

xpinyin 宏包

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2020/05/01 v2.8*

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 X_YL^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 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. 789567a.

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，方便阅者\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
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，
fāng shì yuè zhě liǎo rán bù huò
方便阅者了然不惑。

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，

cháng
长
zhēn shì yīn mèng huàn shí tōng líng
甄士隐梦幻识通灵
zhòng yào
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 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}`

设置拼音的其他格式, 例如颜色等, 缺省值为空。

multiple `multiple = {\format}`

设置多音字拼音的其他格式, 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 \ifpackageafter { expl3 } { 2019/03/05 } { }
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_lazy_or:nnF
15 { \sys_if_engine_xetex_p: }
16 { \sys_if_engine_pdftex_p: }
17 { \msg_critical:nn { xpinyin } { engine-not-supported } }
18 \RequirePackage { xparse }
19 \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。

```

20 \prop_const_from_keyval:Nn \c__xpinyin_tone_prop
21 {
22   { ā } = { \@tabacckludge= a } ,
23   { á } = { \@tabacckludge' a } ,
24   { ä } = { \v a } ,
25   { à } = { \@tabacckludge` a } ,
26   { õ } = { \@tabacckludge= o } ,
27   { ó } = { \@tabacckludge' o } ,

```

```

28 { ǒ } = { \v o } ,
29 { ò } = { \@tabacckludge` o } ,
30 { ē } = { \@tabacckludge= e } ,
31 { é } = { \@tabacckludge' e } ,
32 { ě } = { \v e } ,
33 { è } = { \@tabacckludge` e } ,
34 { ū } = { \@tabacckludge= u } ,
35 { ú } = { \@tabacckludge' u } ,
36 { ů } = { \v u } ,
37 { ù } = { \@tabacckludge` u } ,
38 { ě } = { \@tabacckludge' m } ,
39 { ě } = { \@tabacckludge' n } ,
40 { ě } = { \v n } ,
41 { ě } = { \@tabacckludge` n } ,
42 { ī } = { \@tabacckludge= { \i } } ,
43 { í } = { \@tabacckludge' { \i } } ,
44 { ĭ } = { \v { \i } } ,
45 { ĭ } = { \@tabacckludge` { \i } } ,
46 { ü } = { \" u } ,
47 { ū } = { \@tabacckludge= { \" u } } ,
48 { ú } = { \@tabacckludge' { \" u } } ,
49 { ů } = { \v { \" u } } ,
50 { ù } = { \@tabacckludge` { \" u } }
51 }

```

```

\__xpinyin_UTF_char:nn 52 \cs_new_protected:Npn \__xpinyin_UTF_char:nn #1#2
53 {
54   \cs_if_exist:cF { u8:#1 }
55   { \tl_const:cn { u8:#1 } {#2} }
56 }

```

```

\__xpinyin_GBK_char:nn 57 \cs_new_protected:Npn \__xpinyin_GBK_char:nn #1#2
58 {
59   \__xpinyin_UTF_char:nn {#1} {#2}
60   \exp_args:Nx \__xpinyin_GBK_char_aux:nn { \tl_head:n {#1} } {#1}
61 }
62 \cs_new_protected:Npn \__xpinyin_GBK_char_aux:nn #1#2
63 { \exp_args:Nf \__xpinyin_GBK_char_aux:nnn { \int_eval:n { `#1 } } {#1} {#2} }
64 \cs_new_protected:Npn \__xpinyin_GBK_char_aux:nnn #1#2#3
65 {
66   \cs_if_exist:cF { __xpinyin_UTF_ #1 :w }
67   {
68     \exp_args:Nf \__xpinyin_GBK_char_def:nnn
69     {
70       \int_case:nn { \tl_count:n {#3} }
71       {
72         { 2 } { ##1 }
73         { 3 } { ##1##2 }
74         { 4 } { ##1##2##3 }
75       }
76     }
77     {#1} {#2}
78     \exp_args:Nc \__xpinyin_save_UTF_cs:Nn { __xpinyin_UTF_ #1 :w } {#1}
79     \tl_gput_right:Nx \c__xpinyin_reset_UTF_catcode_tl
80     { \char_set_catcode:nn {#1} { \char_value_catcode:n {#1} } }
81     \char_set_catcode_active:n {#1}
82   }
83 }
84 \cs_new_protected:Npn \__xpinyin_GBK_char_def:nnn #1#2#3
85 {
86   \cs_new_protected:cpn { __xpinyin_UTF_ #2 :w } #1
87   { \use:c { u8: \tl_to_str:n { #3#1 } } }
88 }
89 \tl_new:N \c__xpinyin_reset_UTF_catcode_tl
\__xpinyin_save_UTF_cs:Nn 90 \group_begin:
91 \char_set_catcode_active:n { 126 }
92 \cs_new_protected:Npn \__xpinyin_save_UTF_cs:Nn #1#2

