

xpinyin 宏包

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2014/06/25 v1.9

1 简介

xpinyin 是一个 \LaTeX 宏包, 提供了为汉字自动注音的功能。

2 基本用法

xpinyin 支持采用 GBK 和 UTF-8 编码的 \TeX 源文件, 建议总是使用 UTF-8。如果使用 \LaTeX 或 $\pdf\LaTeX$ 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 X_{\LaTeX} , 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, \LaTeX 或 $\pdf\LaTeX$ 将使用 **CJKutf8**。

xpinyin 还依赖 **l3kernel** 和 **l3packages**, 使用 (pdf) \LaTeX 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_{\LaTeX} 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) \LaTeX 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。

3 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}
```

liè wèi kàn guān nǐ dào cǐ shū cóng hé ér lái ? shuō qǐ gēn yóu suī jìn huāng táng xì àn zé shēn yǒu qù wèi dài zài xià jiāng cǐ lái lì zhù míng fāng shǐ
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
yuè zhè liǎo rán bù huò
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 `pinyin` 环境的命令形式。`\xpinyin` 可以在 `pinyin` 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,

lú 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 7.0.0 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)=(var1), (key2)=(var2), ...}`

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

`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 = {}`

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}}}
```

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

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

New: 2014/01/12

4 代码实现

```
1 (*package)
2 (@@=xpinyin)
3 \msg_new:nnn { xpinyin } { no-LuaTeX }
4 {
5   The~xpinyin~package~is~not~supported~in~LuaTeX.\\
6   You~must~change~your~typesetting~engine~to\\
7   "xelatex"~or~"pdflatex"~or~"latex"~instead~of~"lualatex".
8 }
9 \luatex_if_engine:T { \msg_critical:nn { xpinyin } { no-LuaTeX } }
10 \RequirePackage{xparse}
11 \RequirePackage{l3keys2e}
```

`\c__xpinyin_tone_prop`

```
12 \prop_new:N \c__xpinyin_tone_prop
13 \clist_map_inline:nn
14 {
15   { ā }{ \= a }, { á }{ \' a }, { ä }{ \v a }, { à }{ \` a },
16   { ō }{ \= o }, { ó }{ \' o }, { ö }{ \v o }, { ò }{ \` o },
17   { ē }{ \= e }, { é }{ \' e }, { ë }{ \v e }, { è }{ \` e },
18   { ū }{ \= u }, { ú }{ \' u }, { ü }{ \v u }, { ù }{ \` u },
19   { m̄ }{ \' m }, { n̄ }{ \' n }, { ñ }{ \v n }, { ñ̄ }{ \` n },
20   { ī }{ \= { \i } }, { í }{ \' { \i } },
21   { ï }{ \v { \i } }, { ï̄ }{ \` { \i } },
22   { ü }{ \ " u },
23   { ũ }{ \= { \ " u } }, { ú̄ }{ \' { \ " u } },
24   { ũ̄ }{ \v { \ " u } }, { ù̄ }{ \` { \ " u } }
25 }
26 { \prop_gput:Nnn \c__xpinyin_tone_prop #1 }
(End definition for \c__xpinyin_tone_prop.)
```

`__xpinyin_UTF_char:nn`

```
27 \cs_new_protected_nopar:Npn \__xpinyin_UTF_char:nn #1#2
28 {
29   \cs_if_exist:cF { u8:#1 }
30   { \tl_const:cn { u8:#1 } {#2} }
31 }
(End definition for \__xpinyin_UTF_char:nn.)
```

`__xpinyin_GBK_char:nn`

```
32 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char:nn #1#2
33 {
34   \__xpinyin_UTF_char:nn {#1} {#2}
35   \exp_args:Nx \__xpinyin_GBK_char_aux:nn { \tl_head:n {#1} } {#1}
36 }
37 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_aux:nn #1#2
38 { \exp_args:Nf \__xpinyin_GBK_char_aux:nnn { \int_eval:n { `#1 } } {#1} {#2} }
39 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_aux:nnn #1#2#3
40 {
41   \cs_if_exist:cF { __xpinyin_UTF_ #1 :w }
42   {
43     \exp_args:Nf \__xpinyin_GBK_char_def:nnn
44     {
45       \int_case:nn { \tl_count:n {#3} }
46       {
```

```

47         { \c_two } { ##1 }
48         { \c_three } { ##1##2 }
49         { \c_four } { ##1##2##3 }
50     }
51 }
52 {#1} {#2}
53 \exp_args:Nc \__xpinyin_save_UTF_cs:Nn { __xpinyin_UTF_ #1 :w } {#1}
54 \tl_gput_right:Nx \c__xpinyin_reset_UTF_catcode_tl
55 { \char_set_catcode:nn {#1} { \char_value_catcode:n {#1} } }
56 \char_set_catcode_active:n {#1}
57 }
58 }
59 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_def:nnn #1#2#3
60 {
61     \cs_new_protected_nopar:cpn { __xpinyin_UTF_ #2 :w } #1
62     { \use:c { u8: \tl_to_str:n { #3#1 } } }
63 }
64 \tl_new:N \c__xpinyin_reset_UTF_catcode_tl
(End definition for \__xpinyin_GBK_char:nn)

