

xpinyin 宏包

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第 1 节 简介

xpinyin 是一个 L^AT_EX 宏包, 提供了为汉字自动注音的功能。

第 2 节 基本用法

xpinyin 支持采用 GBK 和 UTF-8 编码的 T_EX 源文件, 建议总是使用 UTF-8。如果使用 L^AT_EX 或 pdfL^AT_EX 的编译方式, 则根据编码的情况, xpinyin 依赖 CJK 或者 CJKutf8 宏包。如果使用 XeL^AT_EX, 则依赖 xeCJK 宏包。如果它们没有在 xpinyin 之前被载入, xpinyin 将根据编译方式自动选择, L^AT_EX 或 pdfL^AT_EX 将使用 CJKutf8。

xpinyin 还依赖 l3kernel 和 l3packages, 使用 (pdf)L^AT_EX 下的 GBK 编码时, 还将依赖 xCJK2uni。

需要注意的是, xpinyin 缺省将拼音的字体设置为与文档的主字体 (`\normalfont`) 相同, 所以为了保证声调字母的正确输出, 应该选用合适的西文主字体。也可以通过将在下一节介绍的 `(font)` 选项来单独设置拼音的字体。

X_YL^AT_EX 下的简单示例:

```
\documentclass{article}
\usepackage{xeCJK}
\usepackage{xpinyin}
\setmainfont{CMU Serif}
\setCJKmainfont{SimSun}

\begin{document}
\xpinyin*{汉语拼音示例}
\end{document}
```

(pdf)L^AT_EX 下的简单示例:

```
\documentclass{article}
\usepackage{CJKutf8}
\usepackage{xpinyin}
\usepackage[T1]{fontenc}
\usepackage{lmodern}

\begin{document}
\begin{CJK}{UTF8}{gbsn}
\xpinyin*{汉语拼音示例}
\end{CJK}
\end{document}
```

运行上述示例要求系统安装了设置的字体, 源文件用 UTF-8 编码保存, 使用相应的编译方式。

xpinyin 可以与 ctex 宏包或文档类共同使用, 使用方式与上面类似。

*ctex-kit rev. 25c0591.

第3节 用户手册

`pinyinscope` `\begin{pinyinscope} [⟨options⟩]`

.....

`\end{pinyinscope}`

为 `pinyinscope` 环境中的汉字自动注音。例如

```
1 \begin{pinyinscope}
2 列位看官：你道此书从何而来？说起根由，虽近荒唐，细按则深有趣味。
3 待在下将此来历注明，方使阅者\xpinyin{了}{liao3}然不惑。
4 \end{pinyinscope}
```

列位看官：你道此书从何而来？说起根由，虽近荒唐，细按则深有趣味。待在下将此来历注明，方使阅者了然不惑。

可选项 `⟨options⟩` 用于局部设置拼音的格式，将在下面说明。

`\xpinyin` `\xpinyin [⟨options⟩] {⟨单个汉字⟩} {⟨拼音⟩}`

`\xpinyin* [⟨options⟩] {⟨文字⟩}`

对于多音字，可以使用 `\xpinyin` 为其设置拼音；而 `\xpinyin*` 相当于 `pinyinscope` 环境的命令形式。`\xpinyin` 可以在 `pinyinscope` 环境和 `\xpinyin*` 中使用。例如，

长
甄士隐梦幻识通灵
重要

```
1 \xpinyin{长}{chang2}\\\
2 \xpinyin*{甄士隐梦幻识通灵}\\\
3 \xpinyin*{\xpinyin{重}{zhong4}}要}
```

`\pinyin` `\pinyin [⟨options⟩] {⟨拼音⟩}`

用于输出拼音，为了输入的方便 `ü` 可以用 `v` 代替。例如，

lǚ zi

nǚ hái zi

```
1 \pinyin{lv2zi}\\\
2 \pinyin{nv3hai2zi}
```

`\setpinyin` `\setpinyin {⟨汉字⟩} {⟨拼音⟩}`

`xpinyin` 宏包的拼音数据 (`xpinyin-database.def`) 来源于 Unicode 的 UniHan 数据库¹中的 `UniHan_Readings.txt` 文件。对于多音字，一般来说这个文件选用的是常用读音。可以使用 `\setpinyin` 来设置多音字的首选读音。

`\xpinyinsetup` `\xpinyinsetup {⟨key1⟩=⟨val1⟩, ⟨key2⟩=⟨val2⟩, ... }`

用于在导言区或文档中，设置拼音的格式。目前可以设置的 `⟨key⟩` 如下介绍。

`ratio` `ratio = {⟨number⟩}`

设置拼音字体大小与当前正文字体大小的比例，缺省值是 0.4。

`vsep` `vsep = {⟨dimen⟩}`

设置拼音的基线与汉字基线的间距，缺省值是 1 em。

`hsep` `hsep = {⟨skip⟩}`

设置注音汉字之间的间距，缺省值与 `\CJKglue` 的值相同。为了断行时行末的对齐，设置的 `⟨skip⟩` 最后有一定的弹性。例如

```
1 \xpinyin*[ratio={.7},hsep={.5em plus .1em},vsep={1.1em}]{贾雨村风尘怀闺秀}
```

jiǎ yǔ cūn fēng chén huái guī xiù
贾雨村风尘怀闺秀

¹<http://www.unicode.org/Public/UNIDATA/UniHan.zip>

pysep `pysep = {\glue}`

设置 `\pinyin` 输出的相邻两个汉语拼音的空白, 缺省值是一个空格。

font `font = {\font}`

设置拼音的字体, 缺省值是 `\normalfont`, 即以正文西文字体相同。为了保证拼音能正确输出, 最好选用收字量较大的西文字体。

format `format = {\format}`

设置拼音的其它格式, 例如颜色等, 缺省值为空。

multiple `multiple = {\format}`

设置多音字拼音的其它格式, 缺省值为空。可以通过这个选项来提醒校正多音字的拼音。例如本文档设置多音字拼音的颜色是红色(需要载入 `color` 宏包):

```
\xpinyinsetup{multiple={\color{red}}}
```

