

Babel support for the German language (traditional orthography)

Johannes Braams Bernd Raichle Walter Schmidt
Jürgen Spitzmüller*

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Abstract

This manual documents the babel language definition file `germanb.ldf` for German (traditional orthography). The file is part of the babel-german bundle.

1 Aim and usage

The file `germanb.ldf` provides the babel package with all language definition macros (language specific strings and settings) for the German language, including the Austrian and Swiss varieties of German. Furthermore, it assures that the correct hyphenation patterns for the respective language or variety are used.¹ The file adheres to the traditional (1901–1996) orthography. For reformed (post-1996) German orthography support, please refer to the complementary `ngermanb.ldf` file.

In order to use the language definitions provided here, you need to use the babel package and pass the respective language name as an option, either of

- `\usepackage[german]{babel}`
- `\usepackage[austrian]{babel}`
- `\usepackage[swissgerman]{babel}`

Please consult the babel manual [2] for details.

2 Shorthands

For all three varieties of German, the character " is made active in order to provide some shorthand macros. Some of these shorthands address a peculiarity of traditional German spelling: consonantal character combinations that change in the context of

*Current maintainer. Please report issues via <https://github.com/jspitz/babel-german>.

¹The file `germanb.ldf` started as a re-implementation of the package `german.sty` (v. 2.5b), which was originally developed by Hubert Partl (cf. [3]) and later maintained by Bernd Raichle (cf. [4]). The re-implementation was done by Johannes Braams.

hyphenations. Other shorthands are provided for frequently used special characters as well for better control of hyphenation, line breaks and ligatures. Table 1 provides an overview of the shorthands that are provided by `germanb.ldf`.

Table 1: Shorthands provided by `germanb.ldf`

"a	Umlaut ⟨ä⟩ (shorthand for <code>\a</code>). Similar shorthands are available for all other lower- and uppercase vowels (umlauts: "a, "o, "u, "A, "O, "U; tremata: "e, "i, "E, "I).
"s	German ⟨ß⟩ (shorthand for <code>\ss{}</code>).
"z	German ⟨ß⟩ (shorthand for <code>\ss{}</code>). The difference to "s is the uppercase version.
"ck	⟨ck⟩, hyphenated as ⟨k-k⟩.
"ff	⟨ff⟩, hyphenated as ⟨ff-f⟩; this is also implemented for ⟨l⟩, ⟨m⟩, ⟨n⟩, ⟨p⟩, ⟨r⟩ and ⟨t⟩.
"S	<code>\uppercase{"s}</code> , typeset as ⟨SS⟩ (⟨ß⟩ must be written as ⟨SS⟩ [or ⟨SZ⟩, see below] in uppercase writing).
"Z	<code>\uppercase{"z}</code> , typeset as ⟨SZ⟩ (⟨ß⟩ must be written as ⟨SZ⟩ [or ⟨SS⟩, see above] in uppercase writing).
"	Disable ligature at this position (e. g., at morpheme boundaries, as in Auf" lage).
"-	An additional breakpoint that does still allow for hyphenation at the breakpoints preset in the hyphenation patterns (as opposed to <code>\-</code>).
" "	A breakpoint that does not output a hyphen if the line break is performed (useful for compound words with hyphen, e. g., (Un-) "Sinn).
"~	An explicit hyphen without a breakpoint. Useful for cases where the hyphen should stick at the following word, e. g., bergauf und "~ab .
"=	An explicit hyphen with a breakpoint, allowing for hyphenation at the other points preset in the hyphenation patterns (as opposed to plain <code>-</code>); useful for long compounds.
"'	German left double quotes ⟨„⟩.
"'	German right double quotes ⟨”⟩.
"<	French/Swiss left double quotes ⟨«⟩.
">	French/Swiss right double quotes ⟨»⟩.

Table 2 lists some babel macros for quotation marks that might be used as an alternative to the quotation mark shorthands provided by `germanb.ldf`.

Table 2: Alternative commands for quotation marks (provided by babel)

<code>\glqq</code>	German left double quotes ⟨„⟩.
<code>\grqq</code>	German right double quotes ⟨”⟩.
<code>\glq</code>	German left single quotes ⟨,⟩.
<code>\grq</code>	German right single quotes ⟨’⟩.
<code>\flqq</code>	French/Swiss left double quotes ⟨«⟩.
<code>\frqq</code>	French/Swiss right double quotes ⟨»⟩.
<code>\flq</code>	French/Swiss left single quotes ⟨<⟩.
<code>\frq</code>	French/Swiss right single quotes ⟨>⟩.
<code>\dq</code>	The straight quotation mark character ⟨"⟩.

