

xCJK2uni 宏包

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第 1 节 简介

xCJK2uni 是一个 L^AT_EX 宏包, 提供了将 CJK 文字转换成 Unicode 的功能。以宏包形式实现 gbk2uni 程序的功能, 使得使用 CJK 和 hyperref 宏包时, 可以得到正确的书签。并提供了 /ToUnicode 映射文件, 使得使用 GBK 等编码时, 配合 cmap 宏包, 用 pdfL^AT_EX 编译得到的 pdf 文件支持查找、复制和粘贴。

xCJK2uni 只适用于下一节说明的有效编码和以 pdfL^AT_EX 作为编译引擎的工作方式。

xCJK2uni 依赖 l3kernel。应该与 CJK 或 CCT 等配合使用, 但 xCJK2uni 不会自动引入它们。

第 2 节 基本命令

`\useCJKencmap` `\useCJKencmap {<Bg5|Bg5+|GB|GBK|JIS|KS>}`

设置当前的编码环境。以上是 xCJK2uni 支持的文字编码, 缺省使用 GBK。xCJK2uni 会在 CJK 环境内自动更新支持的编码。

`\CJKchartouni` * `\CJKchartouni {<单个CJK文字>}`

将文字转换成 16 进制形式的 Unicode。例如 `\CJKchartouni{一}` 将得到 4E00。将它展开两次就可以得到结果。

`\CJKsfdtouni` * `\CJKsfdtouni {<plane>} {<slot>}`

`<plane>` 表示由 .sfd 文件定义的字体的编号, `<slot>` 表示在子字体中的位置, 这个命令将得到该坐标位置的 Unicode。将它展开两次就可以得到结果。如果在当前编码下, 该坐标位置不合法, 将展开为空。

第 3 节 代码实现

3.1 xCJK2uni

```
1 <*package>
2 <@@=CJKtu>
3 \msg_new:nnn { xCJK2uni } { 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!\\
```

*ctex-kit rev. 8df04d2.

```

8     using~your~TeX~package~manager~or~from~CTAN.
9   }
10  \ifpackagealater { expl3 } { 2015/09/24 } { }
11  { \msg_error:nn { xCJK2uni } { l3-too-old } }
12  \sys_if_engine_pdftex:F
13  {
14    \msg_new:nnn { xCJK2uni } { pdflatex }
15    { The~xCJK2uni~package~is~only~supported~in~pdfTeX. }
16    \msg_critical:nn { xCJK2uni } { pdflatex }
17  }
18  \tl_new:N \l__CJKtu_sfd_tl
19  \prop_new:N \c__CJKtu_sfd_prop
20  \seq_new:N \c__CJKtu_encoding_seq
21  \int_new:N \l__CJKtu_i_min_int
22  \int_new:N \l__CJKtu_i_max_int
23  \int_new:N \l__CJKtu_ii_min_int
24  \int_new:N \l__CJKtu_ii_max_int
25  \int_new:N \l__CJKtu_gap_begin_int
26  \int_new:N \l__CJKtu_gap_end_int
27  \int_new:N \l__CJKtu_plane_int
28  \int_set:Nn \l__CJKtu_i_max_int { "FE }
29  \int_set:Nn \l__CJKtu_ii_max_int { "FE }

\__CJKtu_set_enc:nnnnnn

30  \cs_new_protected_nopar:Npn \__CJKtu_set_enc:nnnnnn #1#2#3#4#5#6
31  {
32    \seq_put_right:Nn \c__CJKtu_encoding_seq {#1}
33    \prop_gput:Nnn \c__CJKtu_sfd_prop {#1} {#2}
34    \int_const:cn { c__CJKtu_ #1 _i_min_int } {#3}
35    \int_const:cn { c__CJKtu_ #1 _ii_min_int } {#4}
36    \tl_if_empty:nTF {#5}
37    {
38      \int_const:cn { c__CJKtu_ #1 _gap_begin_int }
39      { \l__CJKtu_ii_max_int + \c_one }
40      \int_const:cn { c__CJKtu_ #1 _gap_end_int }
41      { \use:c { c__CJKtu_ #1 _gap_begin_int } }
42      \int_const:cn { c__CJKtu_ #1 _plane_int }
43      { \l__CJKtu_ii_max_int - (#4) + \c_one }
44    }
45    {
46      \int_const:cn { c__CJKtu_ #1 _gap_begin_int } { #5 + \c_one }
47      \int_const:cn { c__CJKtu_ #1 _gap_end_int } {#6}
48      \int_const:cn { c__CJKtu_ #1 _plane_int }
49      { (#5) - (#4) + \l__CJKtu_ii_max_int - (#6) + \c_two }
50    }
51  \cs_if_exist_use:NNTF \CJKaddEncHook
52  { {#1} { \__CJKtu_enc_map:nn {#1} {#2} } }
53  {
54    \AtBeginDocument
55    {
56      \cs_if_exist_use:NT \CJKaddEncHook
57      { {#1} { \__CJKtu_enc_map:nn {#1} {#2} } }
58    }
59  }
60  }