footnote `footnote = <true|false>`

New: 2014/01/12

是否对拼音环境中的脚注(`\footnote`)汉字加上拼音。缺省值为 `false`。更一般的情况, 请使用 `\disablepinyin`。

`\disablepinyin`
`\enablepinyin`

New: 2014/01/12

`\disablepinyin` 用于在拼音环境(`pinyin scope`)中临时取消对汉字的注音, 而 `\enablepinyin` 用于其后的恢复。

第 4 节 代码实现

```
1 <*package>
2 <@@=xpinyin>
3 \msg_new:nnn { xpinyin } { l3-too-old }
4 {
5   Support~package~'expl3'~too~old. \\\
6   Please~update~an~up~to~date~version~of~the~bundles\\\
7   'l3kernel'~and~'l3packages'\\\
8   using~your~TeX~package~manager~or~from~CTAN.
9 }
10 \ifpackage later { expl3 } { 2015/09/24 } { }
11 { \msg_error:nn { xpinyin } { l3-too-old } }
12 \msg_new:nnn { xpinyin } { engine-not-supported }
13 { Engine~'\c_sys_engine_str'~is~not~yet~supported,~xpinyin~will~abort! }
14 \bool_if:nF
15 {
16   \sys_if_engine_xetex_p: ||
17   \sys_if_engine_pdftex_p:
18 }
19 { \msg_critical:nn { xpinyin } { engine-not-supported } }
20 \RequirePackage { xparse }
21 \RequirePackage { l3keys2e }
```

`\c__xpinyin_tone_prop` 重音标记 `\``、`\'` 和 `\=` 在 `tabbing` 环境中被移作他用, 为避免错误, 我们使用内部命令 `\@tabacckludge` 或 `\a` 来定义。

```
22 \prop_new:N \c__xpinyin_tone_prop
23 \clist_map_inline:nn
24 {
25   { ā }{ \@tabacckludge= a } ,           { á }{ \@tabacckludge' a } ,
26   { ä }{ \v a } ,                       { à }{ \@tabacckludge` a } ,
```

```

27 { ǒ }{ \@tabacckludge= o } , { ó }{ \@tabacckludge' o } ,
28 { ǒ }{ \v o } , { ò }{ \@tabacckludge` o } ,
29 { ē }{ \@tabacckludge= e } , { é }{ \@tabacckludge' e } ,
30 { ě }{ \v e } , { è }{ \@tabacckludge` e } ,
31 { ū }{ \@tabacckludge= u } , { ú }{ \@tabacckludge' u } ,
32 { ů }{ \v u } , { ù }{ \@tabacckludge` u } ,
33 { ě }{ \@tabacckludge' m } , { ñ }{ \@tabacckludge' n } ,
34 { ñ }{ \v n } , { ñ }{ \@tabacckludge` n } ,
35 { ī }{ \@tabacckludge= { \i } } , { í }{ \@tabacckludge' { \i } } ,
36 { ĭ }{ \v { \i } } , { ï }{ \@tabacckludge` { \i } } ,
37 { ü }{ \" u } , { ũ }{ \@tabacckludge' { \" u } } ,
38 { ū }{ \@tabacckludge= { \" u } } , { ü }{ \@tabacckludge` { \" u } } ,
39 { ů }{ \v { \" u } } , { ù }{ \@tabacckludge` { \" u } }
40 }
41 { \prop_gput:Nnn \c__xpinyin_tone_prop #1 }

```

(End definition for \c__xpinyin_tone_prop.)

__xpinyin_UTF_char:nn

```

42 \cs_new_protected_nopar:Npn \__xpinyin_UTF_char:nn #1#2
43 {
44   \cs_if_exist:cF { u8:#1 }
45   { \tl_const:cn { u8:#1 } {#2} }
46 }

```

(End definition for __xpinyin_UTF_char:nn.)

__xpinyin_GBK_char:nn

```

47 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char:nn #1#2
48 {
49   \__xpinyin_UTF_char:nn {#1} {#2}
50   \exp_args:Nx \__xpinyin_GBK_char_aux:nn { \tl_head:n {#1} } {#1}
51 }
52 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_aux:nn #1#2
53 { \exp_args:Nf \__xpinyin_GBK_char_aux:nnn { \int_eval:n { `#1 } } {#1} {#2} }
54 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_aux:nnn #1#2#3
55 {
56   \cs_if_exist:cF { __xpinyin_UTF_ #1 :w }
57   {
58     \exp_args:Nf \__xpinyin_GBK_char_def:nnn
59     {
60       \int_case:nn { \tl_count:n {#3} }
61       {
62         { \c_two } { ##1 }
63         { \c_three } { ##1##2 }
64         { \c_four } { ##1##2##3 }
65       }
66     }
67     {#1} {#2}
68     \exp_args:Nc \__xpinyin_save_UTF_cs:Nn { __xpinyin_UTF_ #1 :w } {#1}
69     \tl_gput_right:Nx \c__xpinyin_reset_UTF_catcode_tl
70     { \char_set_catcode:nn {#1} { \char_value_catcode:n {#1} } }
71     \char_set_catcode_active:n {#1}
72   }
73 }
74 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_def:nnn #1#2#3
75 {
76   \cs_new_protected_nopar:cpn { __xpinyin_UTF_ #2 :w } #1
77   { \use:c { u8: \tl_to_str:n { #3#1 } } }
78 }
79 \tl_new:N \c__xpinyin_reset_UTF_catcode_tl

```

(End definition for __xpinyin_GBK_char:nn.)

