

The pagegrid package

Heiko Oberdiek
<heiko.oberdiek at gmail.com>

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Abstract

The L^AT_EX package prints a page grid in the background.

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1 Documentation

The package puts a grid on the paper. It was written for developers of a class or package who have to put elements on definite locations on a page (e.g. letter class). The grid allows a faster optical check, whether the positions are correct. If the previewer already offers features for measuring, the the package might be obsolete. Otherwise it saves the developer from printing the page and measuring by hand.

1.1 Options

Options are evaluated in the following order:

1. Configuration file `pagegrid.cfg` using `\pagegridsetup` if the file exists.
2. Package options given for `\usepackage`.
3. Later calls of `\pagegridsetup`.

`\pagegridsetup{<option list>}`

The options are key value options. Boolean options are enabled by default (without value) or by using the explicit value `true`. Value `false` disable the option.

1.1.1 Options enable, disable

enable: This boolean option controls whether the page grid is drawn. As default the page grid drawing is activated.

disable: It is the opposite of option `enable`. It was added for convenience and allows the abbreviation `disable` for `enable=false`.

1.1.2 Grid origins

The package supports up to two grids on a page allowing measurement from opposite directions. As default two grids are drawn, the first from bottom left to top right. The origin of the second grid is at the opposite top right corner. The origins are controlled by the following options. The number of grids (one or two) depend on the number of these options in one call of `\pagegridsetup`. The following frame shows a paper and in its corners are the corresponding options. At the left and right side alias names are given for the options inside the paper.

| | | | |
|------------------------------|----|----|--------------------------------|
| left-top, lt, top-left | tl | tr | top-right, rt, right-top |
| left-bottom, lb, bottom-left | bl | br | bottom-right, rb, right-bottom |

Examples:

```
\pagegridsetup{bl,tr}
```

This is the default setting with two grids as described previously. The following setups one grid only. Its origin is the upper left corner:

```
\pagegridsetup{top-left}
```

1.1.3 Grid unit

step This option takes a length and setups the unit for the grid. The page width and page height should be multiples of this unit. Currently the default is `1mm`. But this might change later by a heuristic based on the paper size.

1.1.4 Color options

The basic grid lines are drawn as ultra thin help lines and is only drawn for the first grid. Each tenth and fiftyth line of the basic net is drawn thicker in a special color for the two grids.

firstcolor: Color for the thicker lines and the arrows of the first grid. Default value is `red`.

secondcolor: Color for the thicker lines and the arrows of the second grid. Default value is `blue`.

Use a color specification that package `tikz` understands. (The grid is drawn with `pgf/tikz`.)

1.1.5 Arrow options

Arrows are put at the origin at the grid to show the grid start and the direction of the grid.

arrows: This boolean option turns the arrows on or off. As default arrows are enabled.

arrowlength: The length given as value is the length of the edge of a square at the origin within the arrow is put as diagonal. Default is 10 times the grid unit (10 mm). The real arrow length is this length multiplied by $\sqrt{2}$.

1.1.6 Miscellaneous options

double: The output page is doubled, one without page grid and the other with page grid. Possible values are shown in the following table:

| Option | Meaning |
|-------------------------------|--|
| <code>false</code> | Turns option off. |
| <code>first</code> | Grid page comes first. |
| <code>last</code> | Grid page comes after the page without grid. |
| <code>true</code> | Same as <code>last</code> . |
| <code><no value></code> | Same as <code>true</code> . |

Note: The double output of the page has side effects. All whatits are executed twice, for example: file writing and anchor setting. Some unwanted actions are caught such as multiple `\label` definitions, duplicate entries in the table of contents. For bookmarks, use package `bookmarks`.

foreground: Boolean option, default is `false`. Sometimes there might be elements on the page (e.g. large images) that hide the grid. Then option `foreground` puts the grids over the current output page.

