

The LXGW Font Family* | 落霞与孤鹜齐飞 秋水共长天一色

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This package packs a selection of open-source CJK fonts from 霞鹜新繖宋, 霞鹜新晰黑, 霞鹜文楷, 霞鹜臻楷, which are released into public domain by LXGW and 朱雀仿宋 released into public domain by TrionesType since 2021. They are licensed under the SIL Open Font License (OFL).

Abstract

The LXGW Font Family provides an open-source CJK font family with a comprehensive character set for Chinese (Simplified/Traditional), Cantonese, and Japanese. A fontset configuration of this font family for the ctex-kit is also provided in this package.

1 Usage

Users are allowed to use the friendly interface: the fontset key in CT_εX kit

```
\documentclass[fontset = lxgw]{ctex<art|book|rep|beamer>}  
\usepackage[fontset = lxgw]{ctex}
```

with X_εLT_εX, LuaLT_εX, LT_εX + DVIPDFMx, upLT_εX + DVIPDFMx, and ApLT_εX (aka pLT_εX-ng) supported. pdfLT_εX is not supported temporarily since the long mapping time of zhmap. Four commands are provided for loading the listed regular and **bold** font files

\songti	宋体 (CJKmainfont): LXGWNeoZhiSong.ttf, LXGWNeoZhiSongScreen.ttf
\heiti	黑体 (CJKsansfont): LXGWNeoXiHei.ttf, LXGWNeoXiHeiScreen.ttf
\fangsong	仿宋 (CJKmonofont): LXGWZhuqueFangsong-Regular.ttf (AutoFakeBold enabled)
\kaishu	楷书 (it.of CJKmainfont): LXGWWenKaiGBLite-Regular.ttf, LXGWZhenKaiGB-Regular.ttf

This user-friendly interface is implemented in A.1, A.2, and A.3.

The .ttf files are sourced from the following links

- <https://github.com/lxgw/LxgwNeoZhiSong/releases/latest/download/LXGWNeoZhiSong.ttf>
- <https://github.com/lxgw/LxgwNeoXiZhi-Screen/releases/latest/download/LXGWNeoZhiSongScreen.ttf>
- <https://github.com/lxgw/LxgwNeoXiHei/releases/latest/download/LXGWNeoXiHei.ttf>
- <https://github.com/lxgw/LxgwNeoXiZhi-Screen/releases/latest/download/LXGWNeoXiHeiScreen.ttf>
- <https://github.com/TrionesType/zhuque/releases/download/v0.212/ZhuqueFangsong-v0.212.zip>
- <https://github.com/lxgw/LxgwWenkaiGB-Lite/releases/latest/download/LXGWWenKaiGBLite-Regular.ttf>
- <https://github.com/lxgw/LxgwZhenKai/releases/latest/download/LXGWZhenKaiGB-Regular.ttf>

*<https://github.com/myhsia/LXGW-CTAN>

[†]<https://github.com/lxgw>, <https://github.com/TrionesType/zhuque>

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2 Font Demos

The following lists the Chinese/English name, filename, and demos of the fonts: Cantonese, Japanese, Chinese (Simplified/Traditional) versions of “I Can Eat Glass”, and missing character markers are provided with punctuation compression disabled.

霞鶯新緻宋 (LXGW Neo ZhiSong) LXGWNeoZhiSong.ttf, LXGWNeoZhiSongScreen.ttf

私	ガ	ラ	ス	を	食	べ	ら	れ	ま	す	。	☒	そ	れ	は	私	を	傷	つ	け	ま	せ	ん	。
我	能	吞	下	玻	璃	而	不	伤	身	体	。	☒	我	能	吞	下	玻	璃	而	不	伤	身	体	。
我	能	吞	下	玻	璃	而	不	傷	身	體	。	我	可	以	食	玻	璃	，	佢	傷	唔	到	我	。

