Package paracol User's Manual (version 0.91)

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1 Introduction

This document describes the usage of yet another multi-column package named paracol. The unique feature of the package is that columns are typeset *in parallel.*

Suppose you are writing a bilingual document whose left column is written in a language, say English, and right column has the translation of the left column in another language, e.g. Japanese. With the paracol package you may write an English part of arbitrary length and then *switch* to its Japanese counterpart to place both parts side by side. Of course you may return to the English writing similarly.

The column switching is always allowed when you complete an outermost level paragraph. You may be unaware whether a column is broken into multiple pages before switching because the package automatically goes back and forward to the correct page and vertical position when you switch the column. Moreover, you may *synchronize* columns so that the tops of the first paragraphs after switching in all columns are vertically aligned. At a synchronization point, you may give a single-column text, for example a common section header, optionally. You may also switch single-column and multi-column in a page arbitrary.

This manual itself is an example of two-column documents typeset by paracol. Since the author is

```
\begin{paracol}{2}[\section{Introduction}]
\hbadness5000
This document describes the usage of yet
another multi-column package named
\textsf{paracol}.  The unique feature of
the package is that columns are typeset
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place both parts side by side.  Of course
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you complete an outermost level paragraph.
You may be unaware whether a column is
broken into multiple pages before switching
because the package automatically goes back
and forward to the correct page and
vertical position when you switch the
```

not familiar with languages other than English and Japanese and the latter should be hardly understood by most of readers, the right column is the translation of the left English column into a computational language. That is, the right column is the LaTeX source code of the left column[1].

```
column.  Moreover, you may {\em
synchronize} columns so that the tops of
the first paragraphs after switching in all
columns are vertically aligned.  At a
synchronization point, you may give a
single-column text, for example a common
section header, optionally.  You may also
switch single-column and multi-column in a
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two-column documents typeset by
\textsf{paracol}.  Since the author is not
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and Japanese and the latter should be
hardly understood by most of readers, the
right column is the translation of the left
English column into a computational
language.  That is, the right column is the
\LaTeX{} source code of the left column%
\footnote{Not really but its essence is
shown.}.

\switchcolumn

\begin{verbatim}
Here is the source of above.
\end{verbatim}[1]
```

2 Basic Usage

Loading the package is very simple. What you have to do is `\usepackage{paracol}` in the preamble. Note that paracol can be used with LaTeX 2$_\varepsilon$ and does not work with LaTeX 2.09.

The fundamental means of parallel-column typesetting are the environment `paracol` and the command `\switchcolumn`. The `paracol` environment needs an argument to specify the number of columns. Thus the following is the basic construct for two-parallel-column documents.

```
\switchcolumn*[\section{Basic Usage}]
Loading the package is very simple.  What
you have to do is \|\usepackage{paracol}|
in the preamble.  ...[2]
\switchcolumn
source
\switchcolumn*
The fundamental means of parallel-column
typesetting are the environment \|paracol|
and the command \|\switchcolumn|.  ...
```

[1] Not really but its essence is shown.

[1] This `verbatim` construct is simply referred as to "*source*" hereafter.

[2] Hereafter, a part of the source code may be omitted like this.

```
\begin{paracol}{2}
left column text
\switchcolumn
right column text
\switchcolumn
left column text
\switchcolumn
right column text
\switchcolumn
        ⋮
\end{paracol}
```

The `\switchcolumn` command may have an optional argument to specify the column number (zero origin) to start. That is, `\switchcolumn[0]` means to switch to the leftmost column, `\switchcolumn[1]` is to start the second column and so on. Thus the `\switchcolumn` without the optional argument may be considered as `\switchcolumn`$[i+1 \bmod n]$ where i is the last column number and n is the number of columns given to `paracol` environment.

```
\switchcolumn
source

\switchcolumn[1]*
source
\switchcolumn[0]
The \|\switchcolumn| command may have an
optional argument to specify the column
number (zero origin) to start.  ...
```

3 Column Synchronization

The `\switchcolumn` command may also be followed by a '`*`' to *synchronize* columns. After you switch from a column to another by `\switchcolumn*` (or `\switchcolumn`$[i]$`*`), all the columns are vertically aligned at the bottom of the *deepest* one preceding the command. For example, the previous section has three `\switchcolumn*` commands at which left and right columns are vertically aligned.