```

```

93 {
94   \group_begin:
95   \char_set_lccode:nn { 126 } {#2}
96   \tex_lowercase:D
97   {
98     \group_end:
99     \tl_gput_right:Nn \c__xpinyin_reset_UTF_cs_tl { \cs_set_eq:NN ~ #1 }
100   }
101 }
102 \group_end:
103 \tl_new:N \c__xpinyin_reset_UTF_cs_tl

104 \bool_new:N \g__xpinyin_GBK_bool
105 \@ifpackageloaded { xeCJK }
106 { \AtEndOfPackage { \__xpinyin_adjust_xeCJK_hook: } }
107 {
108   \@ifpackageloaded { CJKutf8 }
109   {
110     \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_UTF_char:nn
111     \AtEndOfPackage { \__xpinyin_adjust_CJK_hook: }
112   }
113   {
114     \@ifpackageloaded { CJK }
115     {
116       \RequirePackage { xCJK2uni }
117       \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_GBK_char:nn
118       \AtEndOfPackage
119       {
120         \tl_put_right:Nn \l__xpinyin_pinyin_box_hook_tl
121         { \c__xpinyin_reset_UTF_cs_tl }
122         \__xpinyin_adjust_CJK_hook:
123         \tl_use:N \c__xpinyin_reset_UTF_catcode_tl
124       }
125       \bool_gset_true:N \g__xpinyin_GBK_bool
126     }
127     {
128       \sys_if_engine_xetex:TF
129       {
130         \RequirePackage { xeCJK }
131         \AtEndOfPackage { \__xpinyin_adjust_xeCJK_hook: }
132       }
133       {
134         \RequirePackage { CJKutf8 }
135         \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_UTF_char:nn
136         \AtEndOfPackage { \__xpinyin_adjust_CJK_hook: }
137       }
138     }
139   }
140 }

\l__xpinyin_tmpa_box 141 \box_new:N \l__xpinyin_tmpa_box
\l__xpinyin_tmpb_box 142 \box_new:N \l__xpinyin_tmpb_box

\__xpinyin_width:Nn 143 \cs_new_protected:Npn \__xpinyin_width:Nn #1#2
144 {
145   \hbox_set:Nn \l__xpinyin_tmpa_box {#2}
146   #1 = \box_wd:N \l__xpinyin_tmpa_box
147 }

\__xpinyin_make_pinyin_box:nnn 148 \cs_new_protected: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_to_wd_and_ht: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 }
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_drop: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 }

\__xpinyin_CJKsymbol:n 188 \cs_new_protected:Npn \__xpinyin_CJKsymbol:n #1
189 { \__xpinyin_CJKsymbol:xn { \__xpinyin_to_unicode:n {#1} } {#1} }
190 \cs_new_protected: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 }

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

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

