Kp-fonts: OpenType version

Daniel Flipo

30th March 2023

This bundle provides OpenType versions of Type1 Kp-fonts designed by Christophe Caignaert. See `Kpfonts-Doc-English.pdf` for the full documentation of the original Type1 fonts.

It is usable only with LuaTeX or XeTeX engines; it consists of sixteen Text OpenType fonts, a Roman family **KpRoman** in eight shapes and weights —*Regular*, *Italic*, *Bold*, *BoldItalic*, *Light*, *LightItalic*, *Semibold*, *SemiboldItalic*—, a Sans-Serif family **KpSans** and a TypeWriter family **KpMono**, each of them in four shapes and weights—*Regular*, *Italic*, *Bold* and *BoldItalic*— and six maths OpenType fonts **KpMath-Regular**, **KpMath-Bold**, **KpMath-Light**, **KpMath-Semibold**, **KpMath-Sans** and **KpMath-SansBold**.

KpRoman and **KpSans** families have small caps available in two sizes (SmallCaps and PetiteCaps), upper and lowercase digits (0123456789), ancient ligatures ᴄᴛ, ſt and Q a long-tailed capital Q. Superior and inferior digits and letters have been added to the OpenType **KpRoman** and **KpSans** fonts for footnotes' calls and abbreviations 1ˢᵗ, 2ⁿᵈ…

The support of text fonts covers Latin and Latin Extended A (U+0020 to U+017F) but neither IPA nor Greek nor Cyrillic alphabets.

For all maths fonts, Latin and Greek letters are available in Upright and Italic shapes, in Bold and Regular weights: a β C Δ, *a β C Δ*, **a β C Δ**, ***a β C Δ***.

Blackboard Bold capitals are available in two shapes, Serif and Sans: `\mathbb{ABC}` prints either 𝔸𝔹ℂ (default) or 𝔸𝔹ℂ (option [`Style=bbsans`]) Commands `\mathcal{ABC}` and `\mathscr{ABC}` print respectively 𝒜ℬ𝒞 and 𝒜ℬ𝒞 while `\mathfrak{ABCabc}` prints 𝔄𝔅ℭabc.

File `unimath-kpfonts.pdf` shows the full list of Unicode maths symbols provided by Kp-fonts, compared with other common maths fonts. More symbols, specific to Kp-fonts, are listed in section 3.2.

A style file `kpfont-otf.sty` is provided to load Kp-fonts easily. It is derived from `kpfont.sty` but options differ.

Please beware of the *experimental* status of the current version (0.51).

All fonts are covered by OFL licence, style file and documentation are under LPPL-1.3 licence.

1 Loading `kpfonts-otf.sty`

For users of the original `kpfonts.sty` package, the easiest way to try the OpenType version is to load `kpfonts-otf.sty`:

`\usepackage[ `*options*` ]{kpfonts-otf}`

this loads `unicode-math`, `fontspec` and `realscripts`, and defines **KpRoman** (**Regular** or **Light** depending on options), **KpSans** and **KpMono** as Text fonts, **KpMath** (**Regular** or **Light** depending on options) as maths fonts.

`kpfonts-otf.sty` also defines all symbols available in `latexsym` and `amssymb` under the same names [1] and a bunch of Kp-fonts specifics symbols.

1.1 Global options for both text and maths

light: switches to *light* fonts, metrics are unchanged; *light* fonts might not look perfect on screen but they print fine.

Please compare *regular* (left) and *light* fonts (right):

Normal or light? Just a matter of taste. Normal or light? Just a matter of taste.
$E = mc^2$ $E = mc^2$

Normal or light? Just a matter of taste *Normal or light? Just a matter of taste*

Normal or light? Just a matter of taste **Normal or light? Just a matter of taste**

Normal or light? Just a matter of taste ***Normal or light? Just a matter of taste***

nomath: load neither `unicode-math` nor **KpMath** fonts; useful for documents without maths, or to choose other maths fonts.

notext: do not change any Text font, use the defaults.

nosf: do not change Sans-Serif Text fonts, use the defaults.

nott: do not change Typewriter Text fonts, use the defaults.

onlyrm: equivalent to the last two combined.

fulloldstyle: equivalent to options `oldstyle` and `oldstylemath`.

fulloldstylenums: equivalent to options `oldstylenums` and `oldstylenumsmath`.

1.2 Options for text fonts *only*

lighttext: switches to *light* Text fonts.

Two more weights are provided by `kpfonts-otf.sty`: with the *lighttext* (or *light*) option, *Semibold* and *Extrabold* vs *Light* and *Semibold* without it. These weights are available through `\ltseries`, `\sbseries` and `\ebseries` commands to be used in a group or alternatively through one argument commands `\textlt{}`, `\textsb{}` and `\texteb{}`.

`{\sbseries\itshape Foo}` or `\textsb{\textit{Foo}}` print *Foo*.

---

1. Unicode names often differ from AMS names.

oldstylenums: provides lowercase digits as a default.