The *starred* version of `\switchcolumn` may have an optional argument to specify a multi-column text whose bottom is the vertical alignment points of the columns. For example, `\section` commands in this manual are given as optional arguments of `\switchcolumn*` like;

```
\switchcolumn*[\section{Basic Usage}]
```

The `paracol` environment may also start with a multi-column text by specifying it as the optional argument of `\begin{paracol}`. For example, at the beginning of this document, the author put;

```
\begin{paracol}[\section{Introduction}]
```

```
\switchcolumn[0]*[%
  \section{Column Synchronization}
  \label{sec:sync}]
The \|\switchcolumn| command may also be
followed by a '\|*|' to {\em synchronize}
columns. ...

The {\em starred} version of
\|\switchcolumn| may have an optional
argument to specify a multi-column text
whose bottom is the vertical alignment
points of the columns.  ...
\switchcolumn
source
```

4 Environments for Columns

4.1 Environment `column`

The `\switchcolumn` is simple but you may prefer to pack the contents of a column in an environment. The `column` environment is available for this well-structurization of LaTeX sources for parallel columned documents. A construct;

```
\begin{column}
text for a column
\end{column}
```

is (almost) equivalent to;

```
\switchcolumn
text for a column
```

The `column*` environment is also available for the column synchronization and may have an optional argument for multi-column text.

4.2 Environment `nthcolumn`

The `\switchcolumn` can start an arbitrarily specified column with the column number given through its optional argument, but the `column` environment cannot do it. If you want to start i-th column, you have to do `\beign{nthcolumn}{`i`}` (or `nthcolumn*` with an optional argument to synchronize).

4.3 Environment `leftcolumn` and `rightcolumn`

The environment `leftcolumn` and `rightcolumn` (and their starred versions with an optional argument) are available as more convenient means than saying `\begin{nthcolumn}{0}` and `\begin{nthcolumn}{1}`.

4.1 Environment column

```
\begin{column*}[%
  \section{Environments for Columns}
  \label{sec:env}]
\subsection{Environment \texttt{column}}
The \|\switchcolumn| is simple but you may
prefer to pack the contents of a column in
an environment.  ...
\end{column*}
\begin{column}
source
\end{column}
```

4.2 Environment nthcolumn

```
\begin{nthcolumn*}{1}
source
\end{nthcolumn*}

\begin{nthcolumn}{0}
\subsection{Environment \texttt{nthcolumn}}
The \|\switchcolumn| can start an
arbitrarily specified column with the
column number given through its optional
argument, but the \|column| environment
cannot do it. ...
\end{nthcolumn}
```

4.3 Environment leftcolumn and rightcolumn

```
\begin{leftcolumn*}
\subsection{%
  Environment \texttt{leftcolumn} and\\
  \texttt{rightcolumn}}
The environment \|leftcolumn| and
\|rightcolumn| (and their starred versions
```

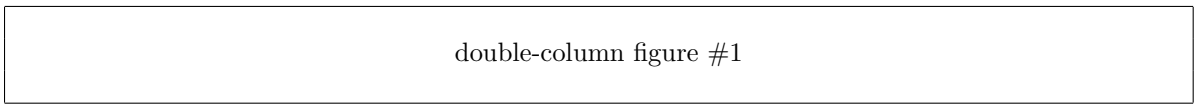

Figure 1: A Double-Column Figure

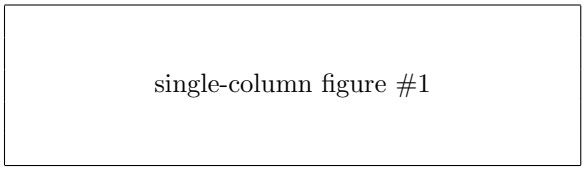

Figure 2: A Single-Column Figure

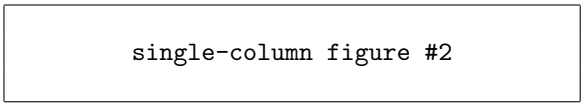

Figure 3: Another Single-Column Figure

with an optional argument) are available as more convenient means than saying \|\begin{nthcolumn}{0}| and \|\begin{nthcolumn}{1}|.

\begin{figure*}...\end{figure*}
\begin{figure}[t]...\end{figure}
\end{leftcolumn*}
\begin{rightcolumn}
source and a ***figure*** *env*
\end{rightcolumn}

5 Floats, Footnotes and Counters

5.1 Figures and Tables

As shown in this page, double-column figures/tables (or those spanned multiple columns if you have three or more) may be placed by `figure*` and `table*` environments as usual. A single-column figure/table will be placed in the column in which you put `figure` and `table`. For example, the contents of `figure` environment in a `leftcolumn` environment is *always* placed in a left column. That is, even if the column of the *current* page does not have enough room to place the figure, it will not thrown to the right column but will

Table 1: A Single-Column Table

An	example	of
single	column	table

5.1 Figures and Tables

```
\begin{leftcolumn*}[\section{%
   Floats, Footnotes and Counters}]
\begin{table}[b]
\caption{A Single-Column Table}
\centerline{\begin{tabular}[t]{|l|c|r|}
  \hline
  An&example&of\\\hline
  single&column&table\\\hline
  \end{tabular}}
```

Table 2: Another Single-Column Table

Another	example
of	single
column	table

be placed in the left column of the next page[2].

