Fancy Cross-referencing

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Abstract

fancyref.sty is a package for fancy cross-referencing. See the files README and COPYING for additional information.

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1 Introduction

Besides the notorious FAQ problem “I get a section number when referring to a figure!”\footnote{Just put \label after \caption.}, cross-referencing with \LaTeX\ is simple: You set a \texttt{\label} and refer to it with \texttt{\ref} and \texttt{\pageref}. These commands just work.

Some lazy people soon had the idea to write a \texttt{\fullref} command to save some keystrokes:

\begin{verbatim}
\newcommand*{\fullref}[1]{\ref{#1} on page~\pageref{#1}}
\end{verbatim}

After that, people sometimes got page references to the current page which cluttered the text with redundant information.

Perhaps one of these people was FRANK MITTELBACH, who was so annoyed that he wrote the \texttt{varioref} package \cite{varioref}. It provides a \texttt{\vref} command which generates output dependent on the difference between the page number of the label and the page number of the cross-reference, e.g. like “on the next page” or “on page 27”. No output will be generated if label and cross-reference fall onto the same page. This is really great, especially as the package supports lots of languages.

If you write larger documents with lots of sections and figures, you probably will find out that it is important to keep track of your labels. If you have a section labeled \texttt{britain} and a figure labeled \texttt{england}, it is only a question of time until you mix them up. To avoid this, most people \texttt{prefix} the label with an abbreviation for the type of the referenced object, e.g. \texttt{fig} is widely used for figure labels. Also it is common practice to separate this classifying prefix from the label by a \texttt{delimiter} character, normally : is used by convention \cite[p.41]{latex-sage}.\footnotemark
If your labels look like `sec:britain` or `fig:england` a mix-up will belong to the past.

In almost all cases when you are referencing to a figure, you will add a descriptive string like “Figure”, because the counter only is not very helpful to the reader. Hence, some people write macros for this purpose:

```
\newcommand*{\figref}[1]{\figurename~\ref{#1}}
```

`\figurename` is much better than hard-coding “Figure” into the macro, because in this way the command not only works in other languages, but also if you redefine the string:

```
\renewcommand*{\figurename}{Picture}
```

Both captions of figures and cross-references will now happily use the new string.

In many journals cross-references to figures are emphasized by usage of bold face or (much worse) underlining. This enables the reader (who is normally quickly browsing through an article) to find the description of an interesting figure. Of course you can add a `\textbf` to the definition above, however, you will run into trouble, if you want to use the `varioref` package. Neither

```
\newcommand*{\figref}[1]{\textbf{\figurename~\vref{#1}}}
```

nor

```
\newcommand*{\figref}[1]{\textbf{\figurename}~\vref{#1}}
```

will produce the desired output: You will get “**Figure 1 on page 2**” or “**Figure 1 on page 2**” instead of “Figure 1 on page 2”. What you can do in this case is to hack the strings used by `varioref.sty`, e.g. like:

```
\renewcommand*{\refextfaraway}[1]{%
  \normalfont on page~\pageref{#1}%
}
```

But this is dependent on the language and does not work within italic text.

Also, you will not want bold face for every cross-reference to a figure, only for the “main” cross-reference. And you will not want the page number to appear in every cross-reference when explaining a picture consisting of subfigures: “The left part of Figure 1 on the
following page shows England. The right part of Figure 1 on the next page shows Great Britain.” So your set of macros will grow further by \texttt{mainfigref} and \texttt{shortfigref}. And of course the same applies to tables as well. Slowly, cross-referencing starts to get messy …

Ok, you got the idea. I felt the need for a more general solution. The \texttt{fancyref} package supports different \textit{languages} (at the moment only english and german) and allows customization of the classifying \textit{prefixes}, the \textit{delimiter} character and the \textit{strings} used in cross-references. Most important, it provides user-definable \textit{formats}. Enough advocacy, here we go!

\section{Loading}

You will need:

1. \LaTeX\texttt{2\epsilon} (at least the 1995/06/01 release)

2. The \texttt{varioref} package (part of the standard \LaTeX tools, normally included in every distribution)

3. The \texttt{german} or \texttt{babel} package \cite{8, 2} (if you want to write not only in english)

The loading is simple:

\begin{verbatim}
\usepackage{fancyref}
\end{verbatim}

English is used as the default language.

\subsection{Language Options}

At the moment only english and german are supported languages, others might follow.

\begin{verbatim}
\texttt{german}  \hspace{1cm} If you write a german text:
\usepackage[german]{babel}
\usepackage{german}{fancyref}
\end{verbatim}

\begin{verbatim}
\texttt{english}  \hspace{1cm} If you write a mixed english/german text:
\usepackage[english,german]{babel}
\usepackage[english,german]{fancyref}
\end{verbatim}
As with \texttt{babel.sty} the last language given in the optional argument is the current language. For \texttt{german.sty} you will have to use the \texttt{\selectlanguage} command [8, p.7] for english as current language.

Do not pass the language as a global option to the document class! Due to a feature of the \LaTeX{} option handler

\begin{verbatim}
documentclass[english,danish]{article}
usepackage{babel,fancyref}
\end{verbatim}

will result in danish headings ("Figur") and english strings for the cross-references ("Figure"), without a warning or an error [6, p.20]. The correct usage

\begin{verbatim}
documentclass{article}
usepackage[english,danish]{babel,fancyref}
\end{verbatim}

gives a package error, as expected, because danish is not (yet) supported (see section 4.4 on page 9).

\section*{2.2 Spacing Options}

The spacing between the string and the counter can be adjusted, see also section 4.3 on page 8.

\begin{description}
\item[loose] Loose spacing, like in “Figure 1”, which is the default, can be turned on explicitly by:

\begin{verbatim}
usepackage[loose]{fancyref}
\end{verbatim}

\item[tight] Tight spacing, like in “Figure 1” will be obtained with:

\begin{verbatim}
usepackage[tight]{fancyref}
\end{verbatim}

Most textbooks on typography recommend loose spacing (i.e. a normal word space) in this context, but tight spacing (half a word space) is recommended in abbreviated formats like “Fig. 1” [9, p.220].

