

# The bidi package

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## 1 Basic direction switching commands

The bidi package provides a useful interface for typesetting bidirectional texts with X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X.<sup>1</sup> Most of its macros are directly copied or adapted from the Babel bidirectional module for Hebrew.<sup>2</sup>

`\RL` For short right-to-left insertions in left-to-right environments, `\RL{...}`  
`\LR` does the job, as does `\LR{...}` in the opposite case. To typeset a full paragraph  
`\setRL` right-to-left, use the switch `\setRL`, and to revert to left-to-right, use `\setLR`  
`\setLR` (or equivalently `\unsetRL`).

<sup>1</sup>Actually, bidi can actually also be used with any  $\varepsilon$ -T<sub>E</sub>X-based engine, notably pdfL<sup>A</sup>T<sub>E</sub>X, but at this time I do not see how it could be useful outside of the X<sub>Y</sub>T<sub>E</sub>X world.

<sup>2</sup>See section 60.4 of the [Babel user documentation](#).

```
% \setRL
% This is a right-to-left paragraph.
% \setLR
```

<sup>3</sup>paragraph. right-to-left a is This

## 1.1 Direction of plain footnotes

`\setfootnoteRL` With `\setfootnoteRL`, one can insert RL footnotes in LR mode,<sup>4</sup> and conversely with `\setfootnoteLR` (or equivalently `\unsetfootnoteRL`).

**Important note:** Currently, X<sub>Y</sub>TeX's (version 0.996) placement of the footnote mark at the beginning of plain footnotes in RL context is incorrect (as you can see yourself below). Note that this does not happen with pdfTeX. I do not know how to prevent this, but I hope the issue will be fixed soon.

With the package `manyfoot`, it is possible to have several layers of footnotes, each of which can be set in a different direction. See the documentation to ArabX<sub>Y</sub>TeX for more details. This should also be possible with `bigfoot`, but I have not tested it yet.

Some other L<sup>A</sup>TeX macros are redefined internally to ensure their correct behaviour in bidirectional display. Contrary to the Babel approach, we leave the commands defined in standard L<sup>A</sup>TeX classes untouched, as we think this should be done by class authors themselves (who are of course encouraged to make them bidi-compatible :-).

## 2 Alphabetic numerals in Arabic and Hebrew

For convenience the following macros are provided for generating numbers in alphanumerical notation in Arabic (in both Eastern and Western styles) and Hebrew. The interested reader can find information on these systems in the following two Wikipedia articles: [http://en.wikipedia.org/wiki/Abjad\\_numerals](http://en.wikipedia.org/wiki/Abjad_numerals) and [http://en.wikipedia.org/wiki/Hebrew\\_](http://en.wikipedia.org/wiki/Hebrew_)

<sup>3</sup>Note that X<sub>Y</sub>TeX, contrary to T<sub>E</sub>X, uses (roughly speaking) one box per word, instead of one per character. The command `\RL` is thus superfluous for inserting a single Arabic or Hebrew word.

<sup>4</sup>ملاحظات من اليمين إلى اليسار

numerals. Note that the Hebrew implementation in bidi is less sophisticated than the one in Babel, where various special cases are taken into account.

## 2.1 Examples

`\abjad` The Arabic *abjad* numbers can be generated with the command `\abjad`. Example: `\abjad{1863}` yields غُضْصِج.

`\abjadmaghribi` In the Maghrib the conventions are somewhat different, and the maghribi forms of the *abjad* numerals are obtained with the `\abjadmaghribi` command. Example: `\abjadmaghribi{1863}` yields شِظْصِج.

`\hebrewnumeral` Hebrew numerals are generated with the command `\hebrewnumeral`. Example: `\hebrewnumeral{1863}` yields יחמ"ג.

Note that the above macros only outputs the Unicode characters: the active font must thus contain the necessary glyphs.