```

```

\l__xpinyin_enable_bool 221 \bool_new:N \l__xpinyin_enable_bool

\__xpinyin_CJKglue: 222 \cs_new_protected:Npn \__xpinyin_CJKglue:
223 { \skip_horizontal:n { \l__xpinyin_hsep_tl } }

\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 }

\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 }

\__xpinyin_restore_footnote: 249 \cs_new_protected: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 }

\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 \tex_currentgrouptype:D = { 11 }
258   { \disablepinyin }
259 }

\l__xpinyin_CJKglue_dim 260 \dim_new:N \l__xpinyin_CJKglue_dim

\__xpinyin_single_aux:nn 261 \cs_new_protected: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:Npn \__xpinyin_replace_CJKsymbol_single_aux:n #1
268 {
269   \bool_if:NF \l__xpinyin_enable_bool { \__xpinyin_replace_CJKsymbol: }
270   \cs_set_protected:Npn \CJKsymbol ##1
271   { \__xpinyin_single_CJKsymbol:nn {##1} {#1} }
272 }
273 \cs_new_protected: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 }

\__xpinyin_replace_CJKsymbol_aux: 279 \cs_new_protected: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 }

\__xpinyin_restore_CJKsymbol_aux: 284 \cs_new_protected:Npn \__xpinyin_restore_CJKsymbol_aux:
285 { \cs_set_eq:NN \CJKsymbol \__xpinyin_save_CJKsymbol:n }

\__xpinyin_select_font_xetex: 286 \cs_new_protected: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 { \tex_XeTeXfonttype:D \tex_font:D } = \c_zero_int
293         {
294             \exp_last_unbraced:NNV
295             \cs_gset_eq:cN \l__xpinyin_current_coor_tl \tex_font:D
296         }
297     }
298 }

\__xpinyin_select_font_aux: 299 \cs_new_protected:Npn \__xpinyin_select_font_aux:
300 {
301     \fontsize
302     { \l__xpinyin_ratio_tl \tex_dimexpr:D \f@size pt \scan_stop: }
303     { \f@baselineskip }
304     \normalfont
305     \l__xpinyin_font_tl
306     \selectfont
307 }

\__xpinyin_to_unicode_xetex:n 308 \cs_new:Npn \__xpinyin_to_unicode_xetex:n #1
309 { \int_to_arabic:n { `#1 } }

\__xpinyin_UTF_to_unicode:n 310 \cs_new:Npn \__xpinyin_UTF_to_unicode:n #1
\__xpinyin_UTFchar_to_unicode:n 311 {
312     \int_to_arabic:n
313     { \exp_args:No \int_from_hex:n { \CJK@plane } * "100 + #1 }
314 }
315 \cs_new:Npn \__xpinyin_UTFchar_to_unicode:n #1
316 { \int_to_arabic:n { \__xpinyin_UTF_viii_to_unicode:NNNw #1 \q_stop } }
317 \cs_new:Npn \__xpinyin_UTF_viii_to_unicode:NNNw #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 }

\__xpinyin_GBK_to_unicode:n 323 \cs_new:Npn \__xpinyin_GBK_to_unicode:n
\__xpinyin_GBKchar_to_unicode:n 324 { \CJKtu_sfd_map:nn { \CJK@plane } }
325 \cs_new:Npn \__xpinyin_GBKchar_to_unicode:n
326 { \CJKtu_char_to_unicode:n }

\__xpinyin_adjust_xeCJK_hook: 327 \cs_new_protected: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: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 }

\__xpinyin_adjust_CJK_hook: 359 \cs_new_protected: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: \mode_leave_vertical:
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 }

\__xpinyin_adjust_CJKpunct_hook: 392 \cs_new_protected:Npn \__xpinyin_adjust_CJKpunct_hook:
393 {
394     \cs_new_protected: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: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: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:Npn \CJKsymbol ####1
417             { \__xpinyin_single_CJKsymbol:nn { ####1 } { ##1 } }
418         }
419     }
420 }

\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 }

\__xpinyin_pinyin:n 432 \cs_new_protected: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 }

\__xpinyin_pinyin_aux:n 439 \cs_new_protected: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 }

\__xpinyin_tone:nn 470 \cs_new_protected: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 }