霞鶯新晰黑 (LXGW Neo XiHei) LXGWNeoXiHei.ttf, LXGWNeoXiHeiScreen.ttf

私	ガ	ラ	ス	を	食	べ	ら	れ	ま	す	。	☒	そ	れ	は	私	を	傷	つ	け	ま	せ	ん	。
我	能	吞	下	玻	璃	而	不	伤	身	体	。	☒	我	能	吞	下	玻	璃	而	不	伤	身	体	。
我	能	吞	下	玻	璃	而	不	傷	身	體	。	我	可	以	食	玻	璃	，	佢	傷	唔	到	我	。

朱雀仿宋 (ZHUQUE FANGSONG) LXGWZhuqueFangsong-Regular.ttf

私	ガ	ラ	ス	を	食	べ	ら	れ	ま	す	。	■	そ	れ	は	私	を	傷	つ	け	ま	せ	ん	。
我	能	吞	下	玻	璃	而	不	伤	身	体	。	■	我	能	吞	下	玻	璃	而	不	伤	身	体	。
我	能	吞	下	玻	璃	而	不	傷	身	體	。	我	可	以	食	玻	璃	，	佢	傷	唔	到	我	。

霞鶯 文楷/隸楷 (LXGW WenKai/ZhenKai) LXGWWenKaiGBLite-Regular.ttf, LXGWZhenKaiGB-Regular.ttf

私	ガ	ラ	ス	を	食	べ	ら	れ	ま	す	。	☹	そ	れ	は	私	を	傷	つ	け	ま	せ	ん	。
我	能	吞	下	玻	璃	而	不	伤	身	体	。	☹	我	能	吞	下	玻	璃	而	不	伤	身	体	。
我	能	吞	下	玻	璃	而	不	傷	身	體	。	我	可	以	食	玻	璃	，	佢	傷	唔	到	我	。

A The Source Code

A.1 The ctex-fontset-lxgw.def file

Start the optionlist fontset for l3docstrip.

```
1 <*fontset>
```

Declare the ctex-kit font configuration file with date, version, and description.

```
2 \ProvidesExplFile {ctex-fontset-lxgw.def} {2026-06-dd} {v1.522C}  
3 {lxgw fontset configuration for ctex-kit}
```

Load CJK font family, interface, accepts the following 4 branches, provided by ctex-kit.

```
4 \ctex_fontset_case:nnnn
```

pdf_{TeX} (generate PDF) This branch is no longer supported here, and a `fontset-unavailable` error will raise.

```
5 { \ctex_fontset_error:n { lxgw } }
```

TeXhackers note: For some fontset that supports this branch, line 4 – 5 should be replaced as a line

```
\ctex_fontset_case:nnn
```

pdf_{TeX} (generate DVI) For those use \LaTeX + DVIPDFMx.

```
6 {
```

Load the .spa file for the CJKpunct package.

```
7 \ctex_file_input:n { ctexpunct-lxgw.spa }
```

Case choice controlled by the zhmap key of ctex-kit.

```
8 \ctex_zhmap_case:nnn
```

#1: Content of this argument will be outputted to the input stream when `zhmap = zhmcJK`

```
\cs_gset_eq:NN \ctex_zhmap_case:nnn \use_i:nnn
```

