

xpinyin 宏包

李清

sobenlee@gmail.com

2013/11/12 v1.5

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 \pdfLaTeX 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 \XeLaTeX , 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 \pdfLaTeX 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 $\langle font \rangle$ 选项来单独设置拼音的字体。

\XeLaTeX 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

\pinyin scope $\backslash\text{\begin{pinyin}}\langle options \rangle$
.....
 $\backslash\text{\end{pinyin}}$

为 \pinyin scope 环境中的汉字自动注音。例如

```
1 \begin{pinyin}
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{pinyin}
```

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 $\langle options \rangle$ 用于局部设置拼音的格式,将在下面说明。

\xpinyin $\langle options \rangle$ {<单个汉字>} {<拼音>}
\xpinyin* $\langle options \rangle$ {<文字>}

对于多音字,可以使用 **\xpinyin** 为其设置拼音;而 **\xpinyin*** 相当于 **pinyin**scope 环境的命令形式。**\xpinyin** 可以在 **pinyin**scope 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 $\langle options \rangle$ {<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 $\langle options \rangle$ {<汉字>} {<拼音>}

xpinyin 宏包的拼音数据(**xpinyin-map.cfg**)来源于 Unicode 6.1.0 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 {<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 $\langle key \rangle$ 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 $\langle skip \rangle$ 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>

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 } , { â }{ \` a } ,
16   { õ }{ \= o } , { ô }{ \' o } , { ö }{ \v o } , { ò }{ \` o } ,
17   { ē }{ \= e } , { é }{ \' e } , { ë }{ \v e } , { è }{ \` e } ,
18   { ī }{ \= i } , { í }{ \' i } , { ï }{ \v i } , { ì }{ \` i } ,
19   { ū }{ \= u } , { ú }{ \' u } , { ü }{ \v u } , { ù }{ \` u } ,
20   { ṁ }{ \' m } , { ṇ }{ \' n } , { ñ }{ \v n } , { ñ }{ \` n } ,
21   { ü }{ \ " u } ,
22   { ũ }{ \= { \ " u } } , { ŷ }{ \' { \ " u } } ,
23   { Ź }{ \v { \ " u } } , { ŷ }{ \` { \ " u } }
24 }
25 { \prop_gput:Nnn \c__xpinyin_tone_prop #1 }
(End definition for \c__xpinyin_tone_prop.)

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

\__xpinyin_GBK_char:nn
31 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char:nn #1#2
32 {
33   \__xpinyin_UTF_char:nn {#1} {#2}
34   \exp_args:Nx \__xpinyin_GBK_char_aux:nn { \tl_head:n {#1} } {#1}
35 }
36 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_aux:nn #1#2
37 { \exp_args:Nf \__xpinyin_GBK_char_aux:nnn { \int_eval:n { `#1 } } {#1} {#2} }
38 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_aux:nnn #1#2#3
39 {
40   \cs_if_exist:cF { __xpinyin_UTF_ #1 :w }
41   {
42     \exp_args:Nf \__xpinyin_GBK_char_def:nnn
43     {
44       \int_case:nn { \tl_count:n {#3} }
45       {
46         { \c_two } { ##1 }
47         { \c_three } { ##1##2 }
48         { \c_four } { ##1##2##3 }
49       }
50     }
51     {#1} {#2}
52     \exp_args:Nc \__xpinyin_save_UTF_cs:Nn { __xpinyin_UTF_ #1 :w } {#1}
53     \tl_gput_right:Nx \c__xpinyin_reset_UTF_catcode_tl
54     { \char_set_catcode:nn {#1} { \char_value_catcode:n {#1} } }
55     \char_set_catcode_active:n {#1}
56   }
57 }
```

```

58 \cs_new_protected_nopar:Npn \__xpinyin_GBK_char_def:nnn #1#2#3
59 {
60   \cs_new_protected_nopar:cpn { __xpinyin_UTF_ #2 :w } #1
61   { \use:c { u8: \tl_to_str:n { #3#1 } } }
62 }
63 \tl_new:N \c__xpinyin_reset_UTF_catcode_tl
(End definition for \__xpinyin_GBK_char:nn.)

```

__xpinyin_save_UTF_cs:Nn

```

64 \group_begin:
65 \char_set_catcode_active:n { \c_zero }
66 \cs_new_protected_nopar:Npn \__xpinyin_save_UTF_cs:Nn #1#2
67 {
68   \group_begin:
69   \char_set_lccode:nn { \c_zero } {#2}
70   \tl_to_lowercase:n
71   {
72     \group_end:
73     \tl_gput_right:Nn \c__xpinyin_reset_UTF_cs_tl { \cs_set_eq:NN ^^00 #1 }
74   }
75 }
76 \group_end:
77 \tl_new:N \c__xpinyin_reset_UTF_cs_tl
(End definition for \__xpinyin_save_UTF_cs:Nn.)