\section*{2.3 Format Options}

The usage of page numbers for the cross-references can be controlled by using different \texttt{fancyref} formats, see section 4.5 on page 11. The two most common variants are provided also as package options.

\begin{description}
\item[plain] Output without a page number, like “Figure 1”, is used if the \texttt{plain} option is specified:

\begin{verbatim}
usepackage[plain]{fancyref}
\end{verbatim}
\end{description}
Output like from the \texttt{varioref} package ("Figure 1 on the following page") is used by default, but you could give the \texttt{vario} option explicitly:

\usepackage[vario]{fancyref}

2.4 Hook Options

The appearance of a cross-reference can not only be controlled by individual formats which depend on the type of the referenced object, but also by a \textit{hook} which is executed for every cross-reference, see section 4.6 on page 13. Two variants of this hook can be activated by package options (but only one at a time).

You can place all cross-references into the margin, like above. This is achieved by:

\usepackage[margin]{fancyref}

If you want to do this, you should be aware of the limited space in the margin and use abbreviated formats. In my opinion marginal cross-references are sensible only for floats, for which I already defined the \texttt{margin} formats (see section 4.5 on page 11), so this option should better be considered as an example of a hook. The above example was indeed done manually. (-;

You can put all cross-references into parentheses, like this: (section 3). This is achieved by:

\usepackage[paren]{fancyref}

Neither use this option in combination with the \texttt{margin} option nor with the \texttt{margin} formats!

3 Usage

The cross-referencing is done by two almost identical macros.

\texttt{\fref} \texttt{\fref} is used within a sentence and gives lower-case output, like “figure 1”.

\texttt{\Fref} \texttt{\Fref} is used at the beginning of a sentence and gives output with normal capitalization, like “Figure 1”. For german users the macros make no difference, “Abbildung 1” remains “Abbildung 1” even within a sentence. How sensible! (-;
There seems to be no reliable heuristic to determine the start of a sentence, so you either have to cope with two macros or accept “Figure 1” even within a sentence.

Both macros take one optional argument, the format of the cross-reference, and one mandatory argument, consisting of the classifying prefix, the delimiter character and the label itself:

$$\texttt{\textbackslash ref}[(\textit{format})\{(\textit{prefix})\textit{delim}\}\textit{label}]$$

$$\texttt{\textbackslash Fref}[(\textit{format})\{(\textit{prefix})\textit{delim}\}\textit{label}]$$

A typical cross-reference will thus look like this,

$$\texttt{\textbackslash ref}\{\texttt{fig:england}\}$$

with \texttt{fig} as the prefix, : as the delimiter and \texttt{britain} as the label, using the default format. The formats, the prefixes and the delimiter character are described in detail in the following section.

4 Customization

4.1 Prefixes

The following table shows the defaults of the various prefixes I already defined for you.

<table>
<thead>
<tr>
<th>Object</th>
<th>Macro</th>
<th>Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter</td>
<td>\texttt{fancyrefchaplabelprefix}</td>
<td>chap</td>
</tr>
<tr>
<td>Section</td>
<td>\texttt{fancyrefseclabelprefix}</td>
<td>sec</td>
</tr>
<tr>
<td>Equation</td>
<td>\texttt{fancyrefeqlabelprefix}</td>
<td>eq</td>
</tr>
<tr>
<td>Figure</td>
<td>\texttt{fancyreffiglabelprefix}</td>
<td>fig</td>
</tr>
<tr>
<td>Table</td>
<td>\texttt{fancyreftablabelprefix}</td>
<td>tab</td>
</tr>
<tr>
<td>Enumeration</td>
<td>\texttt{fancyrefenumlabelprefix}</td>
<td>enum</td>
</tr>
<tr>
<td>Footnote</td>
<td>\texttt{fancyreffnlabelprefix}</td>
<td>fn</td>
</tr>
</tbody>
</table>

If you need to add a prefix, use the following syntax:

$$\texttt{\textbackslash newcommand\star\{(macro)\{(prefix)\}}$$

For example, if you need theorems in your document, you could use:

$$\texttt{\textbackslash newcommand\star\{(fancyrefthmlabelprefix)\{thm\}}$$
Note that the name of the macro does not matter, but names fitting into the scheme are highly recommended. Be consistent. After that, you will need to define your own \texttt{fancyref} formats for the new prefixes. Read section 4.5 on page 11. And let me know of objects for which I should supply prefixes.

\texttt{\textbackslash...changeprefix} If you need to change a prefix (either one I already provided or one you added later), use the following syntax:

\begin{verbatim}
\texttt{fancyrefchangeprefix\{\textit{macro}\}\{\textit{prefix}\}}
\end{verbatim}

For example, if you are labeling your equations with \texttt{eqn} instead of \texttt{eq} (I guess this will be the most common change):

\begin{verbatim}
\texttt{fancyrefchangeprefix\{fancyrefeqlabelprefix\}\{eqn\}}
\end{verbatim}

4.2 Delimiters

\texttt{fancyreffargdelim} The default delimiter character is the colon (\texttt{:}). If you need to change it, for example to \texttt{-}, use the following syntax:

\begin{verbatim}
\texttt{\renewcommand*\{\textit{fancyreffargdelim}\}\{-\}}
\end{verbatim}

There is no restriction to one character, you could also use \texttt{too-long}, but you definitely should use a delimiter that never, ever occurs within the real label. A single letter would be a very bad idea.

4.3 Spacing

\texttt{\textbackslash...spacing} Quite unlikely that someone is not happy with at least one of the package options for this purpose, but one never knows ...

The following table shows the definition of the spacing macros.

<table>
<thead>
<tr>
<th>Macro</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>\fancyreffloosespacing</td>
<td>~</td>
<td>Figure 1</td>
</tr>
<tr>
<td>\fancyreftightspacing</td>
<td>\texttt{,}</td>
<td>Figure 1</td>
</tr>
<tr>
<td>\fancyreffdefaultspacing</td>
<td>\fancyreffloosespacing</td>
<td>Figure 1</td>
</tr>
</tbody>
</table>

You could switch from loose to tight spacing and vice versa even after the package is loaded:

\begin{verbatim}
\texttt{\textbackslash\renewcommand*\{\textit{fancyreffdefaultspacing}\}\{\%}
\texttt{\textit{fancyrefftightspacing}}
\texttt{\}}
\end{verbatim}
You could loosen the tight spacing or tighten the loose spacing by using for example

\renewcommand*{\fancyrefloosespacing}{\kern.25em}

but you should not change \fancyrefdefaultspacing in this way, because you would lose flexibility: Almost all fancyref formats (except the margin formats) use \fancyrefdefaultspacing, so it is clever to adjust \fancyreftightspacing and \fancyrefloosespacing and then to switch between the two variants. But I doubt that this will ever be necessary.