```

__xpinyin_save_UTF_cs:Nn

```

65 \group_begin:
66 \char_set_catcode_active:n { 126 }
67 \cs_new_protected_nopar:Npn \__xpinyin_save_UTF_cs:Nn #1#2
68 {
69     \group_begin:
70     \char_set_lccode:nn { 126 } {#2}
71     \tex_lowercase:D
72     {
73         \group_end:
74         \tl_gput_right:Nn \c__xpinyin_reset_UTF_cs_tl { \cs_set_eq:NN ~ #1 }
75     }
76 }
77 \group_end:
78 \tl_new:N \c__xpinyin_reset_UTF_cs_tl
(End definition for \__xpinyin_save_UTF_cs:Nn)

```

```

79 \bool_new:N \g__xpinyin_GBK_bool
80 \@ifpackageloaded { xeCJK }
81 { \AtEndOfPackage { \__xpinyin_adjust_xeCJK_hook: } }
82 {
83     \@ifpackageloaded { CJKutf8 }
84     {
85         \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_UTF_char:nn
86         \AtEndOfPackage { \__xpinyin_adjust_CJK_hook: }
87     }
88     {
89         \@ifpackageloaded { CJK }
90         {
91             \RequirePackage { xCJK2uni }
92             \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_GBK_char:nn
93             \AtEndOfPackage
94             {
95                 \tl_put_right:Nn \l__xpinyin_pinyin_box_hook_tl
96                 { \c__xpinyin_reset_UTF_cs_tl }
97                 \__xpinyin_adjust_CJK_hook:
98                 \tl_use:N \c__xpinyin_reset_UTF_catcode_tl
99             }
100         }
101         \bool_gset_true:N \g__xpinyin_GBK_bool
102     }
103     {
104         \xetex_if_engine:TF
105         {
106             \RequirePackage { xeCJK }
107             \AtEndOfPackage { \__xpinyin_adjust_xeCJK_hook: }
108         }
109         {
110             \RequirePackage { CJKutf8 }
111             \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_UTF_char:nn

```

```

111         \AtEndOfPackage { \__xpinyin_adjust_CJK_hook: }
112     }
113 }
114 }
115 }

```

\l__xpinyin_tmpa_box

\l__xpinyin_tmpb_box

```

116 \box_new:N \l__xpinyin_tmpa_box
117 \box_new:N \l__xpinyin_tmpb_box
(End definition for \l__xpinyin_tmpa_box and \l__xpinyin_tmpb_box.)

```

__xpinyin_width:Nn

```

118 \cs_new_protected:Npn \__xpinyin_width:Nn #1#2
119 {
120     \hbox_set:Nn \l__xpinyin_tmpa_box {#2}
121     #1 = \box_wd:N \l__xpinyin_tmpa_box
122 }
(End definition for \__xpinyin_width:Nn.)

```

__xpinyin_make_pinyin_box:nnn

```

123 \cs_new_protected_nopar:Npn \__xpinyin_make_pinyin_box:nnn #1#2#3
124 {
125     \__xpinyin_leavevmode:
126     \hbox_overlap_right:n
127     {
128         \hbox_set:Nn \l__xpinyin_tmpa_box
129         { \__xpinyin_CJKsymbol_hook: \__xpinyin_save_CJKsymbol:n {#2} }
130         \hbox_set:Nn \l__xpinyin_tmpb_box
131         {
132             \color_group_begin: \color_ensure_current:
133             \l__xpinyin_pinyin_box_hook_tl
134             \__xpinyin_select_font:
135             \clist_if_exist:cTF { c__xpinyin_multiple_ #1 _clist }
136             { \l__xpinyin_multiple_tl \l__xpinyin_format_tl }
137             { \l__xpinyin_format_tl }
138             {#3}
139             \color_group_end:
140         }
141         \dim_compare:nNnT
142         { \box_wd:N \l__xpinyin_tmpb_box } >
143         { \box_wd:N \l__xpinyin_tmpa_box + \l__xpinyin_CJKglue_dim }
144         {
145             \box_resize:Nnn \l__xpinyin_tmpb_box
146             { \box_wd:N \l__xpinyin_tmpa_box + \l__xpinyin_CJKglue_dim }
147             { \box_ht:N \l__xpinyin_tmpb_box + \box_dp:N \l__xpinyin_tmpb_box }
148         }
149         \box_move_up:nn { \l__xpinyin_vsep_tl }
150         {
151             \hbox_to_wd:nn { \box_wd:N \l__xpinyin_tmpa_box }
152             { \tex_hss:D \box_use_clear:N \l__xpinyin_tmpb_box \tex_hss:D }
153         }
154     }
155 }
156 \tl_new:N \l__xpinyin_pinyin_box_hook_tl
157 \pdfTeX_if_engine:T
158 {
159     \tl_put_right:Nn \l__xpinyin_pinyin_box_hook_tl
160     { \cs_set_eq:NN \CJK@plane \tex_undefined:D }
161 }
162 \cs_generate_variant:Nn \__xpinyin_make_pinyin_box:nnn { x }
(End definition for \__xpinyin_make_pinyin_box:nnn.)