__xpinyin_save_UTF_cs:Nn

```

80 \group_begin:

```

```

81 \char_set_catcode_active:n { 126 }
82 \cs_new_protected_nopar:Npn \__xpinyin_save_UTF_cs:Nn #1#2
83 {
84   \group_begin:
85   \char_set_lccode:nn { 126 } {#2}
86   \tex_lowercase:D
87   {
88     \group_end:
89     \tl_gput_right:Nn \c__xpinyin_reset_UTF_cs_tl { \cs_set_eq:NN ~ #1 }
90   }
91 }
92 \group_end:
93 \tl_new:N \c__xpinyin_reset_UTF_cs_tl

(End definition for \__xpinyin_save_UTF_cs:Nn.)

94 \bool_new:N \g__xpinyin_GBK_bool
95 \@ifpackageloaded { xeCJK }
96 { \AtEndOfPackage { \__xpinyin_adjust_xeCJK_hook: } }
97 {
98   \@ifpackageloaded { CJKutf8 }
99   {
100     \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_UTF_char:nn
101     \AtEndOfPackage { \__xpinyin_adjust_CJK_hook: }
102   }
103   {
104     \@ifpackageloaded { CJK }
105     {
106       \RequirePackage { xCJK2uni }
107       \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_GBK_char:nn
108       \AtEndOfPackage
109       {
110         \tl_put_right:Nn \l__xpinyin_pinyin_box_hook_tl
111         { \c__xpinyin_reset_UTF_cs_tl }
112         \__xpinyin_adjust_CJK_hook:
113         \tl_use:N \c__xpinyin_reset_UTF_catcode_tl
114       }
115       \bool_gset_true:N \g__xpinyin_GBK_bool
116     }
117     {
118       \sys_if_engine_xetex:TF
119       {
120         \RequirePackage { xeCJK }
121         \AtEndOfPackage { \__xpinyin_adjust_xeCJK_hook: }
122       }
123       {
124         \RequirePackage { CJKutf8 }
125         \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_UTF_char:nn
126         \AtEndOfPackage { \__xpinyin_adjust_CJK_hook: }
127       }
128     }
129   }
130 }

\l__xpinyin_tmpa_box
\l__xpinyin_tmpp_box
131 \box_new:N \l__xpinyin_tmpa_box
132 \box_new:N \l__xpinyin_tmpp_box

(End definition for \l__xpinyin_tmpa_box and \l__xpinyin_tmpp_box.)

\__xpinyin_width:Nn

133 \cs_new_protected:Npn \__xpinyin_width:Nn #1#2
134 {
135   \hbox_set:Nn \l__xpinyin_tmpa_box {#2}
136   #1 = \box_wd:N \l__xpinyin_tmpa_box
137 }

(End definition for \__xpinyin_width:Nn.)

```

_xpinyin_leave_vmode:

```

138 \cs_if_exist:NTF \pdfTeX_quitvmode:D
139 { \cs_new_eq:NN \_xpinyin_quit_vmode: \pdfTeX_quitvmode:D }
140 {
141   \cs_new_protected_nopar:Npn \_xpinyin_quit_vmode:
142   {
143     \if_mode_vertical:
144       \exp_after:wN \tex_indent:D
145     \fi:
146   }
147 }

```

(End definition for _xpinyin_leave_vmode:.)

_xpinyin_make_pinyin_box:nnn

```

148 \cs_new_protected_nopar:Npn \_xpinyin_make_pinyin_box:nnn #1#2#3
149 {
150   \_xpinyin_leavevmode:
151   \hbox_overlap_right:n
152   {
153     \hbox_set:Nn \l__xpinyin_tmpa_box
154     { \_xpinyin_CJKsymbol_hook: \_xpinyin_save_CJKsymbol:n {#2} }
155     \hbox_set:Nn \l__xpinyin_tmpb_box
156     {
157       \color_group_begin: \color_ensure_current:
158       \l__xpinyin_pinyin_box_hook_tl
159       \_xpinyin_select_font:
160       \clist_if_exist:cTF { c__xpinyin_multiple_ #1 _clist }
161       { \l__xpinyin_multiple_tl \l__xpinyin_format_tl }
162       { \l__xpinyin_format_tl }
163       {#3}
164       \color_group_end:
165     }
166     \dim_compare:nNnT
167     { \box_wd:N \l__xpinyin_tmpb_box } >
168     { \box_wd:N \l__xpinyin_tmpa_box + \l__xpinyin_CJKglue_dim }
169     {
170       \box_resize:Nnn \l__xpinyin_tmpb_box
171       { \box_wd:N \l__xpinyin_tmpa_box + \l__xpinyin_CJKglue_dim }
172       { \box_ht:N \l__xpinyin_tmpb_box + \box_dp:N \l__xpinyin_tmpb_box }
173     }
174     \box_move_up:nn { \l__xpinyin_vsep_tl }
175     {
176       \hbox_to_wd:nn { \box_wd:N \l__xpinyin_tmpa_box }
177       { \tex_hss:D \box_use_clear:N \l__xpinyin_tmpb_box \tex_hss:D }
178     }
179   }
180 }
181 \tl_new:N \l__xpinyin_pinyin_box_hook_tl
182 \sys_if_engine_pdfTeX:T
183 {
184   \tl_put_right:Nn \l__xpinyin_pinyin_box_hook_tl
185   { \cs_set_eq:NN \CJK@plane \tex_undefined:D }
186 }
187 \cs_generate_variant:Nn \_xpinyin_make_pinyin_box:nnn { x }

```

(End definition for _xpinyin_make_pinyin_box:nnn.)

_xpinyin_CJKsymbol:n

```

188 \cs_new_protected_nopar:Npn \_xpinyin_CJKsymbol:n #1
189 { \_xpinyin_CJKsymbol:xn { \_xpinyin_to_unicode:n {#1} } {#1} }
190 \cs_new_protected_nopar:Npn \_xpinyin_CJKsymbol:nn #1#2
191 {
192   \_xpinyin_make_pinyin_box:nnn {#1} {#2} { \use:c { c__xpinyin_ #1 _tl } }
193   \_xpinyin_save_CJKsymbol:n {#2}
194 }
195 \cs_generate_variant:Nn \_xpinyin_CJKsymbol:nn { x }

```

(End definition for `_xpinyin_CJKsymbol:n`.)

pinyinscope

```

196 \NewDocumentEnvironment { pinyinscope } { 0 { } }
197 {
198   \keys_set:nn { xpinyin } {#1}
199   \enablepinyin
200 }
201 { }
```

(End definition for `pinyinscope`. This function is documented on page 2.)