4.4 Names

The following table shows some strings that are already provided by many document classes. If they do not exist, I will define them, otherwise I will not touch their values (in case you have changed them already).

<table>
<thead>
<tr>
<th>Macro</th>
<th>English string</th>
<th>German string</th>
</tr>
</thead>
<tbody>
<tr>
<td>\chaptername</td>
<td>Chapter</td>
<td>Kapitel</td>
</tr>
<tr>
<td>\figurename</td>
<td>Figure</td>
<td>Abbildung</td>
</tr>
<tr>
<td>\pagename</td>
<td>Page</td>
<td>Seite</td>
</tr>
<tr>
<td>\tablename</td>
<td>Table</td>
<td>Tabelle</td>
</tr>
</tbody>
</table>

The next table shows the strings used for cross-references at the beginning of a sentence.

<table>
<thead>
<tr>
<th>Macro</th>
<th>English string</th>
<th>German string</th>
</tr>
</thead>
<tbody>
<tr>
<td>\Frefchapname</td>
<td>\chaptername</td>
<td>\chaptername</td>
</tr>
<tr>
<td>\Frefenumname</td>
<td>Item</td>
<td>Punkt</td>
</tr>
<tr>
<td>\Frefeqname</td>
<td>Equation</td>
<td>Gleichung</td>
</tr>
<tr>
<td>\Freffigname</td>
<td>\figurename</td>
<td>\figurename</td>
</tr>
<tr>
<td>\Freffname</td>
<td>Footnote</td>
<td>Fußnote</td>
</tr>
<tr>
<td>\Frefonname</td>
<td>On</td>
<td>Auf</td>
</tr>
<tr>
<td>\Frefpgname</td>
<td>\pagename</td>
<td>\pagename</td>
</tr>
<tr>
<td>\Refsename</td>
<td>Section</td>
<td>Abschnitt</td>
</tr>
<tr>
<td>\Frefseename</td>
<td>See</td>
<td>Siehe</td>
</tr>
<tr>
<td>\Freftabname</td>
<td>\tablename</td>
<td>\tablename</td>
</tr>
</tbody>
</table>

The fancyref package uses own macros to achieve maximum flexibility: If you redefine \figurename to “Picture”, both the caption
and the cross-references will use this string. If brevity is more important to you than consistency, you could also use “Picture” within the caption and “Pic.” for the cross-references. The necessary code is:

\renewcommand*{\figurename}{Picture}
\renewcommand*{\Freffigname}{Pic.}

Within a sentence you should use “picture” instead of “Picture”. The fancyref package takes care of this for you and defines the corresponding macros (\ref...name) with automatically generated lower-case strings.

\Frefonname and \Frefseename are not used by any fancyref formats, but you could use them for your additional formats. An interesting idea would be to use an arrow (\rightarrow) for \Frefseename:

\renewcommand*{\Frefseename}{%\ensuremath{\mathsurround 0pt\rightarrow}%
\ensuremath{\mathsurround 0pt\rightarrow}%
}

If do this, there will be no need to redefine \frefseename manually, because the \MakeLowercase command [6, p. 26] used internally to generate the lower-case strings can cope even with such strange things. (\:-

The table shows some abbreviated strings used for cross-references with the margin formats. I do not like abbreviations very much,\(^2\) because they need to be introduced carefully (written out at the first occurrence) and even then make a document less readable. Also, at the beginning of a sentence, abbreviations should be written out, so you run into inconsistencies (also known as trouble). In my opinion they are reasonable for the margin formats, so only the strings necessary for these formats are defined. If you are a big fan of PCMCIA\(^3\) or abbreviations or simply do not bear my propaganda, you are on your own.

<table>
<thead>
<tr>
<th>Macro</th>
<th>English string</th>
<th>German string</th>
</tr>
</thead>
<tbody>
<tr>
<td>\Freffigshortname</td>
<td>Fig.</td>
<td>Abb.</td>
</tr>
<tr>
<td>\Frefpgshortname</td>
<td>P.</td>
<td>S.</td>
</tr>
<tr>
<td>\Freftabshortname</td>
<td>Tab.</td>
<td>Tab.</td>
</tr>
</tbody>
</table>

Lower-case versions of these strings (\ref...shortname) are generated automatically again.

\...addcaptions If you add new prefixes (section 4.1 on page 7), you will probably

\(^2\)I am stubborn, DIRK, am I not? (\:-

\(^3\)People Cannot Memorize Computer Industry’s Acronyms.
also need further strings, e.g. \texttt{\Frefthmname}. If you write a multilingual document, they should automatically be changed with the active language. For this case the \texttt{fancyref} package offers the following command,

\fancyrefaddcaptions{(language)}{(stringdefs)}

which can be used only in the preamble of the document. In the above example you would use:

\fancyrefaddcaptions{english}{\%
    \newcommand*{\Frefthmname}{Theorem}\%
    \newcommand*{\frefthmname}{\%
        \MakeLowercase{\Frefthmname}\%
    }\%
}\}
\fancyrefaddcaptions{german}{\%
    \newcommand*{\Frefthmname}{Satz}\%
    \newcommand*{\frefthmname}{\Frefthmname}\%
}\}

If you can supply such additional strings or further languages, please do and send me a mail.

### 4.5 Formats

The output of the \texttt{\fref} and \texttt{\Fref} commands depends on the used \texttt{fancyref} format. For all the different objects that can be cross-referenced, two \texttt{fancyref} formats, \texttt{plain} and \texttt{vario}, are already defined. In addition, for the floating objects (\texttt{figure} or \texttt{table} environments) two other \texttt{fancyref} format called \texttt{margin} and \texttt{main} are available. The following table shows sample output of these \texttt{fancyref} formats.