> To get uppercase digits locally: {\addfontfeature{Numbers=Lining} 123}.
>
> Examples, upright, italic, bold and bolditalic:

— 0123456789 !

— *0123456789 !*

— **0123456789 !**

— ***0123456789 !***

oldstyle: provides lowercase digits as a default, long-tailed Q (Quebec) and (for Roman and Sans-Serif fonts only) old style ligatures 'ꜩ' and 'ſt'.

> Examples:

— Queſt for an attractive font!

— *Queſt for an attractive font!*

— **Queſt for an attractive font!**

— Qᴜᴇsᴛ ғᴏʀ ᴀɴ ᴀᴛᴛʀᴀᴄᴛɪᴠᴇ ғᴏɴᴛ!

— ***Queſt for an attractive font!***

— **Qᴜᴇsᴛ ғᴏʀ ᴀɴ ᴀᴛᴛʀᴀᴄᴛɪᴠᴇ ғᴏɴᴛ!**

veryoldstyle: same as option oldstyle but the round 's' is replaced by the long one 'ſ' unless it ends a word or is followed by *b, f* or *h* [2] and ancient ligatures fi, fl, ft are activated. Coding \textit{some of Highlands' mysterious castles…} will print *ſome of Highlandſ' myſteriouſ caſtleſ…* which is correct.

> The automatic substitution relies on the OpenType feature StylisticSet=12. A round 's' (resp. long 'ſ') can be forced by coding s= or \shorts{} (resp. f [3] or \longs{}).

largesmallcaps: prints larger Sᴍᴀʟʟ Cᴀᴘs than the default ones (Pᴇᴛɪᴛᴇ Cᴀᴘs).

altfligs : prints alternative shapes for ligatures fi, fl, ffi, ffl instead of fi, fl, ffi, ffl.

germandbls : \SS prints SS instead of ẞ (capital *Eszett*), ditto for small/petite caps.

eurosym : replaces the Euro character (€) by the official symbol (€) (available in regular, italic, bold and bolditalic).

harfbuzz : switches Renderer=Harfbuzz for HBLuaTeX engine; up to version 0.34, this renderer was silently activated but seldom useful.

1.3 Options for maths fonts *only*

lightmath: uses *light* maths fonts.

bbsans: command \mathbb prints Sans-Serif Blackboard Bold capitals with Serif fonts too: compare ℂ, 𝕂, ℕ, ℚ, ℝ, ℤ, with ℂ, 𝕂, ℕ, ℚ, ℝ, ℤ (default).

frenchstyle: Latin uppercase letters and all Greek letters are printed upright, only lowercase Latin letters are printed in italics; this follows the French typographic usage.

---

2. Rules found on [wikipedia](#).

3. On Unix systems the Compose key can be used: Compose f s.

oldstylenumsmath: prints lowercase digits in maths (default is uppercase).

narrowiints: prints condensed repeated integrals :

$$\iiint \text{ and } \iiiint \quad \text{ instead of } \quad \iiint \text{ and } \iiiint \text{ (default)}.$$

partialup: the \partial symbol is printed upright ∂ instead of ∂.

fancyReIm: commands \Re and \Im print $\mathcal{Re}$ and $\mathcal{Im}$ respectively instead of $\Re$ and $\Im$.

tight : horizontal spaces tightened in maths mode (same settings as fourier-otf).

noDcommand: do not define \D to avoid incompatibilities with other packages.

Please note that the **mathcal** option has been deleted: commands $\mathcal{ABC}$ and $\mathscr{ABC}$ now print $\mathcal{ABC}$ and $\mathscr{ABC}$ respectively when kpfonts-otf.sty is loaded.

2 Another way to load Kp-fonts

Loading Kp-fonts through kpfonts-otf.sty offers only a limited choice of options; the standard commands \setmainfont, \setsansfont, \setmonofont, \setmathfont offer much more flexibility.

On the other hand, kpfonts-otf.sty defines a lot of useful commands to access AMS and specific Kp-fonts symbols. Loading kpfonts-otf with the symbols option enables to get all these commands defined without loading any font:

\usepackage[symbols]{kpfonts-otf}

Please note that unicode-math [4] (and fontspec) *are loaded* by this procedure, no need to do it again, unless specific options are required, then unicode-math has to be loaded *before* kpfonts-otf, f.i.:

\usepackage[math-style=ISO,bold-style=upright]{unicode-math}
\usepackage[symbols]{kpfonts-otf}

Then, it is up to the user to load Kp-fonts with whatever option he/she likes using commands

\set...font{*font*}[*options*].

For documents requiring no maths fonts, loading fontspec and using the \set...font commands is enough, no need to load kpfonts-otf at all.

2.1 Options for Text fonts

Here are the options available for Text Kp-fonts:

Numbers=Lowercase to get lowercase digits 1,2,3 instead of 1,2,3; the default is
    Numbers=Lining.

---

4. A careful reading of both manuals unicode-math.pdf and fonspec.pdf (available in all TeX distributions) is required in order to take full advantage of these packages.