```

```

__xpinyin_replace_v:n 473 \cs_new: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   }

__xpinyin_pinyin_init: 483 \cs_new: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 }

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

\l__xpinyin_first_bool 493 \bool_new:N \l__xpinyin_first_bool

\c__xpinyin_a_tl 494 \tl_const:Nn \c__xpinyin_a_tl { 3 }
\c__xpinyin_o_tl 495 \tl_const:Nn \c__xpinyin_o_tl { 2 }
\c__xpinyin_e_tl 496 \tl_const:Nn \c__xpinyin_e_tl { 2 }
\c__xpinyin_i_tl 497 \tl_const:Nn \c__xpinyin_i_tl { 1 }
\c__xpinyin_u_tl 498 \tl_const:Nn \c__xpinyin_u_tl { 1 }
\c__xpinyin_v_tl 499 \tl_const:Nn \c__xpinyin_v_tl { 1 }

__xpinyin_num_to_tone:Nn 500 \cs_new_protected:Npn __xpinyin_num_to_tone:Nn #1#2
501 {
502   \if_case:w \int_eval:n { #2 - 1 } \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:Npn __xpinyin_num_to_tone_i:Nn #1#2
508 {
509   \if_case:w \int_eval:n { #2 - 1 } \exp_stop_f:
510   ī \or: í \or: î \or: ï \else: i \fi:
511 }
512 \cs_new_protected: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 - 1 } \exp_stop_f:
518     ū \or: ú \or: ũ \or: ù \else: ü \fi:
519   }
520   { __xpinyin_num_to_tone:Nn u {#2} }
521 }

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

ratio 523 \clist_map_inline:nn
vsep 524 { ratio , vsep , hsep , pysep , font , format , multiple }
hsep 525 { \keys_define:nn { xpinyin } { #1 .tl_set:c = { l__xpinyin_ #1 _tl } } }
pysep 526 \keys_define:nn { xpinyin }
font 527 { footnote .bool_set:N = \l__xpinyin_footnote_bool }
format 528 \keys_set:nn { xpinyin }
multiple 529 {
footnote 530   ratio    = .4 ,
531   vsep     = 1 em ,
532   pysep    = \c_space_tl ,
533   font     = \normalfont ,
534 }

```

```

\xpinyin_customary:nnn 535 \cs_new_protected:Npn \xpinyin_customary:nnn #1#2
\xpinyin_multiple:nnn 536 { \cs_gset_nopar:cpn { c__xpinyin_ #2 _tl } }
537 \cs_new_protected:Npn \xpinyin_multiple:nnn #1#2
538 { \cs_gset_nopar:cpn { c__xpinyin_multiple_ #2 _clist } }

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} _tl }
548   { \__xpinyin_pinyin:n {#2} }
549 }

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",
580   dbfile = "xpinyin.db"
581 },
582 preamble = [[
583 %<<COMMENT
584 %%
585 %% Do not edit this file!
586 %% Created from UniHan database:
587 %%
588 %% $file

```

²<http://lua-users.org/wiki/TimeZone>

```

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,
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

```

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

```

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