\xpinyin

```

202 \NewDocumentCommand \xpinyin { s 0 { } m }
203 {
204   \IfBooleanTF {#1}
205   {
206     \group_begin:
207     \keys_set:nn { xpinyin } {#2}
208     \enablepinyin
209     #3
210     \group_end:
211   }
212   {
213     \group_begin:
214     \keys_set:nn { xpinyin } {#2}
215     \bool_if:NF \l__xpinyin_enable_bool
216     { \_xpinyin_width:Nn \l__xpinyin_CJKglue_dim { \CJKglue } }
217     \__xpinyin_quit_vmode:
218     \_xpinyin_single_aux:nn {#3}
219   }
220 }
```

(End definition for `\xpinyin`. This function is documented on page 2.)

\l__xpinyin_enable_bool

```

221 \bool_new:N \l__xpinyin_enable_bool
```

(End definition for `\l__xpinyin_enable_bool`.)

__xpinyin_CJKglue:

```

222 \cs_new_protected_nopar:Npn \__xpinyin_CJKglue:
223 { \skip_horizontal:n { \l__xpinyin_hsep_tl } }
```

(End definition for `__xpinyin_CJKglue:.`)

\enablepinyin

```

224 \NewDocumentCommand \enablepinyin { }
225 {
226   \bool_if:NF \l__xpinyin_enable_bool
227   {
228     \tl_if_empty:NF \l__xpinyin_hsep_tl
229     {
230       \cs_set_eq:NN \__xpinyin_save_CJKglue: \CJKglue
231       \cs_set_eq:NN \CJKglue \__xpinyin_CJKglue:
232     }
233     \__xpinyin_width:Nn \l__xpinyin_CJKglue_dim { \CJKglue }
234     \__xpinyin_replace_CJKsymbol:
235     \__xpinyin_restore_footnote:
236     \bool_set_true:N \l__xpinyin_enable_bool
237   }
238 }
```

(End definition for `\enablepinyin`. This function is documented on page 3.)

`\disablepinyin`

```

239 \NewDocumentCommand \disablepinyin { }
240 {
241   \bool_if:NT \l__xpinyin_enable_bool
242   {
243     \cs_if_eq:NNT \CJKglue \__xpinyin_CJKglue:
244     { \cs_set_eq:NN \CJKglue \__xpinyin_save_CJKglue: }
245     \__xpinyin_restore_CJKsymbol:
246     \bool_set_false:N \l__xpinyin_enable_bool
247   }
248 }

```

(End definition for `\disablepinyin`. This function is documented on page 3.)

`__xpinyin_restore_footnote:`

```

249 \cs_new_protected_nopar:Npn \__xpinyin_restore_footnote:
250 {
251   \bool_if:NF \l__xpinyin_footnote_bool
252   { \tl_put_left:Nn \@parboxrestore { \l__xpinyin_restore_footnote_tl } }
253 }

```

(End definition for `__xpinyin_restore_footnote:`.)

`\l__xpinyin_restore_footnote_tl`

```

254 \tl_new:N \l__xpinyin_restore_footnote_tl
255 \tl_set:Nn \l__xpinyin_restore_footnote_tl
256 {
257   \int_compare:nNnT \etex_currentgrouptype:D = \c_eleven
258   { \disablepinyin }
259 }

```

(End definition for `\l__xpinyin_restore_footnote_tl`.)

`\l__xpinyin_CJKglue_dim`

```

260 \dim_new:N \l__xpinyin_CJKglue_dim

```

(End definition for `\l__xpinyin_CJKglue_dim`.)

`__xpinyin_single_aux:nn`

```

261 \cs_new_protected_nopar:Npn \__xpinyin_single_aux:nn #1#2
262 {
263   \__xpinyin_replace_CJKsymbol_single:n {#2}
264   #1
265   \group_end:
266 }
267 \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol_single_aux:n #1
268 {
269   \bool_if:NF \l__xpinyin_enable_bool { \__xpinyin_replace_CJKsymbol: }
270   \cs_set_protected_nopar:Npn \CJKsymbol ##1
271   { \__xpinyin_single_CJKsymbol:nn {##1} {#1} }
272 }
273 \cs_new_protected_nopar:Npn \__xpinyin_single_CJKsymbol:nn #1#2
274 {
275   \__xpinyin_make_pinyin_box:xnn
276   { \__xpinyin_to_unicode:n {#1} } {#1} { \__xpinyin_pinyin:n {#2} }
277   \__xpinyin_save_CJKsymbol:n {#1}
278 }

```

(End definition for `__xpinyin_single_aux:nn`.)

`_xpinyin_replace_CJKsymbol_aux:`

```

279 \cs_new_protected_nopar:Npn \_xpinyin_replace_CJKsymbol_aux:
280 {
281   \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \CJKsymbol
282   \cs_set_eq:NN \CJKsymbol \__xpinyin_CJKsymbol:n
283 }

```

(End definition for _xpinyin_replace_CJKsymbol_aux:.)

_xpinyin_restore_CJKsymbol_aux:

```
284 \cs_new_protected_nopar:Npn \_xpinyin_restore_CJKsymbol_aux:
285   { \cs_set_eq:NN \CJKsymbol \_xpinyin_save_CJKsymbol:n }
```

(End definition for _xpinyin_restore_CJKsymbol_aux:.)

_xpinyin_select_font_xetex:

```
286 \cs_new_protected_nopar:Npn \_xpinyin_select_font_xetex:
287   {
288     \cs_if_exist_use:cF { \l__xpinyin_coor_tl }
289     {
290       \tl_set:Nx \l__xpinyin_current_coor_tl { \l__xpinyin_coor_tl }
291       \_xpinyin_select_font_aux:
292       \int_compare:nNnF { \xetex_fonttype:D \tex_font:D } = \c_zero
293       {
294         \exp_last_unbraced:NNV
295         \cs_gset_eq:cN \l__xpinyin_current_coor_tl \tex_font:D
296       }
297     }
298   }
```

(End definition for _xpinyin_select_font_xetex:.)

_xpinyin_select_font_aux:

```
299 \cs_new_protected_nopar:Npn \_xpinyin_select_font_aux:
300   {
301     \fontsize
302     { \l__xpinyin_ratio_tl \etex_dimexpr:D \f@size pt \scan_stop: }
303     { \f@baselineskip }
304     \normalfont
305     \l__xpinyin_font_tl
306     \selectfont
307   }
```

(End definition for _xpinyin_select_font_aux:.)