78 \bool_new:N \g__xpinyin_GBK_bool
79 \@ifpackageloaded { xeCJK }
80 { \AtEndOfPackage { \__xpinyin_adjust_xeCJK_hook: } }
81 {
82   \@ifpackageloaded { CJKutf8 }
83   {
84     \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_UTF_char:nn
85     \AtEndOfPackage { \__xpinyin_adjust_CJK_hook: }
86   }
87   {
88     \@ifpackageloaded { CJK }
89     {
90       \RequirePackage { xCJK2uni }
91       \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_GBK_char:nn
92       \AtEndOfPackage
93       {
94         \tl_put_right:Nn \l__xpinyin_pinyin_box_hook_tl
95         { \c__xpinyin_reset_UTF_cs_tl }
96         \__xpinyin_adjust_CJK_hook:
97         \tl_use:N \c__xpinyin_reset_UTF_catcode_tl
98       }
99       \bool_gset_true:N \g__xpinyin_GBK_bool
100     }
101     {
102       \xetex_if_engine:TF
103       {
104         \RequirePackage { xeCJK }
105         \AtEndOfPackage { \__xpinyin_adjust_xeCJK_hook: }
106       }
107       {
108         \RequirePackage { CJKutf8 }
109         \prop_map_function:NN \c__xpinyin_tone_prop \__xpinyin_UTF_char:nn
110         \AtEndOfPackage { \__xpinyin_adjust_CJK_hook: }
111       }
112     }
113   }
114 }

```

\l__xpinyin_tmpa_box

\l__xpinyin_tmpp_box

```

115 \box_new:N \l__xpinyin_tmpa_box
116 \box_new:N \l__xpinyin_tmpp_box
(End definition for \l__xpinyin_tmpa_box and \l__xpinyin_tmpp_box.)

```

_xpinyin_make_box:nn

```

117 \cs_new_protected_nopar:Npn \_xpinyin_make_box:nn #1#2
118 {
119   \_xpinyin_make_pinyin_box:xnn { \_xpinyin_to_unicode:n {#1} } {#1} {#2}
120   \_xpinyin_save_CJKsymbol:n {#1}
121 }
(End definition for \_xpinyin_make_box:nn.)

```

_xpinyin_make_pinyin_box:nnn

```

122 \cs_new_protected_nopar:Npn \_xpinyin_make_pinyin_box:nnn #1#2#3
123 {
124   \_xpinyin_leavevmode:
125   \hbox_overlap_right:n
126   {
127     \hbox_set:Nn \l__xpinyin_tmpa_box
128     { \_xpinyin_CJKsymbol_hook: \_xpinyin_save_CJKsymbol:n {#2} }
129     \hbox_set:Nn \l__xpinyin_tmpb_box
130     {
131       \l__xpinyin_pinyin_box_hook_tl
132       \color_group_begin: \color_ensure_current:
133       \_xpinyin_select_font:
134       \clist_if_exist:cTF { c__xpinyin_multiple_ #1 _clist }
135       { \l__xpinyin_multiple_tl \l__xpinyin_format_tl }
136       { \l__xpinyin_format_tl }
137       {#3}
138       \color_group_end:
139     }
140     \dim_compare:nNnT
141     { \box_wd:N \l__xpinyin_tmpb_box } >
142     { \box_wd:N \l__xpinyin_tmpa_box + \l__xpinyin_CJKglue_dim }
143     {
144       \box_resize:Nnn \l__xpinyin_tmpb_box
145       { \box_wd:N \l__xpinyin_tmpa_box + \l__xpinyin_CJKglue_dim }
146       { \box_ht:N \l__xpinyin_tmpb_box + \box_dp:N \l__xpinyin_tmpb_box }
147     }
148     \box_move_up:nn { \l__xpinyin_vsep_tl }
149     {
150       \hbox_to_wd:nn { \box_wd:N \l__xpinyin_tmpa_box }
151       { \tex_hss:D \box_use_clear:N \l__xpinyin_tmpb_box \tex_hss:D }
152     }
153   }
154 }
155 \tl_new:N \l__xpinyin_pinyin_box_hook_tl
156 \cs_generate_variant:Nn \_xpinyin_make_pinyin_box:nnn { x }
(End definition for \_xpinyin_make_pinyin_box:nnn.)

```

_xpinyin_CJKsymbol:n

```

157 \cs_new_protected_nopar:Npn \_xpinyin_CJKsymbol:n #1
158 { \_xpinyin_CJKsymbol:xn { \_xpinyin_to_unicode:n {#1} } {#1} }
159 \cs_new_protected_nopar:Npn \_xpinyin_CJKsymbol:nn #1#2
160 {
161   \_xpinyin_make_pinyin_box:nnn {#1} {#2} { \use:c { c__xpinyin_ #1 _tl } }
162   \_xpinyin_save_CJKsymbol:n {#2}
163 }
164 \cs_generate_variant:Nn \_xpinyin_CJKsymbol:nn { x }
(End definition for \_xpinyin_CJKsymbol:n.)

```

pinyinscope

```

165 \NewDocumentEnvironment { pinyinscope } { 0 { } }
166 {
167   \keys_set:nn { xpinyin } {#1}
168   \tl_if_empty:NF \l__xpinyin_hsep_tl
169   { \cs_set_nopar:Npn \CJKglue { \skip_horizontal:n { \l__xpinyin_hsep_tl } } }
170   \settowidth \l__xpinyin_CJKglue_dim { \CJKglue }
171   \_xpinyin_replace_CJKsymbol:
172 }
173 { }

```

(End definition for *pinyinscope*. This function is documented on page 1.)

\xpinyin