```

(End definition for __CJKtu_set_enc:nnnnnn.)

__CJKtu_enc_map:nn

```

61  \cs_new_protected_nopar:Npn \__CJKtu_enc_map:nn #1#2
62  {
63    \int_set_eq:Nc \l__CJKtu_i_min_int { c__CJKtu_ #1 _i_min_int }
64    \int_set_eq:Nc \l__CJKtu_ii_min_int { c__CJKtu_ #1 _ii_min_int }
65    \int_set_eq:Nc \l__CJKtu_gap_begin_int { c__CJKtu_ #1 _gap_begin_int }
66    \int_set_eq:Nc \l__CJKtu_gap_end_int { c__CJKtu_ #1 _gap_end_int }
67    \int_set_eq:Nc \l__CJKtu_plane_int { c__CJKtu_ #1 _plane_int }

```

```

68     \cs_if_exist:cF { CJKtu_ #1 _sfd_map:nn }
69     { \group_begin: \file_input:n { xCJK2uni-#2.def } \group_end: }
70     \cs_set_eq:Nc \CJKtu_sfd_map:nn { CJKtu_ #1 _sfd_map:nn }
71 }

```

(End definition for __CJKtu_enc_map:nn.)

__CJKtu_use_enc_map:n

```

72 \cs_new_protected_nopar:Npn \__CJKtu_use_enc_map:n #1
73 {
74     \prop_get:NxNTF \c__CJKtu_sfd_prop {#1} \l__CJKtu_sfd_tl
75     { \__CJKtu_enc_map:nn {#1} { \l__CJKtu_sfd_tl } }
76     { \msg_error:nxx { xCJK2uni } { invalid-encoding } {#1} }
77 }
78 \msg_new:nnn { xCJK2uni } { invalid-encoding }
79 {
80     The~encoding~`#1'~is~invalid.\\
81     Only~\seq_use:Nnnn \c__CJKtu_encoding_seq { ~and~ } { ,~ } { ,~and~ } ~
82     are~supported.
83 }
84 \cs_generate_variant:Nn \prop_get:NnNTF { Nx }

```

(End definition for __CJKtu_use_enc_map:n.)

```

85 \__CJKtu_set_enc:nnnnn { GB } { UGB } { "A1 } { "A1 } { } { }
86 \__CJKtu_set_enc:nnnnn { JIS } { UJIS } { "A1 } { "A1 } { } { }
87 \__CJKtu_set_enc:nnnnn { KS } { UKS } { "A1 } { "A1 } { } { }
88 \__CJKtu_set_enc:nnnnn { Bg5 } { UBig5 } { "A1 } { "40 } { "7E } { "A1 }
89 \__CJKtu_set_enc:nnnnn { Bg5+ } { UBg5plus } { "81 } { "40 } { "7E } { "80 }
90 \__CJKtu_set_enc:nnnnn { GBK } { UGBK } { "81 } { "40 } { "7E } { "80 }

```

__CJKtu_sfd_to_unicode:nn

```

91 \cs_new_nopar:Npn \__CJKtu_sfd_to_unicode:nn #1#2
92 {
93     \exp:w \exp_last_unbraced:Nf
94     \__CJKtu_get_unicode:w \CJKtu_sfd_map:nn {#1} {#2} \exp_end:
95 }

```

(End definition for __CJKtu_sfd_to_unicode:nn.)