_xpinyin_to_unicode_xetex:n

```
308 \cs_new_nopar:Npn \_xpinyin_to_unicode_xetex:n #1
309   { \int_to_arabic:n { `#1 } }
```

(End definition for _xpinyin_to_unicode_xetex:n.)

_xpinyin_UTF_to_unicode:n

```
\_xpinyin_UTFchar_to_unicode:n 310 \cs_new_nopar:Npn \_xpinyin_UTF_to_unicode:n #1
311   {
312     \int_to_arabic:n
313     { \exp_args:No \int_from_hex:n { \CJK@plane } * "100 + #1 }
314   }
315 \cs_new_nopar:Npn \_xpinyin_UTFchar_to_unicode:n #1
316   { \int_to_arabic:n { \_xpinyin_UTF_viii_to_unicode:NNW #1 \q_stop } }
317 \cs_new_nopar:Npn \_xpinyin_UTF_viii_to_unicode:NNW #1#2#3#4 \q_stop
318   {
319     \tl_if_empty:nTF {#4}
320     { ( `#1 - "E0 ) * "1000 + ( `#2 - "80 ) * "40 + ( `#3 - "80 ) }
321     { ( `#1 - "F0 ) * "4000 + ( `#2 - "80 ) * "1000 + ( `#3 - "80 ) * "40 + ( `#4 - "80 ) }
322   }
```

(End definition for _xpinyin_UTF_to_unicode:n and _xpinyin_UTFchar_to_unicode:n.)

_xpinyin_GBK_to_unicode:n

```
\_xpinyin_GBKchar_to_unicode:n 323 \cs_new_nopar:Npn \_xpinyin_GBK_to_unicode:n #1
324   { \int_to_arabic:n { " \CJKtu_sfd_map:nn { \CJK@plane } {#1} } }
325 \cs_new_nopar:Npn \_xpinyin_GBKchar_to_unicode:n #1
326   { \int_to_arabic:n { " \CJKchartouni {#1} } }
```

(End definition for _xpinyin_GBK_to_unicode:n and _xpinyin_GBKchar_to_unicode:n)

_xpinyin_adjust_xeCJK_hook:

```

327 \cs_new_protected_nopar:Npn \_xpinyin_adjust_xeCJK_hook:
328 {
329   \cs_new_eq:NN \_xpinyin_select_font:      \_xpinyin_select_font_xetex:
330   \cs_new_eq:NN \_xpinyin_to_unicode:n      \_xpinyin_to_unicode_xetex:n
331   \cs_new_eq:NN \_xpinyin_char_to_unicode:n \_xpinyin_to_unicode:n
332   \cs_new_eq:NN \_xpinyin_restore_CJKsymbol: \_xpinyin_restore_CJKsymbol_aux:
333   \cs_new_eq:NN \_xpinyin_replace_CJKsymbol: \_xpinyin_replace_CJKsymbol_aux:
334   \cs_new_eq:NN \_xpinyin_replace_CJKsymbol_single:n
335               \_xpinyin_replace_CJKsymbol_single_aux:n
336   \tl_if_exist:NTF \l_xeCJK_current_font_tl
337   {
338     \tl_set:Nn \l__xpinyin_coor_tl
339     {
340       ( \tl_to_str:N \l__xpinyin_font_tl ) /
341       \l_xeCJK_current_font_tl/\l__xpinyin_ratio_tl
342     }
343   }
344   {
345     \tl_set:Nn \l__xpinyin_coor_tl
346     {
347       ( \tl_to_str:N \l__xpinyin_font_tl ) /
348       \xeCJK@family/\f@series/\f@shape/\f@size/\l__xpinyin_ratio_tl
349     }
350   }
351   \cs_new_eq:NN \_xpinyin_leavevmode: \prg_do_nothing:
352   \cs_new_protected_nopar:Npx \_xpinyin_CJKsymbol_hook:
353   {
354     \exp_not:N \makeXeCJKinactive
355     \cs_if_exist_use:NF \xeCJK_select_font:
356     { \exp_not:N \xeCJK_setfont }
357   }
358 }

```

(End definition for _xpinyin_adjust_xeCJK_hook:.)

_xpinyin_adjust_CJK_hook:

```

359 \cs_new_protected_nopar:Npn \_xpinyin_adjust_CJK_hook:
360 {
361   \bool_if:NTF \g__xpinyin_GBK_bool
362   {
363     \cs_new_eq:NN \_xpinyin_to_unicode:n      \_xpinyin_GBK_to_unicode:n
364     \cs_new_eq:NN \_xpinyin_char_to_unicode:n \_xpinyin_GBKchar_to_unicode:n
365   }
366   {
367     \cs_new_eq:NN \_xpinyin_to_unicode:n      \_xpinyin_UTF_to_unicode:n
368     \cs_new_eq:NN \_xpinyin_char_to_unicode:n \_xpinyin_UTFchar_to_unicode:n
369   }
370   \cs_new_eq:NN \_xpinyin_select_font:      \_xpinyin_select_font_aux:
371   \cs_new_eq:NN \_xpinyin_leavevmode:      \_xpinyin_quit_vmode:
372   \cs_new_eq:NN \_xpinyin_CJKsymbol_hook: \prg_do_nothing:
373   \@ifpackageloaded { CJKpunct }
374   { \_xpinyin_adjust_CJKpunct_hook: }
375   {
376     \cs_new_eq:NN \_xpinyin_restore_CJKsymbol: \_xpinyin_restore_CJKsymbol_aux:
377     \cs_new_eq:NN \_xpinyin_replace_CJKsymbol: \_xpinyin_replace_CJKsymbol_aux:
378     \cs_new_eq:NN \_xpinyin_replace_CJKsymbol_single:n
379                 \_xpinyin_replace_CJKsymbol_single_aux:n
380     \AtBeginDocument
381     {
382       \@ifpackageloaded { CJKpunct }
383       {
384         \cs_undefine:N \_xpinyin_restore_CJKsymbol:
385         \cs_undefine:N \_xpinyin_replace_CJKsymbol:

```

```

386         \cs_undefine:N \__xpinyin_replace_CJKsymbol_single:n
387         \__xpinyin_adjust_CJKpunct_hook:
388     } { }
389 }
390 }
391 }

```

(End definition for __xpinyin_adjust_CJK_hook:.)