```

174 \NewDocumentCommand \xpinyin { s O { } m }
175 {
176   \IfBooleanTF {#1}
177   {
178     \group_begin:
179     \keys_set:nn { xpinyin } {#2}
180     \tl_if_empty:NF \l__xpinyin_hsep_tl
181     { \cs_set_nopar:Npn \CJKglue { \skip_horizontal:n { \l__xpinyin_hsep_tl } } }
182     \settowidth \l__xpinyin_CJKglue_dim { \CJKglue }
183     \__xpinyin_replace_CJKsymbol:
184     #3
185     \group_end:
186   }
187   {
188     \group_begin:
189     \keys_set:nn { xpinyin } {#2}
190     \settowidth \l__xpinyin_CJKglue_dim { \CJKglue }
191     \leavevmode
192     \__xpinyin_single_aux:nn {#3}
193   }
194 }

```

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

\l__xpinyin_CJKglue_dim

```

195 \dim_new:N \l__xpinyin_CJKglue_dim

```

(End definition for *\l__xpinyin_CJKglue_dim*.)

__xpinyin_single_aux:nn

```

196 \cs_new_protected_nopar:Npn \__xpinyin_single_aux:nn #1#2
197 {
198   \__xpinyin_single_hook:n
199   { \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \use:n }
200   \cs_set_eq:NN \__xpinyin_to_unicode:n \__xpinyin_char_to_unicode:n
201   \__xpinyin_make_box:nn {#1} { \__xpinyin_pinyin:n {#2} }
202   \group_end:
203 }

```

(End definition for *__xpinyin_single_aux:nn*.)

__xpinyin_replace_CJKsymbol_aux:

```

204 \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol_aux:
205 {
206   \cs_if_eq:NNF \CJKsymbol \__xpinyin_CJKsymbol:n
207   {
208     \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \CJKsymbol
209     \cs_set_eq:NN \CJKsymbol \__xpinyin_CJKsymbol:n
210   }
211 }

```

(End definition for *__xpinyin_replace_CJKsymbol_aux:*.)

__xpinyin_single_hook_aux:n

```

212 \cs_new_protected_nopar:Npn \__xpinyin_single_hook_aux:n
213 {
214   \cs_if_eq:NNTF \CJKsymbol \__xpinyin_CJKsymbol:n
215   {
216     \cs_set_eq:NN \CJKsymbol \__xpinyin_save_CJKsymbol:n
217     \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \use:n
218   }
219 }

```

(End definition for *__xpinyin_single_hook_aux:n*.)

_xpinyin_select_font_xetex:

```
220 \cs_new_protected_nopar:Npn \__xpinyin_select_font_xetex:
221 {
222   \cs_if_exist_use:cF { \l__xpinyin_coor_tl }
223   {
224     \tl_set:Nx \l__xpinyin_current_coor_tl { \l__xpinyin_coor_tl }
225     \__xpinyin_select_font_aux:
226     \int_compare:nNnF { \XeTeXfonttype \tex_font:D } = \c_zero
227     {
228       \exp_last_unbraced:NNV
229       \cs_gset_eq:cN \l__xpinyin_current_coor_tl \tex_font:D
230     }
231   }
232 }
(End definition for \__xpinyin_select_font_xetex:.)
```

__xpinyin_select_font_aux:

```
233 \cs_new_protected_nopar:Npn \__xpinyin_select_font_aux:
234 {
235   \fontsize
236   { \l__xpinyin_ratio_tl \tex_dimexpr:D \f@size pt \scan_stop: }
237   { \f@baselineskip }
238   \l__xpinyin_font_tl
239   \selectfont
240 }
(End definition for \__xpinyin_select_font_aux:.)
```

_xpinyin_to_unicode_xetex:n

```
241 \cs_new_nopar:Npn \__xpinyin_to_unicode_xetex:n #1
242 { \int_to_hexadecimal:n { `#1 } }
(End definition for \__xpinyin_to_unicode_xetex:n.)
```

__xpinyin_UTF_to_unicode:n

_xpinyin_UTFchar_to_unicode:n

```
243 \cs_new_nopar:Npn \__xpinyin_UTF_to_unicode:n #1
244 {
245   \int_to_hexadecimal:n
246   { \exp_args:No \int_from_hexadecimal:n { \CJK@plane } * "100 + #1 }
247 }
248 \cs_new_nopar:Npn \__xpinyin_UTFchar_to_unicode:n #1
249 { \int_to_hexadecimal:n { \__xpinyin_UTF_viii_to_unicode:NNNw #1 \q_stop } }
250 \cs_new_nopar:Npn \__xpinyin_UTF_viii_to_unicode:NNNw #1#2#3#4 \q_stop
251 {
252   \tl_if_empty:nTF {#4}
253   { ( `#1 - "E0 ) * "1000 + ( `#2 - "80 ) * "40 + ( `#3 - "80 ) }
254   { ( `#1 - "F0 ) * "4000 + ( `#2 - "80 ) * "1000 + ( `#3 - "80 ) * "40 + ( `#4 - "80 ) }
255 }
(End definition for \__xpinyin_UTF_to_unicode:n and \__xpinyin_UTFchar_to_unicode:n.)
```

__xpinyin_GBK_to_unicode:n

_xpinyin_GBKchar_to_unicode:n

```
256 \cs_new_nopar:Npn \__xpinyin_GBK_to_unicode:n #1
257 { \CJKtu_sfd_map:nn { \CJK@plane } {#1} }
258 \cs_new_nopar:Npn \__xpinyin_GBKchar_to_unicode:n #1
259 { \CJKchartouni {#1} }
(End definition for \__xpinyin_GBK_to_unicode:n and \__xpinyin_GBKchar_to_unicode:n.)
```

_xpinyin_adjust_xeCJK_hook:

```
260 \cs_new_protected_nopar:Npn \__xpinyin_adjust_xeCJK_hook:
261 {
262   \cs_new_eq:NN \__xpinyin_select_font: \__xpinyin_select_font_xetex:
263   \cs_new_eq:NN \__xpinyin_to_unicode:n \__xpinyin_to_unicode_xetex:n
264   \cs_new_eq:NN \__xpinyin_char_to_unicode:n \__xpinyin_to_unicode:n
265   \cs_new_eq:NN \__xpinyin_replace_CJKsymbol: \__xpinyin_replace_CJKsymbol_aux:
266   \tl_gset:Nn \l__xpinyin_coor_tl
267   { (\cs_meaning:N \l__xpinyin_font_tl)/\l_xeCJK_current_font_tl/\l__xpinyin_ratio_tl }
268   \cs_new_eq:NN \__xpinyin_leavevmode: \prg_do_nothing:
269   \cs_new_protected_nopar:Npn \__xpinyin_CJKsymbol_hook:
```

```

270     { \makeexeCJKinactive \xeCJK_select_font: }
271     \cs_new_protected_nopar:Npn \__xpinyin_single_hook:n
272     { \cs_if_eq:NNTF \CJKsymbol \__xpinyin_CJKsymbol:n { \cs_set_eq:NN \CJKsymbol \use:n } }
273   }
(End definition for \__xpinyin_adjust_xeCJK_hook:.)

```

__xpinyin_adjust_CJK_hook:

```

274 \cs_new_protected_nopar:Npn \__xpinyin_adjust_CJK_hook:
275   {
276     \bool_if:NTF \g__xpinyin_GBK_bool
277     {
278       \cs_new_eq:NN \__xpinyin_to_unicode:n \__xpinyin_GBK_to_unicode:n
279       \cs_new_eq:NN \__xpinyin_char_to_unicode:n \__xpinyin_GBKchar_to_unicode:n
280     }
281     {
282       \cs_new_eq:NN \__xpinyin_to_unicode:n \__xpinyin_UTF_to_unicode:n
283       \cs_new_eq:NN \__xpinyin_char_to_unicode:n \__xpinyin_UTFchar_to_unicode:n
284     }
285     \cs_new_eq:NN \__xpinyin_select_font: \__xpinyin_select_font_aux:
286     \cs_new_eq:NN \__xpinyin_leavevmode: \leavevmode
287     \cs_new_eq:NN \__xpinyin_CJKsymbol_hook: \prg_do_nothing:
288     \@ifpackageloaded { CJKpunct }
289     { \__xpinyin_adjust_CJKpunct_hook: }
290     {
291       \cs_new_eq:NN \__xpinyin_single_hook:n \__xpinyin_single_hook_aux:n
292       \cs_new_eq:NN \__xpinyin_replace_CJKsymbol: \__xpinyin_replace_CJKsymbol_aux:
293       \AtBeginDocument
294       {
295         \@ifpackageloaded { CJKpunct }
296         {
297           \cs_undefine:N \__xpinyin_single_hook:n
298           \cs_undefine:N \__xpinyin_replace_CJKsymbol:
299           \__xpinyin_adjust_CJKpunct_hook:
300         } { }
301       }
302     }
303   }
(End definition for \__xpinyin_adjust_CJK_hook:.)

```

__xpinyin_adjust_CJKpunct_hook:

```

304 \cs_new_protected_nopar:Npn \__xpinyin_adjust_CJKpunct_hook:
305   {
306     \cs_new_protected_nopar:Npn \__xpinyin_replace_CJKsymbol:
307     {
308       \int_compare:nNnTF { \CJKpunct@punctstyle } = { \CJKpunct@ps@plain }
309       { \__xpinyin_replace_CJKsymbol_aux: }
310       {
311         \cs_if_eq:NNF \CJKsymbol \__xpinyin_CJKsymbol:n
312         {
313           \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \CJKsymbol
314           \cs_set_eq:NN \CJKsymbol \__xpinyin_CJKsymbol:n
315         }
316       }
317     }
318     \cs_new_protected_nopar:Npn \__xpinyin_single_hook:n
319     {
320       \int_compare:nNnTF { \CJKpunct@punctstyle } = { \CJKpunct@ps@plain }
321       { \__xpinyin_single_hook_aux:n }
322       {
323         \cs_if_eq:NNTF \CJKsymbol \__xpinyin_CJKsymbol:n
324         {
325           \cs_set_eq:NN \CJKsymbol \__xpinyin_save_CJKsymbol:n
326           \cs_set_eq:NN \__xpinyin_save_CJKsymbol:n \use:n
327         }
328       }
329     }
330   }
(End definition for \__xpinyin_adjust_CJKpunct_hook:.)

```


\pinyin

```
331 \NewDocumentCommand \pinyin { 0 { } m }
332 {
333   \group_begin:
334   \keys_set:nn { xpinyin } {#1}
335   \l__xpinyin_font_tl
336   \l__xpinyin_format_tl
337   \selectfont
338   \c__xpinyin_reset_UTF_cs_tl
339   \__xpinyin_pinyin:n {#2}
340   \group_end:
341 }
```

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

__xpinyin_pinyin:n