## 3 Implementation

```

1 \NeedsTeXFormat{LaTeX2e}
2 \ProvidesPackage{bidi}
3 [2007/03/06 v0.2 Bidirectional typesetting in XeLaTeX]
4 %% this is not used for now:
5 \newif\if@rlmain
6 \@rlmainfalse
7 \DeclareOption{rldocument}{\@rlmaintrue}
8 \ExecuteOptions{rldocument}
9 \ProcessOptions
10 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
11 \ifx\TeXXeTstate\undefined\else%
12   \TeXXeTstate=1
13 \fi
14 \ifx\beginL\@undefined%
15   \newlinechar`^^J
16   \typeout{^^JTo avoid this error message,^^J%
17     run TeX--XeT or e-TeX engine instead of regular TeX.^^J}
18   \errmessage{Right-to-Left Support Error: use TeX--XeT or e-TeX
19     engine}%
20 \fi

```

```

21 \newif\if@rl
22 %\AtBeginDocument{% Here we set the main document direction
23 % \if@rl\@rlmaintrue%
24 % \else\@rlmainfalse%
25 % \fi%
26 %}

```

### 3.1 Basic bidi macros

This defines the macros for RL insertion in LR context and conversely. Most of it is taken from the file `rlbabel.def` in the Babel distribution, with minor changes.

```

27 \let\n@xt=\
28 \def\LR{\protect\pLR}%
29 \def\pLR{\protect\afterassignment\moreLR \let\n@xt= }
30 \def\moreLR{\bracetext \aftergroup\endL \beginL\@rlfalse}
31 \def\RL{\protect\pRL}
32 \def\pRL{\protect\afterassignment\moreRL \let\n@xt= }
33 \def\moreRL{\bracetext \aftergroup\endR \beginR\@rltrue}
34 \def\bracetext{\ifcat\n@xt{\else\ifcat\n@xt}\fi
35 \errmessage{Missing left brace has been substituted}\fi \bgroup}
36 \everydisplay{\if@rl\aftergroup\beginR\fi }

```

For global right-to-left typesetting, the directional primitive must be included within an `\everypar` construct. The traditional approach was to re-define `\everypar` as a one-argument macro, but since some packages (such as `ledmac`) also play tricks with `\everypar`, this can become problematic. Hence we have adopted Youssef Jabri's clever approach in his `Arabi` package.

```

37 \def\rl@everypar{\if@rl{\setbox\z@\lastbox\beginR\usebox\z@}\fi}
38 \let\o@everypar=\everypar
39 %% The following, surely, will not play well with all pack-
    ages, e.g. ledmac
40 %\def\everypar#1{\o@everypar{\rl@everypar#1}}
41 %% But we now use this instead, taken from Arabicore.sty in the Arabi pack-
    age.
42 %% Thanks to Youssef Jabri! Shukran jazilan!
43 \newtoks\n@everypar
44 \n@everypar\expandafter{\the\o@everypar}
45 \o@everypar{\rl@everypar\the\n@everypar}

```

```
46 \let\everypar=\n@everypar
```

This is not used at the moment:

```
47 \def\@ensure@RL#1{\if@rl#1\else\RL{#1}\fi}
```

```
48 \def\@ensure@LR#1{\if@rl\LR{#1}\else#1\fi}
```

## 3.2 Logos

The following redefinitions ensure proper typesetting of the various logos.

```
49 %%%preserve logos
```

```
50 \let\@@TeX\TeX
```

```
51 \def\TeX{\LR{\@@TeX}}
```

```
52 \let\@@LaTeX\LaTeX
```

```
53 \def\LaTeX{\LR{\@@LaTeX}}
```

```
54 \let\@@LaTeXe\LaTeXe
```

```
55 \def\LaTeXe{\LR{\@@LaTeXe}}
```

```
56 \ifpackageloaded{xltextra}{
```

```
57 \let\@@XeTeX\XeTeX
```

```
58 \def\XeTeX{\LR{\@@XeTeX}}
```

```
59 }{}
```