__CJKtu_get_unicode:w

```

96 \cs_new_nopar:Npn \__CJKtu_get_unicode:w #1 \exp_end:
97 {
98     \tl_if_empty:nTF {#1}
99     { \exp_end: }
100     { \__CJKtu_get_unicode_aux:w #1 \q_stop }
101 }
102 \cs_new_nopar:Npn \__CJKtu_get_unicode_aux:w #1 \or: #2 \q_stop
103 { \or: #2 \exp_end: #1 }

```

(End definition for __CJKtu_get_unicode:w.)

__CJKtu_char_to_unicode:n

```

104 \group_begin:
105 \char_set_catcode_active:n { "7F }
106 \cs_new_nopar:Npn \__CJKtu_char_to_unicode:n #1
107 {
108     \exp:w
109     \int_compare:nNnTF { \tl_count:n {#1} } = \c_two
110     { \CJKtu_byte:NN #1 }
111     {
112         \tl_if_head_eq_meaning:nNTF {#1} ^^7f
113         { \__CJKtu_byte:wNwnw #1 }
114         { \__CJKtu_encoding_error: }
115     }
116 }
117 \cs_new_nopar:Npn \__CJKtu_byte:wNwnw ^^7f #1 ^^7f #2 ^^7f

```

```

118 { \CJKtu_byte_map:nn { `#1 } {#2} }
119 \cs_new_nopar:Npn \__CJKtu_byte:Nwnw #1 ^^7f #2 ^^7f
120 { \CJKtu_byte_map:nn { `#1 } {#2} }

```

(End definition for __CJKtu_char_to_unicode:n.)

\CJKtu_bookmarks_hook:

```

121 \cs_new_protected_nopar:Npn \CJKtu_bookmarks_hook:
122 {
123   \cs_set_eq:NN ^^7f \__CJKtu_byte:Nwnw
124   \cs_set_eq:NN \CJK@XX \CJKtu_byte:NN
125   \cs_set_eq:NN \CJKchar \__CJKtu_byte:wnn
126   \cs_set_eq:NN \CCTchar \CJKtu_byte:nn
127   \cs_set_eq:NN \@CCTSetChar \__CJKtu_CCT_byte:NNN
128   \cs_set_eq:NN \__CJKtu_get_unicode:n \__CJKtu_UTF_xvi_be:n
129 }
130 \group_end:

```

(End definition for \CJKtu_bookmarks_hook:.)

\CJKtu_byte:NN
__CJKtu_CCT_byte:NNN

```

131 \cs_new_nopar:Npn \CJKtu_byte:NN #1#2
132 { \CJKtu_byte:nn { `#1 } { `#2 } }
133 \cs_new_nopar:Npn \__CJKtu_CCT_byte:NNN #1#2#3
134 { \CJKtu_byte:nn { `#1 } { `#3 } }

```

(End definition for \CJKtu_byte:NN and __CJKtu_CCT_byte:NNN.)

__CJKtu_byte:wnn

```

135 \cs_new_nopar:Npn \__CJKtu_byte:wnn #1# { \CJKtu_byte:nn }

```

(End definition for __CJKtu_byte:wnn.)

\CJKtu_byte:nn

```

136 \cs_new_nopar:Npn \CJKtu_byte:nn #1#2
137 {
138   \int_compare:nTF { \l__CJKtu_i_min_int <= #1 <= \l__CJKtu_i_max_int }
139   {
140     \int_compare:nTF { \l__CJKtu_ii_min_int <= #2 < \l__CJKtu_gap_begin_int }
141     { \CJKtu_byte_map:nn {#1} {#2} }
142     {
143       \int_compare:nTF
144       { \l__CJKtu_gap_end_int <= #2 <= \l__CJKtu_ii_max_int }
145       { \CJKtu_byte_map:nn {#1} {#2} }
146       { \__CJKtu_encoding_error: }
147     }
148   }
149   { \__CJKtu_encoding_error: }
150 }
151 \cs_new_nopar:Npn \__CJKtu_encoding_error:
152 {
153   \msg_expandable_error:nn { xCJK2uni } { encoding-error }
154   \exp_end:
155 }
156 \msg_new:nnn { xCJK2uni } { encoding-error }
157 { Wrong~encoding~scheme. }

```

(End definition for \CJKtu_byte:nn.)