__xpinyin_adjust_CJKpunct_hook:

```

392 \cs_new_protected_nopar:Npn \__xpinyin_adjust_CJKpunct_hook:
393 {
394     \cs_new_protected_nopar:Npn \__xpinyin_restore_CJKsymbol:
395     {
396         \int_compare:nNnTF { \CJKpunct@punctstyle } = { \CJKpunct@ps@plain }
397         { \__xpinyin_restore_CJKsymbol_aux: }
398         { \cs_set_eq:NN \CJKsymbol \__xpinyin_save_CJKsymbol:n }
399     }
400     \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol:
401     {
402         \int_compare:nNnTF { \CJKpunct@punctstyle } = { \CJKpunct@ps@plain }
403         { \__xpinyin_replace_CJKsymbol_aux: }
404         {
405             \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \CJKsymbol
406             \cs_set_eq:NN \CJKsymbol \__xpinyin_CJKsymbol:n
407         }
408     }
409     \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol_single:n ##1
410     {
411         \int_compare:nNnTF { \CJKpunct@punctstyle } = { \CJKpunct@ps@plain }
412         { \__xpinyin_replace_CJKsymbol_single_aux:n { ##1 } }
413         {
414             \bool_if:NF \l__xpinyin_enable_bool
415             { \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \CJKsymbol }
416             \cs_set_protected_nopar:Npn \CJKsymbol #####1
417             { \__xpinyin_single_CJKsymbol:nn { #####1 } { ##1 } }
418         }
419     }
420 }

```

(End definition for __xpinyin_adjust_CJKpunct_hook:.)

\pinyin

```

421 \NewDocumentCommand \pinyin { 0 { } m }
422 {
423     \group_begin:
424     \keys_set:nn { xpinyin } {#1}
425     \l__xpinyin_font_tl
426     \l__xpinyin_format_tl { }
427     \selectfont
428     \c__xpinyin_reset_UTF_cs_tl
429     \__xpinyin_pinyin:n {#2}
430     \group_end:
431 }

```

(End definition for \pinyin. This function is documented on page 2.)

__xpinyin_pinyin:n

```

432 \cs_new_protected_nopar:Npn \__xpinyin_pinyin:n #1
433 {
434     \__xpinyin_pinyin_init:
435     \bool_set_true:N \l__xpinyin_first_bool
436     \tl_set:Nn \l__xpinyin_save_tl {#1}
437     \__xpinyin_pinyin_aux:n #1 \q_recursion_tail \q_recursion_stop
438 }

```

(End definition for __xpinyin_pinyin:n.)

_xpinyin_pinyin_aux:n

```

439 \cs_new_protected_nopar:Npn \_xpinyin_pinyin_aux:n #1
440 {
441   \quark_if_recursion_tail_stop_do:nn {#1}
442   {
443     \bool_if:NTF \l__xpinyin_first_bool { \l__xpinyin_save_tl }
444     { \tl_if_empty:NF \l__xpinyin_item_tl { \l__xpinyin_pysep_tl \l__xpinyin_item_tl } }
445   }
446   \_xpinyin_if_number:nTF {#1}
447   {
448     \bool_if:NTF \l__xpinyin_first_bool
449     { \bool_set_false:N \l__xpinyin_first_bool }
450     { \l__xpinyin_pysep_tl }
451     \l__xpinyin_pre_tl
452     \_xpinyin_tone:Vn \l__xpinyin_tone_tl {#1}
453     \l__xpinyin_post_tl
454     \_xpinyin_pinyin_init:
455   }
456   {
457     \int_compare:nNnTF
458     { 0 \cs_if_exist_use:c { c__xpinyin_ \tl_to_str:N \l__xpinyin_tone_tl _tl } } >
459     { 0 \cs_if_exist_use:c { c__xpinyin_ \tl_to_str:n {#1} _tl } }
460     { \tl_put_right:Nn \l__xpinyin_post_tl {#1} }
461     {
462       \tl_set:Nn \l__xpinyin_tone_tl {#1}
463       \tl_set_eq:NN \l__xpinyin_pre_tl \l__xpinyin_item_tl
464       \tl_clear:N \l__xpinyin_post_tl
465     }
466     \tl_put_right:Nx \l__xpinyin_item_tl { \_xpinyin_replace_v:n {#1} }
467   }
468   \_xpinyin_pinyin_aux:n
469 }

```

(End definition for _xpinyin_pinyin_aux:n.)

_xpinyin_tone:Nn

```

470 \cs_new_protected_nopar:Npn \_xpinyin_tone:Nn #1#2
471 { \use:c { __xpinyin_num_to_tone_ #1 :Nn } {#1} {#2} }
472 \cs_generate_variant:Nn \_xpinyin_tone:Nn { V }

```

(End definition for _xpinyin_tone:Nn.)

_xpinyin_replace_v:n

```

473 \cs_new_nopar:Npn \_xpinyin_replace_v:n #1
474 {
475   \str_if_eq:nnTF {#1} { v }
476   {
477     \str_case:onTF { \l__xpinyin_item_tl }
478     { { l } { } { n } { } { L } { } { N } { } }
479     { \exp_not:n { ü } } { u }
480   }
481   { \exp_not:n {#1} }
482 }

```

(End definition for _xpinyin_replace_v:n.)

_xpinyin_pinyin_init:

```

483 \cs_new_nopar:Npn \_xpinyin_pinyin_init:
484 {
485   \tl_clear:N \l__xpinyin_pre_tl   \tl_clear:N \l__xpinyin_post_tl
486   \tl_clear:N \l__xpinyin_item_tl \tl_clear:N \l__xpinyin_tone_tl
487 }

```

(End definition for _xpinyin_pinyin_init:.)