2 Implementation

```
1 <*package>
```

Reload check, especially if the package is not used with L^AT_EX.

```
2 \begingroup
3 \catcode44 12 % ,
4 \catcode45 12 % -
5 \catcode46 12 % .
6 \catcode58 12 % :
7 \catcode64 11 % @
8 \catcode123 1 % {
9 \catcode125 2 % }
10 \expandafter\let\expandafter\x\csname ver@pagegrid.sty\endcsname
11 \ifx\x\relax % plain-TeX, first loading
12 \else
13 \def\empty{}%
14 \ifx\x\empty % LaTeX, first loading,
15 % variable is initialized, but \ProvidesPackage not yet seen
16 \else
17 \catcode35 6 % #
18 \expandafter\ifx\csname PackageInfo\endcsname\relax
19 \def\x#1#2{%
20 \immediate\write-1{Package #1 Info: #2.}%
21 }%
22 \else
23 \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
24 \fi
25 \x{pagegrid}{The package is already loaded}%
```

```

26     \aftergroup\endinput
27     \fi
28     \fi
29 \endgroup
Package identification:
30 \begingroup
31   \catcode35 6 % #
32   \catcode40 12 % (
33   \catcode41 12 % )
34   \catcode44 12 % ,
35   \catcode45 12 % -
36   \catcode46 12 % .
37   \catcode47 12 % /
38   \catcode58 12 % :
39   \catcode64 11 % @
40   \catcode91 12 % [
41   \catcode93 12 % ]
42   \catcode123 1 % {
43   \catcode125 2 % }
44   \expandafter\ifx\csname ProvidesPackage\endcsname\relax
45     \def\x#1#2#3[#4]{\endgroup
46       \immediate\write-1{Package: #3 #4}%
47       \xdef#1{#4}%
48     }%
49   \else
50     \def\x#1#2[#3]{\endgroup
51       #2[#{3}]%
52       \ifx#1@\undefined
53         \xdef#1{#3}%
54       \fi
55       \ifx#1\relax
56         \xdef#1{#3}%
57       \fi
58     }%
59   \fi
60 \expandafter\x\csname ver@pagegrid.sty\endcsname
61 \ProvidesPackage{pagegrid}%
62 [2009/12/04 v1.4 Print page grid in background (HO)]
63 \begingroup
64   \catcode123 1 % {
65   \catcode125 2 % }
66   \def\x{\endgroup
67     \expandafter\edef\csname pagegrid@AtEnd\endcsname{%
68       \catcode35 \the\catcode35\relax
69       \catcode64 \the\catcode64\relax
70       \catcode123 \the\catcode123\relax
71       \catcode125 \the\catcode125\relax
72     }%
73   }%
74 \x
75 \catcode35 6 % #
76 \catcode64 11 % @
77 \catcode123 1 % {
78 \catcode125 2 % }
79 \def\TMP@EnsureCode#1#2{%
80   \edef\pagegrid@AtEnd{%
81     \pagegrid@AtEnd
82     \catcode#1 \the\catcode#1\relax
83   }%
84   \catcode#1 #2\relax
85 }
86 \TMP@EnsureCode{9}{10}% (tab)

