moment a reference to a counter foo will generate the equivalent of \p@foo\thefoo although not quite in this form. For some applications it would be nice of one could have \thefoo being an argument to \p@foo to be able to put material before and after the number generated by \thefoo. This can be easily achieved with a small change to one of the kernel commands as follows:
\def\refstepcounter#1{\stepcounter{#1}\protected@edef\@currentlabel{\csname p@#1\expandafter\endcsname\csname the#1\endcsname}}

The trick is to ensure that \csname the#1\endcsname is turned into a single token before \p@... is expanded further. This way, if the \p@... command is a macro with one argument it will receive \the.... With the kernel code (i.e., without the \expandafter) it will instead pick up \csname which would be disastrous.

Using \expandafter instead of braces delimiting the argument is better because, assuming that the \p@... command is not defined as a macro with one argument, the braces will stay and prohibit kerning that might otherwise happen between the glyphs generated by \the... and surrounding glyphs.

\labelformat A shortcut to set the \p@... macro for a counter. It will pick up the counter representation as an argument so that it can be specially formatted.
\def\labelformat#1{\expandafter\def\csname p#1\endcsname\#1}
This macro expands the result of \ref and then uppercases the first token. Only useful if the label was generated via \labelformat and contains some lower case letter at its start. If the label starts with a complicated construct (e.g., an accented letter) one has to surround everything that needs uppercasing in a brace group in the definition of \labelformat.\footnote{There is one problem with this approach: the braces are kept in a normal \ref which might spoil kerning. Perhaps one day this needs redoing.}

\DeclareRobustCommand\Ref[1]{\protected@edef\@tempa{\ref{#1}}\%\expandafter\MakeUppercase\@tempa}

\Vref is the counterpart to \vref with \ref replaced by \Ref in its definition.

\DeclareRobustCommand\Vref[1]{\@ifstar{\let\vref@space\relax\Vr@f}{\let\vref@space\nobreakspace\Vr@f}{\let\vref@space\relax\Vr@f}}
\def\Vr@f#1{\leavevmode\unskip\vref@space\Ref{#1}\vpageref{\unskip}{#1}}

\Vref is the counterpart to \vref with \ref replaced by \Ref in its definition.

\Vr@f
\Vref

\section*{Change History}

\begin{verbatim}
<table>
<thead>
<tr>
<th>Version</th>
<th>Change</th>
<th>Page</th>
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</thead>
<tbody>
<tr>
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<td>\vr@cnt: use LaTeX counter</td>
<td>21</td>
</tr>
<tr>
<td>v0.1f</td>
<td>@@vpageref: Add another label to catch crossovers</td>
<td>22</td>
</tr>
<tr>
<td>v0.1g</td>
<td>\vref@err: Macro added</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>\vrefwarning: Macro added</td>
<td>25</td>
</tr>
<tr>
<td>v0.1h</td>
<td>General: Small documentation changes</td>
<td>7</td>
</tr>
<tr>
<td>v1.0a</td>
<td>General: Upgrade to LaTeX2e</td>
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</tr>
<tr>
<td>v1.0b</td>
<td>\reftextcurrent: Replace in incorrect <code>def by </code>let</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>\vref@addto: Avoid using babel `addto</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>The babel commands are starting with extras</td>
<td>7</td>
</tr>
<tr>
<td>v1.0f</td>
<td>\reftextcurrent: Inserted missing hash mark</td>
<td>19</td>
</tr>
<tr>
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<tr>
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<tr>
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<td></td>
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<td>25</td>
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</tr>
<tr>
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<td>@\vpageref: Do it correctly</td>
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</tr>
<tr>
<td>v1.0k</td>
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<td>19</td>
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<tr>
<td>v1.0l</td>
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</tr>
<tr>
<td>v1.0m</td>
<td>\reftextcurrent: Added finnish</td>
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</tr>
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</table>

\end{verbatim}
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\vspace{10pt}
v1.4w
\texttt{\textbackslash refpage\textbackslash num}: Use \texttt{\textbackslash protected\textbackslash e\textbackslash def} to avoid problems in complicated setups, e.g., microtype (pr/4080) \hfill 27
\vspace{10pt}
v1.4x
\texttt{\textbackslash Vr@f}: Correct spacing – same mistake as in \texttt{\textbackslash vref} (pr/4123) \hfill 29
\texttt{\textbackslash refextcurrent}: Defaults for esperanto added \hfill 13
\vspace{10pt}
v1.4y
\texttt{\textbackslash refpage\textbackslash num}: Avoid even \texttt{\textbackslash protected\textbackslash e\textbackslash def} to pacify french babel (pr/4093) \hfill 27
\vspace{10pt}
v1.4z
\texttt{\textbackslash refpage\textbackslash num}: Previous fix need one more expansion (pr/4159,pr/4171) \hfill 27
\vspace{10pt}
v1.5a
\texttt{\textbackslash refextcurrent}: Correct text in \texttt{\textbackslash refextbefore} \hfill 18
\vspace{10pt}
v1.5b
\texttt{\textbackslash refextcurrent}: Fixed blunder from 2005 - galician option clearly never used \hfill 14
\vspace{10pt}
v1.5c
\texttt{\textbackslash @@vpageref}: \hfill 25
Delay generating the looping warning until we know more
General: Revamped some of the documentation to better explain how \texttt{\textbackslash varioref} could be used in a multi-lingual context \hfill 22
\vspace{10pt}
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