<table>
<thead>
<tr>
<th>Object</th>
<th>Format</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter</td>
<td>vario</td>
<td>chapter 1 on the following page</td>
</tr>
<tr>
<td></td>
<td>plain</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Equation</td>
<td>vario</td>
<td>Equation (1) on the previous page</td>
</tr>
<tr>
<td></td>
<td>plain</td>
<td>equation (1)</td>
</tr>
<tr>
<td>Figure</td>
<td>margin</td>
<td>$\rightarrow$ Fig. 1, p.1</td>
</tr>
<tr>
<td></td>
<td>main</td>
<td>\texttt{figure 1} on the facing page</td>
</tr>
<tr>
<td></td>
<td>vario</td>
<td>Figure 1 on the page before</td>
</tr>
<tr>
<td></td>
<td>plain</td>
<td>figure 1</td>
</tr>
</tbody>
</table>
The \texttt{fancyref} formats for sections, enumerations and footnotes give output similar to those for chapters, whereas the formats for tables correspond to the \texttt{fancyref} formats for figures.

If no optional argument is specified for the \texttt{ref} or \texttt{Ref} command, the \texttt{vario} format will be used. You can change this default \texttt{fancyref} format to \texttt{plain}:

\begin{verbatim}
\renewcommand{\fancyrefdefaultformat}{plain}
\end{verbatim}

If you do not like some of these \texttt{fancyref} formats or you need some more, e.g. for theorems, algorithms etc., you will have to define them yourself. If you define some nice formats, please let me know, perhaps I will add them in a future version of this package.

The definition is done by means of two almost identical macros. \texttt{\frefformat} declares (or changes) the formats used within a sentence, whereas \texttt{\Frefformat} does the same for the formats used at the beginning of a sentence. Unfortunately this means that you need to do the work twice. :-) :

Both macros take three mandatory arguments, the name of the \texttt{fancyref} format, the prefix macro and the description of the format itself:

\begin{verbatim}
\frefformat{⟨format⟩}{⟨prefix macro⟩}{⟨output⟩}
\Frefformat{⟨format⟩}{⟨prefix macro⟩}{⟨output⟩}
\end{verbatim}

Within the third argument \#1 will be replaced by the counter of the referenced object (i.e. the output of a \texttt{ref} command), \#2 will be replaced by the page number (i.e. the output of a \texttt{pageref} command) and \#3 will be replaced by the output of a \texttt{vpageref} command (“on the facing page”, “on page 1”).

As an example, I will modify the output foss-references to figures done with the \texttt{main} format:

\begin{verbatim}
\frefformat{main}{fancyreffiglabelprefix}{% \MakeUppercase{\freffigname}\fancyrefdefaultspacing\#1\#2% }% 
\Frefformat{main}{fancyreffiglabelprefix}{% \MakeUppercase{\Freffigname}\fancyrefdefaultspacing\#1\#2% }%
\end{verbatim}

These redefinitions will make \texttt{\ref[main]{fig:foo}} come out as “FIGURE 1 on page 1”. The page number will always be printed explicitly, not like \texttt{varioref.sty} output. By use of the \texttt{\freffigname},
\frefgname and \fancyreffigdefaultspacing commands it is ensured that further modifications of the string as well as the spacing and language options of the package will work. A quick and dirty hack would have been:

```
\fref{main}{\fancyreffiglabelprefix}{FIGURE~#1#2}
```

The usage of the defined macros for spacing and naming like in the first example is of course highly recommended. Do not blame me, if your lazyness leads to inconsistencies. (-;

Note that in either case you must use the prefix \texttt{macro}, not the string itself!

### 4.6 Hooks

\fancyrefhook After all the work of the \fancyref formats has been done, the result is passed as an argument to a hook command called \fancyrefhook. Normally, this hook does nothing but simply passing on the output. If you want to change this hook, use the following syntax:

```
\renewcommand{\fancyrefhook}[1]{⟨definition⟩}
```

Within \textit{⟨definition⟩}, \#1 will be replaced by the output of the \fancyref format.

You can use this hook for all kinds of weird stuff, e.g. if you want to have huge cross-references, use the following code:

```
\renewcommand*{\fancyrefhook}[1]{\texttt{huge #1}}
```

In this simple example the *-form of \renewcommand may be used, because the hook does not contain whole paragraphs [5, p.14]. This makes debugging of your code easier.

A more complex (and totally brain-dead) example does not work with the *-form:

```
\renewcommand{\fancyrefhook}[1]{
\begin{itemize}
\item #1
\end{itemize}
}
```

If you define really \textit{useful} and “typographically correct” hooks, please send me a mail, so I can include your work in future versions of this package. (-;
5 Examples

See the example file refest.tex and its output, refest.dvi.

6 Bugs

None, as my beta testers, DIRK KUYPERS and ROBIN S. SOCHA, told me. (-;

If you encounter problems after having changed all your cross-references to the macros provided by fancyref.sty, please go through the following checklist:

1. Make sure that you either use \ as a delimiter or that have changed it as described in section 4.2 on page 8.

2. Make sure that you either use the default prefixes or that you have changed them as described in section 4.1 on page 7. Especially do not try to modify the prefixes with the \renewcommand command.

3. Make sure that you have defined all necessary formats in addition to those provided by me. The definition of fancyref formats is described in section 4.5 on page 11.

4. Make sure that you have eliminated all old superfluous strings like Figure or \figurename in your source code. Just replacing all \ref commands with \fref will not be sufficient.

As far as I know, there is only one real problem: If you are working on a multi-author document where each author is used to a different set of prefixes and prefers a different delimiter, be extremely cautious when redefining the prefixes and the delimiter. You will get really funny errors, if the current delimiter is -, the prefix for equations is eqn and you try to make a cross-reference to an equation in a part written by another author who used : and eq in his \label commands.

With the current implementation the only solution is to temporarily redefine the prefix and the delimiter, do the cross-reference and switch back to the original definitions again. This is annoying, of course. )-:

As a consequence, I would recommend either to drop this cross-reference or to try to convince your co-authors that your prefixes and delimiter are the best. Sorry.
7 Implementation

7.1 Documentation Driver

\begin{document}
\DocInput{fancyref.dtx}
\end{document}

7.2 fancyref.sty

\begin{document}
\NeedsTeXFormat{LaTeX2e}[1995/06/01]%
\ProvidesPackage{fancyref}[1999/02/03 v0.9c Fancy cross-referencing]%
\end{document}

\@fancyref@add@to This macro is adapted from babel.def. If a command (the first argument) is undefined, it will be defined by the content of the second argument. If the command is defined already, the content of the second argument will be appended to the old definition of the command. The macro will be used to add further definitions to the \texttt{captions...} commands provided by the babel package or german.sty.

