The \texttt{nccfloats} package\footnote{This file has version number \texttt{v1.2}, last revised 2006/01/07.}

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The standard \LaTeX{} floating environments, namely \texttt{figure} and \texttt{table}, allow user to place floating material in a document. But they do not introduce a style in which this material must be formatted. In this package, styles are joined with floats and mini-floats are introduced. Mini-floats are prepared at a mini-page and allow captions within. Basing on mini-floats, a number of service commands for figures and tables are defined. The ability to create other types of mini-floats is introduced with the \texttt{newminifloat} command.

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1 Basic Commands

\verbatimverbatim\texttt{\FloatStyle[\texttt{type}]{\texttt{style}}} \texttt{command sets a style for the float of the given \texttt{type}. If the \texttt{type} is omitted, the default style is specified. It will be applied to}
a float or mini-float if no specialized style was defined. This command is available in the preamble only.

To specify the style of a mini-float and of service commands based on it, add the ‘mini’ prefix to the float type. The default styles are

\FloatStyle{}
\FloatStyle[minifigure]{\footnotesize\centering}
\FloatStyle[minitable]{\footnotesize\centering}

This means that the formatting of floats prepared with standard figure and table environments does not changed, but service commands based on mini-figures and mini-tables use a special formatting with \footnotesize font and the centered alignment.

This command is applied inside floats or mini-floats to reset formatting style of \normalfloatstyle subsequent floating material to the standard formatting with paragraph alignment and the normal font of normal size.

We start with the basic commands, namely \minifig and \minitabl. They prepare a material in a mini-page and allow using the \caption command in the body. Their syntax is similar to the \parbox command:

\minifig\[⟨pos⟩]\[⟨height⟩]\[⟨inner-pos⟩]\[⟨width⟩]{⟨body⟩}
\minitabl\[⟨pos⟩]\[⟨height⟩]\[⟨inner-pos⟩]\[⟨width⟩]{⟨body⟩}

The ⟨pos⟩ is a vertical alignment parameter for mini-page (t, b, or c) with respect to surrounding text; the ⟨height⟩ is a mini-page height required; the ⟨inner-pos⟩ is a vertical alignment of text inside the mini-page (t, b, c, or s); and the ⟨width⟩ is the mini-page width. The ⟨body⟩ is prepared in the style specified by the \FloatingStyle command and can contain the \caption command inside.

All other floating extension commands are based on these two commands.

2 Side Figures and Tables

For small figures and tables, it is preferable to insert them inside a text instead of using floating mechanism. The typographic rules usually require an illustrative material to occupy an outer side of page. In two-side mode, this means figure and tables should be on the right side if a page number is odd and on the left side if page number is even. In one-side mode, figures and tables must occupy the right side of page.

The following commands support such a placement:

\sidefig\[⟨pos⟩]\[⟨height⟩]\[⟨inner-pos⟩]\[⟨width⟩]{⟨figure⟩}{⟨text⟩}
\sidefig*\[⟨pos⟩]\[⟨height⟩]\[⟨inner-pos⟩]\[⟨width⟩]{⟨figure⟩}{⟨text⟩}
\sidetabl\[⟨pos⟩]\[⟨height⟩]\[⟨inner-pos⟩]\[⟨width⟩]{⟨table⟩}{⟨text⟩}
\sidetabl*\[⟨pos⟩]\[⟨height⟩]\[⟨inner-pos⟩]\[⟨width⟩]{⟨table⟩}{⟨text⟩}

We use the term mini-float for the small illustrating material (figure or table), however taking into account that it is not a float at all. It is inserted in the main
flow next to a paragraph box specified in the last parameter of above described
commands.

The no-star forms of above described commands place a mini-float next to the
specified text on the outer side of page (to the right for odd page and to the left
for even page). In two-column or one-side mode, mini-float is always posed to
the right. The star-forms provide the reverse placement. By default, mini-float is
vertically centered with respect to the text and the \texttt{\strut} command is inserted
at the beginning and at the end of the \langle text \rangle to provide normal baseline distances
of the first and last lines of the text from surrounding text lines.

All parameters in square and round brackets are optional and mean the follow-

⟨pos⟩ specifies mini-float alignment (t, b, or c; default is c) with respect to text
box and can contain additional chars controlling the text body prepara-
tion: j means the last line of the text to be justified to the right and n
means suppressing of struts insertion (they should be inserted manually if
necessary);

\texttt{w1} is the width of mini-float; and

\texttt{w2} is the width of the text box.

You can omit units in the width parameters. In this case, the width value is
considered as a multiple of \texttt{\unitlength} (similarly to the use of length dimensions
in the picture environment).