\CJKtu_byte_map:nn

```

158 \cs_new_nopar:Npn \CJKtu_byte_map:nn #1#2
159 {
160   \exp_args:Nf \__CJKtu_index_map:n
161   {
162     \int_eval:n
163     {

```

```

164         ( #1 - \l__CJKtu_i_min_int ) * \l__CJKtu_plane_int
165         + (#2) - \l__CJKtu_ii_min_int
166         \int_compare:nNnF {#2} < \l__CJKtu_gap_begin_int
167         { + \l__CJKtu_gap_begin_int - \l__CJKtu_gap_end_int }
168     }
169 }
170 }

```

(End definition for \CJKtu_byte_map:nn.)

__CJKtu_index_map:n

```

171 \cs_new_nopar:Npn \__CJKtu_index_map:n #1
172 {
173     \__CJKtu_get_unicode:n
174     {
175         \CJKtu_sfd_map:nn
176         { \int_div_truncate:nn {#1} { \c_two_hundred_fifty_six } + \c_one }
177         { \int_mod:nn {#1} { \c_two_hundred_fifty_six } }
178     }
179 }

```

(End definition for __CJKtu_index_map:n.)

__CJKtu_get_unicode:n

```

180 \cs_new_nopar:Npn \__CJKtu_get_unicode:n #1
181 { \exp_last_unbraced:Nf \__CJKtu_get_unicode:w #1 \exp_end: }

```

(End definition for __CJKtu_get_unicode:n.)

__CJKtu_UTF_xvi_be:n

```

182 \cs_new_nopar:Npn \__CJKtu_UTF_xvi_be:n #1
183 { \exp_args:Nf \__CJKtu_UTF_xvi_aux:n { \int_eval:n { "#1 } } }
184 \cs_new_nopar:Npn \__CJKtu_UTF_xvi_aux:n #1
185 {
186     \HyPsd@DecimalToOctalFirst
187     { \int_div_truncate:nn {#1} { \c_two_hundred_fifty_six } }
188     \HyPsd@DecimalToOctalSecond
189     { \int_mod:nn {#1} { \c_two_hundred_fifty_six } }
190 }

```

(End definition for __CJKtu_UTF_xvi_be:n.)

```

191 \cs_if_exist_use:NTF \hypersetup { { unicode , CJKbookmarks = false } }
192 { \PassOptionsToPackage { unicode , CJKbookmarks = false } { hyperref } }
193 \msg_new:nnn { xCJK2uni } { UTF-8-encoding }
194 { It~is~not~necessary~to~load~xCJK2uni~in~UTF-8~encoding. }
195 \tl_if_exist:NF \pdfstringdefPreHook { \tl_new:N \pdfstringdefPreHook }
196 \@ifpackageloaded { CJKutf8 }
197 { \msg_warning:nn { xCJK2uni } { UTF-8-encoding } }
198 {
199     \cs_new_eq:NN \CJKtu@bookmarks@hook \CJKtu_bookmarks_hook:
200     \tl_gput_right:Nn \pdfstringdefPreHook { \CJKtu@bookmarks@hook }
201     \AtBeginDocument
202     {
203         \@ifpackageloaded { CJKutf8 }
204         {
205             \cs_gset_eq:NN \CJKtu@bookmarks@hook \scan_stop:
206             \msg_warning:nn { xCJK2uni } { UTF-8-encoding }
207         }
208         { \cs_if_exist_use:NT \hypersetup { { CJKbookmarks = false } } }
209     }
210 }

```

\useCJKencmap

\CJKchartouni

\CJKsfdtouni

```

211 \cs_new_eq:NN \useCJKencmap \__CJKtu_use_enc_map:n
212 \cs_new_eq:NN \CJKchartouni \__CJKtu_char_to_unicode:n
213 \cs_new_eq:NN \CJKsfdtouni \__CJKtu_sfd_to_unicode:nn