3 Implementation

3.1 General settings

If `germanb.ldf` is read via the babel option `germanb`, we make it behave as if `german` was specified.

```
1 \def\bbl@tempa{germanb}
2 \ifx\CurrentOption\bbl@tempa
3   \def\CurrentOption{german}
4   \ifx\l@german\@undefined
5     \@nopatterns{German}
6     \adddialect\l@german0
7   \fi
8   \let\l@germanb\l@german
9   \AtBeginDocument{%
10     \let\captionsgermanb\captionsgerman
11     \let\dategermanb\dategerman
12     \let\extrasgermanb\extrasgerman
13     \let\noextrasgermanb\noextrasgerman
14   }
15 \fi
```

The macro `\LdfInit` takes care of preventing that this file is loaded more than once, checking the category code of the `@` sign, etc.

```
16 \LdfInit\CurrentOption{captions\CurrentOption}
```

If `germanb.ldf` is read as an option, i.e. via `\usepackage` command, `german` could be an ‘unknown’ language, so we have to make it known. We check for the existence of `\l@german` to see whether we have to do something here.

```
17 \ifx\l@german\@undefined
18   \@nopatterns{German (trad. orthography)}
19   \adddialect\l@german0
20 \fi
```

We set `austrian` as a dialect of `german`, since the Austrian variety uses the same hyphenation patterns as Germany’s Standard German.

```
21 \def\bbl@tempa{austrian}
22 \ifx\CurrentOption\bbl@tempa
23   \ifx\l@austrian\@undefined
24     \ifx\l@german\@undefined
25       \@nopatterns{Austrian (trad. orthography) and German (trad. orthography)}
26       \adddialect\l@austrian0
27     \else
28       \@nopatterns{Austrian (trad. orthography)}
29       \adddialect\l@austrian\l@german
30     \fi
31   \fi
32 \fi
```

For the Swiss variety, we attempt to load the specific `swissgerman` hyphenation patterns and fall back to `german` if those are not available.

```

33 \def\bbl@tempa{swissgerman}
34 \ifx\CurrentOption\bbl@tempa
35   \ifx\l@swissgerman\@undefined
36     \ifx\l@german\@undefined
37       \nopatterns{Swiss German (trad. orthography) and German (trad. orthography)}
38       \adddialect\l@swissgerman0
39     \else
40       \nopatterns{Swiss German (trad. orthography)}
41       \adddialect\l@swissgerman\l@german
42     \fi
43 \fi
44 \fi

```

3.2 Language-specific strings (captions)

The next step consists of defining macros that provide language specific strings and settings.

`\@captionsgerman` The macro `\@captionsgerman` defines all strings used in the four standard document classes provided with \LaTeX for German. This is an internal macro that is inherited and modified by the following macros for the respective language varieties.

```

45 \@namedef{@captionsgerman}{%
46   \def\prefacename{Vorwort}%
47   \def\refname{Literatur}%
48   \def\abstractname{Zusammenfassung}%
49   \def\bibname{Literaturverzeichnis}%
50   \def\chaptername{Kapitel}%
51   \def\appendixname{Anhang}%
52   \def\contentsname{Inhaltsverzeichnis}% % oder nur: Inhalt
53   \def\listfigurename{Abbildungsverzeichnis}%
54   \def\listtablename{Tabellenverzeichnis}%
55   \def\indexname{Index}%
56   \def\figurename{Abbildung}%
57   \def\tablename{Tabelle}% % oder: Tafel
58   \def\partname{Teil}%
59   \def\enclname{Anlage(n)}%
60   \def\ccname{Verteiler}% % oder: Kopien an
61   \def\headtoname{An}%
62   \def\pagename{Seite}%
63   \def\seename{siehe}%
64   \def\alsoname{siehe auch}%
65   \def\proofname{Beweis}%
66   \def\glossaryname{Glossar}%
67 }

```

`\captionsgerman` The macro `\captionsgerman` is identical to `\@captionsgerman`, but only defined if `german` is requested.

```

68 \def\bbl@tempa{german}
69 \ifx\CurrentOption\bbl@tempa