If both width parameters are absent, the width of both mini-float and text
body is calculated as \texttt{\linewidth-1.5em}/2. If \texttt{w2} is absent, the text body
width is calculated as \texttt{\linewidth-w1-1.5em}.

The placement of side-floats in the document consists in the following steps:

1. Decide where you want to insert a side-float;
2. Insert a \texttt{\sidefig} or \texttt{\sidetabl} command after a word that finishes the line
   before the supposed side-float position;
3. Specify a width of float in its parameter and set the top alignment as the
   \langle pos \rangle parameter (e.g. \texttt{\sidefig[t](w1)});
4. Prepare the side-float in the first mandatory parameter of the command (e.g.
   \texttt{\sidefig[t](w1)\{figure\}});
5. Enclose enough text going after the command in braces;
6. Translate the document;
7. Find what part of the text is redundant in the \langle text \rangle parameter;
8. Move it after the close brace;
9. If the same paragraph continues after the close brace, add the j letter to the \textlangle pos\rangle parameter. Also change the t alignment to c alignment in the \textlangle pos\rangle parameter;

10. Translate the document once more;

11. If the side-float has a wrong placement (this can appear when paragraph with a side-float begins at the end of page), insert the star after the side-float command and translate the document once more.

While preparing a side-float, it is sometimes necessary to provide conditional placement depending on the side a mini-float is posed. The command \textsc{\textbackslash ifleftsidefloat}{\langle left-clause\rangle}{\langle right-clause\rangle}
provides this. It is useful in parameters of \textsc{\textbackslash sidefig} or \textsc{\textbackslash sidetabl} and processes \textlangle left-clause\rangle if the mini-float is posed to the left and \textlangle right-clause\rangle otherwise.

Side-floats can be also used within floating environments to pos a caption near a figure or table.

3 Floating Figures and Tables

\textsc{\textbackslash fig} The following commands envelop floating environments:

\texttt{\textbackslash fig\{\langle placement\rangle\}(w)\{\langle body\rangle\}}
\texttt{\textbackslash fig\*\{\langle placement\rangle\}(w)\{\langle body\rangle\}}
\texttt{\textbackslash tabl\{\langle placement\rangle\}(w)\{\langle body\rangle\}}
\texttt{\textbackslash tabl\*\{\langle placement\rangle\}(w)\{\langle body\rangle\}}

The \textlangle placement\rangle is a float placement parameter describing places where a float can appear. The default value is \texttt{ht} (here or at the top of page). The optional \texttt{w} parameter defines a width of box occupied by the float (the width of nested \textsc{\textbackslash minifig} or \textsc{\textbackslash minitable}). If it is omitted, the float has the maximum width equal to the \texttt{\linewidth}.

The \textsc{\textbackslash fig} and \textsc{\textbackslash tabl} commands envelop the \texttt{\textbackslash figure} and \texttt{\textbackslash table} environments respectively. Their star-forms envelop \texttt{\textbackslash figure\*} or \texttt{\textbackslash table\*} environments respectively.

4 Two Floating Figures or Tables Side by Side

\textsc{\textbackslash figs} The following commands place two figures or tables side by side.

\texttt{\textbackslash figs\{\langle placement\rangle\}(w_1)(w_2)\{\langle body1\rangle\}\{\langle body2\rangle\}}
\texttt{\textbackslash figs\*\{\langle placement\rangle\}(w_1)(w_2)\{\langle body1\rangle\}\{\langle body2\rangle\}}
\texttt{\textbackslash tabls\{\langle placement\rangle\}(w_1)(w_2)\{\langle body1\rangle\}\{\langle body2\rangle\}}
\texttt{\textbackslash tabls\*\{\langle placement\rangle\}(w_1)(w_2)\{\langle body1\rangle\}\{\langle body2\rangle\}}
The \textit{body1} is a body of the left figure or table and the \textit{body2} is a body of the right figure or table. Other parameters are optional. The meaning and default value of the \textit{placement} parameter is the same as described above. The \( w_1 \) and \( w_2 \) parameters are widths of left and right boxes. If they both are omitted, the left and right boxes will have the width equal to \( (\text{\textbackslash linewidth}-1\text{em})/2 \). If \( w_2 \) is omitted, the right box will occupy the rest of horizontal space minus \text{1em}. If both parameters are specified, the rest space is inserted between boxes. If the total width of left and right floats exceeds the \text{\textbackslash linewidth}, the floats will overlap at the middle (a negative horizontal space is inserted between them).