\verbatimverbatim\begin{verbatim}
\newcommand*{\@fancyref@add@to}[2]{%  
\ifx#1\@undefined
\newcommand*{#1}{#2}%  
\else
\ifx#1\relax
\newcommand*{#1}{#2}%  
\else
\bgroup
\toks@\expandafter{#1#2}%  
\xdef#1{\the\toks@}%
\endgroup
\endverbatim
\end{verbatim}
This macro adds strings (the second argument) to the \captions commands\(^4\) provided by the babel package or german.sty, or it simply defines these new strings. The name of the language is given in the first argument.

To make the new strings become effective, the current language is saved\(^5\) at the beginning of the document, the code defining the strings is executed and the language for the captions is switched back again.

\fancyrefhook It may be clever to define a hook that is executed for every \fref or \Fref command. For the moment the hook does nothing but simply inserting its argument. I will do something more useful with it later in this file. You can use it also for the way of cross-referencing the world is waiting for. (-;

Send me a mail, if you think you have defined a really nifty hook, so I can include it in future versions of this package.

\(^4\)Credits go to Bernd Raichle who told me how to do this in a politically correct way.

\(^5\)Credits go to Felix Neubauer, who pointed out that this should be done in a temporary command rather than a token register to avoid an error in combination with babel.sty or german.sty and automatically generated lists like the toc, lof or lot files.
These two macros are used to define the spacing between the type of the referenced object and the counter of the object, for example between “Figure” and “1” in “Figure 1”. Normally there is no need to change these definitions.

\newcommand*{\fancyrefloosespacing}{\~}%
\newcommand*{\fancyreftightspacing}{\,}%

Now the default \fancyref format is initialized. The real value will be set later depending on the package options.

\newcommand*{\fancyrefdefaultformat}{\@empty}%

Now some strings are initialized. The real values will be declared later depending on the package options.

\newcommand*{\Frefchapname}{\@empty}%
\newcommand*{\Frefenumname}{\@empty}%
\newcommand*{\Frefeqname}{\@empty}%
\newcommand*{\Freffigname}{\@empty}%
\newcommand*{\Freffnname}{\@empty}%
\newcommand*{\Frefonname}{\@empty}%
\newcommand*{\Frefpgname}{\@empty}%
\newcommand*{\Frefsecname}{\@empty}%
\newcommand*{\Frefseename}{\@empty}%
\newcommand*{\Freftabname}{\@empty}%
\newcommand*{\Freffigshortname}{\@empty}%
\newcommand*{\Frefpgshortname}{\@empty}%
\newcommand*{\Freftabshortname}{\@empty}%
\newcommand*{\frefchapname}{\@empty}%
\newcommand*{\frefenumname}{\@empty}%
\newcommand*{\frefeqname}{\@empty}%
\newcommand*{\freffigname}{\@empty}%
\newcommand*{\freffnname}{\@empty}%
\newcommand*{\frefonname}{\@empty}%
\newcommand*{\frefpgname}{\@empty}%
\newcommand*{\frefsecname}{\@empty}%
\newcommand*{\frefseename}{\@empty}%
\newcommand*{\freftabname}{\@empty}%
\newcommand*{\freffigshortname}{\@empty}%
\newcommand*{\frefpgshortname}{\@empty}%
\newcommand*{\freftabshortname}{\@empty}%

7.2.3 Option Declaration

english Now the package options are declared. Send me a mail, if you define
options for other languages than english or german.

\DeclareOption{english}{% 
Some strings for cross-referencing in english are added (if the command \captionsenglish is existing) or simply defined.

\fancyrefaddcaptions{english}{% 
I better do not touch these strings, because they are used in many document classes and may be already changed by the user. Therefore they will be defined only if they did not exist before [5].

\providecommand*{\chaptername}{Chapter} 
\providecommand*{\figurename}{Figure} 
\providecommand*{\pagename}{Page} 
\providecommand*{\tablename}{Table} 

\Fref...name The fancyref package uses its own strings for cross-referencing purposes. In this way you can use “Chapter” for chapter headings but “Chap.” for cross-referencing.

However, I do not recommend abbreviations for cross-references, because they look ugly at the beginning of a sentence and should be avoided in these places according to most typographers. Also, the scientific publisher Springer does not allow abbreviation of the words “table” or “Tabelle” (I suppose because of ambiguity with “tabbing” or “Tabulator”).

The macros \Frefonname and \Frefseename may be useful in new, user-defined fancyref formats (see page 27).

All macro names start with a capital S, because they will be used for cross-references at the beginning of a sentence, where usually capital letters are used.

\renewcommand*{\Frefchapname}{\chaptername} 
\renewcommand*{\Frefenumname}{Item} 
\renewcommand*{\Frefeqname}{Equation} 
\renewcommand*{\Freffigname}{\figurename} 
\renewcommand*{\Freffnname}{Footnote} 
\renewcommand*{\Frefonname}{On} 
\renewcommand*{\Frefpgname}{\pagename} 
\renewcommand*{\Frefsecname}{Section} 
\renewcommand*{\Frefseename}{See} 
\renewcommand*{\Freftabname}{\tablename} 

\Fref...shortname These macros are used for cross-references placed in the margin. In marginal notes compact information is crucial due to the limited space,
so abbreviated versions of the strings are used. For my general opinion about abbreviations see above.

\renewcommand*{\Freffigshortname}{Fig.}%
\renewcommand*{\Frefpgshortname}{P.}%
\renewcommand*{\Freftabshortname}{Tab.}%

\ref...name

Now the lower-case versions of the language dependent strings (starting with a lower-case s) are declared. As these macros are generated automatically by use of the \MakeLowercase command, there is no need to customize them, except you want to use for example “Table” at the start of a sentence and “tabular” within a sentence. Inconsistencies like this should of course be avoided.