```

__xpinyin_CJKsymbol:n

```

163 \cs_new_protected_nopar:Npn \__xpinyin_CJKsymbol:n #1
164 { \__xpinyin_CJKsymbol:xn { \__xpinyin_to_unicode:n {#1} } {#1} }
165 \cs_new_protected_nopar:Npn \__xpinyin_CJKsymbol:nn #1#2
166 {

```

```

167   \__xpinyin_make_pinyin_box:nnn {#1} {#2} { \use:c { c__xpinyin_ #1 _tl } }
168   \__xpinyin_save_CJKsymbol:n {#2}
169   }
170 \cs_generate_variant:Nn \__xpinyin_CJKsymbol:nn { x }
(End definition for \__xpinyin_CJKsymbol:n.)

```

pinyinscope

```

171 \NewDocumentEnvironment { pinyinscope } { 0 { } }
172 {
173   \keys_set:nn { xpinyin } {#1}
174   \enablepinyin
175 }
176 { }
(End definition for pinyinscope. This function is documented on page 1.)

```

\xpinyin

```

177 \NewDocumentCommand \xpinyin { s 0 { } m }
178 {
179   \IfBooleanTF {#1}
180   {
181     \group_begin:
182     \keys_set:nn { xpinyin } {#2}
183     \enablepinyin
184     #3
185     \group_end:
186   }
187   {
188     \group_begin:
189     \keys_set:nn { xpinyin } {#2}
190     \bool_if:NF \l__xpinyin_enable_bool
191     { \__xpinyin_width:Nn \l__xpinyin_CJKglue_dim { \CJKglue } }
192     \leavevmode
193     \__xpinyin_single_aux:nn {#3}
194   }
195 }
(End definition for \xpinyin. This function is documented on page 2.)

```

\l__xpinyin_enable_bool

```

196 \bool_new:N \l__xpinyin_enable_bool
(End definition for \l__xpinyin_enable_bool.)

```

__xpinyin_CJKglue:

```

197 \cs_new_protected_nopar:Npn \__xpinyin_CJKglue:
198 { \skip_horizontal:n { \l__xpinyin_hsep_tl } }
(End definition for \__xpinyin_CJKglue:.)

```

\enablepinyin

```

199 \NewDocumentCommand \enablepinyin { }
200 {
201   \bool_if:NF \l__xpinyin_enable_bool
202   {
203     \tl_if_empty:NF \l__xpinyin_hsep_tl
204     {
205       \cs_set_eq:NN \__xpinyin_save_CJKglue: \CJKglue
206       \cs_set_eq:NN \CJKglue \__xpinyin_CJKglue:
207     }
208     \__xpinyin_width:Nn \l__xpinyin_CJKglue_dim { \CJKglue }
209     \__xpinyin_replace_CJKsymbol:
210     \__xpinyin_restore_footnote:
211     \bool_set_true:N \l__xpinyin_enable_bool
212   }
213 }
(End definition for \enablepinyin. This function is documented on page 3.)

```

`\disablepinyin`

```
214 \NewDocumentCommand \disablepinyin { }
215 {
216   \bool_if:NT \l__xpinyin_enable_bool
217   {
218     \cs_if_eq:NNT \CJKglue \__xpinyin_CJKglue:
219     { \cs_set_eq:NN \CJKglue \__xpinyin_save_CJKglue: }
220     \__xpinyin_restore_CJKsymbol:
221     \bool_set_false:N \l__xpinyin_enable_bool
222   }
223 }
```

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

`__xpinyin_restore_footnote:`

```
224 \cs_new_protected_nopar:Npn \__xpinyin_restore_footnote:
225 {
226   \bool_if:NF \l__xpinyin_footnote_bool
227   { \tl_put_left:Nn \@parboxrestore { \l__xpinyin_restore_footnote_tl } }
228 }
```

(End definition for `__xpinyin_restore_footnote:.`)

`\l__xpinyin_restore_footnote_tl`

```
229 \tl_new:N \l__xpinyin_restore_footnote_tl
230 \tl_set:Nn \l__xpinyin_restore_footnote_tl
231 {
232   \int_compare:nNnT \etex_currentgrouptype:D = \c_eleven
233   { \disablepinyin }
234 }
```

(End definition for `\l__xpinyin_restore_footnote_tl`.)

`\l__xpinyin_CJKglue_dim`

```
235 \dim_new:N \l__xpinyin_CJKglue_dim
236 (End definition for \l__xpinyin_CJKglue_dim.)
```

`__xpinyin_single_aux:nn`

```
236 \cs_new_protected_nopar:Npn \__xpinyin_single_aux:nn #1#2
237 {
238   \__xpinyin_replace_CJKsymbol_single:n {#2}
239   #1
240   \group_end:
241 }
242 \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol_single_aux:n #1
243 {
244   \bool_if:NF \l__xpinyin_enable_bool { \__xpinyin_replace_CJKsymbol: }
245   \cs_set_protected_nopar:Npn \CJKsymbol ##1
246   { \__xpinyin_single_CJKsymbol:nn {##1} {#1} }
247 }
248 \cs_new_protected_nopar:Npn \__xpinyin_single_CJKsymbol:nn #1#2
249 {
250   \__xpinyin_make_pinyin_box:xnn
251   { \__xpinyin_to_unicode:n {#1} } {#1} { \__xpinyin_pinyin:n {#2} }
252   \__xpinyin_save_CJKsymbol:n {#1}
253 }
```

(End definition for `__xpinyin_single_aux:nn`.)