```

```

70 \namedef{captionsgerman}{%
71   \@nameuse{@captionsgerman}%
72 }
73 \fi

```

`\captionsaustrian` The macro `\captionsaustrian` builds on `\@captionsgerman`, but redefines some strings following Austrian conventions (for the respective variants, cf. [1]).

```

74 \def\bbl@tempa{austrian}
75 \ifx\CurrentOption\bbl@tempa
76   \namedef{captionsaustrian}{%
77     \@nameuse{@captionsgerman}%
78     \def\enclname{Beilage(n)}%
79   }
80 \fi

```

`\captionsswissgerman` The macro `\captionsswissgerman` builds on `\@captionsgerman`, but redefines some strings following Swiss conventions (for the respective variants, cf. [1]).

```

81 \def\bbl@tempa{swissgerman}
82 \ifx\CurrentOption\bbl@tempa
83   \namedef{captionsswissgerman}{%
84     \@nameuse{@captionsgerman}%
85     \def\enclname{Beilage(n)}%
86   }
87 \fi

```

3.3 Date localizations

`\month@german` The macro `\month@german` defines German month names for all varieties.

```

88 \def\month@german{\ifcase\month\or
89   Januar\or Februar\or M"arz\or April\or Mai\or Juni\or
90   Juli\or August\or September\or Oktober\or November\or Dezember\fi}

```

`\dategerman` The macro `\dategerman` redefines the command `\today` to produce German dates.

```

91 \def\bbl@tempa{german}
92 \ifx\CurrentOption\bbl@tempa
93   \def\dategerman{\def\today{\number\day.\~\month@german
94     \space\number\year}}
95 \fi

```

`\dateswissgerman` The macro `\dateswissgerman` does the same for Swiss German dates. The result is identical to German.

```

96 \def\bbl@tempa{swissgerman}
97 \ifx\CurrentOption\bbl@tempa
98   \def\dateswissgerman{\def\today{\number\day.\~\month@german
99     \space\number\year}}
100 \fi

```

`\dateaustrian` The macro `\dateaustrian` redefines the command `\today` to produce Austrian versions of the German dates. Here, the naming of January („Jänner“) differs from the other German varieties.

```

101 \def\bbl@tempa{austrian}
102 \ifx\CurrentOption\bbl@tempa
103   \def\dateaustrian{\def\today{\number\day.\sim\ifnum1=\month
104     J\"anner\else \month@german\fi \space\number\year}}
105 \fi

```

3.4 Extras

`\extrasgerman` The macros `\extrasgerman`, `\extrasaustrian` and `\extrasswissgerman`, respectively, will perform all the extra definitions needed for the German language or the respective variety. The macro `\noextrasgerman` is used to cancel the actions of `\extrasgerman`. `\noextrasgerman`, `\noextrasaustrian` and `\noextrasswissgerman` behave analogously.

`\noextrasaustrian` For all German varieties, the character " is made active. This is done once, later on its definition may vary.

```

106 \initiate@active@char{"}
107 \@namedef{extras\CurrentOption}{%
108   \languageshorthands{german}}
109 \expandafter\addto\csname extras\CurrentOption\endcsname{%
110   \bbl@activate{"}}

```

Turn the shorthands off again outside of German.

```

111 \expandafter\addto\csname noextras\CurrentOption\endcsname{%
112   \bbl@deactivate{"}}

```

In order for \TeX to be able to hyphenate German words which contain ‘ß’ (in the OT1 position ^^Y) we have to give the character a nonzero `\lccode` (see Appendix H, the \TeX book).

```

113 \expandafter\addto\csname extras\CurrentOption\endcsname{%
114   \babel@savevariable{\lccode25}%
115   \lccode25=25}

```

The umlaut accent macro `\` is changed to lower the umlaut dots. The redefinition is done with the help of `\umlautlow`.

```

116 \expandafter\addto\csname extras\CurrentOption\endcsname{%
117   \babel@save"\umlautlow}

118 \expandafter\addto\csname noextras\CurrentOption\endcsname{%
119   \umlauthigh}

```

The German hyphenation patterns can be used with `\lefthyphenmin` and `\righthyphenmin` set to 2.

```

120 \providehyphenmins{\CurrentOption}{\tw@\tw@}

```

For German texts we need to assure that `\frenchspacing` is turned on.

```

121 \expandafter\addto\csname extras\CurrentOption\endcsname{%
122   \bbl@frenchspacing}
123 \expandafter\addto\csname noextras\CurrentOption\endcsname{%
124   \bbl@nonfrenchspacing}

```

3.5 Active characters, macros & shorthands

The following code is necessary because we need an extra active character. This character is then used as indicated in table 1.