\renewcommand*{\frefchapname}{%
  \MakeLowercase{\Frefchapname}%
}\renewcommand*{\frenumname}{%
  \MakeLowercase{\Frenumname}%
}\renewcommand*{\freffiname}{%
  \MakeLowercase{\Freffiname}%
}\renewcommand*{\freffnname}{%
  \MakeLowercase{\Freffnname}%
}\renewcommand*{\frefonname}{%
  \MakeLowercase{\Frefonname}%
}\renewcommand*{\frefpgname}{%
  \MakeLowercase{\Frefpgname}%
}\renewcommand*{\frefsecname}{%
  \MakeLowercase{\Frefsecname}%
}\renewcommand*{\freffnshortname}{%
  \MakeLowercase{\Freffnshortname}%
}\renewcommand*{\freffgshortname}{%
  \MakeLowercase{\Freffgshortname}%
}\renewcommand*{\freffnshortname}{%
  \MakeLowercase{\Freffnshortname}%
}\renewcommand*{\freffnshortname}{%
  \MakeLowercase{\Freffnshortname}%
}\renewcommand*{\freffgshortname}{%
The closing brace of the second argument of `\fancyrefaddto`:

If `\captionsenglish` is defined (`babel.sty` or `german.sty` are used), the language is switched to English. In either case the `varioref` package will be called with the option `english` to provide English strings like “on the following page”, see `varioref.dvi`.

The closing brace of the `english` option:

The definition of the German strings is more simple. Except for `\Frefonname` and `\Frefseename` the lower-case versions of the macros are identical with the upper-case version. Damn, my mother tongue seems to be a rather simple language. (-;

A check for the existence of `\captionsgerman` should not be necessary as in almost all cases German LaTeXicians use either `babel.sty` or `german.sty`, but one never knows ... The language is switched and the `varioref` package is prepared accordingly.

german

The `\DeclareOption{german}` command is used to define the German strings:

- The names of chapters are changed to "Kapitel".
- The names of figures are changed to "Abbildung".
- The names of pages are changed to "Seite".
- The names of tables are changed to "Tabelle".
- The names of sections are changed to "Punkt".
- The names of equations are changed to "Gleichung".
- The names of figures are changed to "Abb.".
loose This option sets up loose spacing between string and counter like “Figure 1”. This spacing is recommended, because \texttt{varioref.sty} is using it also (on a hard-coded base), and so inconsistencies can be avoided. Do not take things too seriously, the inter-word spacing varies quite a bit from line to line. Even a trained eye will not always be able to distinguish between “tight” and “loose” spacing. Compared with favourite \texttt{WYTYSYDG} word processors the spacing will be tight in either case. (~;\)

\DeclareOption{loose}{%
This option is an example for a application of \texttt{fancyrefhook}. It places all cross-references into the margin, typesetting them in \texttt{footnotesize} and \texttt{raggedright}. For details see the definition of the \texttt{margin} format on page 28.

Do not use the \texttt{margin} option in combination with those \texttt{margin} formats. As this would need nested \texttt{marginpar} commands, you will get \texttt{Float(s) lost}. error messages.

Also, you should use abbreviated formats in combination with the \texttt{margin} option, because there is not enough space for a message like “Figure 1 on the following page” out there.

I would recommend the usage of marginal cross-references only for floats. The according formats are already defined, so take this options as an example for what is possible.

Another example for an application of \texttt{fancyrefhook}. It simply puts parentheses around every cross-reference. This does not make much sense, if you intend to use marginal notes for cross-referencing purposes: If you combine this option with the \texttt{margin} option, the last specified option “wins”. If you use the \texttt{margin} formats defined later, you will get parentheses around marginal notes, which is ugly.

If this package option is given, only the plain counter of the referenced object will be used, no page number will be printed at all.
tight This option may be useful, if you prefer tight spacing between string and counter. According to most textbooks on typography this is the recommended spacing between parts of abbreviations like “i.e.” or “Fig. 1”.

\DeclareOption{tight}{% 
  \newcommand*{\fancyrefdefaultspacing}{% 
    \fancyreftightspacing 
  }% 
}%

If this package option is given, all cross-referencing commands will use the vario format with variable output of the page number, like with varioref.sty. This is the default.

\DeclareOption{vario}{% 
  \renewcommand*{\fancyrefdefaultformat}{vario}% 
}%

Other local options will be passed to the varioref package after causing an error message. If you use e.g. danish as a global option (see clsguide.dvi), you will get english fancyref strings without a warning or an error, hence be careful. This is not the fault of the fancyref package, but a feature of the \LaTeX\ option handler. You really should load the package according to section 2 on page 4.

\DeclareOption*{% 
  \PackageError{fancyref}{% 
    Unknown option \texttt{''\CurrentOption''}}{% 
  }{% 
    The option \texttt{''\CurrentOption''} was not declared in 
    package \texttt{fancyref},\MessageBreak 
    perhaps you have only misspelled its name.\MessageBreak 
    Currently only the languages \texttt{''english''} and \texttt{''german''} 
    are defined.\MessageBreak 
    Try typing \texttt{<return>} to proceed. Most likely your 
    output will be wrong,\MessageBreak 
    e. g. \texttt{''Figure''} instead of \texttt{''Abbildung''}.% 
}%
\PassOptionsToPackage{\CurrentOption}{varioref}%
%
7.2.4 Option Processing

If no options are specified, english strings for cross-referencing, loose spacing between string and counter, and variable output of the page
numbers will be used by default. Otherwise the options are processed in the order given by the calling command.

\ExecuteOptions{english,loose,vario}\
\ProcessOptions{english,loose,vario}\

7.2.5 Loading Files

This package uses a nice feature of the varioref package to generate variable output depending on the difference between the page number on which the cross-reference occurs and the page number of the referenced object. varioref.sty is therefore required.

\RequirePackage{varioref}\

7.2.6 Defining Commands

\...labelprefix Most users distinguish between labels for figures and tables to avoid a mix-up. This is usually done by prefixing the labels with fig or tab. These definitions declare the defaults for this classifying part.

\newcommand*{\fancyrefchaplabelprefix}{chap}\
\newcommand*{\fancyreffenumlabelprefix}{enum}\
\newcommand*{\fancyrefeqlabelprefix}{eq}\
\newcommand*{\fancyreffiglabelprefix}{fig}\
\newcommand*{\fancyreffnlabelprefix}{fn}\
\newcommand*{\fancyrefseclabelprefix}{sec}\
\newcommand*{\fancyreftablalabelprefix}{tab}\

To enable user changes of these prefixes it is necessary to do some list processing.\(^7\) There is one command list for each prefix. It contains a number of macros that will rename the formatting commands defined for this prefix. Initially, the package defines the \@fancyref@ren command as empty, by means of \newcommand*. In this way, even with the \def command other macros cannot be overwritten by accident.\(^8\)

\@...append@ren The first argument of the following command is one of those command lists, the second argument is a fancyref format. A macro renaming the corresponding formatting command will be appended to the command list.