In the \texttt{\textbackslash tables} command, boxes of the left and right bodies are top-aligned, but, in the \texttt{\textbackslash figs} command, the bottom alignment is used. The star-forms of this commands are based on the \texttt{\textbackslash figure*} or \texttt{\textbackslash table*} environments respectively.

5 Declare a Mini-float and Service Commands

\newminifloat

If a new type of float is introduced, the respective mini-float and service commands can be helpful for it. To prepare them, use the following declaration:

\newminifloat\{\langle gen\rangle\}{\langle type\rangle}{\langle placement\rangle}{\langle pos\rangle}

Here \texttt{\langle gen\rangle} is a root for command names to be generated, \texttt{\langle type\rangle} is a float type, \texttt{\langle placement\rangle} is a default placement on the page, and \texttt{\langle pos\rangle} is a vertical alignment for pair of floats.

This command declares 4 commands: \texttt{\textbackslash mini\langle gen\rangle}, \texttt{\textbackslash side\langle gen\rangle}, \texttt{\langle gen\rangle}, and \texttt{\langle gen\rangle}s. For example, the commands described in previous sections are declared as follows:

\begin{verbatim}
\newminifloat{fig}{figure}{ht}{b}
\newminifloat{tabl}{table}{ht}{t}
\end{verbatim}

6 The Implementation

The package uses some commands of the \texttt{nccboxes} package. Load it here:

1 (\texttt{\textbackslash \textbackslash requirespackage{nccboxes}}[2002/03/20]

6.1 Float Style

\FloatStyle

\texttt{\textbackslash FloatStyle\{\langle type\rangle\}{\langle style\rangle\}} specifies a style for a given float type.

3 \texttt{newcommand\{\textbackslash FloatStyle\}[2]\{\%
4 \texttt{\textbackslash expandafter\textbackslash def\textbackslash csname NCC@fltstyle@#1\textbackslash endsname\{#2\}}
5 \texttt{\textbackslash \textbackslash onlypreamble\textbackslash FloatStyle}

\NCC@setfltstyle

\texttt{\textbackslash NCC@setfltstyle\{\langle prefix\rangle\}} applies a style for a float of \texttt{\textbackslash \textbackslash captype} type. While selection a style to be applied it adds the given \texttt{\langle prefix\rangle} to the float type.

6 \texttt{\textbackslash def\textbackslash NCC@setfltstyle#1\%}
We add this style with empty prefix to the \@floatboxreset hook which is applied at the end of preamble of a float.

\normalfloatstyle Reset a float style to par-box formatting with normal font of the normal size.

6.2 The Kernel

\NCC@minifloat The base for mini-floats

\NCC@minifloat[⟨pos⟩][⟨height⟩][⟨inner-pos⟩]{⟨width⟩}{⟨body⟩}

It finishes a mini-float with extra \endgroup command. A \@captype should be specified before it.

\NCC@pair The command

\NCC@pair⟨⟨c1⟩⟩⟨⟨c2⟩⟩⟨⟨def-dist⟩⟩⟨⟨def-place⟩⟩*⟨⟨place⟩⟩(⟨w₁⟩)(⟨w₂⟩)

executes ⟨⟨c1⟩⟩⟨⟨place⟩⟩⟨⟨w₁⟩⟩⟨⟨w₂⟩⟩ if star is absent or ⟨⟨c2⟩⟩⟨⟨place⟩⟩⟨⟨w₁⟩⟩⟨⟨w₂⟩⟩ if star presents. Four first parameters are mandatory. Others a optional. The ⟨⟨def-dist⟩⟩ parameter contains a default distance value. It is saved in the \tempdimc register. The ⟨⟨def-place⟩⟩ parameter contains the default value for the ⟨⟨place⟩⟩ parameter. If the last one is omitted, the ⟨⟨def-place⟩⟩ is used instead.
The \texttt{\textbackslash NCC@setwidth\{\textbackslash register\}\{\textbackslash width\\}} command sets the given \texttt{\textbackslash width} for the \texttt{\textbackslash register\}. If units in \texttt{\textbackslash width} are omitted, the \texttt{\textbackslash unitlength} unit is used. In other words, if \texttt{\textbackslash width} is a real number, it is considered as a multiple of \texttt{\textbackslash unitlength}.

\begin{verbatim}
def\NCC@setwidth#1#2{\@defaultunits#1#2\unitlength\relax\@nnil}
\end{verbatim}

The \texttt{\textbackslash NCC@wcalc\{\texttt{w}_1\}\{\texttt{w}_2\}} calculates widths of left and right boxes in the \texttt{\@tempdima} and \texttt{\@tempdimb} registers. The distance between boxes must be specified in \texttt{\@tempdimc} register before the call. The algorithm:

- If \texttt{\texttt{w}_1} is empty, \texttt{\@tempdima:=\textbackslash linewidth-\@tempdimc}/2, otherwise, \texttt{\@tempdima:=\texttt{w}_1};
- If \texttt{\texttt{w}_2} is empty, \texttt{\@tempdimb:=\textbackslash linewidth-\@tempdima-\@tempdimc}, otherwise, \texttt{\@tempdimb:=\texttt{w}_2};
- If \texttt{\texttt{w}_2} is nonempty, \texttt{\@tempdimc:=\textbackslash linewidth-\@tempdima-\@tempdimb}.

\begin{verbatim}
def\NCC@wcalc#1#2{\if!#1\!\@tempdima .5\textbackslash linewidth \advance\@tempdima -.5\@tempdimc\else \NCC@setwidth\@tempdima{#1}\fi
\if!#2\!\@tempdimb \textbackslash linewidth \advance\@tempdimb -\@tempdima \advance\@tempdimb -\@tempdimc\else \NCC@setwidth\@tempdimb{#2}\fi
\@tempdimc \textbackslash linewidth \advance\@tempdimc -\@tempdima \advance\@tempdimc -\@tempdimc\fi}
\end{verbatim}

6.3 Side Floats

This command is used in parameters of side-floats.

The command

\begin{verbatim}
def\NCC@sidemfloat\{\textbackslash command\}\{\textbackslash pos\}\{\texttt{w}_1\}\{\texttt{w}_2\}\{\texttt{mini-float}\}\{\texttt{text}\}
\end{verbatim}

is used for preparing a side-float. The \texttt{\textbackslash command} parameter contains a \texttt{\textbackslash mini\{\textbackslash gen\}} command. The \texttt{\textbackslash pos} parameter specifies vertical alignment and additional flags. The \texttt{\texttt{w}_1} and \texttt{\texttt{w}_2} parameters (if present) specify widths of \texttt{\textbackslash mini-float} and \texttt{\texttt{text}} boxes. Starred version reverses the position of side-float and text boxes.
The implementation of these commands is based on the \NCC@pair command that parses all optional parameters. Finally the \NCC@smflt command is executed.

51 \def\NCC@sidemfloat#1{%  
52 \NCC@smfltleftfalse  
53 \if@twocolumn \else  
54 \if@twoside  
55 \ifodd\c@page \else \NCC@smfltlefttrue \fi  
56 \fi  
57 \fi  
58 \NCC@pair\{\NCC@smflt\{#1\}\}  
59 (\if\NCC@smfltleft \NCC@smfltleftfalse \else \NCC@smfltlefttrue\fi   
60 \{1.5em\}{}  
61 )  
62 }

\NCC@smflt The command
\NCC@smflt\{⟨command⟩\}⟨⟨pos⟩⟩\{⟨w₁⟩\}⟨⟨mini-float⟩⟩\{⟨text⟩⟩
prepares a side-float. The \@tempdimc register contains the default distance between the mini-float and text.

63 \long\def\NCC@smflt#1#2#3#4#5#6{  
Parse the ⟨⟨pos⟩⟩ parameter. Create a \NCC@⟨⟨letter⟩⟩ command with empty content for every ⟨⟨letter⟩⟩ from the ⟨⟨pos⟩⟩.

64 \let\NCC@t\relax \let\NCC@b\relax \let\NCC@j\relax \let\NCC@n\strut  
65 \@tfor\@tempa :=#2\do {  
Define the vertical alignment letter in the \NCC@c command.

66 \expandafter\let\csname NCC@\@tempa\endcsname\@empty}  
67 \ifx\NCC@t\@empty \def\NCC@c{t}\else  
68 \ifx\NCC@b\@empty \def\NCC@c{b}\else  
69 \def\NCC@c{c}  
70 \fi  
71 \fi  
72 Define a justification hook in the \NCC@j command.
73 \ifx\NCC@t\@empty \def\NCC@j{\parfillskip\z@skip}\fi  
Define the text starting hook in the \NCC@t command. It will contain the \parindent setting command and the optional \noindent command.
74 \edef\NCC@t{\parindent the\parindent if\fmode\else\noindent\fi}\%  
Complete the current paragraph and leave the horizontal mode.
75 \if\fmode\else  
76 \unskip\parfillskip\rightskip\par\vskip -\parskip  
77 \fi  
Prepare the side-float in \@tempboxa:
78 \setbox\@tempboxa\vbox{\hspace{\linewidth}\noindent
Calculate widths of left and right boxes and distance between them in \@tempdima, \@tempdimb, and \@tempdimc.