In order to be able to define the function of " , we first define a couple of ‘support’ macros.

`\dq` We save the original double quotation mark character in `\dq` to keep it available, the math accent `\"` can now be typed as `\`.

```
125 \begingroup \catcode'\ "12
126 \def\x{\endgroup
127 \def\@SS{\mathchar"7019 }
128 \def\dq{"}}
129 \x
```

Now we can define the doublequote shorthands: the umlauts,

```
130 \declare@shorthand{german}{a}{\textormath{\ "{a}\allowhyphens}{\ddot a}}
131 \declare@shorthand{german}{o}{\textormath{\ "{o}\allowhyphens}{\ddot o}}
132 \declare@shorthand{german}{u}{\textormath{\ "{u}\allowhyphens}{\ddot u}}
133 \declare@shorthand{german}{A}{\textormath{\ "{A}\allowhyphens}{\ddot A}}
134 \declare@shorthand{german}{O}{\textormath{\ "{O}\allowhyphens}{\ddot O}}
135 \declare@shorthand{german}{U}{\textormath{\ "{U}\allowhyphens}{\ddot U}}
```

tremata,

```
136 \declare@shorthand{german}{e}{\textormath{\ "{e}}{\ddot e}}
137 \declare@shorthand{german}{E}{\textormath{\ "{E}}{\ddot E}}
138 \declare@shorthand{german}{i}{\textormath{\ "{i}}{\%
139 {\ddot\imath}}
140 \declare@shorthand{german}{I}{\textormath{\ "{I}}{\ddot I}}
```

German ß,

```
141 \declare@shorthand{german}{s}{\textormath{\ss}{\@SS{}}}
142 \declare@shorthand{german}{S}{\SS}
143 \declare@shorthand{german}{z}{\textormath{\ss}{\@SS{}}}
144 \declare@shorthand{german}{Z}{SZ}
```

German and French/Swiss quotation marks,

```
145 \declare@shorthand{german}{" '}{\glqq}
146 \declare@shorthand{german}{" '}{\grqq}
147 \declare@shorthand{german}{"<}{\flqq}
148 \declare@shorthand{german}{">}{\frqq}
```

discretionary commands

```
149 \declare@shorthand{german}{c}{\textormath{\bbl@disc ck}{c}}
150 \declare@shorthand{german}{C}{\textormath{\bbl@disc CK}{C}}
151 \declare@shorthand{german}{F}{\textormath{\bbl@disc F{FF}}{F}}
152 \declare@shorthand{german}{l}{\textormath{\bbl@disc l{ll}}{l}}
153 \declare@shorthand{german}{L}{\textormath{\bbl@disc L{LL}}{L}}
154 \declare@shorthand{german}{m}{\textormath{\bbl@disc m{mm}}{m}}
155 \declare@shorthand{german}{M}{\textormath{\bbl@disc M{MM}}{M}}
156 \declare@shorthand{german}{n}{\textormath{\bbl@disc n{nn}}{n}}
```

```

157 \declare@shorthand{german}{ "N" {\textormath{\bbl@disc N{NN}}{N}}
158 \declare@shorthand{german}{ "p" {\textormath{\bbl@disc p{pp}}{p}}
159 \declare@shorthand{german}{ "P" {\textormath{\bbl@disc P{PP}}{P}}
160 \declare@shorthand{german}{ "r" {\textormath{\bbl@disc r{rr}}{r}}
161 \declare@shorthand{german}{ "R" {\textormath{\bbl@disc R{RR}}{R}}
162 \declare@shorthand{german}{ "t" {\textormath{\bbl@disc t{tt}}{t}}
163 \declare@shorthand{german}{ "T" {\textormath{\bbl@disc T{TT}}{T}}

(we need to treat "f a bit differently in order to preserve the ff-ligature)

164 \declare@shorthand{german}{ "f" {\textormath{\bbl@discff}{f}}
165 \def\bbl@discff{\penalty\@M
166   \afterassignment\bbl@insertff \let\bbl@nextff= }
167 \def\bbl@insertff{%
168   \if f\bbl@nextff
169     \expandafter\@firstoftwo\else\expandafter\@secondoftwo\fi
170     {\relax\discretionary{ff-}{f}{ff}\allowhyphens}{f\bbl@nextff}}
171 \let\bbl@nextff=f

and some additional commands (hyphenation and ligature control):

172 \declare@shorthand{german}{ "-" {\nobreak\-\bbl@allowhyphens}
173 \declare@shorthand{german}{ "|" }{%
174   \textormath{\penalty\@M\discretionary{-}{-}{\kern.03em}%
175     \allowhyphens}}
176 \declare@shorthand{german}{ " " }{\hskip\z@skip}
177 \declare@shorthand{german}{ "~" {\textormath{\leavevmode\hbox{-}{-}}{-}}
178 \declare@shorthand{german}{ "=" {\penalty\@M-\hskip\z@skip}