The LXGW font family uses the UniGB-UTF16-H cmap (Character To Glyph Index Mapping Table).

```
9 {  
10 \setCJKmainfont { LXGWNeoZhiSong.ttf }  
11 [  
12 cmap = UniGB-UTF16-H, AutoFakeBold,  
13 ItalicFont = LXGWWenKaiGBLite-Regular.ttf,  
14 BoldItalicFont = LXGWZhenKaiGB-Regular.ttf  
15 ]  
16 \setCJKsansfont { LXGWNeoXiHei.ttf }  
17 [ cmap = UniGB-UTF16-H, AutoFakeBold, AutoFakeSlant ]  
18 \setCJKmonofont { LXGWZhuqueFangsong-Regular.ttf }  
19 [ cmap = UniGB-UTF16-H, AutoFakeBold, AutoFakeSlant ]  
20 \setCJKfamilyfont { zhsong } { LXGWNeoZhiSong.ttf }  
21 [ cmap = UniGB-UTF16-H, AutoFakeBold, AutoFakeSlant ]  
22 \setCJKfamilyfont { zhhei } { LXGWNeoXiHei.ttf }  
23 [ cmap = UniGB-UTF16-H, AutoFakeBold, AutoFakeSlant ]  
24 \setCJKfamilyfont { zhfs } { LXGWZhuqueFangsong-Regular.ttf }  
25 [ cmap = UniGB-UTF16-H, AutoFakeBold, AutoFakeSlant ]  
26 \setCJKfamilyfont { zhkai } { LXGWWenKaiGBLite-Regular.ttf }  
27 [ cmap = UniGB-UTF16-H, AutoFakeSlant,  
28 BoldFont = LXGWZhenKaiGB-Regular.ttf,  
29 SlantedFont = LXGWWenKaiGBLite-Regular.ttf,
```

```

30         ItalicFont      = LXGWenKaiGBLite-Regular.ttf,
31         BoldSlantedFont = LXGWZhenKaiGB-Regular.ttf,
32         BoldItalicFont  = LXGWZhenKaiGB-Regular.ttf ]

```

Configure the usages of the edge information of the defined CJK families.

```

33         \ctex_punct_set:n { lxxw }
34         \ctex_punct_map_family:nn { \CJKrmdefault } { zhsong }
35         \ctex_punct_map_family:nn { \CJKsfdefault } { zhhei }
36         \ctex_punct_map_family:nn { \CJKttdefault } { zhfs }
37         \ctex_punct_map_bfseries:nn { \CJKrmdefault, zhsong } { zhsongb }
38         \ctex_punct_map_bfseries:nn { \CJKsfdefault, zhhei } { zhheib }
39         \ctex_punct_map_itshape:nn { \CJKrmdefault } { zhkai }
40     }

```

#2: Content of this argument will be outputted to the input stream when `zhmap = true`

```
\cs_gset_eq:NN \ctex_zhmap_case:nnn \use_ii:nnn
```

Load the mapping file `ctex-zhmap-lxxw.tex` (see A.3) for `zhmatrices` and set `\CJKrmdefault`, `\CJKsfdefault`, `\CJKttdefault`, respectively.

```

41     {
42         \ctex_load_zhmap:nnnn { rm } { zhhei } { zhfs } { lxxw }

```

Configure the usages of the edge information of `\CJKrmdefault`.

```

43         \ctex_punct_set:n { lxxw }
44         \ctex_punct_map_family:nn { \CJKrmdefault } { zhsong }
45         \ctex_punct_map_bfseries:nn { \CJKrmdefault } { zhhei }
46         \ctex_punct_map_itshape:nn { \CJKrmdefault } { zhkai }
47     }

```

#3: Content of this argument will be outputted to the input stream when `zhmap = false`

```
\cs_gset_eq:NN \ctex_zhmap_case:nnn \use_iii:nnn
```

Here will raise a `fontset-unavailable` error.

```

48         { \ctex_fontset_error:n { lxxw } }
49     }

```

`upTeX`, `ApTeX` (aka `pTeX-ng`) For those use `upTeX` + `DVIPDFMx`. Configure the basic font mapping for `upTeX`. Due to the definition in `zhmetrics-uptex`, configure

1. upshape of serif font.
2. bfseries of serif font.
3. itshape of serif font.
4. upshape of sans font.
5. bfseries of sans font.
6. upshape of mono font.

```

50     {
51         \ctex_set_upfonts:nnnnnn
52         { LXGWNeoZhiSong.ttf }
53         { LXGWNeoZhiSongScreen.ttf }
54         { LXGWenKaiGBLite-Regular.ttf }
55         { LXGWNeoXiHei.ttf }
56         { LXGWNeoXiHeiScreen.ttf }
57         { LXGWZhuqueFangsong-Regular.ttf }