`__xpinyin_replace_CJKsymbol_aux:`

```
254 \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol_aux:
255 {
256   \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \CJKsymbol
257   \cs_set_eq:NN \CJKsymbol \__xpinyin_CJKsymbol:n
258 }
```

(End definition for `__xpinyin_replace_CJKsymbol_aux:.`)

`__xpinyin_restore_CJKsymbol_aux:`

```
259 \cs_new_protected_nopar:Npn \__xpinyin_restore_CJKsymbol_aux:
260 { \cs_set_eq:NN \CJKsymbol \__xpinyin_save_CJKsymbol:n }
```

(End definition for __xpinyin_restore_CJKsymbol_aux:.)

__xpinyin_select_font_xetex:

```
261 \cs_new_protected_nopar:Npn \__xpinyin_select_font_xetex:
262 {
263   \cs_if_exist_use:cF { \l__xpinyin_coor_tl }
264   {
265     \tl_set:Nx \l__xpinyin_current_coor_tl { \l__xpinyin_coor_tl }
266     \__xpinyin_select_font_aux:
267     \int_compare:nNnF { \XeTeXfonttype \tex_font:D } = \c_zero
268     {
269       \exp_last_unbraced:NNV
270       \cs_gset_eq:cN \l__xpinyin_current_coor_tl \tex_font:D
271     }
272   }
273 }
```

(End definition for __xpinyin_select_font_xetex:.)

__xpinyin_select_font_aux:

```
274 \cs_new_protected_nopar:Npn \__xpinyin_select_font_aux:
275 {
276   \fontsize
277   { \l__xpinyin_ratio_tl \etex_dimexpr:D \f@size pt \scan_stop: }
278   { \f@baselineskip }
279   \normalfont
280   \l__xpinyin_font_tl
281   \selectfont
282 }
```

(End definition for __xpinyin_select_font_aux:.)

__xpinyin_to_unicode_xetex:n

```
283 \cs_new_nopar:Npn \__xpinyin_to_unicode_xetex:n #1
284 { \int_to_Hex:n { `#1 } }
```

(End definition for __xpinyin_to_unicode_xetex:n.)

__xpinyin_UTF_to_unicode:n

__xpinyin_UTFchar_to_unicode:n

```
285 \cs_new_nopar:Npn \__xpinyin_UTF_to_unicode:n #1
286 {
287   \int_to_Hex:n
288   { \exp_args:No \int_from_hex:n { \CJK@plane } * "100 + #1 }
289 }
290 \cs_new_nopar:Npn \__xpinyin_UTFchar_to_unicode:n #1
291 { \int_to_Hex:n { \__xpinyin_UTF_viii_to_unicode:NNNw #1 \q_stop } }
292 \cs_new_nopar:Npn \__xpinyin_UTF_viii_to_unicode:NNNw #1#2#3#4 \q_stop
293 {
294   \tl_if_empty:nTF {#4}
295   { ( `#1 - "E0 ) * "1000 + ( `#2 - "80 ) * "40 + ( `#3 - "80 ) }
296   { ( `#1 - "F0 ) * "4000 + ( `#2 - "80 ) * "1000 + ( `#3 - "80 ) * "40 + ( `#4 - "80 ) }
297 }
```

(End definition for __xpinyin_UTF_to_unicode:n and __xpinyin_UTFchar_to_unicode:n.)

__xpinyin_GBK_to_unicode:n

__xpinyin_GBKchar_to_unicode:n

```
298 \cs_new_nopar:Npn \__xpinyin_GBK_to_unicode:n #1
299 { \CJKtu_sfd_map:nn { \CJK@plane } {#1} }
300 \cs_new_nopar:Npn \__xpinyin_GBKchar_to_unicode:n #1
301 { \CJKchartouni {#1} }
```

(End definition for __xpinyin_GBK_to_unicode:n and __xpinyin_GBKchar_to_unicode:n.)