```

```

87 \TMP@EnsureCode{10}{12}% ^^J
88 \TMP@EnsureCode{33}{12}% !
89 \TMP@EnsureCode{34}{12}% "
90 \TMP@EnsureCode{36}{3}% $
91 \TMP@EnsureCode{38}{4}% &
92 \TMP@EnsureCode{39}{12}% '
93 \TMP@EnsureCode{40}{12}% (
94 \TMP@EnsureCode{41}{12}% )
95 \TMP@EnsureCode{42}{12}% *
96 \TMP@EnsureCode{43}{12}% +
97 \TMP@EnsureCode{44}{12}% ,
98 \TMP@EnsureCode{45}{12}% -
99 \TMP@EnsureCode{46}{12}% .
100 \TMP@EnsureCode{47}{12}% /
101 \TMP@EnsureCode{58}{12}% :
102 \TMP@EnsureCode{59}{12}% ;
103 \TMP@EnsureCode{60}{12}% <
104 \TMP@EnsureCode{61}{12}% =
105 \TMP@EnsureCode{62}{12}% >
106 \TMP@EnsureCode{63}{12}% ?
107 \TMP@EnsureCode{91}{12}% [
108 \TMP@EnsureCode{93}{12}% ]
109 \TMP@EnsureCode{94}{7}% ^ (superscript)
110 \TMP@EnsureCode{96}{12}% '
111 \TMP@EnsureCode{124}{12}% |

112 \RequirePackage{tikz}
113 \RequirePackage[atbegshi][2009/12/02]
114 \RequirePackage[kvoptions][2009/07/17]

115 \begingroup\expandafter\expandafter\expandafter\endgroup
116 \expandafter\ifx\csname stockwidth\endcsname\relax
117   \def\pagegrid@width{\paperwidth}%
118   \def\pagegrid@height{\paperheight}%
119 \else
120   \def\pagegrid@width{\stockwidth}%
121   \def\pagegrid@height{\stockheight}%
122 \fi

123 \SetupKeyvalOptions{%
124   family=pagegrid,%
125   prefix=pagegrid@,%
126 }
127 \def\pagegrid@init{%
128   \let\pagegrid@origin@a\@empty
129   \let\pagegrid@origin@b\@empty
130   \let\pagegrid@init\relax
131 }
132 \let\pagegrid@@init\pagegrid@init
133 \def\pagegrid@origin@a{bl}
134 \def\pagegrid@origin@b{tr}
135 \def\pagegrid@SetOrigin#1{%
136   \pagegrid@init
137   \ifx\pagegrid@origin@a\@empty
138     \def\pagegrid@origin@a{#1}%
139   \else
140     \ifx\pagegrid@origin@b\@empty
141       \else
142         \let\pagegrid@origin@a\pagegrid@origin@b
143       \fi
144     \def\pagegrid@origin@b{#1}%
145   \fi
146 }
147 \def\pagegrid@temp#1{%
148   \DeclareVoidOption{#1}{\pagegrid@SetOrigin{#1}}%

```

```

149 \@namedef{pagegrid@N@#1}{#1}%
150 }
151 \pagegrid@temp{bl}
152 \pagegrid@temp{br}
153 \pagegrid@temp{tl}
154 \pagegrid@temp{tr}
155 \def\pagegrid@temp#1#2{%
156   \DeclareVoidOption{#2}{\pagegrid@SetOrigin{#1}}%
157 }%
158 \pagegrid@temp{bl}{lb}
159 \pagegrid@temp{br}{rb}
160 \pagegrid@temp{tl}{lt}
161 \pagegrid@temp{tr}{rt}
162 \pagegrid@temp{bl}{bottom-left}
163 \pagegrid@temp{br}{bottom-right}
164 \pagegrid@temp{tl}{top-left}
165 \pagegrid@temp{tr}{top-right}
166 \pagegrid@temp{bl}{left-bottom}
167 \pagegrid@temp{br}{right-bottom}
168 \pagegrid@temp{tl}{left-top}
169 \pagegrid@temp{tr}{right-top}
170 \DeclareBoolOption[true]{enable}
171 \DeclareComplementaryOption{disable}{enable}
172 \DeclareBoolOption{foreground}
173 \newlength{\pagegrid@step}
174 \define@key{pagegrid}{step}{%
175   \setlength{\pagegrid@step}{#1}%
176 }
177 \DeclareStringOption[red]{firstcolor}
178 \DeclareStringOption[blue]{secondcolor}
179 \DeclareBoolOption[true]{arrows}
180 \newlength\pagegrid@arrowlength
181 \pagegrid@arrowlength=\z@
182 \define@key{pagegrid}{arrowlength}{%
183   \setlength{\pagegrid@arrowlength}{#1}%
184 }
185 \define@key{pagegrid}{double}[true]{%
186   \@ifundefined{pagegrid@double@#1}{%
187     \PackageWarning{pagegrid}{%
188       Unsupported value ‘#1’ for option ‘double’.\MessageBreak
189       Known values are:\MessageBreak
190       ‘false’, ‘first’, ‘last’, ‘true’.\MessageBreak
191       Now ‘false’ is used%
192     }%
193     \chardef\pagegrid@double\z@
194   }{%
195     \chardef\pagegrid@double\csname pagegrid@double@#1\endcsname\relax
196   }%
197 }
198 \@namedef{pagegrid@double@false}{0}
199 \@namedef{pagegrid@double@first}{1}
200 \@namedef{pagegrid@double@last}{2}
201 \@namedef{pagegrid@double@true}{2}
202 \chardef\pagegrid@double\z@
203 \newcommand*{\pagegridsetup}{%
204   \let\pagegrid@init\pagegrid@@init
205   \setkeys{pagegrid}%
206 }
207 \pagegridsetup{%