```
342 \cs_new_protected_nopar:Npn \__xpinyin_pinyin:n #1
343 {
344   \__xpinyin_pinyin_init:
345   \bool_set_true:N \l__xpinyin_first_bool
346   \tl_set:Nn \l__xpinyin_save_tl {#1}
347   \__xpinyin_pinyin_aux:n #1 \q_recursion_tail \q_recursion_stop
348 }
```

(End definition for __xpinyin_pinyin:n.)

__xpinyin_pinyin_aux:n

```
349 \cs_new_protected_nopar:Npn \__xpinyin_pinyin_aux:n #1
350 {
351   \quark_if_recursion_tail_stop_do:nn {#1}
352   {
353     \bool_if:NTF \l__xpinyin_first_bool { \l__xpinyin_save_tl }
354     { \tl_if_empty:NF \l__xpinyin_item_tl { \l__xpinyin_pysep_tl \l__xpinyin_item_tl } }
355   }
356   \__xpinyin_if_number:nTF {#1}
357   {
358     \bool_if:NTF \l__xpinyin_first_bool
359     { \bool_set_false:N \l__xpinyin_first_bool }
360     { \l__xpinyin_pysep_tl }
361     \l__xpinyin_pre_tl
362     \__xpinyin_tone:Vn \l__xpinyin_tone_tl {#1}
363     \l__xpinyin_post_tl
364     \__xpinyin_pinyin_init:
365   }
366   {
367     \int_compare:nNnTF
368     { 0 \cs_if_exist_use:c { c__xpinyin_ \tl_to_str:N \l__xpinyin_tone_tl _tl } } >
369     { 0 \cs_if_exist_use:c { c__xpinyin_ \tl_to_str:n {#1} _tl } }
370     { \tl_put_right:Nn \l__xpinyin_post_tl {#1} }
371     {
372       \tl_set:Nn \l__xpinyin_tone_tl {#1}
373       \tl_set_eq:NN \l__xpinyin_pre_tl \l__xpinyin_item_tl
374       \tl_clear:N \l__xpinyin_post_tl
375     }
376     \tl_put_right:Nx \l__xpinyin_item_tl { \__xpinyin_replace_v:n {#1} }
377   }
378   \__xpinyin_pinyin_aux:n
379 }
```

(End definition for __xpinyin_pinyin_aux:n.)

__xpinyin_tone:Nn

```
380 \cs_new_protected_nopar:Npn \__xpinyin_tone:Nn #1#2
381 { \use:c { __xpinyin_num_to_tone_ #1 :Nn } {#1} {#2} }
382 \cs_generate_variant:Nn \__xpinyin_tone:Nn { V }
```

(End definition for __xpinyin_tone:Nn.)

__xpinyin_replace_v:n

```
383 \cs_new_nopar:Npn \__xpinyin_replace_v:n #1
384 {
385   \str_if_eq:nnTF {#1} { v }
386   {
387     \str_case:onTF { \l__xpinyin_item_tl }
388     { { l } { } { n } { } { L } { } { N } { } }
389     { \exp_not:n { ü } } { u }
390   }
391   { \exp_not:n {#1} }
392 }
```

(End definition for __xpinyin_replace_v:n.)

__xpinyin_pinyin_init:

```
393 \cs_new_nopar:Npn \__xpinyin_pinyin_init:
394 {
395   \tl_clear:N \l__xpinyin_pre_tl   \tl_clear:N \l__xpinyin_post_tl
396   \tl_clear:N \l__xpinyin_item_tl \tl_clear:N \l__xpinyin_tone_tl
397 }
```

(End definition for __xpinyin_pinyin_init:.)

__xpinyin_if_number:nTF

```
398 \prg_new_conditional:Npnn \__xpinyin_if_number:n #1 { TF }
399 {
400   \if_int_compare:w \c_one < 1 \tl_to_str:n {#1} \exp_stop_f:
401   \prg_return_true: \else: \prg_return_false: \fi:
402 }
```

(End definition for __xpinyin_if_number:nTF.)

\l__xpinyin_first_bool

```
403 \bool_new:N \l__xpinyin_first_bool
(End definition for \l__xpinyin_first_bool.)
```

\c__xpinyin_a_tl

\c__xpinyin_o_tl

\c__xpinyin_e_tl

\c__xpinyin_i_tl

\c__xpinyin_u_tl

\c__xpinyin_v_tl

```
404 \tl_const:Nn \c__xpinyin_a_tl { 3 }
405 \tl_const:Nn \c__xpinyin_o_tl { 2 }
406 \tl_const:Nn \c__xpinyin_e_tl { 2 }
407 \tl_const:Nn \c__xpinyin_i_tl { 1 }
408 \tl_const:Nn \c__xpinyin_u_tl { 1 }
409 \tl_const:Nn \c__xpinyin_v_tl { 1 }
```

(End definition for \c__xpinyin_a_tl and others.)

__xpinyin_num_to_tone:Nn