__xpinyin_adjust_xeCJK_hook:

```
302 \cs_new_protected_nopar:Npn \__xpinyin_adjust_xeCJK_hook:
303 {
304   \cs_new_eq:NN \__xpinyin_select_font: \__xpinyin_select_font_xetex:
305   \cs_new_eq:NN \__xpinyin_to_unicode:n \__xpinyin_to_unicode_xetex:n
306   \cs_new_eq:NN \__xpinyin_char_to_unicode:n \__xpinyin_to_unicode:n
307   \cs_new_eq:NN \__xpinyin_restore_CJKsymbol: \__xpinyin_restore_CJKsymbol_aux:
308   \cs_new_eq:NN \__xpinyin_replace_CJKsymbol: \__xpinyin_replace_CJKsymbol_aux:
```



```

309 \cs_new_eq:NN \__xpinyin_replace_CJKsymbol_single:n
310 \__xpinyin_replace_CJKsymbol_single_aux:n
311 \tl_if_exist:NTF \l_xeCJK_current_font_tl
312 {
313   \tl_set:Nn \l__xpinyin_coor_tl
314   {
315     ( \tl_to_str:N \l__xpinyin_font_tl ) /
316     \l_xeCJK_current_font_tl/\l__xpinyin_ratio_tl
317   }
318 }
319 {
320   \tl_set:Nn \l__xpinyin_coor_tl
321   {
322     ( \tl_to_str:N \l__xpinyin_font_tl ) /
323     \xeCJK@family/\f@series/\f@shape/\f@size/\l__xpinyin_ratio_tl
324   }
325 }
326 \cs_new_eq:NN \__xpinyin_leavevmode: \prg_do_nothing:
327 \cs_new_protected_nopar:Npx \__xpinyin_CJKsymbol_hook:
328 {
329   \exp_not:N \makeXeCJKinactive
330   \cs_if_exist_use:NF \xeCJK_select_font:
331   { \exp_not:N \xeCJK@setfont }
332 }
333 }
(End definition for \__xpinyin_adjust_xeCJK_hook:.)

```

__xpinyin_adjust_CJK_hook:

```

334 \cs_new_protected_nopar:Npn \__xpinyin_adjust_CJK_hook:
335 {
336   \bool_if:NTF \g__xpinyin_GBK_bool
337   {
338     \cs_new_eq:NN \__xpinyin_to_unicode:n \__xpinyin_GBK_to_unicode:n
339     \cs_new_eq:NN \__xpinyin_char_to_unicode:n \__xpinyin_GBKchar_to_unicode:n
340   }
341   {
342     \cs_new_eq:NN \__xpinyin_to_unicode:n \__xpinyin_UTF_to_unicode:n
343     \cs_new_eq:NN \__xpinyin_char_to_unicode:n \__xpinyin_UTFchar_to_unicode:n
344   }
345   \cs_new_eq:NN \__xpinyin_select_font: \__xpinyin_select_font_aux:
346   \cs_new_eq:NN \__xpinyin_leavevmode: \leavevmode
347   \cs_new_eq:NN \__xpinyin_CJKsymbol_hook: \prg_do_nothing:
348   \@ifpackageloaded { CJKpunct }
349   { \__xpinyin_adjust_CJKpunct_hook: }
350   {
351     \cs_new_eq:NN \__xpinyin_restore_CJKsymbol: \__xpinyin_restore_CJKsymbol_aux:
352     \cs_new_eq:NN \__xpinyin_replace_CJKsymbol: \__xpinyin_replace_CJKsymbol_aux:
353     \cs_new_eq:NN \__xpinyin_replace_CJKsymbol_single:n
354     \__xpinyin_replace_CJKsymbol_single_aux:n
355     \AtBeginDocument
356     {
357       \@ifpackageloaded { CJKpunct }
358       {
359         \cs_undefine:N \__xpinyin_restore_CJKsymbol:
360         \cs_undefine:N \__xpinyin_replace_CJKsymbol:
361         \cs_undefine:N \__xpinyin_replace_CJKsymbol_single:n
362         \__xpinyin_adjust_CJKpunct_hook:
363       } { }
364     }
365   }
366 }
(End definition for \__xpinyin_adjust_CJK_hook:.)

```

__xpinyin_adjust_CJKpunct_hook:

```

367 \cs_new_protected_nopar:Npn \__xpinyin_adjust_CJKpunct_hook:
368 {
369   \cs_new_protected_nopar:Npn \__xpinyin_restore_CJKsymbol:
370   {

```

```

371     \int_compare:nNnTF { \CJKpunct@punctstyle } = { \CJKpunct@ps@plain }
372     { \__xpinyin_restore_CJKsymbol_aux: }
373     { \cs_set_eq:NN \CJKKosymbol \__xpinyin_save_CJKsymbol:n }
374   }
375 \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol:
376   {
377     \int_compare:nNnTF { \CJKpunct@punctstyle } = { \CJKpunct@ps@plain }
378     { \__xpinyin_replace_CJKsymbol_aux: }
379     {
380       \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \CJKKosymbol
381       \cs_set_eq:NN \CJKKosymbol \__xpinyin_CJKsymbol:n
382     }
383   }
384 \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol_single:n ##1
385   {
386     \int_compare:nNnTF { \CJKpunct@punctstyle } = { \CJKpunct@ps@plain }
387     { \__xpinyin_replace_CJKsymbol_single_aux:n { ##1 } }
388     {
389       \bool_if:NF \l__xpinyin_enable_bool
390       { \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \CJKKosymbol }
391       \cs_set_protected_nopar:Npn \CJKKosymbol ####1
392       { \__xpinyin_single_CJKsymbol:nn { ####1 } { ##1 } }
393     }
394   }
395 }

```

(End definition for __xpinyin_adjust_CJKpunct_hook:.)