```

Config the NFSS font families zhsong, zhhei, zhfs, and zhkai to the JFM name in normal type and bold type. Leave empty for those font families with no bold version.

```

58 \ctex_set_upfamily:nnn { zhsong } { upzhserif } { upzhserifb }
59 \ctex_set_upfamily:nnn { zhhei } { upzhsans } { upzhsans }
60 \ctex_set_upfamily:nnn { zhfs } { upzhmono } { }
61 \ctex_set_upfamily:nnn { zhkai } { upzhserifit } { }
62 }

```

X₃TeX, LuaTeX For those use X₃TeX or LuaTeX.

```

63 {
64   \setCJKmainfont { LXGWNeoZhiSong }
65   [
66     Extension      = .ttf, AutoFakeBold,
67     ItalicFont     = LXGWWenKaiGBLite-Regular,
68     BoldItalicFont = LXGWZhenKaiGB-Regular.ttf,
69   ]
70   \setCJKsansfont { LXGWNeoXiHei }
71   [ Extension = .ttf, AutoFakeBold, AutoFakeSlant ]
72   \setCJKmonofont { LXGWZhuqueFangsong-Regular }
73   [ Extension = .ttf, AutoFakeBold, AutoFakeSlant ]
74   \setCJKfamilyfont { zhsong } { LXGWNeoZhiSong }
75   [ Extension = .ttf, AutoFakeBold, AutoFakeSlant ]
76   \setCJKfamilyfont { zhhei } { LXGWNeoXiHei }
77   [ Extension = .ttf, AutoFakeBold, AutoFakeSlant ]
78   \setCJKfamilyfont { zhfs } { LXGWZhuqueFangsong-Regular }
79   [ Extension = .ttf, AutoFakeBold, AutoFakeSlant ]
80   \setCJKfamilyfont { zhkai } { LXGWWenKaiGBLite-Regular }
81   [ Extension = .ttf, BoldFont      = LXGWZhenKaiGB-Regular,
82     SlantedFont    = LXGWWenKaiGBLite-Regular,
83     ItalicFont     = LXGWWenKaiGBLite-Regular,
84     BoldSlantedFont = LXGWZhenKaiGB-Regular,
85     BoldItalicFont = LXGWZhenKaiGB-Regular ]
86 }

```

```

\songti Shortcuts that same as those in the ctex-kit.
\heiti
\fangsong
\kaishu
87 \NewDocumentCommand \songti { } { \CJKfamily { zhsong } }
88 \NewDocumentCommand \heiti { } { \CJKfamily { zhhei } }
89 \NewDocumentCommand \fangsong { } { \CJKfamily { zhfs } }
90 \NewDocumentCommand \kaishu { } { \CJKfamily { zhkai } }

```

(End of definition for `\songti` and others. These functions are documented on page 1.)

End the optionlist fontset for l3docstrip.

```

91 \fontset

```

A.2 The ctex-spa-make.tex and the ctexpunct-lxgw.tex file

The .spa file of the corresponding font will be used for the CJKpunct package to achieve the punctuation compression, which can ensure the best typeset effect (under the pdfTeX engine). Run the following script, ctex-spa-make.tex, by executing

```
xetex ctex-spa-make
```

in the terminal. Then, one can obtain the ctexpunct-lxgw.tex file.

Implementation of the script Start the optionlist makespa for l3docstrip.

```
92 <*makespa>
```

Loading the macro file `ctex-spa-macro.tex` provided by ctex-kit.

```
93 \input ctex-spa-macro %
```

List all the CJK families with the corresponding font files in terms of “case-pairs”.

```
94 \MAKESPA {ctexpunct-lxgw.tex}
95 {
96   {lxgwwzhong}      {LXGWWNeoZhiSong} ,
97   {lxgwwzhongb}     {LXGWWNeoZhiSongScreen} ,
98   {lxgwwzhongh}     {LXGWWNeoXiHei} ,
99   {lxgwwzhonghb}    {LXGWWNeoXiHeiScreen} ,
100  {lxgwwzhongf}      {LXGWWZhuqueFangsong-Regular} ,
101  {lxgwwzhongkai}    {LXGWWenKaiGBLite-Regular} ,
102  {lxgwwzhongkaib}   {LXGWWZhenKaiGB-Regular} ,
103 }
```