```

(End definition for `\useCJKencmap`, `\CJKchartouni`, and `\JKsfdtouni`. These functions are documented on page 1.)

```

\__CJKtu_initial:N
214 \cs_new_protected_nopar:Npn \__CJKtu_initial:N #1
215   {
216     \tl_if_exist:NTF #1
217     {
218       \prop_get:NxNTF \c__CJKtu_sfd_prop {#1} \l__CJKtu_sfd_tl
219       { \__CJKtu_enc_map:nn {#1} { \l__CJKtu_sfd_tl } }
220       { \__CJKtu_use_enc_map:n { GBK } }
221     }
222     { \__CJKtu_use_enc_map:n { GBK } }
223   }

```

(End definition for `__CJKtu_initial:N`)

```

224 \exp_args:Nc \__CJKtu_initial:N { CJK @ @ @ enc }
225 </package>

```

3.2 xCJK2uni-make

```

226 <*make>
227 \msg_new:nnn { xCJK2uni } { file-not-found }
228   {
229     SFD file~`#2'~for~encoding~`#1'~not~found.\\
230     xCJK2uni~will~not~work!
231   }
232 \ior_new:N \g__CJKtu_sfd_ior
233 \str_new:N \g__CJKtu_path_str
234 \sys_if_engine luatex:TF
235   {
236     \str_gset:Nx \g__CJKtu_path_str
237     {
238       \lua_now_x:n
239       {
240         kpse.set_program_name("luatex") ~
241         local ~ sfd = kpse.find_file("UGBK.sfd", "subfont~definition~files") ~
242         if ~ sfd ~ then ~
243           tex.write(sfd) ~
244         end
245       }
246     }
247   }
248   {
249     \ior_open:NnTF \g__CJKtu_sfd_ior { |kpsewhich ~ UGBK.sfd }
250     {
251       \ior_get_str:NN \g__CJKtu_sfd_ior \g__CJKtu_path_str
252       \ior_close:N \g__CJKtu_sfd_ior
253     }
254     { \msg_fatal:nnnn { xCJK2uni } { file-not-found } { GBK } { UGBK.sfd } }
255   }
256 \tl_if_blank:oTF { \g__CJKtu_path_str }
257   { \msg_fatal:nnnn { xCJK2uni } { file-not-found } { GBK } { UGBK.sfd } }
258   {
259     \seq_set_split:NnV \l_tmpa_seq { / } \g__CJKtu_path_str
260     \seq_pop_right:NN \l_tmpa_seq \g__CJKtu_path_str
261     \str_gset:Nx \g__CJKtu_path_str { \seq_use:Nn \l_tmpa_seq { / } }
262   }
263 \str_const:Nx \c__CJKtu_indent_str
264   { \c_catcode_other_space_tl \c_catcode_other_space_tl }
265 \iow_new:N \g__CJKtu_sfd_map_iow
266 \iow_new:N \g__CJKtu_sfd_cmap_iow
267 \seq_new:N \l__CJKtu_sfd_plane_seq
268 \seq_new:N \l__CJKtu_sfd_line_seq
269 \tl_new:N \l__CJKtu_sfd_plane_tl

```

```
270 \tl_new:N \l__CJKtu_cmap_block_tl
271 \int_new:N \l__CJKtu_sfd_index_int
```

```
\c__CJKtu_sfd_map_prop
```

```
272 \prop_new:N \c__CJKtu_sfd_map_prop
273 \prop_gput:Nnn \c__CJKtu_sfd_map_prop { GB } { { 10 } { UGB } }
274 \prop_gput:Nnn \c__CJKtu_sfd_map_prop { JIS } { { 40 } { UJIS } }
275 \prop_gput:Nnn \c__CJKtu_sfd_map_prop { KS } { { 60 } { UKS } }
276 \prop_gput:Nnn \c__CJKtu_sfd_map_prop { Bg5 } { { 00 } { UBig5 } }
277 \prop_gput:Nnn \c__CJKtu_sfd_map_prop { Bg5+ } { { 09 } { UBg5plus } }
278 \prop_gput:Nnn \c__CJKtu_sfd_map_prop { GBK } { { 19 } { UGBK } }
```