```

```

208 step=1mm%
209 }
210 \InputIfFileExists{pagegrid.cfg}{}%
211 \ProcessKeyvalOptions*\relax
212 \AtBeginDocument{%
213   \ifdim\pagegrid@arrowlength>\z@
214   \else
215     \pagegrid@arrowlength=10\pagegrid@step
216   \fi
217 }

218 \def\pagegridShipoutDoubleBegin{%
219   \begingroup
220   \let\newlabel\@gobbletwo
221   \let\zref@newlabel\@gobbletwo
222   \let\writefile\@gobbletwo
223   \let\select@language\@gobble
224 }
225 \def\pagegridShipoutDoubleEnd{%
226   \endgroup
227 }

228 \def\pagegrid@WriteDouble#1#2{%
229   \immediate\write#1{%
230     \@backslashchar csname %
231     pagegridShipoutDouble#2%
232     \@backslashchar endcsname%
233   }%
234 }

235 \def\pagegrid@ShipoutDouble#1{%
236   \begingroup
237   \if@filesw
238     \pagegrid@WriteDouble\@mainaux{Begin}%
239     \ifx\@auxout\@partaux
240       \pagegrid@WriteDouble\@partaux{Begin}%
241     \def\pagegrid@temp{%
242       \pagegrid@WriteDouble\@mainaux{End}%
243       \pagegrid@WriteDouble\@partaux{End}%
244     }%
245   \else
246     \def\pagegrid@temp{%
247       \pagegrid@WriteDouble\@mainaux{End}%
248     }%
249   \fi
250   \else
251     \def\pagegrid@temp{}%
252   \fi
253   \let\protect\noexpand
254   \AtBeginShipoutOriginalShipout\copy#1\relax
255   \pagegrid@temp
256 \endgroup
257 }

258 \AtBeginShipout{%
259   \ifdim\pagegrid@step>\z@
260   \else
261     \pagegrid@enablefalse
262   \fi
263   \ifpagegrid@enable
264     \ifnum\pagegrid@double=\@ne
265       \pagegrid@ShipoutDouble\AtBeginShipoutBox
266     \else
267       \ifnum\pagegrid@double=\tw@
268         \ifundefined{pagegrid@DoubleBox}{%
269           \newbox\pagegrid@DoubleBox

```

```

270     }{}%
271     \setbox\pagegrid@DoubleBox=\copy\AtBeginShipoutBox
272     \fi
273 \fi
274 \ifpagegrid@foreground
275     \expandafter\AtBeginShipoutUpperLeftForeground
276 \else
277     \expandafter\AtBeginShipoutUpperLeft
278 \fi
279 {%
280     \put(0,0){%
281         \makebox(0,0)[lt]{%
282             \begin{tikzpicture}[%
283                 bl/.style={},%
284                 br/.style={xshift=\pagegrid@width,xscale=-1},%
285                 tl/.style={yshift=\pagegrid@height,yscale=-1},%
286                 tr/.style={xshift=\pagegrid@width,%
287                     yshift=\pagegrid@height,scale=-1}%
288             ]%
289                 \useasboundingbox
290                 (0mm,\pagegrid@height) rectangle (0mm,\pagegrid@height);%
291                 \draw[%
292                     \pagegrid@origin@a,%
293                     step=\pagegrid@step,%
294                     style=help lines,%
295                     ultra thin%
296                 ] (0mm,0mm) grid (\pagegrid@width,\pagegrid@height);%
297                 \ifx\pagegrid@origin@b\@empty
298                 \else
299                     \draw[%
300                         \pagegrid@origin@b,%
301                         step=10\pagegrid@step,%
302                         {\pagegrid@secondcolor},%
303                         very thin%
304                     ] (0mm,0mm) grid (\pagegrid@width,\pagegrid@height);%
305                 \fi
306                 \draw[%
307                     \pagegrid@origin@a,%
308                     step=10\pagegrid@step,%
309                     {\pagegrid@firstcolor},%
310                     very thin%
311                 ] (0mm,0mm) grid (\pagegrid@width,\pagegrid@height);%
312                 \ifx\pagegrid@origin@b\@empty
313                 \else
314                     \draw[%
315                         \pagegrid@origin@b,%
316                         step=50\pagegrid@step,%
317                         {\pagegrid@secondcolor},%
318                         thick%
319                     ] (0mm,0mm) grid (\pagegrid@width,\pagegrid@height);%
320                 \fi
321                 \draw[%
322                     \pagegrid@origin@a,%
323                     step=50\pagegrid@step,%
324                     {\pagegrid@firstcolor},%
325                     thick%
326                 ] (0mm,0mm) grid (\pagegrid@width,\pagegrid@height);%
327                 \ifpagegrid@arrows
328                 \ifx\pagegrid@origin@b\@empty
329                 \else
330                     \draw[%
331                         \pagegrid@origin@b,%