End of the script.

```
104 \primitive\end
```

End the optionlist zhmap for l3docstrip.

```
105 </makespa>
```

```
106 <*lxgw-spa>
```

```
107 \ctexspadef{lxgwwzhong}{10,8,9,8,67,8,58,8,71,8,65,9,67,8,65,10,55,5,54,4,64,9,71,9,0,0,10,10}
108 \ctexspadef{lxgwwzhongb}{9,7,8,7,67,8,58,8,70,8,65,8,67,8,65,9,55,5,53,3,63,8,70,8,-0,-0,10,10}
109 \ctexspadef{lxgwwzhongh}{9,5,10,5,65,8,58,5,68,8,66,8,61,8,67,8,53,5,52,3,60,7,71,7,0,0,11,11,4}
110 \ctexspadef{lxgwwzhonghb}{9,5,9,5,64,8,57,5,68,8,65,7,61,8,67,8,53,5,52,3,60,6,70,6,0,0,11,11,4}
111 \ctexspadef{lxgwwzhongf}{3,2,3,2,60,8,60,5,65,16,62,17,63,18,59,17,60,13,49,12,60,6,69,8,0,0,11,11}
112 \ctexspadef{lxgwwzhongkai}{12,11,6,4,72,6,68,5,72,6,71,7,72,6,68,7,66,5,52,5,70,-1,72,4,0,0,12,12}
113 \ctexspadef{lxgwwzhongkaib}{6,8,6,8,71,4,64,5,71,5,70,6,71,5,67,6,65,4,47,4,62,3,66,3,-1,-1,10,10}
114 </lxgw-spa>
```

A.3 The `ctex-zhmap-lxgw.tex` file

Start the optionlist zhmap for l3docstrip.

```
115 <*zhmap>
```

Forked from the zhmap optionlist of `ctex.dtx`¹.

```
116 \begingroup\catcode61\catcode48\catcode32=10\relax%
117   \catcode 35=6 % #
118   \catcode 45=12 % -
119   \catcode123=1 % {
120   \catcode125=2 % }
121   \toks0{\endlinechar=\the\endlinechar\relax}%
122   \toks2{\endlinechar=-1}%
123   \def\x#1 #2 {%
124     \toks0\expandafter{\the\toks0 \catcode#1=\the\catcode#1\relax}%
125     \toks2\expandafter{\the\toks2 \catcode#1=#2}}%
126   \x 13 5 % carriage return
127   \x 32 10 % space
128   \x 35 6 % #
```

¹<https://github.com/CTeX-org/ctex-kit/blob/master/ctex/ctex.dtx>

```

129 \x 40 12 % (
130 \x 41 12 % )
131 \x 45 12 % -
132 \x 46 12 % .
133 \x 47 12 % /
134 \x 58 12 % :
135 \x 60 12 % <
136 \x 61 12 % =
137 \x 64 11 % @
138 \x 91 12 % [
139 \x 93 12 % ]
140 \x 123 1 % {
141 \x 125 2 % }
142 \edef\x#1{\endgroup%
143 \edef\noexpand#1{%
144 \the\toks0 %
145 \let\noexpand\noexpand\noexpand#1%
146 \noexpand\noexpand\noexpand\undefined%
147 \noexpand\noexpand\noexpand\endinput}%
148 \the\toks2}%
149 \expandafter\x\csname ctex@zhmap@endinput\endcsname
150 \begingroup\expandafter\endgroup
151 \expandafter\let\csname ifzhmappdf\expandafter\endcsname\csname
152 \expandafter\ifx\csname ifctexpdf\endcsname\relax
153 \expandafter\ifx\csname pdfoutput\endcsname\relax
154 \iffalse\else\ifnum\pdfoutput < 1 \iffalse\else \iftrue\fi\fi
155 \else ifctexpdf\fi
156 \endcsname
157 \begingroup
158 \expandafter\ifx\csname ProvidesFile\endcsname\relax
159 \long\def\x#1\ProvidesFile#2[#3]{%
160 #1%
161 \immediate\write-1{File: #2 #3}%
162 \expandafter\xdef\csname ver@#2\endcsname{#3}}
163 \expandafter\x%
164 \fi
165 \endgroup