(End definition for \c__CJKtu_sfd_map_prop.)

```
\__CJKtu_write_file:nnn
```

```
279 \cs_new_protected_nopar:Npn \__CJKtu_write_file:nnn #1#2#3
280 {
281   \group_begin:
282   \file_path_include:n { \g__CJKtu_path_str / }
283   \ior_open:NnTF \g__CJKtu_sfd_ior { #3.sfd }
284   {
285     \group_end:
286     \seq_clear:N \l__CJKtu_sfd_plane_seq
287     \__CJKtu_write_sfd_map_header:n {#1}
288     \ior_str_map_inline:Nn \g__CJKtu_sfd_ior
289     { \str_if_eq:nnT {##1} { 00 ~ 0x0000_0x00FF } { \ior_map_break: } }
290     \ior_str_map_inline:Nn \g__CJKtu_sfd_ior
291     {
292       \tl_if_blank:nTF {##1}
293       {
294         \ior_map_break:n
295         {
296           \__CJKtu_write_sfd_map_trailer:n {#1}
297           \__CJKtu_write_cmap_file:n {#2}
298         }
299       }
300       { \__CJKtu_read_sfd_line:nnn {##1} {#1} {#2} }
301     }
302     \iow_close:N \g__CJKtu_sfd_cmap_iow
303     \ior_close:N \g__CJKtu_sfd_ior
304     \seq_clear:N \l__CJKtu_sfd_plane_seq
305     \seq_clear:N \l__CJKtu_sfd_line_seq
306   }
307   {
308     \group_end:
309     \msg_critical:nxxx { xCJK2uni } { file-not-found } {#1} { #3.sfd }
310   }
311 }
```

(End definition for __CJKtu_write_file:nnn.)

```
\__CJKtu_read_sfd_line:n
```

```
\__CJKtu_read_sfd_line:nn
```

```
312 \cs_new_protected_nopar:Npx \__CJKtu_read_sfd_line:nnn #1#2#3
313 {
314   \exp_not:N \__CJKtu_read_sfd_line:nwnn #1
315   \c_backslash_str \exp_not:N \q_nil \exp_not:N \q_stop {#2} {#3}
316 }
317 \use:x
318 {
319   \cs_new_protected_nopar:Npn \exp_not:N \__CJKtu_read_sfd_line:nwnn
320   ##1 0 \token_to_str:N x ##2 \c_backslash_str ##3 \exp_not:N \q_stop
321   ##4##5
322   {
323     \exp_not:N \__CJKtu_read_sfd_line:nnnnn
324     {##1} { 0 \token_to_str:N x } {##2} {##4} {##5}
325   }
326 }
```

(End definition for _CJKtu_read_sfd_line:n and _CJKtu_read_sfd_line:nn.)

_CJKtu_read_sfd_line:nnnn

```

327 \cs_new_protected_nopar:Npn \_CJKtu_read_sfd_line:nnnn #1#2#3#4#5
328 {
329   \tl_if_blank:nF {#1}
330   {
331     \seq_if_empty:NF \l__CJKtu_sfd_plane_seq
332     {
333       \iow_now:Nx \g__CJKtu_sfd_map_iow
334       {
335         \c__CJKtu_indent_str \c__CJKtu_indent_str
336         \token_to_str:N \fi: \iow_newline:
337         \c__CJKtu_indent_str \c_right_brace_str
338       }
339       \_CJKtu_write_cmap_file:n {#5}
340     }
341     \_CJKtu_write_plane_map:nn {#1} {#4}
342     \tl_set:Nx \l__CJKtu_sfd_plane_tl { \tl_trim_spaces:n {#1} }
343   }
344   \seq_set_split:Nnn \l__CJKtu_sfd_line_seq {#2} {#3}
345   \seq_concat:NNN \l__CJKtu_sfd_plane_seq
346   \l__CJKtu_sfd_plane_seq \l__CJKtu_sfd_line_seq
347   \iow_now:Nx \g__CJKtu_sfd_map_iow
348   {
349     \c__CJKtu_indent_str \c__CJKtu_indent_str \c__CJKtu_indent_str
350     \seq_use:Nn \l__CJKtu_sfd_line_seq { \or: }
351     \token_to_str:N \or:
352   }
353 }

```

(End definition for _CJKtu_read_sfd_line:nnnnn.)