```

\mdqon All that's left to do now is to define a couple of commands for reasons of compatibility
\mdqoff with german.sty.

```

\ck 179 \def\mdqon{\shorthandon{}}
180 \def\mdqoff{\shorthandoff{}}
181 \def\ck{\allowhyphens\discretionary{k-}{k}{ck}\allowhyphens}

```

The macro \ldf@finish takes care of looking for a configuration file, setting the main language to be switched on at \begin{document} and resetting the category code of @ to its original value.

```

182 \ldf@finish\CurrentOption

```

3.6 austrian.ldf, german.ldf and swissgerman.ldf

Babel expects a *<lang>.ldf* file for each *<lang>*. So we create portmanteau ldf files for austrian, german and swissgerman.² These files themselves only load germanb.ldf, which does the real work:

```

183 \input germanb.ldf\relax

```

²For some austrian and german, this is not strictly necessary, since babel provides aliases for these languages (pointing to germanb). However, since babel does not officially support these aliases anymore after the language definition files have been separated from the core, we provide the whole range of ldf files for the sake of completeness.

Change History

Version 1.0a	Version 2.2a
General: Incorporated Nico's comments 1	General: Renamed babel.sty in babel.com 1
Version 1.0b	Version 2.2d
General: fixed typo in definition for austrian language found by Werenfried Spit nspit@fys.ruu.nl . 1	General: Removed use of \@ifundefined 3
Version 1.0c	Version 2.3
General: Fixed some typos 1	General: Rewritten parts of the code to use the new features of babel version 3.1 1
Version 1.1	Version 2.3e
\noextrasgerman: Added \dieresis . . 6	\@captionsgerman: Added \prefacename, \seename and \alsoname 4
General: When using PostScript fonts with the Adobe fontencoding, the dieresis-accent is located elsewhere, modified germanb 1	\dategerman: Added \month@german . . 5
Version 1.1a	General: Added \save@sf@q macro and rewrote all quote macros to use it . 7
General: Modified the documentation somewhat 1	Added warning, if no german patterns loaded 3
Version 2.0	Brought up-to-date with german.tex v2.3e (plus some bug fixes) [br] . . . 1
General: Modified for babel 3.0 1	Version 2.3h
Now use \adddialect for austrian . . 3	General: moved definition of \allowhyphens, \set@low@box and \save@sf@q to babel.com 7
Now use \adddialect if language undefined 3	Version 2.4
Version 2.0a	\@captionsgerman: \headpagename should be \pagename 4
General: Removed some problems in change log 1	Version 2.5
Version 2.0b	General: Update or $\TeX 2\epsilon$ 1
\extrasgerman: added some comment chars to prevent white space 6	Version 2.5c
\noextrasgerman: added some comment chars to prevent white space 6	General: Now use \@nopatterns to produce the warning 3
Version 2.1	Removed the use of \filedate and moved the identification after the loading of babel.def 1
General: Removed bug found by van der Meer 1	Version 2.6a
Version 2.2	\noextrasswissgerman: All the code to handle the active double quote has been moved to babel.def 6
\@captionsgerman: \pagename should be \headpagename 4	Removed \3 as it is no longer in germanb.ldf 6
Removed \global definitions 4	use \germanhyphenmins to store the correct values 6
\extrasgerman: Save all redefined macros 6	General: \umlautlow and \umlauthigh moved to glyphs.dtx, as well as
\noextrasgerman: Try to restore everything to its former state 6	
General: Removed global assignments, brought uptodate with german.tex v2.3d 1	