```



```

332         {\pagegrid@secondcolor},%
333         stroke,%
334         line width=1pt,%
335         line cap=round%
336     ] (0mm,0mm) %
337     -- (\pagegrid@arrowlength,\pagegrid@arrowlength) %
338     (\pagegrid@arrowlength,.5\pagegrid@arrowlength) %
339     -- (\pagegrid@arrowlength,\pagegrid@arrowlength) %
340     -- (.5\pagegrid@arrowlength,\pagegrid@arrowlength);%
341 \fi
342 \draw[%
343     \pagegrid@origin@a,%
344     {\pagegrid@firstcolor},%
345     stroke,%
346     line width=1pt,%
347     line cap=round%
348 ] (0mm,0mm) %
349 -- (\pagegrid@arrowlength,\pagegrid@arrowlength) %
350 (\pagegrid@arrowlength,.5\pagegrid@arrowlength) %
351 -- (\pagegrid@arrowlength,\pagegrid@arrowlength) %
352 -- (.5\pagegrid@arrowlength,\pagegrid@arrowlength);%
353 \fi
354 \end{tikzpicture}%
355 }%
356 }%
357 }%
358 \ifnum\pagegrid@double=\tw@
359 \pagegrid@ShipoutDouble\pagegrid@DoubleBox
360 \fi
361 \fi
362 }
363 \pagegrid@AtEnd
364 \end{package}

```

3 Test

3.1 Catcode checks for loading

```

365 <*test1>
366 \catcode'\{=1 %
367 \catcode'\}=2 %
368 \catcode'\#=6 %
369 \catcode'\@=11 %
370 \expandafter\ifx\csname count@\endcsname\relax
371 \countdef\count@=255 %
372 \fi
373 \expandafter\ifx\csname @gobble\endcsname\relax
374 \long\def@gobble#1{%
375 \fi
376 \expandafter\ifx\csname @firstofone\endcsname\relax
377 \long\def@firstofone#1{#1}%
378 \fi
379 \expandafter\ifx\csname loop\endcsname\relax
380 \expandafter@firstofone
381 \else
382 \expandafter@gobble
383 \fi
384 {%
385 \def\loop#1\repeat{%
386 \def\body{#1}%
387 \iterate
388 }%

```

```

389 \def\iterate{%
390   \body
391   \let\next\iterate
392   \else
393   \let\next\relax
394   \fi
395   \next
396 }%
397 \let\repeat=\fi
398 }%
399 \def\RestoreCatcodes{}
400 \count@=0 %
401 \loop
402   \edef\RestoreCatcodes{%
403     \RestoreCatcodes
404     \catcode\the\count@=\the\catcode\count@\relax
405   }%
406 \ifnum\count@<255 %
407   \advance\count@ 1 %
408 \repeat
409
410 \def\RangeCatcodeInvalid#1#2{%
411   \count@=#1\relax
412   \loop
413     \catcode\count@=15 %
414   \ifnum\count@<#2\relax
415     \advance\count@ 1 %
416   \repeat
417 }
418 \expandafter\ifx\csname LoadCommand\endcsname\relax
419   \def\LoadCommand{\input pagegrid.sty\relax}%
420 \fi
421 \def\Test{%
422   \RangeCatcodeInvalid{0}{47}%
423   \RangeCatcodeInvalid{58}{64}%
424   \RangeCatcodeInvalid{91}{96}%
425   \RangeCatcodeInvalid{123}{255}%
426   \catcode'\@=12 %
427   \catcode'\=0 %
428   \catcode'\{=1 %
429   \catcode'\}=2 %
430   \catcode'\#=6 %
431   \catcode'\ [=12 %
432   \catcode'\]=12 %
433   \catcode'\%=14 %
434   \catcode'\ =10 %
435   \catcode13=5 %
436   \LoadCommand
437   \RestoreCatcodes
438 }
439 \Test
440 \csname @@end\endcsname
441 \end
442 </test1>