```
410 \cs_new_protected_nopar:Npn \__xpinyin_num_to_tone:Nn #1#2
411 {
412   \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
413   \= {#1} \or: \' {#1} \or: \v {#1} \or: \` {#1} \else: #1 \fi:
414 }
415 \tl_map_inline:nn { a o e u }
416 { \cs_new_eq:cN { __xpinyin_num_to_tone_ #1 :Nn } \__xpinyin_num_to_tone:Nn }
417 \cs_new_nopar:Npn \__xpinyin_num_to_tone_i:Nn #1#2
418 {
419   \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
420   ī \or: í \or: ï \or: i \else: i \fi:
421 }
422 \cs_new_protected_nopar:Npn \__xpinyin_num_to_tone_v:Nn #1#2
423 {
424   \str_case:onTF { \l__xpinyin_pre_tl }
425   { { l } { } { n } { } { L } { } { N } { } }
426   {
427     \if_case:w \int_eval:n { #2 - \c_one } \exp_stop_f:
428     ū \or: ú \or: ũ \or: û \else: ü \fi:
429   }
430   { \__xpinyin_num_to_tone:Nn u {#2} }
431 }
```

(End definition for __xpinyin_num_to_tone:Nn.)

`\xpinyinsetup`

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

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

```
ratio
vsep 433 \clist_map_inline:nn
hsep 434 { ratio , vsep , hsep , pysep , font , format , multiple }
pysep 435 { \keys_define:nn { xpinyin } { #1 .tl_set:c = { l__xpinyin_ #1 _tl } } }
font 436 \keys_set:nn { xpinyin }
437 {
format 438 ratio = .4 ,
multiple 439 vsep = 1 em ,
440 pysep = \c_space_tl ,
441 font = \normalfont ,
442 }
```

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

`xpinyin-map.cfg`

```
443 \group_begin:
444 \char_set_catcode_active:N \U
445 \char_set_catcode_active:N \V
446 \cs_set_nopar:Npn U+ #1 ~ #2 ~
447 { \tl_gset:cn { c__xpinyin_ #1 _tl } {#2} }
448 \cs_set_nopar:Npn V+ #1 ~ #2 ~
449 { \clist_gset:cn { c__xpinyin_multiple_ #1 _clist } {#2} }
450 \use:n
451 {
452 \char_set_catcode_space:N \
453 \file_input:n { xpinyin-map.cfg }
454 }
455 \group_end:
```

(End definition for `xpinyin-map.cfg`.)

`\setpinyin`

```
456 \NewDocumentCommand \setpinyin { m m }
457 {
458 \tl_set:cn
459 { c__xpinyin_ __xpinyin_char_to_unicode:n {#1} _tl }
460 { __xpinyin_pinyin:n {#2} }
461 }
```

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