\pinyin

```

396 \NewDocumentCommand \pinyin { 0 { } m }
397   {
398     \group_begin:
399     \keys_set:nn { xpinyin } {#1}
400     \l__xpinyin_font_tl
401     \l__xpinyin_format_tl { }
402     \selectfont
403     \c__xpinyin_reset_UTF_cs_tl
404     \__xpinyin_pinyin:n {#2}
405     \group_end:
406   }

```

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

__xpinyin_pinyin:n

```

407 \cs_new_protected_nopar:Npn \__xpinyin_pinyin:n #1
408   {
409     \__xpinyin_pinyin_init:
410     \bool_set_true:N \l__xpinyin_first_bool
411     \tl_set:Nn \l__xpinyin_save_tl {#1}
412     \__xpinyin_pinyin_aux:n #1 \q_recursion_tail \q_recursion_stop
413   }

```

(End definition for __xpinyin_pinyin:n.)

__xpinyin_pinyin_aux:n

```

414 \cs_new_protected_nopar:Npn \__xpinyin_pinyin_aux:n #1
415   {
416     \quark_if_recursion_tail_stop_do:nn {#1}
417     {
418       \bool_if:NTF \l__xpinyin_first_bool { \l__xpinyin_save_tl }
419       { \tl_if_empty:NF \l__xpinyin_item_tl { \l__xpinyin_pysep_tl \l__xpinyin_item_tl } }
420     }
421     \__xpinyin_if_number:nTF {#1}
422     {
423       \bool_if:NTF \l__xpinyin_first_bool
424       { \bool_set_false:N \l__xpinyin_first_bool }
425       { \l__xpinyin_pysep_tl }
426     }
427     \l__xpinyin_pre_tl
428     \__xpinyin_tone:Vn \l__xpinyin_tone_tl {#1}
429     \l__xpinyin_post_tl

```

```

429     \__xpinyin_pinyin_init:
430     }
431     {
432     \int_compare:nNnTF
433     { 0 \cs_if_exist_use:c { c__xpinyin_ \tl_to_str:N \l__xpinyin_tone_tl _tl } } >
434     { 0 \cs_if_exist_use:c { c__xpinyin_ \tl_to_str:n {#1} _tl } }
435     { \tl_put_right:Nn \l__xpinyin_post_tl {#1} }
436     {
437     \tl_set:Nn \l__xpinyin_tone_tl {#1}
438     \tl_set_eq:NN \l__xpinyin_pre_tl \l__xpinyin_item_tl
439     \tl_clear:N \l__xpinyin_post_tl
440     }
441     \tl_put_right:Nx \l__xpinyin_item_tl { \__xpinyin_replace_v:n {#1} }
442     }
443     \__xpinyin_pinyin_aux:n
444     }

```

(End definition for __xpinyin_pinyin_aux:n)

__xpinyin_tone:Nn

```

445 \cs_new_protected_nopar:Npn \__xpinyin_tone:Nn #1#2
446 { \use:c { __xpinyin_num_to_tone_ #1 :Nn } {#1} {#2} }
447 \cs_generate_variant:Nn \__xpinyin_tone:Nn { V }

```

(End definition for __xpinyin_tone:Nn)

__xpinyin_replace_v:n

```

448 \cs_new_nopar:Npn \__xpinyin_replace_v:n #1
449 {
450     \str_if_eq:nnTF {#1} { v }
451     {
452     \str_case:onTF { \l__xpinyin_item_tl }
453     { { l } } { } { n } { } { L } { } { N } { } }
454     { \exp_not:n { ü } } { u }
455     }
456     { \exp_not:n {#1} }
457     }

```

(End definition for __xpinyin_replace_v:n)

__xpinyin_pinyin_init:

```

458 \cs_new_nopar:Npn \__xpinyin_pinyin_init:
459 {
460     \tl_clear:N \l__xpinyin_pre_tl \tl_clear:N \l__xpinyin_post_tl
461     \tl_clear:N \l__xpinyin_item_tl \tl_clear:N \l__xpinyin_tone_tl
462     }

```

(End definition for __xpinyin_pinyin_init:)

__xpinyin_if_number:nTF

```

463 \prg_new_conditional:Npnn \__xpinyin_if_number:n #1 { TF }
464 {
465     \if_int_compare:w \c_one < 1 \tl_to_str:n {#1} \exp_stop_f:
466     \prg_return_true: \else: \prg_return_false: \fi:
467     }

```

(End definition for __xpinyin_if_number:nTF)

\l__xpinyin_first_bool

```

468 \bool_new:N \l__xpinyin_first_bool

```

(End definition for \l__xpinyin_first_bool)

\c__xpinyin_a_tl

```

\c__xpinyin_o_tl 469 \tl_const:Nn \c__xpinyin_a_tl { 3 }
\c__xpinyin_e_tl 470 \tl_const:Nn \c__xpinyin_o_tl { 2 }
\c__xpinyin_i_tl 471 \tl_const:Nn \c__xpinyin_e_tl { 2 }
\c__xpinyin_u_tl 472 \tl_const:Nn \c__xpinyin_i_tl { 1 }
\c__xpinyin_u_tl 473 \tl_const:Nn \c__xpinyin_u_tl { 1 }
\c__xpinyin_v_tl 474 \tl_const:Nn \c__xpinyin_v_tl { 1 }

```

(End definition for \c__xpinyin_a_tl and others.)