_xpinyin_if_number:nTF

```

488 \prg_new_conditional:Npnn \_xpinyin_if_number:n #1 { TF }
489 {
490   \if_int_compare:w \c_one < 1 \tl_to_str:n {#1} \exp_stop_f:
491   \prg_return_true: \else: \prg_return_false: \fi:
492 }

```

(End definition for _xpinyin_if_number:nTF.)

\l_xpinyin_first_bool

```

493 \bool_new:N \l_xpinyin_first_bool

```

(End definition for \l_xpinyin_first_bool.)

\c_xpinyin_a_tl

\c_xpinyin_o_tl

```

494 \tl_const:Nn \c_xpinyin_a_tl { 3 }

```

\c_xpinyin_e_tl

```

495 \tl_const:Nn \c_xpinyin_o_tl { 2 }

```

\c_xpinyin_i_tl

```

496 \tl_const:Nn \c_xpinyin_e_tl { 2 }

```

\c_xpinyin_u_tl

```

497 \tl_const:Nn \c_xpinyin_i_tl { 1 }

```

\c_xpinyin_v_tl

```

498 \tl_const:Nn \c_xpinyin_u_tl { 1 }

```

```

499 \tl_const:Nn \c_xpinyin_v_tl { 1 }

```

(End definition for \c_xpinyin_a_tl and others.)

_xpinyin_num_to_tone:Nn

```

500 \cs_new_protected_nopar:Npn \_xpinyin_num_to_tone:Nn #1#2
501 {
502   \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
503   \= {#1} \or: \'{#1} \or: \v {#1} \or: \` {#1} \else: #1 \fi:
504 }
505 \tl_map_inline:nn { a o e u }
506 { \cs_new_eq:cN { \_xpinyin_num_to_tone_ #1 :Nn } \_xpinyin_num_to_tone:Nn }
507 \cs_new_nopar:Npn \_xpinyin_num_to_tone_i:Nn #1#2
508 {
509   \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
510   ī \or: í \or: ï \or: i \else: i \fi:
511 }
512 \cs_new_protected_nopar:Npn \_xpinyin_num_to_tone_v:Nn #1#2
513 {
514   \str_case:onTF { \l_xpinyin_pre_tl }
515   { { l } { } { n } { } { L } { } { N } { } }
516   {
517     \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
518     ū \or: ú \or: ũ \or: ù \else: ü \fi:
519   }
520   { \_xpinyin_num_to_tone:Nn u {#2} }
521 }

```

(End definition for _xpinyin_num_to_tone:Nn.)

\xpinyinsetup

```

522 \NewDocumentCommand \xpinyinsetup { m } { \keys_set:nn { xpinyin } {#1} }

```

(End definition for \xpinyinsetup. This function is documented on page 2.)

ratio

vsep

```

523 \clist_map_inline:nn

```

hsep

```

524 { ratio , vsep , hsep , pysep , font , format , multiple }

```

pysep

```

525 { \keys_define:nn { xpinyin } { #1 .tl_set:c = { l_xpinyin_ #1 _tl } } }

```

font

```

526 \keys_define:nn { xpinyin }

```

format

```

527 { footnote .bool_set:N = \l_xpinyin_footnote_bool }

```

multiple

```

528 \keys_set:nn { xpinyin }

```

footnote

```

529 {

```

```

530   ratio    = .4 ,

```

```

531   vsep     = 1 em ,

```

```

532   pysep    = \c_space_tl ,

```

```

533   font     = \normalfont ,

```

```

534 }

```

(End definition for ratio and others. These functions are documented on page 2.)

```
\xpinyin_customary:nnn
\xpinyin_multiple:nnn
535 \cs_new_protected_nopar:Npn \xpinyin_customary:nnn #1#2#3
536 { \cs_gset_nopar:cpn { c__xpinyin_ #2 _t1 } {#3} }
537 \cs_new_protected_nopar:Npn \xpinyin_multiple:nnn #1#2#3
538 { \cs_gset_nopar:cpn { c__xpinyin_multiple_ #2 _clist } {#3} }

(End definition for \xpinyin_customary:nnn and \xpinyin_multiple:nnn.)

539 \group_begin:
540 \cs_set_eq:NN \XPYU \xpinyin_customary:nnn
541 \cs_set_eq:NN \XPYUM \xpinyin_multiple:nnn
542 \file_input:n { xpinyin-database.def }
543 \group_end:

\setpinyin

544 \NewDocumentCommand \setpinyin { m m }
545 {
546   \tl_set:cn
547   { c__xpinyin_ \__xpinyin_char_to_unicode:n {#1} _t1 }
548   { \__xpinyin_pinyin:n {#2} }
549 }

(End definition for \setpinyin. This function is documented on page 2.)

550 \ProcessKeysOptions { xpinyin }
551 </package>
```

第 5 节 xpinyin.lua

```
552 <*lua>

553 xpinyin = xpinyin or { }
554 local xpinyin = xpinyin

    计算时区2。

555 xpinyin.tzoffset = "+0000"
556 do
557   -- Compute the difference in seconds between local time and UTC.
558   local function get_timezone()
559     local now = os.time()
560     return os.difftime(now, os.time(os.date("!*t", now)))
561   end
562   -- Return a timezone string in ISO 8601:2000 standard form (+hhmm or -hhmm)
563   local function get_tzoffset(timezone)
564     local h, m = math.modf(timezone / 3600)
565     return string.format("%+.4d", 100 * h + 60 * m)
566   end
567   xpinyin.tzoffset = get_tzoffset(get_timezone())
568 end

569 xpinyin = {
570   uchar = unicode.utf8.char,
571   readings = { },
572   fixreadings = {

    为汉字“〇”增加拼音。

573   { "U+3007", "Mandarin", "líng" }
574 },

575   database = {
576     source = "http://www.unicode.org/Public/UNIDATA/UniHan.zip",
577     file = "UniHan_Readings.txt",
578     date = "Date: 2014-05-09 18:17:02 GMT [JHJ]",
579     version = "Unicode version: 7.0.0",
```