\NCC@wcalc{#3}{#4}%

Conditionally put a side-float to the left:

\ifNCC@smfltleft
  \jparbox{\Strut}[\NCC@c]\@tempdimaa{#1\@tempdimaa{#5}}%
  \nobreak\hskip\@tempdimc
\fi

Put a text box:

\jparbox{\NCC@n\Strut}[\NCC@c]\@tempdimb{\everypar{\NCC@n\everypar{}}\NCC@t#6}%
\ifvmode \else \unskip\NCC@n\NCC@j\fi}

Conditionally put a side-float to the right:

\ifNCC@smfltleft \else
  \nobreak\hskip\@tempdimc
  \jparbox{\Strut}[\NCC@c]\@tempdimaa{#1\@tempdimaa{#5}}%
\fi

Games with height and depth the \@temboxa allow us produce right line spacing with surrounding text.

\@tempdimaa\dp\@temboxa \advance\@tempdimaa\lineskip
\dp\@temboxa\@tempdimaa
\@tempdimaa\ht\@temboxa \advance\@tempdimaa -\ht\strutbox
\noindent \raise\@tempdimaa\box\@temboxa
\}

6.4 Service Commands

\NCC@float The command

\NCC@float{⟨(type)⟩}{⟨(def-place)⟩}*{⟨(placement)⟩}{⟨(w)⟩}{⟨(body)⟩}

is the envelope for a mini-float inside a float. The ⟨(def-place)⟩ is the default placement specifier.

\def\NCC@float#1#2{\ifstar{\NCC@flt{#1*}{#2}}{\NCC@flt{#1}{#2}}}
\def\NCC@flt#1#2{\ifnextchar[\NCC@flt@{#1}}{\NCC@flt@{#1}\[#2\]}
\def\NCC@flt@#1[#2]{\begin{#1}[#2]\normalfloatstyle\centering
\ifnextchar\{\NCC@@flt{#1}}{\NCC@@flt{#1}\()\}
\long\def\NCC@@flt#1(#2)#3{%
\if!#2!\@tempdimaa\linewidth \else \NCC@setwidth\@tempdimaa\#2\fi
\begingroup\NCC@minifloat[c]\@tempdimaa\#3\%
\end(#1)\%
}

\NCC@floats The command

\NCC@floats{⟨(type)⟩}{⟨(pos)⟩}{⟨(def-place)⟩}*{⟨(placement)⟩}{⟨(w1)⟩}{⟨(w2)⟩}{⟨(body1)⟩}{⟨(body2)⟩}
is the envelope for a pair of mini-floats inside a float. The implementation of these commands is based on the \NCC@pair command that parses all optional parameters. Finally the \NCC@flts command is executed.

\NCC@flts

The command

\NCC@flts{(type)}{(pos)}{(placement)}{w_1}{w_2}{(body1)}{(body2)}

prepares a pair of floats within \(type\) environment. The \(pos\) contains relative vertical alignment of floats. The \(w_1\) and \(w_2\) parameters (if present) specify widths of floats. The \@tempdimc register contains the default distance between floats.

6.5 Declare a New Mini-float and Service Commands

\newminifloat

The command

\newminifloat{(gen)}{(type)}{(def-place)}{(pos)}

declares a new mini-float and 3 service commands.

\newcommand*\newminifloat[4]{%
  \edef\@tempa{%
    Prepare \(mini\text{(gen)}\) definition:
    \noexpand\newcommand\expandafter\csname mini#1\endcsname{\
      \noexpand\begingroup\noexpand\def\noexpand\@captype{#2}\
      \noexpand\NCC@minifloat%}

    Prepare \(side\text{(gen)}\) definition:
    \noexpand\newcommand\expandafter\csname side#1\endcsname{\
      \noexpand\begingroup\noexpand\WCC@minifloat%\noexpand\def\noexpand\@captype{#2}}%}

    Prepare \(\text{(gen)}\) definition:
    \noexpand\newcommand\expandafter\csname #1\endcsname{\
      \noexpand\begingroup\noexpand\WCC@minifloat{#2}#3%}

    Define all commands:
    \@tempa%
  }%
}\@onlypreamble\newminifloat
6.6 Base Mini-floats and Defaults

\newminifloat{fig}{figure}{ht}{b}
\newminifloat{tabl}{table}{ht}{t}
\FloatStyle{}
\FloatStyle[minifigure]{\footnotesize\centering}
\FloatStyle[minitable]{\footnotesize\centering}
\endinput