`_xpinyin_num_to_tone:Nn`

```
475 \cs_new_protected_nopar:Npn \_xpinyin_num_to_tone:Nn #1#2
476 {
477   \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
478     = {#1} \or: \'{#1} \or: \v {#1} \or: \` {#1} \else: #1 \fi:
479 }
480 \tl_map_inline:nn { a o e u }
481 { \cs_new_eq:cN { \_xpinyin_num_to_tone_ #1 :Nn } \_xpinyin_num_to_tone:Nn }
482 \cs_new_nopar:Npn \_xpinyin_num_to_tone_i:Nn #1#2
483 {
484   \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
485     ī \or: í \or: ĭ \or: ì \else: i \fi:
486 }
487 \cs_new_protected_nopar:Npn \_xpinyin_num_to_tone_v:Nn #1#2
488 {
489   \str_case:onTF { \l__xpinyin_pre_tl }
490     { { l } { } { n } { } { L } { } { N } { } }
491     {
492       \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
493         ū \or: ú \or: ũ \or: ù \else: ü \fi:
494     }
495     { \_xpinyin_num_to_tone:Nn u {#2} }
496 }
```

(End definition for `_xpinyin_num_to_tone:Nn`.)

`\xpinyinsetup`

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

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

`ratio`
`vsep`
`hsep`
`pysep`
`font`
`format`
`multiple`
`footnote`

```
498 \clist_map_inline:nn
499 { ratio , vsep , hsep , pysep , font , format , multiple }
500 { \keys_define:nn { xpinyin } { #1 .tl_set:c = { l__xpinyin_ #1 _tl } } }
501 \keys_define:nn { xpinyin }
502 { footnote .bool_set:N = \l__xpinyin_footnote_bool }
503 \keys_set:nn { xpinyin }
504 {
505   ratio    = .4 ,
506   vsep     = 1 em ,
507   pysep    = \c_space_tl ,
508   font     = \normalfont ,
509 }
```

(End definition for `ratio` and others. These functions are documented on page 3.)

`\xpinyin_customary:nnn`

`\xpinyin_multiple:nnn`

```
510 \cs_new_protected_nopar:Npn \xpinyin_customary:nnn #1#2#3
511 { \cs_gset_nopar:cpn { c__xpinyin_ #2 _tl } {#3} }
512 \cs_new_protected_nopar:Npn \xpinyin_multiple:nnn #1#2#3
513 { \cs_gset_nopar:cpn { c__xpinyin_multiple_ #2 _clist } {#3} }
514
```

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

```
514 \group_begin:
515   \cs_set_eq:NN \XPYU \xpinyin_customary:nnn
516   \cs_set_eq:NN \XPYUM \xpinyin_multiple:nnn
517   \file_input:n { xpinyin-database.def }
518 \group_end:
```

`\setpinyin`

```
519 \NewDocumentCommand \setpinyin { m m }
520 {
521   \tl_set:cn
522     { c__xpinyin_ \_xpinyin_char_to_unicode:n {#1} _tl }
523     { \_xpinyin_pinyin:n {#2} }
524 }
```

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

```
525 \ProcessKeysOptions { xpinyin }
```

```
526 </package>
```

5 xpinyin.lua

```
527 (*lua)
528 xpinyin      = xpinyin or { }
529 local xpinyin = xpinyin

    计算时区2。
530 xpinyin.tzoffset = "+0000"
531 do
532     -- Compute the difference in seconds between local time and UTC.
533     local function get_timezone()
534         local now = os.time()
535         return os.difftime(now, os.time(os.date("!*t", now)))
536     end
537     -- Return a timezone string in ISO 8601:2000 standard form (+hhmm or -hhmm)
538     local function get_tzoffset(timezone)
539         local h, m = math.modf(timezone / 3600)
540         return string.format("%+.4d", 100 * h + 60 * m)
541     end
542     xpinyin.tzoffset = get_tzoffset(get_timezone())
543 end

544 xpinyin = {
545     svnid      = "$Id: xpinyin.dtx 700 2014-06-25 10:54:28Z sobenlee $",
546     uchar      = unicode.utf8.char,
547     readings   = { },
548     fixreadings = {
```

为汉字“〇”增加拼音。

```
549     {"U+3007", "Mandarin", "líng"},
```

修改汉字“女”的错误拼音。

```
550     {"U+5973", "HanyuPinlu", "nǚ(1129) rǚ(37)"}
```

```
551     },
```

```
552     database = {
```

```
553         file      = "Unihan_Readings.txt",
```

```
554         date      = "Date: 2014-05-09 18:17:02 GMT [JHJ]",
```

```
555         version   = "Unicode version: 7.0.0",
```

```
556         dbfile    = "xpinyin.db"
```

```
557     },
```

DocStrip 会将一行开头的 %% 替换成 \MetaPrefix, 因此我们在行首加了空格, 需要把它去掉。

```
558     preamble = string.gsub([[
559         %%
560         %% Do not edit this file!
561         %% Created from Unihan database:
562         %%
563         %% $file
564         %% $date
565         %% $version
566         %%
567         %% by "]] .. arg[-1] .. " " .. arg[0] .. [[" on ]]
568         .. os.date("%Y-%m-%d %X ") .. xpinyin.tzoffset
569         .. "\n%%", "[ ]+(%%%%)", "%1"
570     ]]
```