## 3.3 Redefinition of internal L<sup>A</sup>T<sub>E</sub>X macros

```
60 %%VARIOUS LATEX MACROS
```

```
61 \def\list#1#2{%
```

```
62   \ifnum \@listdepth >5\relax
```

```
63     \@toodeep
```

```
64   \else
```

```
65     \global\advance\@listdepth\@ne
```

```
66   \fi
```

```
67   \rightmargin\z@
```

```
68   \listparindent\z@
```

```
69   \itemindent\z@
```

```
70   \csname @list\romannumeral\the\@listdepth\endcsname
```

```
71   \def\@itemlabel{#1}%
```

```
72   \let\makelabel\@mklab
```

```
73   \@nibrlistfalse
```

```
74   #2\relax
```

```
75   \@trivlist
```

```

76 \parskip\parsep
77 \parindent\listparindent
78 \advance\linewidth -\rightmargin
79 \advance\linewidth -\leftmargin
80 \if@rl
81   \advance\@totalleftmargin \rightmargin
82 \else
83   \advance\@totalleftmargin \leftmargin
84 \fi
85 \parshape \@ne \@totalleftmargin \linewidth
86 \ignorespaces}
87 %%%
88 \def\@dottedtocline#1#2#3#4#5{%
89   \ifnum #1>\c@tocdepth \else
90     \vskip \z@ \@plus.2\p@
91     {\if@rl\rightskip\else\leftskip\fi #2\relax
92     \if@rl\leftskip\else\rightskip\fi \@tocmarg \parfillskip
93     -\if@rl\leftskip\else\rightskip\fi
94     \parindent #2\relax\@afterindenttrue
95     \interlinepenalty\@M
96     \leavevmode
97     \@tempdima #3\relax
98     \advance\if@rl\rightskip\else\leftskip\fi \@tempdima
99     \null\nobreak\hskip -\if@rl\rightskip\else\leftskip\fi
100    {#4}\nobreak
101    \leaders\hbox{$\m@th
102      \mkern \@dotsep mu\hbox{.}\mkern \@dotsep
103      mu$}\hfill
104    \nobreak
105    \hb@xt@\@pnumwidth{\hfil\normalfont \normalcolor \beginL#5\endL}%
106    \par}%
107 \fi}
108 %%%
109 \def\raggedright{%
110   \let\\\@centercr
111   \leftskip\z@skip\rightskip\@flushglue
112   \parindent\z@\parfillskip\z@skip}
113 \let\@raggedleft=\raggedleft

```

```

114 \let\@@raggedright=\raggedright
115 \renewcommand\raggedleft{\if@rl\@@raggedright%
116         \else\@@raggedleft\fi}
117 \renewcommand\raggedright{\if@rl\@@raggedleft%
118         \else\@@raggedright\fi}
119 \let\@@@underline=\underline
120 \def\underline#1{\@@@underline{\if@rl\RL{#1}\else #1\fi}}
121 \if@compatibility
122     \let\undertext=\underline
123 \fi

```

### 3.4 Footnotes

This implements the bidirectionality of plain L<sup>A</sup>T<sub>E</sub>X footnotes.

```

124 \newif\if@rl@footnote
125 \if@rl\@rl@footnotetrue\else\@rl@footnotefalse\fi
126 \let\@@footnoterule=\footnoterule
127 \def\LRfootnoterule{\@@footnoterule}
128 %bug?-->this causes new par to be set, hence hack with vskip :-{
129 \def\RLfootnoterule{\vskip -\baselineskip\hbxt@\hsize{\hss\vbox{\@@footnoterule}}}}
130 %
131 \def\setfootnoteRL{\@rl@footnotetrue}
132 \def\unsetfootnoteRL{\@rl@footnotefalse}
133 \def\setfootnoteLR{\unsetfootnoteRL}
134 %
135 \def\footnoterule{\if@rl@footnote\RLfootnoterule\else\LRfootnoterule\fi}

```

### 3.5 Bidi switching commands

Commands for switching between LR and RL global contexts.

```

136 \def\setRL{\@rltrue\@rl@footnotetrue}
137 \def\unsetRL{\@rlfalse\@rl@footnotefalse}
138 \def\setLR{\unsetRL}

```

### 3.6 Footnotes (cont.)

This redefines L<sup>A</sup>T<sub>E</sub>X's internal footnote macros.

```

139 \long\def\@footnotetext#1{\insert\footins{%