Another caution about float placement is that you have to be careful when you try to put a top-float explicitly with `t`-option or implicitly without placement option (i.e., `tbp` in most classes) and to synchronize columns. The rule is as follows; after you synchronize columns in a page, the page cannot have top-floats any more. When you synchronize columns, paracol fixes a virtual horizontal line in the page as the synchronization barrier. Thus no top-floats cannot be added above the line[3]. Therefore, the author put two `figure` environments for the figures shown in the previous page into the `leftcolumn*` and `rigtcolumn` environment for the previous section.

5.2 Footnotes and Marginal Notes

Footnotes are also put at the bottom of the column in which `\footnote` commands and their references (like this[4]) reside, as shown in page 2 and this page. Marginal notes behave similarly like what you are seeing in the left margin of this sentence and the right marginal note in this page[5].

An example of marginal note.

5.3 Local and Global Counters

You probably found that the numbering of figures and tables is *global* while that of footnotes are *local*. That is, the figure in the right column of the previous page has number 3 following its left-column counterpart Figure 2. The tables in the page are also numbered as 1 and 2 crossing the column boundary. However, the footnotes in each column have their own numbering sequence. Moreover, the footnote numbers in left columns are typeset in Roman font while those in right columns have italic shapes. Similarly, sub-section numbering is local and the headings

[2]Or some farther page if LaTeX cannot solve the placement problem wisely.

[3]Even if you have enough space above, sorry.

[4]An example of footnote.

[5]If you have three or more columns, marginal notes of the second or succeeding columns are placed just right of the column. Thus marginal notes of non-leftmost and non-rightmost columns will appear in the space separating columns rather than the margin of a page.

```
\end{table}
\subsection{Figures and Tables}
As shown in this page, double-column
figures\slash tables (or those spanned
multiple columns if you have three or more
columns) may be placed by \|figure*| and
table* environments as usual[3].  ...
```

5.2 Footnotes and Marginal Notes

```
Footnotes are also put at the bottom of the
column in which \|\footnote| commands and
their references (like this\footnote{%
An example of footnote.}) reside, as shown
in page~2 and this page.  Marginal notes
behave similarly like what you are seeing
in the left margin of this
sentense\marginpar{\raggedright An example
of marginal note.} and the right marginal
note in this page\footnote{...}. ...
```

Another example of marginal note.

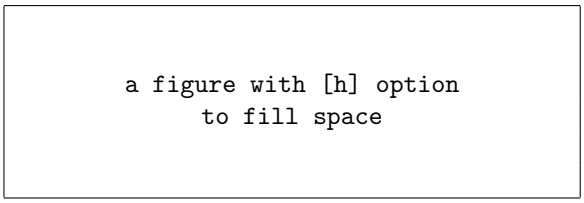

Figure 4: A Figure with [h] Option

5.3 Local and Global Counters

```
You probably found that the numbering of
figures and tables is \emph{global} while
that of footnotes are \emph{local}. ...
\end{leftcolumn*}
```

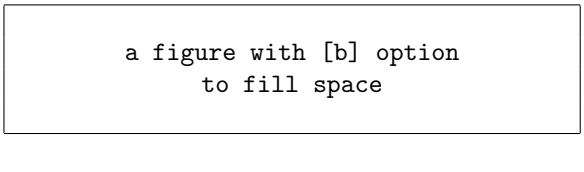

Figure 5: A Figure with [b] Option

[3]Another example of footnote.

in right columns have typewriter-face numbers.

This happens because the author declared the counters `figure` and `table` are *global* in the preamble of this document by saying;

```
\globalcounter{figure}
\globalcounter{table}
```

and do nothing about `footnote` and `subsection` counters. By default, all the counters except for `page` are local to columns. The value of a local counter of a column is saved somewhere when you leave the column, and it is restored when you revisit the column. The initial value of the local counters are the value they have at `\begin{paracol}`. After you close the `paracol` environment, the values of the left-most column are used for the rest of your document.