_CJKtu_write_plane_map:nn

```

354 \cs_new_protected_nopar:Npn \_CJKtu_write_plane_map:nn #1#2
355 {
356   \iow_now:Nx \g__CJKtu_sfd_map_iow
357   {
358     \cs_new_nopar:cpn { ~ __CJKtu_ #2 _sfd_map_ \int_eval:n {#1} :n ~ } ~
359     \c_hash_str 1 \iow_newline:
360     \c__CJKtu_indent_str \c_left_brace_str \iow_newline:
361     \c__CJKtu_indent_str \c__CJKtu_indent_str
362     \exp_not:N \if_case:w \etex_numexpr:D
363     \c_hash_str 1 ~ \token_to_str:N \scan_stop:
364   }
365 }

```

(End definition for _CJKtu_write_plane_map:nn.)

_CJKtu_write_cmap_file:n

```

366 \cs_new_protected_nopar:Npn \_CJKtu_write_cmap_file:n #1
367 {
368   \tl_clear:N \l__CJKtu_cmap_block_tl
369   \int_zero:N \l__CJKtu_sfd_index_int
370   \iow_open:Nn \g__CJKtu_sfd_cmap_iow { c #1 \l__CJKtu_sfd_plane_tl .cmap }
371   \_CJKtu_write_cmap_header:nn { C #1 } { \l__CJKtu_sfd_plane_tl }
372   \iow_now:Nx \g__CJKtu_sfd_cmap_iow
373   {
374     \iow_newline:
375     1~begincodespacerange \iow_newline:
376     \c__CJKtu_indent_str < 00 > ~
377     <
378     \int_to_Hex:n
379     { \seq_count:N \l__CJKtu_sfd_plane_seq - \c_one }
380     > \iow_newline:
381     endcodespacerange

```



```

382     }
383     \seq_map_function:NN \l__CJKtu_sfd_plane_seq \__CJKtu_write_cmap_body:n
384     \tl_if_empty:NF \l__CJKtu_cmap_block_tl
385     {
386         \iow_now:Nx \g__CJKtu_sfd_cmap_iow
387         {
388             \iow_newline:
389             \int_mod:nn { \l__CJKtu_sfd_index_int } { \c_one_hundred } ~
390             beginbfchar \iow_newline:
391             \l__CJKtu_cmap_block_tl
392             endbfchar
393         }
394     }
395     \__CJKtu_write_cmap_trailer:
396     \seq_clear:N \l__CJKtu_sfd_plane_seq
397 }

```

(End definition for __CJKtu_write_cmap_file:n)

__CJKtu_write_cmap_body:n

```

398 \cs_new_protected_nopar:Npn \__CJKtu_write_cmap_body:n #1
399 {
400     \int_case:nnTF { \l__CJKtu_sfd_index_int }
401     { { 99 } { } { 199 } { } }
402     {
403         \iow_now:Nx \g__CJKtu_sfd_cmap_iow
404         {
405             \iow_newline:
406             100 ~ beginbfchar \iow_newline:
407             \l__CJKtu_cmap_block_tl
408             < \int_to_Hex:n { \l__CJKtu_sfd_index_int } > ~
409             <#1> \iow_newline:
410             endbfchar
411         }
412         \tl_clear:N \l__CJKtu_cmap_block_tl
413     }
414     {
415         \tl_put_right:Nx \l__CJKtu_cmap_block_tl
416         {
417             <
418             \int_compare:nNf \l__CJKtu_sfd_index_int > \c_fifteen { 0 }
419             \int_to_Hex:n { \l__CJKtu_sfd_index_int }
420             > ~ <#1> \iow_newline:
421         }
422     }
423     \int_incr:N \l__CJKtu_sfd_index_int
424 }

```

(End definition for __CJKtu_write_cmap_body:n)