²<http://lua-users.org/wiki/TimeZone>

```

580     dbfile = "xpinyin.db"
581 },
582 preamble = [[
583 %<<COMMENT
584 %%
585 %% Do not edit this file!
586 %% Created from UniHan database:
587 %%
588 %% $file
589 %% $date
590 %% $version
591 %%
592 %% by "texlua xpinyin.lua" on ]]
593     .. os.date("%Y-%m-%d %X ") .. xpinyin.tzoffset
594     .. "\n%"
595 %COMMENT
596 }

597 local http_request = require("socket.http").request
598 local ltn12_sink_file = require("ltn12").sink.file
599 local zip_open = require("zip").open

    将 UniHan_Readings.txt3 保存到一张表里面。
600 function xpinyin.maketable (txt)
601     local f = io.open(txt or xpinyin.database.file, "r")
602     if not f then
603         local source = xpinyin.database.source
604         local zfilename = source:match("[~/]+.$")
605         local zfile = zip_open(zfilename)
606         if not zfile then
607             xpinyin.download(source, zfilename)
608             zfile = assert(zip_open(zfilename))
609         end
610         f = assert(zfile:open(xpinyin.database.file))
611         zfile:close()
612     end
613     local s, prop
614     for line in f:lines() do
615         s = line:explode("\t")
616         if #s == 3 then
617             prop = s[2]:sub(2)
618             if prop == "Mandarin" or
619                prop == "HanyuPinyin" or
620                prop == "XHC1983" or
621                prop == "HanyuPinlu" then
622                 xpinyin.insert(s[1], prop, s[3])
623             end
624         elseif line:find("Date") then
625             xpinyin.database.date = line:match("^[%s]*(.*)")
626         elseif line:find("Unicode version:") then
627             xpinyin.database.version = line:match("^[%s]*(.*)")
628         end
629     end
630     f:close()
631     if xpinyin.fixreadings then
632         for _, s in pairs(xpinyin.fixreadings) do
633             xpinyin.insert(s[1], s[2], s[3])
634         end
635     end
636 end

    下载 UniHan.zip。
637 function xpinyin.download (source, zip)
638     print("\nRetrieving UniHan Database from\n", source)
639     local status, err = http_request{
640         url = source,

```

³<http://http://www.unicode.org/reports/tr38/>。

```

641     sink = ltn12_sink_file(io.open(zip, "wb")) }
642   if not status then
643     error([[Download ']] .. zip .. [[' failed because of ]] .. err .. ".")
644   end
645 end

```

往拼音表中加入项目。

```

646 function xpinyin.insert (unicode, prop, value)
647   local index = tonumber(unicode:match("%x+$"), 16)
648   if not xpinyin.readings[index] then
649     xpinyin.readings[index] = { }
650   end
651   xpinyin.readings[index][prop] = value
652 end

```

输出需要的格式文件。

```

653 function xpinyin.output (db)
654   local f = assert(io.open(db or xpinyin.database.dbfile, "w"))
655   local preamble = xpinyin.preamble:gsub("%$(%w+)", xpinyin.database)
656   f:write(preamble, "\n")
657   local hanzi, pinyin
658   local mt = { }
659   for index, pyt in xpinyin.pairsByKeys(xpinyin.readings) do
660     pinyin = assert(xpinyin.grep(pyt))
661     hanzi = xpinyin.uchar(index)
662     f:write("\\XPYU{" .. hanzi, "}{" .. index, "}{" .. pinyin, "}\n")
663     pinyin = xpinyin.multiple(pyt)
664     if pinyin then
665       mt[#mt + 1] = "\\XPYUM{" .. hanzi .. "}{" .. index .. "}{" .. pinyin .. "}"
666     end
667   end
668   f:write(table.concat(mt, "\n"), "\n")
669   f:close()
670 end

```

将表按照索引排序, 代码来源于 *Programming in Lua*。

```

671 function xpinyin.pairsByKeys (t, f)
672   local a = { }
673   for n in pairs(t) do a[#a + 1] = n end
674   table.sort(a, f)
675   local i = 0 -- iterator variable
676   return function () -- iterator function
677     i = i + 1
678     return a[i], t[a[i]]
679   end
680 end

```

按照 Mandarin、XHC1983、HanyuPinyin 的顺序选择最常用的拼音。HanyuPinlu 的质量较差, 不采用。

```

681 function xpinyin.grep (pyt)
682   if pyt.Mandarin then
683     return pyt.Mandarin:match("%S+"), "Mandarin"
684   elseif pyt.XHC1983 then
685     return pyt.XHC1983:match(":(%S+)"), "XHC1983"
686   elseif pyt.HanyuPinyin then
687     return pyt.HanyuPinyin:match(":(^[^,%s]+)"), "HanyuPinyin"
688   end
689 end

```

根据 XHC1983 和 HanyuPinyin 选出多音字。

```

690 function xpinyin.multiple (pyt)
691   if pyt.XHC1983 then
692     local s = pyt.XHC1983:explode()
693     if s[2] then
694       local t = { }
695       for i, v in ipairs(s) do
696         t[#t + 1] = v:explode(":")[2]
697       end

```

```
698     return xpinyin.unique(t), "XHC1983"
699   end
700   elseif pyt.HanyuPinyin and pyt.HanyuPinyin:find("%D,") then
701     local t = { }
702     for _, v in ipairs(pyt.HanyuPinyin:explode()) do
703       for _, py in ipairs(v:explode(":")[2]:explode(",")) do
704         t[#t + 1] = py
705       end
706     end
707     return xpinyin.unique(t), "HanyuPinyin"
708   end
709 end
```

删除掉数组中的重复元素。

```
710 function xpinyin.unique (t)
711   local rt = xpinyin.remove_duplicate(t)
712   if #rt > 1 then
713     return table.concat(rt, ",")
714   end
715 end
716 function xpinyin.remove_duplicate (t)
717   local ht = { }
718   local nt = { }
719   for i, v in ipairs(t) do
720     if not ht[v] then
721       nt[#nt + 1] = v
722       ht[v] = true
723     end
724   end
725   return nt
726 end
727 xpinyin.maketable()
728 xpinyin.output()
729 </lua>
```

代码索引

意大利体的数字表示描述对应索引项的页码;带下划线的数字表示定义对应索引项的代码行号;罗马字体的数字表示使用对应索引项的代码行号。

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\`	503

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