```

Provides the identification information of the font map loader.

```

166 \ProvidesFile{ctex-zhmap-lxgw.tex}%
167 [2026-06-dd v1.522C lxgw font map loader for DVIPDFMx (CTEX)]

```

Font map loader for pdf_T_EX (generate PDF) is disabled since pdf_T_EX maps too slowly.

```

168 \ifzhmappdf

```

Configuration for pdf_T_EX (generate DVI).

```

169 \else

```

Configure the upright shape of `\songti`, `\kaishu`, `\heiti`, and `\fangsong` mapping for GBK encoding and UTF8 encoding.

```

170 \special{pdf:mapline gbk@UGBK@ UniGB-UTF16-H LXGWNeoZhiSong.ttf}
171 \special{pdf:mapline gbksong@UGBK@ UniGB-UTF16-H LXGWNeoZhiSong.ttf}
172 \special{pdf:mapline gbkkai@UGBK@ UniGB-UTF16-H LXGWenKaiGBLite-Regular.ttf}
173 \special{pdf:mapline gbkhei@UGBK@ UniGB-UTF16-H LXGWNeoXiHei.ttf}
174 \special{pdf:mapline gbkfs@UGBK@ UniGB-UTF16-H LXGWZhuqueFangsong-Regular.ttf}

```

```

175 \special{pdf:mapline cyberb@Unicode@ UniGB-UTF16-H LXGWNeoZhiSong.ttf}
176 \special{pdf:mapline unisong@Unicode@ UniGB-UTF16-H LXGWNeoZhiSong.ttf}
177 \special{pdf:mapline unikai@Unicode@ UniGB-UTF16-H LXGWWenKaiGBLite-Regular.ttf}
178 \special{pdf:mapline unihei@Unicode@ UniGB-UTF16-H LXGWNeoXiHei.ttf}
179 \special{pdf:mapline unifs@Unicode@ UniGB-UTF16-H LXGWZhuqueFangsong-Regular.ttf}

```

Similar for the (fake) slant shape, set the *Afine Transformation coefficient* to 0.167, which is the same as the default value of AutoFakeSlant in the xeCJK package.

```

180 \special{pdf:mapline gbksongsl@UGBK@ UniGB-UTF16-H LXGWNeoZhiSong.ttf -s .167}
181 \special{pdf:mapline gbkkaisl@UGBK@ UniGB-UTF16-H LXGWWenKaiGBLite-Regular.ttf -s .167}
182 \special{pdf:mapline gbkheisl@UGBK@ UniGB-UTF16-H LXGWNeoXiHei.ttf -s .167}
183 \special{pdf:mapline gbkfssl@UGBK@ UniGB-UTF16-H LXGWZhuqueFangsong-Regular.ttf -s .167}
184 \special{pdf:mapline unisongsl@Unicode@ UniGB-UTF16-H LXGWNeoZhiSong.ttf -s .167}
185 \special{pdf:mapline unikaisl@Unicode@ UniGB-UTF16-H LXGWWenKaiGBLite-Regular.ttf -s .167}
186 \special{pdf:mapline uniheisl@Unicode@ UniGB-UTF16-H LXGWNeoXiHei.ttf -s .167}
187 \special{pdf:mapline unifssl@Unicode@ UniGB-UTF16-H LXGWZhuqueFangsong-Regular.ttf -s .167}
188 \fi

```

End the optionlist zhmap for l3docstrip.

```

189 </zhmap>

```


Index

The italic numbers denote the pages where the corresponding entry is described, numbers underlined point to the definition, all others indicate the places where it is used.

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