```

```
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。

Symbols

\"	46, 47, 48, 49, 50
\'	503
\\	5, 6, 7, 662, 665
\`	503

A

\AtBeginDocument	380
\AtEndOfPackage	106, 111, 118, 131, 136

B

bool commands:	
\bool_gset_true:N	125
\bool_if:NTF	216, 226, 241, 251, 269, 361, 414, 443, 448
\bool_lazy_or:nnTF	14
\bool_new:N	104, 221, 493
\bool_set_false:N	246, 449
\bool_set_true:N	236, 435
box commands:	
\box_ht:N	172
\box_move_up:nn	174
\box_new:N	141, 142
\box_resize_to_wd_and_ht:Nnn	170
\box_use_drop:N	177
\box_wd:N	146, 167, 168, 171, 176

C

char commands:	
\char_set_catcode:nn	80
\char_set_catcode_active:n	81, 91
\char_set_lccode:nn	95
\char_value_catcode:n	80
\CJKglue	217, 230, 231, 233, 243, 244
\CJKsymbol	398, 405, 406, 415, 416
\CJKsymbol	270, 281, 282, 285
CJKtu commands:	
\CJKtu_char_to_unicode:n	326
\CJKtu_sfd_map:nn	324
clist commands:	
\clist_if_exist:NTF	160
\clist_map_inline:nn	523
color commands:	
\color_ensure_current:	157
\color_group_begin:	157
\color_group_end:	164
cs commands:	
\cs_generate_variant:Nn	187, 195, 472
\cs_gset_eq:NN	295
\cs_gset_nopar:Npn	536, 538
\cs_if_eq:NNTF	243
\cs_if_exist:NTF	54, 66

\cs_if_exist_use:N	458, 459
\cs_if_exist_use:NTF	288, 355
\cs_new:Npn	308, 310, 315, 317, 323, 325, 473, 483, 507
\cs_new_eq:NN	329, 330, 331, 332, 333, 334, 351, 363, 364, 367, 368, 370, 371, 372, 376, 377, 378, 506
\cs_new_protected:Npn	52, 57, 62, 64, 84, 86, 92, 143, 148, 188, 190, 222, 249, 261, 267, 273, 279, 284, 286, 299, 327, 359, 392, 394, 400, 409, 432, 439, 470, 500, 512, 535, 537
\cs_new_protected:Npx	352
\cs_set_eq:NN	99, 185, 230, 231, 244, 281, 282, 285, 398, 405, 406, 415, 540, 541
\cs_set_protected:Npn	270, 416
\cs_undefine:N	384, 385, 386

D

dim commands:	
\dim_compare:nNnTF	166
\dim_new:N	260
\disablepinyin	3, 239, 258

E

else commands:	
\else:	491, 503, 510, 518
\enablepinyin	3, 199, 209, 224
exp commands:	
\exp_args:Nc	78
\exp_args:Nf	63, 68
\exp_args:No	313
\exp_args:Nx	60
\exp_last_unbraced:NNV	294
\exp_not:N	354, 356
\exp_not:n	479, 481
\exp_stop_f:	490, 502, 509, 517

F

fi commands:	
\fi:	491, 503, 510, 518
file commands:	
\file_input:n	542
font	3, 523
\fontsize	301
footnote	3, 523
format	3, 523

G

group commands:	
\group_begin:	90, 94, 207, 214, 423, 539
\group_end:	98, 102, 211, 265, 430, 543

H

hbox commands:	
\hbox_overlap_right:n	151

\hbox_set:Nn	145, 153, 155		
\hbox_to_wd:nn	176		
hsep	2, 523		
I			
\i	42, 43, 44, 45		
if commands:			
\if_case:w	502, 509, 517		
\if_int_compare:w	490		
\IfBooleanTF	205		
int commands:			
\int_case:nn	70		
\int_compare:nNnTF	257, 292, 396, 402, 411, 457		
\int_eval:n	63, 502, 509, 517		
\int_from_hex:n	313		
\int_to_arabic:n	309, 312, 316		
\c_one_int	490		
\c_zero_int	292		
K			
keys commands:			
\keys_define:nn	525, 526		
\keys_set:nn	198, 208, 215, 424, 522, 528		
M			
\makexeCJKinactive	354		
mode commands:			
\mode_leave_vertical:	204, 371		
msg commands:			
\msg_critical:nn	17		
\msg_error:nn	11		
\msg_new:nnn	3, 12		