\newumlaut (now \lower@umlaut . . . 6	Version 2.6j
Moved all quotation characters to	\@captionsgerman: Added
glyphs.dtx 7	\glossaryname 4
Moved the identification to the top	\noextrasswissgerman: Now use
of the file 1	\providehyphenmins to provide a
Rewrote the code that handles the	default value 6
active double quote character 1	Version 2.6k
Use \ddot instead of \MATHUMLAUT . 7	\noextrasswissgerman: Turn
Version 2.6b	frenchspacing on, as in german.sty 6
\@captionsgerman: Added \proofname	Version 2.6l
for AMS- \TeX 4	General: Making germanb behave like
Version 2.6c	german needs some more work
\noextrasswissgerman: Use decimal	besides defining \CurrentOption . . 3
number instead of hat-notation as	Version 2.6m
the hat may be activated 6	General: Corrected a typo 3
General: added the \allowhyphens . . . 7	Version 2.7
Moved \german@dq@disc to	\@captionsgerman: Changed \enclname
babel.def, calling it \bbl@disc . . . 7	in austrian to <i>Beilage(n)</i> 4
Version 2.6d	Split \captionsgerman from
\@captionsgerman: Construct control	\captionsaustrian and
sequence on the fly 4	\captionsswissgerman. 4
\noextrasswissgerman: Construct control	\dateswissgerman: Added
sequence \extrasgerman or	\dateswissgerman. 5
\extrasaustrian on the fly 6	\noextrasswissgerman: Added
General: Moved the definition of	\extrasswissgerman and
\atcatcode right to the beginning. . 1	\noextrasswissgerman. 6
Now use \ldf@finish to wrap up . . . 8	Deactivate shorthands also outside
Now use \LdfInit to perform initial	of austrian and swissgerman. 6
checks 3	Do not use \@namedef when
Replaced \undefined with	\noextrasswissgerman is already defined and
\@undefined and \empty with	should not be overwritten. 6
\@empty for consistency with \TeX . 1	General: Added support for variety
Version 2.6f	swissgerman. 1
\ck: Now use \shorthandon and	Generate portmanteau files
\shorthandoff 8	austrian.ldf, german.ldf and
\dateaustrian: use \def instead of	swissgerman.ldf. 8
\edef 6	Revised austrian support. 1
Use \edef to define \today to save	Revised documentation: Turn the
memory 6	babel manual chapter into a
\dategerman: use \def instead of \edef 5	self-enclosed manual. 1
Use \edef to define \today to save	Version 2.7b
memory 5	General: Do not warn about missing
General: Copied the coding for "f	swissgerman patterns if
from german.dtx version 2.5d 8	swissgerman is not loaded 3
use \SS instead of SS, removed	Version 2.8
braces after \ss 7	\@captionsgerman: Define
Version 2.6i	trans-variational base captions
\noextrasswissgerman: Deactivate	which are loaded and modified by
shorthands outside of German. . . . 6	the varieties 4

<code>\captionsaustrian</code> : Only define <code>\captionsaustrian</code> if austrian is requested.	5	<code>\dateaustrian</code> if austrian is requested.	6
<code>\captionsgerman</code> : Only define <code>\captionsgerman</code> if german is requested.	4	<code>\dategerman</code> : Only define <code>\dategerman</code> if german is requested.	5
<code>\captionsswissgerman</code> : Only define <code>\captionsswissgerman</code> if swissgerman is requested.	5	<code>\dateswissgerman</code> : Only define <code>\dateswissgerman</code> if swissgerman is requested.	5
<code>\dateaustrian</code> : Only define		General: Only add Austrian dialect if austrian is loaded	3

References

- [1] Ammon, Ulrich et al.: *Variantenwörterbuch des Deutschen. Die Standardsprache in Österreich, der Schweiz und Deutschland sowie in Liechtenstein, Luxemburg, Ostbelgien und Südtirol*. Berlin, New York: De Gruyter.
- [2] Braams, Johannes and Bezos, Javier: *Babel*. <http://www.ctan.org/pkg/babel>.
- [3] Partl, Hubert: *German T_EX, TUGboat* 9 (1988) #1, p. 70–72.
- [4] Raichle, Bernd: *German*. <http://www.ctan.org/pkg/german>.