_CJKtu_write_sfd_map_header:n

```

425 \group_begin:
426 \char_set_catcode_other:N \%
427 \cs_new_protected_nopar:Npn \_CJKtu_write_sfd_map_header:n #1
428 {
429     \iow_now:Nx \g__CJKtu_sfd_map_iow
430     {
431         %<#1> \iow_newline:
432         \cs_new_nopar:cpn { ~ CJKtu_#1_sfd_map:nn ~ } ~ \c_hash_str 1
433         \iow_newline: \c__CJKtu_indent_str \c_left_brace_str \iow_newline:
434         \c__CJKtu_indent_str \c__CJKtu_indent_str
435         \token_to_str:N \cs_if_exist_use:cF
436         \iow_newline: \c__CJKtu_indent_str \c__CJKtu_indent_str \c__CJKtu_indent_str
437         { ~ __CJKtu_#1_sfd_map_ ~ \exp_not:N \int_eval:n { \c_hash_str 1 } ~ :n ~ }
438         \iow_newline: \c__CJKtu_indent_str \c__CJKtu_indent_str \c__CJKtu_indent_str
439         { ~ \exp_not:N \use_none:n } \iow_newline:
440         \c__CJKtu_indent_str \c_right_brace_str

```

```

441     }
442 }

(End definition for \_CJktu_write_sfd_map_header:n)

```

_CJktu_write_sfd_map_trailer:n

```

443 \cs_new_protected_nopar:Npn \_CJktu_write_sfd_map_trailer:n #1
444 {
445   \iow_now:Nx \g__CJktu_sfd_map_iow
446   {
447     \c__CJktu_indent_str \c__CJktu_indent_str
448     \token_to_str:N \fi: \iow_newline:
449     \c__CJktu_indent_str \c_right_brace_str \iow_newline:
450     %</#1>
451   }
452 }

(End definition for \_CJktu_write_sfd_map_trailer:n)

```

_CJktu_write_cmap_header:nn

```

453 \cs_new_protected_nopar:Npn \_CJktu_write_cmap_header:nn #1#2
454 {
455   \iow_now:Nx \g__CJktu_sfd_cmap_iow
456   {
457     %!PS-Adobe-3.0~Resource-CMap \iow_newline:
458     %%DocumentNeededResources:~ProcSet~(CIDInit) \iow_newline:
459     %%IncludeResource:~ProcSet~(CIDInit) \iow_newline:
460     %%BeginResource:~CMap~(TeX-#1-#2-0) \iow_newline:
461     %%Title:~(TeX-#1-#2-0~TeX~#1-#2~0) \iow_newline:
462     %%Version:~1.000 \iow_newline:
463     %%EndComments \iow_newline: \iow_newline:
464     /CIDInit~/ProcSet~findresource~begin \iow_newline: \iow_newline:
465     12~dict~begin \iow_newline: \iow_newline:
466     begincmap \iow_newline: \iow_newline:
467     /CIDSystemInfo~3~dict~dup~begin \iow_newline:
468     \c__CJktu_indent_str /Registry~(TeX)~def \iow_newline:
469     \c__CJktu_indent_str /Ordering~(#1-#2)~def \iow_newline:
470     \c__CJktu_indent_str /Supplement~0~def \iow_newline:
471     end~def \iow_newline: \iow_newline:
472     /CMapName~/TeX-#1-#2-0~def \iow_newline:
473     /CMapVersion~1.000~def \iow_newline:
474     /CMapType~2~def \iow_newline: \iow_newline:
475     /WMode~0~def
476   }
477 }

(End definition for \_CJktu_write_cmap_header:nn)

```

_CJktu_write_cmap_trailer:

```

478 \cs_new_protected_nopar:Npx \_CJktu_write_cmap_trailer:
479 {
480   \iow_now:Nn \g__CJktu_sfd_cmap_iow
481   {
482     \iow_newline:
483     endcmap \iow_newline:
484     CMapName~currentdict~/CMap~defineresource~pop \iow_newline:
485     end \iow_newline:
486     end \iow_newline: \iow_newline:
487     %%EndResource \iow_newline:
488     %%EOF
489   }
490 }
491 \group_end:

```

```
(End definition for \_CJKtu_write_cmap_trailer:.)  
492 \iow_open:Nn \g\_CJKtu_sfd_map_iow { xCJK2uni-sfd.def }  
493 \prop_map_inline:Nn \c\_CJKtu_sfd_map_prop  
494   { \_CJKtu_write_file:nnn {#1} #2 }  
495 \iow_close:N \g\_CJKtu_sfd_map_iow  
496 \cs_if_exist_use:NF \CJKtuend { \tex_end:D }  
497 </make>
```

代码索引

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

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