multiple	3, 523		
N			
\n	594, 638, 656, 662, 668		
\NewDocumentCommand	202, 224, 239, 421, 522, 544		
\NewDocumentEnvironment	196		
\normalfont	304, 533		
\nRetrieving	638		
O			
or commands:			
\or:	503, 510, 518		
P			
\pinyin	2, 421		
pinyinscope	2, 196		
prg commands:			
\prg_do_nothing:	351, 372		
\prg_new_conditional:Npnn	488		
\prg_return_false:	491		
\prg_return_true:	491		
\ProcessKeysOptions	550		
prop commands:			
\prop_const_from_keyval:Nn	20		
\prop_map_function:NN	110, 117, 135		
pysep	3, 523		
Q			
quark commands:			
\quark_if_recursion_tail_stop_do:nn	441		
\q_recursion_stop	437		
\q_recursion_tail	437		
\q_stop	316, 317		
R			
ratio	2, 523		
\RequirePackage	18, 19, 116, 130, 134		
S			
scan commands:			
\scan_stop:	302		
\selectfont	306, 427		
\setpinyin	2, 544		
skip commands:			
\skip_horizontal:n	223		
str commands:			
\str_case:nnTF	477, 514		
\str_if_eq:nnTF	475		
sys commands:			
\c_sys_engine_str	13		
\sys_if_engine_pdftex:TF	182		
\sys_if_engine_pdftex_p:	16		
\sys_if_engine_xetex:TF	128		
\sys_if_engine_xetex_p:	15		
T			
\t	615		
T _E X and L ^A T _E X 2 _ε commands:			
\@ifpackagelater	10		
\@ifpackageloaded	105, 108, 114, 373, 382		
\@parboxrestore	252		
\@tabacckludge	3, 22, 23, 25, 26, 27, 29, 30, 31, 33, 34, 35, 37, 38, 39, 41, 42, 43, 45, 47, 48, 50		
\a	3		
\begin	2		
\CJK@plane	185, 313, 324		
\CJKglue	2		
\CJKpunct@ps@plain	396, 402, 411		
\CJKpunct@punctstyle	396, 402, 411		
\disablepinyin	3, 3		
\enablepinyin	3		
\end	2		
\f@baselineskip	303		
\f@series	348		
\f@shape	348		
\f@size	302, 348		
\footnote	3		
\normalfont	1, 3		
\pinyin	2, 3		
\setpinyin	2		
\xeCJK@family	348		
\xeCJK@setfont	356		
\xpinyin	2		
\xpinyin*	2		

- \xpinyinsetup 2
- tex commands:
- \tex_currentgrouptype:D 257
- \tex_dimexpr:D 302
- \tex_font:D 292, 295
- \tex_hss:D 177
- \tex_lowercase:D 96
- \tex_undefined:D 185
- \tex_XeTeXfonttype:D 292
- tl commands:
- \c_space_tl 532
- \tl_clear:N 464, 485, 486
- \tl_const:Nn 55, 494, 495, 496, 497, 498, 499
- \tl_count:n 70
- \tl_gput_right:Nn 79, 99
- \tl_head:n 60
- \tl_if_empty:NTF 228, 444
- \tl_if_empty:nTF 319
- \tl_if_exist:NTF 336
- \tl_map_inline:nn 505
- \tl_new:N 89, 103, 181, 254
- \tl_put_left:Nn 252
- \tl_put_right:Nn 120, 184, 460, 466
- \tl_set:Nn 255, 290, 338, 345, 436, 462, 546
- \tl_set_eq:NN 463
- \tl_to_str:N 340, 347, 458
- \tl_to_str:n 87, 459, 490
- \tl_use:N 123
- U**
- use commands:
- \use:N 87, 192, 471
- V**
- \v 24, 28, 32, 36, 40, 44, 49, 503
- vsep 2, 523
- X**
- xeCJK commands:
- \l_xeCJK_current_font_tl 336, 341
- \xeCJK_select_font: 355
- \xpinyin 2, 202
- xpinyin commands:
- \xpinyin_customary:nnn 535, 540
- \xpinyin_multiple:nnn 535, 541
- xpinyin internal commands:
- \c_xpinyin_a_tl 494
- __xpinyin_adjust_CJK_hook: 111, 122, 136, 359
- __xpinyin_adjust_CJKpunct_hook: 374, 387, 392
- __xpinyin_adjust_xeCJK_hook: 106, 131, 327
- __xpinyin_char_to_unicode:n 331, 364, 368, 547
- __xpinyin_CJKglue: 222, 231, 243