\newcommand*{\@fancyref@ren}{\@empty}\

\(^7\)Credits go to Carsten Heinz and Heiko Oberdiek for providing and optimizing this code. I did not understand a single token in the beginning. (-;

\(^8\)Credits go to Bernd Raichle for this nice little trick, which is used throughout this package.
\@...check@prefix  This command does most of the work, when a prefix is to be renamed. First, the old, saved prefix for the corresponding object type is recalled.

\newcommand*{\@fancyref@check@prefix}[1]{%
\expandafter\let\expandafter\@fancyref@old@prefix\csname @fancyref@saved@prefix\string#1\endcsname
The old prefix is compared with the prefix given by the argument.
\ifx\@fancyref@old@prefix#1%
If the prefixes are different, the renaming macros are set up. Their only argument will be a fancyref format.
\else
\def\@fancyref@ren##1{%
The prefixing part of the name will be changed, if the renaming macros are called with the corresponding argument.
  More precisely, the definition of the old formatting command is copied to a new command including the new prefix in its name.
  \expandafter\let\expandafter\csname fr@##1@#1\expandafter\endcsname\csname fr@##1@\@fancyref@old@prefix\endcsname
Then the old command is deleted.
\expandafter\let\csname fr@##1@#1\endcsname\@undefined
\}%
Now the command list containing the renaming macros for the given prefix is executed.
\csname @fr@ren@list\string#1\endcsname
The procedure is repeated for the upper-case formatting commands.
\def\@fancyref@ren##1{%
\expandafter\let\csname Fr@##1@#1\endcsname\@undefined
\}%
Finally the new prefix for the corresponding object type is saved.

\newcommand*{\fancyrefchangeprefix}[2]{%
\renewcommand*{#1}{#2}%
\@fancyref@check@prefix{#1}%
}%

\frefformat
This macro is used to define new formats for the typesetting of cross-references. It takes three arguments, the first is the name of the declared format, the second is the prefix macro used for this format (e.g. \fancyreffiglabelprefix for cross-references to figures) and the third describes the output generated by the cross-reference.

Within the third argument #1 will be replaced by the counter of the referenced object (i.e. the output of a \ref command), #2 will be replaced by the page number (i.e. the output of a \pageref command) and #3 will be replaced by the output of a \vpageref command.

\newcommand{\frefformat}[2]{%
\@fancyref@check@prefix{#2}%
Then the \fancyref format given in the first argument is appended to the command list for the prefix given in the second argument.
\expandafter\@fancyref@append@ren
\csname @fr@ren@list\string#2\endcsname{#1}%
Finally the formatting command is defined.
\@namedef{fr@#1@#2}##1##2##3%
}%
The definition of the command for declaring `fancyref` formats used at the beginning of a sentence is almost the same, the only difference is that upper-case commands like `\Fr@sample@ex` are used internally. This enables usage of “figure” within a sentence and “Figure” at the beginning of a sentence.

\newcommand{\Frefformat}[2]{% 
\@fancyref@check@prefix{#2}\
\expandafter\@fancyref@append@ren 
\csname @Fr@ren@list\string#2\endcsname{#1}\
\@namedef{Fr@#1@#2}##1##2##3%
}%

**Format Definition.** Now it is time for the definition of the `fancyref` formats. Generally the vario formats use the features of the varioref package, whereas the plain formats provide the name of the referenced object and its counter, but no page number.

Of course the various macros for spacing, classifying prefixes and names of the referenced object are used. This will ensure that the default formats also work after redefining e.g. `\chaptername` to “Fool” and `\fancyrefchaplabelprefix` to “moron”. Cross-references generated by `\fref{moron:bar}` will then come out correctly as “fool 1.”

\frefformat{vario}{\fancyrefchaplabelprefix}{} \frefchapname\fancyrefdefaultspacing#1#3%
\frefformat{plain}{\fancyrefchaplabelprefix}{} \frefchapname\fancyrefdefaultspacing#1%
\frefformat{vario}{\fancyrefenumlabelprefix}{} \frefenumname\fancyrefdefaultspacing#1#3%
\frefformat{plain}{\fancyrefenumlabelprefix}{} \frefenumname\fancyrefdefaultspacing#1%

The formats for the cross-references to equations are more complex, because I wanted to support the `\tagform@` command of the amsmath package [1]:

\makeatletter
\renewcommand{\tagform@}[1]{\textup{[#1]}}
\makeatother

27
will make both the equation numbers and the cross-references generated e.g. by \ref{eq:bar} come out as “[1]”. Even within a formula a cross-referenced equation number will not be typeset in italics.

\@ifundefined{tagform@}{%
  \frefformat{vario}{\fancyeqlabelprefix}{%\frefeqname\fancyrefdefaultspacing\textup{(#1)}#3%
  }%
  \frefformat{plain}{\fancyeqlabelprefix}{%\frefeqname\fancyrefdefaultspacing\textup{(#1)}%
  }%
}{%
  \frefformat{vario}{\fancyeqlabelprefix}{%\frefeqname\fancyrefdefaultspacing\textup{\tagform@{#1}}#3%
  }%
  \frefformat{plain}{\fancyeqlabelprefix}{%\frefeqname\fancyrefdefaultspacing\textup{\tagform@{#1}}%
  }%
}\%

For figures and tables an additional fancyref format called margin is provided to put cross-references into the margin. \mbox{} will fix an alignment problem, if the \marginpar command occurs prior to the first word of a paragraph, see [4, p. 75]. \hspace{0pt} enables hyphenation of the very first word of the \marginpar command.

Marginal notes are typeset in a smaller font and \raggedright. The \rightarrow is typeset in math mode without the horizontal space usually added by \mathsurround.

In marginal notes tight spacing is appropriate, because due to the limited space in the margins abbreviated strings are used.