```
462 \ProcessKeysOptions { xpinyin }
463 \endpackage
```

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。

Symbols

\ " 21, 22, 23
\ ' 15, 16, 17, 18, 19, 20, 22, 413
\ = 15, 16, 17, 18, 19, 22, 413
\@ifpackageloaded 79, 82, 88, 288, 295
\ \ 5, 6
_xpinyin_CJKsymbol:n
..... 157, 157, 206, 209, 214, 272, 311, 314, 323
_xpinyin_CJKsymbol:nn 159, 164
_xpinyin_CJKsymbol:xn 158
_xpinyin_CJKsymbol_hook: 128, 269, 287
_xpinyin_GBK_char:nn 31, 31, 91
_xpinyin_GBK_char_aux:nn 34, 36
_xpinyin_GBK_char_aux:nnn 37, 38
_xpinyin_GBK_char_def:nnn 42, 58
_xpinyin_GBK_to_unicode:n 256, 256, 278
_xpinyin_GBKchar_to_unicode:n 256, 258, 279
_xpinyin_UTF_char:nn 26, 26, 33, 84, 109
_xpinyin_UTF_to_unicode:n 243, 243, 282
_xpinyin_UTF_viii_to_unicode:NNNw 249, 250
_xpinyin_UTFchar_to_unicode:n 243, 248, 283
_xpinyin_adjust_CJK_hook: 85, 96, 110, 274, 274
_xpinyin_adjust_CJKpunct_hook: 289, 299, 304, 304
_xpinyin_adjust_xeCJK_hook: 80, 105, 260, 260
_xpinyin_char_to_unicode:n 200, 264, 279, 283, 459
_xpinyin_if_number:n 398
_xpinyin_if_number:nTF 356, 398
_xpinyin_leavevmode: 124, 268, 286
_xpinyin_make_box:nn 117, 117, 201
_xpinyin_make_pinyin_box:nnn 122, 122, 156, 161
_xpinyin_make_pinyin_box:xnn 119
_xpinyin_num_to_tone:Nn 410, 410, 416, 430
_xpinyin_num_to_tone_i:Nn 417
_xpinyin_num_to_tone_v:Nn 422
_xpinyin_pinyin:n 201, 339, 342, 342, 460
_xpinyin_pinyin_aux:n 347, 349, 349, 378
_xpinyin_pinyin_init: 344, 364, 393, 393
_xpinyin_replace_CJKsymbol: 171, 183, 265, 292, 298, 306
_xpinyin_replace_CJKsymbol_aux: 204, 204, 265, 292, 309
_xpinyin_replace_v:n 376, 383, 383
_xpinyin_save_CJKsymbol:n
..... 120, 128, 162, 199, 208, 216, 217, 313, 325, 326
_xpinyin_save_UTF_cs:Nn 52, 64, 66
_xpinyin_select_font: 133, 262, 285
_xpinyin_select_font_aux: 225, 233, 233, 285
_xpinyin_select_font_xetex: 220, 220, 262
_xpinyin_single_aux:nn 192, 196, 196
_xpinyin_single_hook:n 198, 271, 291, 297, 318
_xpinyin_single_hook_aux:n 212, 212, 291, 321
_xpinyin_to_unicode:n .. 119, 158, 200, 263, 264, 278, 282
_xpinyin_to_unicode_xetex:n 241, 241, 263
_xpinyin_tone:Nn 380, 380, 382
_xpinyin_tone:Vn 362
\` 15, 16, 17, 18, 19, 20, 23, 413
_ 452

A

\AtBeginDocument 293
\AtEndOfPackage 80, 85, 92, 105, 110
ratio 2

B

\bool_gset_true:N 99
\bool_if:NTF 276, 353, 358
\bool_new:N 78, 403
\bool_set_false:N 359
\bool_set_true:N 345
\box_dp:N 146
\box_ht:N 146
\box_move_up:nn 148
\box_new:N 115, 116
\box_resize:Nnn 144
\box_use_clear:N 151
\box_wd:N 141, 142, 145, 150

C

\c_xpinyin_a_tl 404, 404
\c_xpinyin_e_tl 404, 406
\c_xpinyin_i_tl 404, 407
\c_xpinyin_o_tl 404, 405
\c_xpinyin_reset_UTF_catcode_tl 53, 63, 97
\c_xpinyin_reset_UTF_cs_tl 73, 77, 95, 338
\c_xpinyin_tone_prop 12, 12, 25, 84, 91, 109
\c_xpinyin_u_tl 404, 408
\c_xpinyin_v_tl 404, 409
\c_four 48
\c_one 400, 412, 419, 427
\c_space_tl 440
\c_three 47
\c_two 46
\c_zero 65, 69, 226
\char_set_catcode:nn 54
\char_set_catcode_active:N 444, 445
\char_set_catcode_active:n 55, 65
\char_set_catcode_space:N 452
\char_set_lccode:nn 69
\char_value_catcode:n 54
\CJK@plane 246, 257
\CJKchartouni 259
\CJKglue 169, 170, 181, 182, 190
\CJKsymbol 311, 313, 314, 323, 325
\CJKpunct@ps@plain 308, 320
\CJKpunct@punctstyle 308, 320
\CJKsymbol 206, 208, 209, 214, 216, 272
\CJKtu_sfd_map:nn 257
\clist_gset:cn 449
\clist_if_exist:cTF 134
\clist_map_inline:nn 13, 433
\color_ensure_current: 132
\color_group_begin: 132
\color_group_end: 138
\cs_generate_variant:Nn 156, 164, 382
\cs_gset_eq:cN 229
\cs_if_eq:NNF 206, 311

<code>\cs_if_eq:NNTF</code>	214, 272, 323	<code>pinyinscope</code>	1
<code>\cs_if_exist:cF</code>	28, 40		
<code>\cs_if_exist_use:c</code>	368, 369		
<code>\cs_if_exist_use:cF</code>	222		
<code>\cs_meaning:N</code>	267		
<code>\cs_new_eq:cN</code>	416		
<code>\cs_new_eq:NN</code>	262, 263,		
	264, 265, 268, 278, 279, 282, 283, 285, 286, 287, 291, 292		
<code>\cs_new_nopar:Npn</code>	241, 243, 248, 250, 256, 258, 383, 393, 417		
<code>\cs_new_protected_nopar:cpn</code>	29, 60		
<code>\cs_new_protected_nopar:Npn</code>	26, 31, 36,		
	38, 58, 66, 117, 122, 157, 159, 196, 204, 212, 220, 233,		
	260, 269, 271, 274, 304, 306, 318, 342, 349, 380, 410, 422		
<code>\cs_set_eq:NN</code>			
	.. 73, 199, 200, 208, 209, 216, 217, 272, 313, 314, 325, 326		
<code>\cs_set_nopar:Npn</code>	169, 181, 446, 448		
<code>\cs_undefine:N</code>	297, 298		
	D		
<code>\dim_compare:nNnT</code>	140		
<code>\dim_new:N</code>	195		
	E		