- \l_xpinyin_CJKglue_dim 168, 171, 217, 233, 260
- __xpinyin_CJKsymbol:n 188, 282, 406
- __xpinyin_CJKsymbol:nn 189, 190, 195
- __xpinyin_CJKsymbol_hook: 154, 352, 372
- \l_xpinyin_coar_tl 288, 290, 338, 345
- \l_xpinyin_current_coar_tl 290, 295
- \c_xpinyin_e_tl 494
- \l_xpinyin_enable_bool 216, 221, 226, 236, 241, 246, 269, 414
- \l_xpinyin_first_bool 435, 443, 448, 449, 493
- \l_xpinyin_font_tl 305, 340, 347, 425
- \l_xpinyin_footnote_bool 251, 527
- \l_xpinyin_format_tl 161, 162, 426
- \g_xpinyin_GBK_bool 104, 125, 361
- __xpinyin_GBK_char:nn 57, 117
- __xpinyin_GBK_char_aux:nn 60, 62
- __xpinyin_GBK_char_aux:nnn 63, 64
- __xpinyin_GBK_char_def:nnn 68, 84
- __xpinyin_GBK_to_unicode:n 323, 363
- __xpinyin_GBKchar_to_unicode:n 323, 364
- \l_xpinyin_hsep_tl 223, 228
- \c_xpinyin_i_tl 494
- __xpinyin_if_number:n 488
- __xpinyin_if_number:nTF 446, 488
- \l_xpinyin_item_tl 444, 463, 466, 477, 486
- __xpinyin_leavevmode: 150, 351, 371
- __xpinyin_make_pinyin_box:nnn 148, 192, 275
- \l_xpinyin_multiple_tl 161
- __xpinyin_num_to_tone:Nn 500
- __xpinyin_num_to_tone_i:Nn 507
- __xpinyin_num_to_tone_v:Nn 512
- \c_xpinyin_o_tl 494
- __xpinyin_pinyin:n 276, 429, 432, 548
- __xpinyin_pinyin_aux:n 437, 439
- \l_xpinyin_pinyin_box_hook_tl 120, 158, 181, 184
- __xpinyin_pinyin_init: 434, 454, 483
- \l_xpinyin_post_tl 453, 460, 464, 485
- \l_xpinyin_pre_tl 451, 463, 485, 514
- \l_xpinyin_pysep_tl 444, 450
- \l_xpinyin_ratio_tl 302, 341, 348
- __xpinyin_replace_CJKsymbol: 234, 269, 333, 377, 385, 400
- __xpinyin_replace_CJKsymbol_aux: 279, 333, 377, 403
- __xpinyin_replace_CJKsymbol_single:n 263, 334, 378, 386, 409
- __xpinyin_replace_CJKsymbol_single_aux:n 267, 335, 379, 412
- __xpinyin_replace_v:n 466, 473
- \c_xpinyin_reset_UTF_catcode_tl 79, 89, 123
- \c_xpinyin_reset_UTF_cs_tl 99, 103, 121, 428
- __xpinyin_restore_CJKsymbol: 245, 332, 376, 384, 394
- __xpinyin_restore_CJKsymbol_aux: 284, 332, 376, 397
- __xpinyin_restore_footnote: 235, 249
- \l_xpinyin_restore_footnote_tl 252, 254
- __xpinyin_save_CJKglue: 230, 244
- __xpinyin_save_CJKsymbol:n 154, 193, 277, 281, 285, 398, 405, 415
- \l_xpinyin_save_tl 436, 443
- __xpinyin_save_UTF_cs:Nn 78, 90
- __xpinyin_select_font: 159, 329, 370
- __xpinyin_select_font_aux: 291, 299, 370

_xpinyin_select_font_xetex:	286 , 329	_xpinyin_UTF_char:nn	52 , 59 , 110 , 135
_xpinyin_single_aux:nn	218 , 261	_xpinyin_UTF_to_unicode:n	310 , 367
_xpinyin_single_CJKsymbol:nn	271 , 273 , 417	_xpinyin_UTF_viii_to_unicode:NNW	316 , 317
\l_xpinyin_tmpa_box ..	141 , 145 , 146 , 153 , 168 , 171 , 176	_xpinyin_UTFchar_to_unicode:n	310 , 368
\l_xpinyin_tmpb_box	141 , 155 , 167 , 170 , 172 , 177	\c_xpinyin_v_tl	494
_xpinyin_to_unicode:n ..	189 , 276 , 330 , 331 , 363 , 367	\l_xpinyin_vsep_tl	174
_xpinyin_to_unicode_xetex:n	308 , 330	_xpinyin_width:Nn	143 , 217 , 233
_xpinyin_tone:nn	452 , 470	\xpinyinsetup	2 , 522
\c_xpinyin_tone_prop	20 , 110 , 117 , 135	\XPYU	540
\l_xpinyin_tone_tl	452 , 458 , 462 , 486	\XPYUM	541
\c_xpinyin_u_tl	494		