将 Unihan_Readings.txt³ 保存到一张表里面。

```
571 function xpinyin.maketable (txt)
572     local f = assert(io.open(txt or xpinyin.database.file, "r"))
573     local s, prop
574     for line in f:lines() do
575         s = line:explode("\t")
576         if #s == 3 then
577             prop = s[2]:sub(2)
578             if prop == "Mandarin" or
579                prop == "HanyuPinyin" or
580                prop == "XHC1983" or
581                prop == "HanyuPinlu" then
582                 xpinyin.insert(s[1], prop, s[3])
```

²<http://lua-users.org/wiki/TimeZone>

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

```

583     end
584     elseif line:find("Date") then
585         xpinyin.database.date = line:match("^[#%s]*(.*)")
586     elseif line:find("Unicode version:") then
587         xpinyin.database.version = line:match("^[#%s]*(.*)")
588     end
589 end
590 f:close()
591 if xpinyin.fixreadings then
592     for _, s in pairs(xpinyin.fixreadings) do
593         xpinyin.insert(s[1], s[2], s[3])
594     end
595 end
596 end

```

往拼音表中加入项目。

```

597 function xpinyin.insert (unicode, prop, value)
598     local index = tonumber(unicode:sub(3), 16)
599     if not xpinyin.readings[index] then
600         xpinyin.readings[index] = { }
601     end
602     xpinyin.readings[index][prop] = value
603 end

```

输出需要的格式文件。

```

604 function xpinyin.output (db)
605     local f = assert(io.open(db or xpinyin.database.dbfile, "w"))
606     local preamble = xpinyin.preamble:gsub("%$(%w+)", xpinyin.database)
607     f:write(preamble, "\n")
608     local pinyin, code_point, char
609     local mt = { }
610     for index, pyt in xpinyin.pairsByKeys(xpinyin.readings) do
611         pinyin = assert(xpinyin.grep(pyt))
612         code_point = string.format("%X", index)
613         char = xpinyin.uchar(index)
614         f:write("\\XPYU{" .. char .. "}" .. code_point .. "}" .. pinyin .. "\n")
615         pinyin = xpinyin.multiple(pyt)
616         if pinyin then
617             mt[#mt + 1] = "\\XPYUM{" .. char .. "}" .. code_point .. "}" .. pinyin .. "}"
618         end
619     end
620     f:write(table.concat(mt, "\n"), "\n")
621     f:close()
622 end

```

将表按照索引排序,代码来源于 *Programming in Lua*。

```

623 function xpinyin.pairsByKeys (t, f)
624     local a = { }
625     for n in pairs(t) do a[#a + 1] = n end
626     table.sort(a, f)
627     local i = 0 -- iterator variable
628     return function () -- iterator function
629         i = i + 1
630         return a[i], t[a[i]]
631     end
632 end

```

按照 HanyuPinlu、Mandarin、XHC1983、HanyuPinyin 的顺序选择最常用的拼音。

```

633 function xpinyin.grep (pyt)
634     if pyt.HanyuPinlu then
635         return pyt.HanyuPinlu:match("[^%()+]", "HanyuPinlu")
636     elseif pyt.Mandarin then
637         return pyt.Mandarin:match("%S+"), "Mandarin"
638     elseif pyt.XHC1983 then
639         return pyt.XHC1983:match(":(%S+)"), "XHC1983"
640     elseif pyt.HanyuPinyin then
641         return pyt.HanyuPinyin:match(":([^,%s]+)"), "HanyuPinyin"
642     end
643 end

```

根据 XHC1983 和 HanyuPinyin 选出多音字。

```

644 function xpinyin.multiple (pyt)
645   if pyt.XHC1983 then
646     local s = pyt.XHC1983:explode()
647     if s[2] then
648       local t = { }
649       for i, v in ipairs(s) do
650         t[#t + 1] = v:explode(":")[2]
651       end
652       return xpinyin.unique(t), "XHC1983"
653     end
654   elseif pyt.HanyuPinyin and pyt.HanyuPinyin:find("%D,") then
655     local t = { }
656     for _, v in ipairs(pyt.HanyuPinyin:explode()) do
657       for _, py in ipairs(v:explode(":")[2]:explode(", ")) do
658         t[#t + 1] = py
659       end
660     end
661     return xpinyin.unique(t), "HanyuPinyin"
662   end
663 end

    删除掉数组中的重复元素。
664 function xpinyin.unique (t)
665   local rt = xpinyin.remove_duplicate(t)
666   if #rt > 1 then
667     return table.concat(rt, ",")
668   end
669 end

670 function xpinyin.remove_duplicate (t)
671   local ht = { }
672   local nt = { }
673   for i, v in ipairs(t) do
674     if not ht[v] then
675       nt[#nt + 1] = v
676       ht[v] = true
677     end
678   end
679   return nt
680 end

681 xpinyin.maketable()
682 xpinyin.output()
683 </lua>

```

代码索引

斜体的数字表示对应项说明所在的页码,下划线的数字表示定义所在的代码行号,而直立的数字表示对应项使用时所在的行号。

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