If you make a counter global by the command `\globalcounter`, the save/restore operations are not performed to the counter and thus it is globally incremented by `\[ref]stepcounter` or commands such as `\caption` and `\section`. Note that the value of a global counter depends on the place where it is incremented (or set) in the *source code* rather than where it appears in the output. Thus if the author put a `table` environment here to increment `table` counter, the right-column table at the bottom of page 5 would be Table 3 because its `table` environment does not appear yet in the source code.

Another counter which the author made global in this documnet is `section`. As explained in Section 3, an optional multi-column text of column switching is considered as in the left-most column. Since `\section` commands in this document are always multi-column texts, so far, it seems unnecessary to make `section` global because it is incremented correctly in the left-most column. However, the stepping `section` has a side effect to reset its decendent counter `subsection` and referred from `\thesubsection` command. Thus if `section` were local, the right-column sub-sections in Section 4 would be numbered as "0.1", "0.2" and "0.3" because the local value of `section` would be zero. Moreover, the right-column sub-sections of this section would be "0.4", "0.5" and "0.6" because stepping `section` local to left-columns would not reset `subsection` local to right-columns.

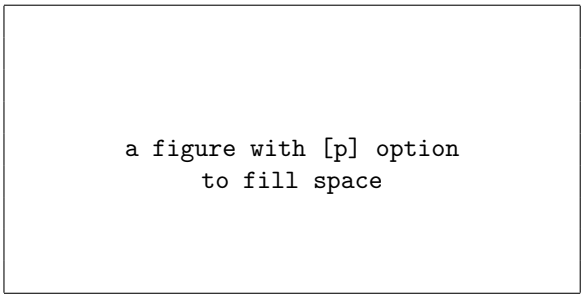

Figure 6: `A Figure with [p] Option`

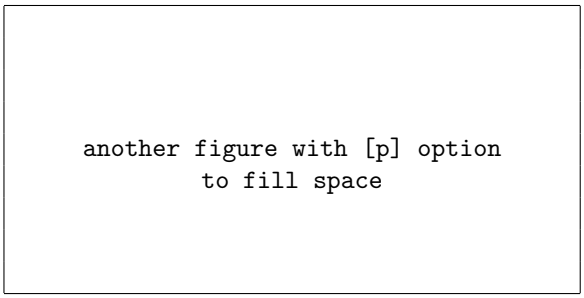

Figure 7: `Another Figure with [p] Option`

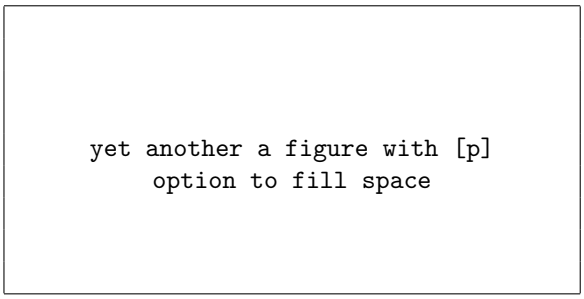

Figure 8: `Yet Another Figure with [p] Option`

You may give a local appearance to a counter *ctr* for the *i*-th column (zero origin) by a command;

`\definethecounter{`*ctr*`}{`*i*`}{`*def*`}`

where *def* is to be the body of the local definition of `\the`*ctr*. For example, the preamble of this document has the following to give non-default defitions to `\thefootnote` and `\thesubsetion` for right columns.

```
\definethecounter{footnote}{1}{%
  \textit{\arabic{footnote}}}
\definethecounter{subsection}{1}{%
  \texttt{%
    \arabic{section}.\arabic{subsection}}}
```

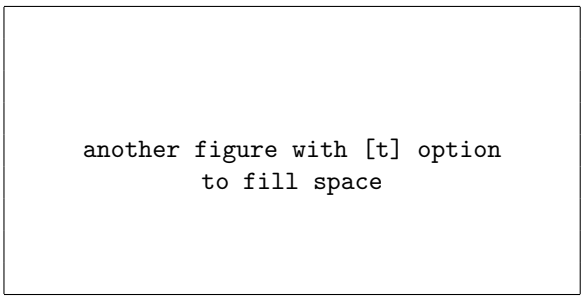

Figure 9: `Another Figure with [t] Option`

source.

6 Closing `paracol` Environment and Page Flushing

The final example shown here is this single-column text which the author put after `paracol` environment is closed. As you are seeing, `paracol` environment can be finished at any vertical position in a page and can be followed by ordinary single column texts.