```

```

140 \if@rl@footnote\@rltrue\else\@rlfalse\fi
141 \reset@font\footnotesize
142 \interlinepenalty\interfootnotelinepenalty
143 \splittopskip\footnotesep
144 \splitmaxdepth \dp\strutbox \floatingpenalty \@MM
145 \hsize\columnwidth \@parboxrestore
146 \protected@edef\@currentlabel{%
147     \csname p@footnote\endcsname\@thefnmark
148 }%
149 \color@begingroup
150     \@makefntext{%
151         \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
152 \color@endgroup}}%
153 %... also in minipages
154 \long\def\@mpfootnotetext#1{%
155     \global\setbox\@mpfootins\vbox{%
156         \if@rl@footnote\@rltrue\else\@rlfalse\fi
157         \unvbox\@mpfootins
158         \reset@font\footnotesize
159         \hsize\columnwidth
160         \@parboxrestore
161         \protected@edef\@currentlabel
162             {\csname p@mpfootnote\endcsname\@thefnmark}%
163         \color@begingroup
164             \@makefntext{%
165                 \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
166         \color@endgroup
167     }}

```

### 3.7 \textcolor

\textcolor needs to be redefined so that the color-switching commands in the output will affect the correct portion of text also in RL context. At present this only works if the textual argument does not overlap more than one line, at least for PDF output generated by X<sub>Y</sub>TEX and xdvipdfmx. The following code is again taken from `rlbabel.def`.

```

168 \ifx\@textcolor\@undefined\else%
169 \AtBeginDocument{%

```



```

170 \def\@textcolor#1#2#3{%
171   \if@rl%
172     \beginL\protect\leavevmode{\color#1{#2}\beginR#3\endR}\endL%
173   \else%
174     \protect\leavevmode{\color#1{#2}#3}%
175   \fi%
176 }%
177}%
178\fi
179%%

```

### 3.8 Alphanumerical numbers

The code that follows is a straightforward adaptation of the corresponding code in the Arabi package. The code for Hebrew numerals is a simplified version of the implementation in Babel.

```

180\def\abjad#1{%
181\ifnum#1>1999\PackageWarning{bidi}{Illegal value (#1) for abjad nu-
182   meral} {#1}
183\else
184  \ifnum#1<\z@\space\PackageWarning{bidi}{Illegal value (#1) for ab-
185   jad numeral}%
186  \else
187    \ifnum#1<10\expandafter\abj@num@i\number#1%
188    \else
189      \ifnum#1<100\expandafter\abj@num@ii\number#1%
190      \else
191        \ifnum#1<\@M\expandafter\abj@num@iv\number#1%since #1<2000, we must have 1000
192        \fi
193      \fi
194    \fi
195  \fi
196\fi
197\fi
198}
199

```

```

200 \def\abjadmaghribi#1{%
201 \ifnum#1>1999 \PackageWarning{bidi}{Illegal value (#1) for abjad nu-
    meral} {#1}
202 \else
203 \ifnum#1<\z@\space\PackageWarning{bidi}{Illegal value (#1) for ab-
    jad numeral}%
204 \else
205 \ifnum#1<10\expandafter\abj@num@i\number#1%
206 \else
207 \ifnum#1<100\expandafter\abj@maghribi@num@ii\number#1%
208 \else
209 \ifnum#1<\@m\expandafter\abj@maghribi@num@iii\number#1%
210 \else
211 \ifnum#1<\@M\expandafter\abj@maghribi@num@iv\number#1%
212 \fi
213 \fi
214 \fi
215 \fi
216 \fi
217 \fi
218 }
219
220 \def\hebrewnumeral#1{%
221 \ifnum#1>9999 \PackageWarning{bidi}{Illegal value (#1) for Hebrew nu-
    meral} {#1}
222 \else
223 \ifnum#1<\z@\space\PackageWarning{bidi}{Illegal value (#1) for He-
    brew numeral}%
224 \else
225 \ifnum#1<10\expandafter\heb@num@i\number#1%
226 \else
227 \ifnum#1<100\expandafter\heb@num@ii\number#1%
228 \else
229 \ifnum#1<\@m\expandafter\heb@num@iii\number#1%
230 \else
231 \ifnum#1<\@M\expandafter\heb@num@iv\number#1%
232 \fi
233 \fi

```

```

234      \fi
235      \fi
236      \fi
237 \fi
238 }
239 %

```

### 3.8.1 Symbol for zero

By default the *abjad* symbol for zero is not defined, but if a package writer or user owns or develops a font containing appropriate glyphs (e.g. as found in medieval manuscripts), it can be easily redefined.

```

240 \def\abjad@zero{}
241 \def\hebnum@zero{}