<code>\else:</code>	401, 413, 420, 428		
<code>\etex_dimexpr:D</code>	236		
<code>\exp_args:Nc</code>	52		
<code>\exp_args:Nf</code>	37, 42		
<code>\exp_args:No</code>	246		
<code>\exp_args:Nx</code>	34		
<code>\exp_last_unbraced:NNV</code>	228		
<code>\exp_not:n</code>	389, 391		
<code>\exp_stop_f:</code>	400, 412, 419, 427		
	F		
<code>\f@baselineskip</code>	237		
<code>\f@size</code>	236		
<code>\fi:</code>	401, 413, 420, 428		
<code>\file_input:n</code>	453		
<code>\font</code>	433		
<code>\fontsize</code>	235		
<code>\format</code>	433		
	G		
<code>\g__xpinyin_GBK_bool</code>	78, 99, 276		
<code>\group_begin:</code>	64, 68, 178, 188, 333, 443		
<code>\group_end:</code>	72, 76, 185, 202, 340, 455		
	H		
<code>\hbox_overlap_right:n</code>	125		
<code>\hbox_set:Nn</code>	127, 129		
<code>\hbox_to_wd:nn</code>	150		
<code>\hsep</code>	433		
	I		
<code>\i</code>	18		
<code>\if_case:w</code>	412, 419, 427		
<code>\if_int_compare:w</code>	400		
<code>\IfBooleanTF</code>	176		
<code>\int_case:nn</code>	44		
<code>\int_compare:nNnF</code>	226		
<code>\int_compare:nNnTF</code>	308, 320, 367		
<code>\int_eval:n</code>	37, 412, 419, 427		
<code>\int_from_hexadecimal:n</code>	246		
<code>\int_to_hexadecimal:n</code>	242, 245, 249		
	K		
<code>\keys_define:nn</code>	435		
<code>\keys_set:nn</code>	167, 179, 189, 334, 432, 436		
	L		
<code>\l__xpinyin_CJKglue_dim</code> ..	142, 145, 170, 182, 190, 195, 195		
<code>\l__xpinyin_coord_tl</code>	222, 224, 266		
<code>\l__xpinyin_current_coord_tl</code>	224, 229		
<code>\l__xpinyin_first_bool</code>	345, 353, 358, 359, 403, 403		
<code>\l__xpinyin_font_tl</code>	238, 267, 335		
<code>\l__xpinyin_format_tl</code>	135, 136, 336		
<code>\l__xpinyin_hsep_tl</code>	168, 169, 180, 181		
<code>\l__xpinyin_item_tl</code>	354, 373, 376, 387, 396		
<code>\l__xpinyin_multiple_tl</code>	135		
<code>\l__xpinyin_pinyin_box_hook_tl</code>	94, 131, 155		
<code>\l__xpinyin_post_tl</code>	363, 370, 374, 395		
<code>\l__xpinyin_pre_tl</code>	361, 373, 395, 424		
<code>\l__xpinyin_pysep_tl</code>	354, 360		
<code>\l__xpinyin_ratio_tl</code>	236, 267		
<code>\l__xpinyin_save_tl</code>	346, 353		
<code>\l__xpinyin_tmpa_box</code>	115, 115, 127, 142, 145, 150		
<code>\l__xpinyin_tmptb_box</code>	115, 116, 129, 141, 144, 146, 151		
<code>\l__xpinyin_tone_tl</code>	362, 368, 372, 396		
<code>\l__xpinyin_vsep_tl</code>	148		
<code>\l_xeCJK_current_font_tl</code>	267		
<code>\leavevmode</code>	191, 286		
<code>\luatex_if_engine:T</code>	9		
	M		
<code>\makeXeCJKinactive</code>	270		
<code>\msg_critical:nn</code>	9		
<code>\msg_new:nnn</code>	3		
<code>\multiple</code>	433		
	N		
<code>\NewDocumentCommand</code>	174, 331, 432, 456		
<code>\NewDocumentEnvironment</code>	165		
<code>\normalfont</code>	441		
	O		
<code>font</code>	2		
<code>\or:</code>	413, 420, 428		
<code>format</code>	2		
	P		
<code>\pinyin</code>	2, 331, 331		
<code>\pinyinscope</code>	165		
<code>\prg_do_nothing:</code>	268, 287		
<code>\prg_new_conditional:Npnn</code>	398		
<code>\prg_return_false:</code>	401		
<code>\prg_return_true:</code>	401		
<code>\ProcessKeysOptions</code>	462		
<code>\prop_gput:Nnn</code>	25		
<code>\prop_map_function:NN</code>	84, 91, 109		
<code>\prop_new:N</code>	12		
<code>\pysep</code>	433		
	Q		
<code>\q_recursion_stop</code>	347		
<code>\q_recursion_tail</code>	347		
<code>\q_stop</code>	249, 250		
<code>\quark_if_recursion_tail_stop_do:nn</code>	351		

R			
\ratio	433	\tl_put_right:Nx	376
\RequirePackage	10, 11, 90, 104, 108	\tl_set:cn	458
S		\tl_set:Nn	346, 372
\scan_stop:	236	\tl_set:Nx	224
\selectfont	239, 337	\tl_set_eq:NN	373
hsep	2	\tl_to_lowercase:n	70
vsep	2	\tl_to_str:N	368
\setpinyin	2, 456, 456	\tl_to_str:n	61, 369, 400
\settowidth	170, 182, 190	\tl_use:N	97
\skip_horizontal:n	169, 181	U	
\str_case:onTF	387, 424	\U	444
\str_if_eq:nnTF	385	multiple	2
T		\use:c	61, 161, 381
\tex_font:D	226, 229	\use:n	199, 217, 272, 326, 450
\tex_hss:D	151	V	
\tl_clear:N	374, 395, 396	\V	445
\tl_const:Nn	404, 405, 406, 407, 408, 409	\v	15, 16, 17, 18, 19, 20, 23, 413
\tl_count:n	44	\vsep	433
\tl_gput_right:Nn	73	X	
\tl_gput_right:Nx	53	\xeCJK_select_font:	270
\tl_gset:cn	447	\xetex_if_engine:TF	102
\tl_gset:Nn	266	\XeTeXfonttype	226
\tl_head:n	34	\xpinyin	2, 174, 174
\tl_if_empty:NF	168, 180, 354	\xpinyin-map.cfg	443
\tl_if_empty:nTF	252	\xpinyinsetup	2, 432, 432
\tl_map_inline:nn	415	Y	
\tl_new:N	63, 77, 155	pysep	2
\tl_put_right:Nn	94, 370		