The environment may also be restarted anywhere you like as shown here.

The last issue is to flush a page. The ordinary `\newpage` command works as you expect. If you say `\newpage` in the left column in a page, the contents following it will appear in the left column in the next page. Note that this does not affects the layout of the right column.

To flush all columns in a page, a command `\flushpage` is available. This command in *i*-th column is almost equivalent to;

`\switchcolumn[`*i*`]*[\newpage]`

but more robust[6]. The ordinary page breaking command `\clearpage` may also be used to flush all columns and to start a fresh page, but it has a side effect to put all figures and tables which are not yet output.

Now the aurthor will do `\flushpage` shortly to start a real binlingual example from the next page. O.K., now!!

```
\begin{leftcolumn}
The environment may also be restarted
anywhere you like as shown here. ...
\end{leftcolumn}
```

source

[6]For example `\switchcolumn*` may flush a page for the synchronization and thus `\newpage` may leave an empty page.

An Die Freude/To Joy

Friedrich Schiller

The following is the libretto of the fourth movement of Beethoven's Ninth Symphony, his adaptation of Schiller's ode "An Die Freude" (or "To Joy" in English). Beethoven's additions and revisions are indicated in italics.

O Freunde, nicht diese Töne!
Sondern laßt uns angenehmere anstimmen und freudenvollere[7]*.*

Oh friends, no more of these sad tones!
Let us rather raise our voices together
In more pleasant and joyful tones[6]*.*

Freude!
Freude, schöner Götterfunken Tochter aus Elysium,
Wir betreten feuertrunken, Himmlische, dein Heiligtum!
Deine Zauber binden wieder, *Was die Mode streng geteilt;*
Alle Menschen werden Brüder[8]*,* Wo dein sanfter Flügel weilt

Joy!
Joy, thou shining spark of God,
Daughter of Elysium,
With fiery rapture, goddess,
We approach thy shrine.
Your magic reunites
That which stern custom has parted;
All humans will become brothere[7]
Under your protective wing.

Wem der große Wurf gelungen, eines Freundes Freund zu sein;
Wer ein holdes Weib errungen, mische seinen Jubel ein!
Ja, wer auch nur eine Seele sein nennt auf dem Erdenrund!
Und wer's nie gekonnt, der stehle weinend sich aus diesem Bund!

Let the man who has had the fortune
To be a helper to his friend,
And the man who has won a noble woman,
Join in our chorus of jubilation!
Yes, even if he holds but one soul
As his own in all the world!
But let the man who knows nothing of this
Steal away alone and in sorrow.

Freude trinken alle Wesen an den Brüsten der Natur;
Alle Guten, all Bösen folgen ihrer Rosenspur.
Küsse gab sie uns und Reben, einen Freund, geprüft im Tod;
Wollust ward dem Wurm gegeben, und der Cherub steht vor Gott.

All the world's creatures drink
From the breasts of nature;
Both the good and the evil
Follow her trail of roses.
She gave us kisses and wine
And a friend loyal unto death;
She gave the joy of life to the lowliest,
And to the angels who dwell with God.

Froh, wie seine Sonnen fliegen durch des Himmels prächt'gen Plan,

Joyous, as his suns speed
Through the glorious order of Heaven,
Hasten, brothers, on your way,

[6] This part was added by Beethoven.

[7] original: What custom's sword has parted;
Beggars become princes' brothers

[7] If I had been a good student in my German class, this footnote would say "This part was added by Beethoven." in German.

[8] Original: Was der Mode Schwert geteilt;
Bettler werden Fürstenbrüder,

Laufet, Brüder, eure Bahn, freudig, wie ein Held zum Siegen.	Joyful as a hero to victory.
Seid umschlungen, Millionen! Diesen Kuß der ganzen Welt! Brüder, über'm Sternenzelt muß ein lieber Vater wohnen.	Be embraced, all ye millions! With a kiss for all the world! Brothers, beyond the stars Surely dwells a loving Father.
Ihr stürzt nieder, Millionen? Ahnest du den Schöpfer, Welt? Such'ihn überm Sternenzelt! Über Sternen muß er wohnen.	Do you kneel before him, oh millions? Do you sense the Creator's presence? Seek him beyond the stars! He must dwell beyond the stars.

Acknowledgements

The author thanks to Yacine Daddi Addoun who gave the author the motivation to write the style for his bilingual document. He also thanks to Robin Fairbairns who kindly invited the style to CTAN after the author's lazy six years failing to upload the style.