```

### 3.8.2 Definitions of alphanumeric characters

```

242 \def\abj@num@i#1{%
243   \ifcase#1\or\char"0627 \or\char"0628 \or\char"062C \char"200D\or\char"062F %
244     \or\char"0647 \or\char"0648 \or\char"0632 \or\char"062D \or\char"0637 \fi
245   \ifnum#1=\z@\abjad@zero\fi}
246 \def\abj@num@ii#1{%
247   \ifcase#1\or\char"064A \or\char"0643 \or\char"0644 \or\char"0645 \or\char"0646 %
248     \or\char"0633 \or\char"0639 \or\char"0641 \or\char"0635 \fi
249   \ifnum#1=\z@\fi\abj@num@i}
250 \def\abj@num@iii#1{%
251   \ifcase#1\or\char"0642 \or\char"0631 \or\char"0634 \or\char"062A \or\char"062B %
252     \or\char"062E \or\char"0630 \or\char"0636 \or\char"0638 \fi
253   \ifnum#1=\z@\fi\abj@num@ii}
254 \def\abj@num@iv#1{%
255   \ifcase#1\or\char"063A \fi
256   \ifnum#1=\z@\fi\abj@num@iii}
257
258 %maghribi ش -> غ ط -> ص س -> ش ص -> ص ص -> س
259 \def\abj@maghribi@num@ii#1{%
260   \ifcase#1\or\char"064A \or\char"0643 \or\char"0644 \or\char"0645 \or\char"0646 %
261     \or\char"0635 \or\char"0639 \or\char"0641 \or\char"0636 \fi
262   \ifnum#1=\z@\abjad@zero\fi\abj@num@i}

```

```

263 \def\abj@maghribi@num@iii#1{%
264 \ifcase#1\or\char"0642 \or\char"0631 \or\char"0633 \or\char"062A \or\char"062B %
265 \or\char"062E \or\char"0630 \or\char"0638 \or\char"063A \fi
266 \ifnum#1=\z@\fi\abj@maghribi@num@ii}
267 \def\abj@maghribi@num@iv#1{%
268 \ifcase#1\or\char"0634 \fi
269 \ifnum#1=\z@\fi\abj@maghribi@num@iii}
270
271 %Hebrew alphabetic numerals (primitive implementation -- the code in Ba-
    bel is more complex):
272 \def\heb@num@i#1{%
273 \ifcase#1\or\char"05D0 \or\char"05D1 \or\char"05D2 \or\char"05D3 \or\char"05D4 %
274 \or\char"05D5 \or\char"05D6 \or\char"05D7 \or\char"05D8 \fi
275 \ifnum#1=\z@\fi\heb@num@zero\fi}
276 \def\heb@num@ii#1{%
277 \ifcase#1\or\char"05D9 \or\char"05DB \or\char"05DC \or\char"05DE \or\char"05E0 %
278 \or\char"05E1 \or\char"05E2 \or\char"05E4 \or\char"05E6 \fi
279 \ifnum#1=\z@\fi\heb@num@i}
280 \def\heb@num@iii#1{%
281 \ifcase#1\or\char"05E7 \or\char"05E8 \or\char"05E9 \or\char"05EA \or\char"05DA %
282 \or\char"05DD \or\char"05DF \or\char"05E3 \or\char"05E5 \fi
283 \ifnum#1=\z@\fi\heb@num@ii}
284 \def\heb@num@iv#1{%
285 \ifcase#1\or\char"05D0\char"05F3 \or\char"05D1\char"05F3 \or\char"05D2\char"05F3 %
286 \or\char"05D3\char"05F3 \or\char"05D4\char"05F3 \or\char"05D5\char"05F3 %
287 \or\char"05D6\char"05F3 \or\char"05D7\char"05F3 \or\char"05D8\char"05F3 \fi
288 \ifnum#1=\z@\fi\heb@num@iii}
289 %TODO [optionally]
290 % -insert gereshayim (\char"05F4) before last letter of a se-
    quence of two letters or more
291 % -insert geresh (\char"05F3) after letter if it is alone

```