```

4 Installation

4.1 Download

Package. This package is available on CTAN¹:

¹<ftp://ftp.ctan.org/tex-archive/>

[CTAN:macros/latex/contrib/oberdiek/pagegrid.dtx](#) The source file.

[CTAN:macros/latex/contrib/oberdiek/pagegrid.pdf](#) Documentation.

Bundle. All the packages of the bundle ‘oberdiek’ are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

[CTAN:install/macros/latex/contrib/oberdiek.tds.zip](#)

TDS refers to the standard “A Directory Structure for \TeX Files” ([CTAN:tds/tds.pdf](#)). Directories with `texmf` in their name are usually organized this way.

4.2 Bundle installation

Unpacking. Unpack the `oberdiek.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip oberdiek.tds.zip -d ~/texmf
```

Script installation. Check the directory `TDS:scripts/oberdiek/` for scripts that need further installation steps. Package `attachfile2` comes with the Perl script `pdfatfi.pl` that should be installed in such a way that it can be called as `pdfatfi`. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

4.3 Package installation

Unpacking. The `.dtx` file is a self-extracting `docstrip` archive. The files are extracted by running the `.dtx` through plain- \TeX :

```
tex pagegrid.dtx
```

TDS. Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

```
pagegrid.sty      → tex/generic/oberdiek/pagegrid.sty
pagegrid.pdf      → doc/latex/oberdiek/pagegrid.pdf
test/pagegrid-test1.tex → doc/latex/oberdiek/test/pagegrid-test1.tex
pagegrid.dtx      → source/latex/oberdiek/pagegrid.dtx
```

If you have a `docstrip.cfg` that configures and enables `docstrip`’s TDS installing feature, then some files can already be in the right place, see the documentation of `docstrip`.

4.4 Refresh file name databases

If your \TeX distribution (`te \TeX` , `mik \TeX` , ...) relies on file name databases, you must refresh these. For example, `te \TeX` users run `texhash` or `mktexlsr`.

4.5 Some details for the interested

Attached source. The PDF documentation on CTAN also includes the `.dtx` source file. It can be extracted by AcrobatReader 6 or higher. Another option is `pdftk`, e.g. unpack the file into the current directory:

```
pdftk pagegrid.pdf unpack_files output .
```

Unpacking with L^AT_EX. The .dtx chooses its action depending on the format:

plain-T_EX: Run docstrip and extract the files.

L^AT_EX: Generate the documentation.

If you insist on using L^AT_EX for docstrip (really, docstrip does not need L^AT_EX), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{pagegrid.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

Generating the documentation. You can use both the .dtx or the .drv to generate the documentation. The process can be configured by the configuration file ltxdoc.cfg. For instance, put this line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with pdfL^AT_EX:

```
pdflatex pagegrid.dtx
makeindex -s gind.ist pagegrid.idx
pdflatex pagegrid.dtx
makeindex -s gind.ist pagegrid.idx
pdflatex pagegrid.dtx
```

5 Acknowledgement

Klaus Braune: He provided the idea and the first tikz code.

6 History

[2009/11/06 v1.0]

- The first version.

[2009/11/06 v1.1]

- Option foreground added.

[2009/12/02 v1.2]

- Color options, arrow options added.
- Names for origin options changed.

[2009/12/03 v1.3]

- Option double added.
- First CTAN release.

[2009/12/04 v1.4]

- Option double: Some unwanted side effects removed.

7 Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

| Symbols | D |
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