\frefformat{margin}{\fancyreffiglabelprefix}{%
  \mbox{}\marginpar{%\raggedright\hspace{Opt}\footnotesize
  \ensuremath{\m@th\rightarrow}~%
  \Freffigshortname\fancyreftightspacing#1,\frefpgshortname\fancyreftightspacing#2%
  }%
}\%

The main format should be used for that cross-reference which explains the referenced object in detail. Scientific papers usually are browsed
very quickly, perhaps the reader stops at a figure or a table and begins to search for the explanation of this float. Hence it is very helpful to typeset this main cross-reference in bold face and to provide the full information including the page number (with support of the varioref package). These main formats are defined only for floats, i.e. figures or tables, because for other, non-floating objects the “main” cross-reference usually can be found very near to the object.

```
\frefformat{main}\{\fancyreffiglabelprefix}\{
  \textbf{\freffigname}\fancyrefdefaultspacing#1}%
\frefformat{vario}\{\fancyreffiglabelprefix}\{
  \freffigname}\fancyrefdefaultspacing#1%
\frefformat{plain}\{\fancyreffiglabelprefix}\{
  \freffigname}\fancyrefdefaultspacing#1%
\frefformat{vario}\{\fancyreffnlabelprefix}\{
  \freffnname}\fancyrefdefaultspacing#1%
\frefformat{plain}\{\fancyreffnlabelprefix}\{
  \freffnname}\fancyrefdefaultspacing#1%
\frefformat{vario}\{\fancyrefseclabelprefix}\{
  \frefsecname}\fancyrefdefaultspacing#1%
\frefformat{plain}\{\fancyrefseclabelprefix}\{
  \frefsecname}\fancyrefdefaultspacing#1%
\frefformat{margin}\{\fancyreftablabelprefix}\{
  \marginpar{\raggedright\hspace{Opt}\footnotesize
    \ensuremath{\m@th\rightarrow}~\
    \Freftabshortname}\fancyreftightspacing#1,\
    \frefpgshortname}\fancyreftightspacing#2%
\frefformat{main}\{\fancyreftablabelprefix}\{
  \textbf{\freftabname}\fancyrefdefaultspacing#1%}
\frefformat{vario}\{\fancyreftablabelprefix}\{
  \freftabname}\fancyrefdefaultspacing#1%
```

The rest of the format definitions should now be straightforward.
Now it is time for the upper-case versions of the format definitions.

\Frefformat{vario}{\fancyrefchaplabelprefix}{% 
\Frefchapname\fancyrefdefaultspacing#1#3% 
}%
\Frefformat{plain}{\fancyrefchaplabelprefix}{% 
\Frefchapname\fancyrefdefaultspacing#1% 
}%
\Frefformat{vario}{\fancyrefenumlabelprefix}{% 
\Frefenumname\fancyrefdefaultspacing#1#3% 
}%
\Frefformat{plain}{\fancyrefenumlabelprefix}{% 
\Frefenumname\fancyrefdefaultspacing#1% 
}%
\@ifundefined{tagform@}{% 
\Frefformat{vario}{\fancyrefeqlabelprefix}{% 
\Frefeqname\fancyrefdefaultspacing\textup{(#1)}#3% 
}%
\Frefformat{plain}{\fancyrefeqlabelprefix}{% 
\Frefeqname\fancyrefdefaultspacing\textup{(#1)}% 
}%
}%
\Frefformat{margin}{\fancyreffiglabelprefix}{% 
\mbox{}\marginpar{\raggedright\hspace{0pt}\footnotesize\ensuremath{\m@th\rightarrow}~\Freffigshortname\fancyreftightspacing#1,\frefpgshortname\fancyreftightspacing#2}%
}%
\Frefformat{main}{\fancyreffiglabelprefix}{%
... much tedious work!

\fancyrefargdelim The following definition sets up the default for the delimiting character between the “classifying” part and the “labeling” part of a label, e.g. in fig:foo the colon is used as a delimiter. This can be customized, but most users will stick to the conventional :.
The following code saves the backslash char in a token register, so it can be used in \PackageError messages.\footnote{Sorry, I do not understand the code due to its \catcode and grouping hacking. Still much to learn...}

\begingroup \catcode'|=0 |catcode'|=12 |toks0={|endgroup |def|backslashchar{|}} |the|toks0 \relax

\@...page@ref This macro is a hacked version of the \vpageref command from the varioref package, which removes a space that is superfluous for my purpose.

\newcommand*{\@fancyref@page@ref}{\@ifnextchar[\] \@vpageref{\@vpageref\unskip]}% 

\@f@ref This macro now does the real work. It tests if the specified format for the given classifying prefix exists. If it does, the formatting command is called with three arguments: The counter of the referenced object (\ref), the page number of the referenced object (\pageref) and the page number resulting from a \vpageref. The output of the formatting command will be passed as an argument to the \fancyrefhook command (see page 16). If the formatting command does not exist, a package error occurs.

\newcommand*{\@f@ref}[4]{% 
\@ifundefined{#1r@#2@#3}{% 
\PackageError{fancyref}{% 
\backslashchar#1ref\space format ‘‘#2’’% 
undefined\MessageBreak for label type ‘‘#3’’% 
}{% 
\The format ‘‘#2’’ was not defined for the label type ‘‘#3’’\MessageBreak and the \backslashchar#1ref\space command. Perhaps you have only misspelled its name.\MessageBreak Otherwise you will have to define it with \protect\newrefformat\MessageBreak prior to using it.% 
}% %

\footnote{Credits go to Bernd Raichle for this dirty trick.}
This macro is the front-end for the user. Its first, optional argument is the format of the cross-reference, the second, mandatory argument is the label of the cross-referenced object. If no optional argument is provided, \fancyrefdefaultformat will be used as a format.

The second argument is then split at the delimiting character (\fancyrefargdelim, see page 31) into a classifying prefix and the labeling part. I am sorry that I do not understand the \fref command completely. But it works really well,\(^\text{10}\) and passes four arguments to the \@f@ref command: Lower-case flag, format, classifying prefix and labeling part.

\fref

\Fref

This macro works exactly the same way as \Fref. It should be used at the beginning of a sentence and hence passes an upper-case S to the \@f@ref command. Stefan Ulrich\(^\text{11}\) told me kindly that it is very difficult to implement a reliable heuristic to check for the start of a sentence. So I decided to leave this as an exercise for the reader. (-;

\(^{10}\)Credits go to David Carlisle who once again send me the cut-and-paste solution for my problems.

\(^{11}\)He will easily notice that his name was typeset without his additions to the soul package [3]. (-;
References