SmallCapsFeatures = {Letters=SmallCaps} the \textsc{} command will print larger Small Caps than the default Petite Caps.
The default setting [5], is **SmallCapsFeatures = {Letters=PetiteCaps}**.

Ligatures=TeX (default) ' !` ?` -- --- print respectively ' ¡ ¿ – —.

Ligatures=Common (default) automatic ligatures ff ffi ffl fi fl (plus s=).

StylisticSet=1 provides an alternative for glyphs ffi ffl fi fl (ff is unchanged).

Ligatures=Required : adds ft and tt ligatures.

Ligatures=Rare adds ct and st ligatures.

Style=Swash to get the long-tailed capital Q: Queen, also in small caps (both sizes): Queen and Queen.

Style=Historic replaces any instance of 's' by the long variant 'ſ'. It is still possible to get a round 's' coding it as 's='; this option should no longer be used, it is superseded by StylisticSet=12 below.

StylisticSet=12 has been described in option veryoldstyle p. 3: it operates a contextual substitution of round 's' by long 'ſ'. An alias Style=autolongs is available if kpfonts-otf.sty has been loaded.

Ligatures=Historic switches specific ligatures for the long f: fi, fl, ft.

StylisticSet=2 : \SS prints SS instead of ß (capital *Eszett*), ditto for small/petite caps.

StylisticSet=3 replaces the Euro character (€) by the official symbol (€) (available in regular, italics, bold and bolditalic).

Options may be are chosen for each font, say:

```
\setmonofont{KpMono}[Numbers=Lowercase,Style=Historic]
```

but can also be shared by different typefaces:

```
\defaultfontfeatures+[KpRoman,KpSans,KpMono]{Numbers=Lowercase}
\defaultfontfeatures+[KpRoman,KpSans]{%
 Ligatures = Rare,
 Style = Swash,
 SmallCapsFeatures = {Letters=PetiteCaps},
 }
\setmainfont{KpRoman}
\setsansfont{KpSans}
\setmonofont{KpMono}
```

Notes : 1. \setmonofont{KpMono}, \setsansfont{KpSans}, \setmainfont{KpRoman} rely on files KpMono.fontspec, KpSans.fontspec and KpRoman.fontspec installed by Kpfonts.

2. Note the + ending \defaultfontfeatures+ : options are *added*, not overwriting any other (including those of fontspec.cfg).

---

5. Changed in v0.37 to match the original kpfonts package.

3. Options can be gathered: `Ligatures={Rare,Historic}` (with braces) is equivalent to `Ligatures=Rare` and `Ligatures=Historic`.

4. These options can also be switched on and off *locally* using `\addfontfeatures` inside a group, f.i. to print lowercase digits 1234576890 with a font loaded with option `Numbers=Lining`:

```
{\addfontfeatures{Numbers=Lowercase}1234576890}
```

Actually, a shortcut is available in this case: `\oldstylenums{1234576890}`.

5. With the **KpRoman**, it is possible to define two more weights *Light* and *Semibold* borrowed from **KpLight**:

```
\newfontfamily\KpLight{KpLight}[<same options as KpRoman>]
\newcommand*{\ltseries}{\KpLight}
\newcommand*{\sbseries}{\KpLight\bfseries}
\DeclareTextFontCommand{\textlt}{\ltseries}
\DeclareTextFontCommand{\textsb}{\sbseries}
```

These weights are then available through `\ltseries`, `\sbseries` commands to be used in a group or alternatively through one argument commands `\textlt{}` and `\textsb{}`.

With the **KpLight**, weights *Semibold* and *Extrabold* can be defined similarly.

2.2 Options for maths fonts

The following options can be passed either to `unicode-math`[6] or to `\setmathfont{}`:

math-style = `ISO`, TeX (default), `french`, `upright`;

bold-style = `ISO`, TeX (default), `upright`;

partial = `upright` (default italic);

nabla = `italic` (default upright);

Seven 'Style Variants' are available with Kp-fonts, here are the first three:

Style=mathcal (+ss01) commands `\mathcal{}` and `\mathscr{}` print $\mathcal{ABC}$ instead of $\mathscr{ABC}$ (default), see note below;

Style=bbsans (+ss02) `\mathbb{}` prints Sans-Serif Blackboard bold capitals $\mathbb{ABC}$ for Serif maths fonts `KpMath-Regular` and `KpMath-light` instead of $\mathbb{ABC}$;

Style=narrowiints (+ss03) provides condensed repeated integrals: $\iiint$ instead of $\iiint$ (default).

Note: if you want commands `$\mathcal{ABC}$` and `$\mathscr{ABC}$` to print $\mathcal{ABC}$ and $\mathscr{ABC}$ respectively, you can use `unicode-math`'s option `range` this way:
`\setmathfont{KpMath-Regular}[`*options*`]`
`\setmathfont{KpMath-Regular}[range={cal,bfcal},StylisticSet=1]`
Both lines are mandatory: the first one loads **KpMath** as usual while the second one modifies `\mathcal{}` command's output.

---

6. See the manual `unicode-math.pdf`.

The next four tables present the other Style Variants available:

Table 1 – Style=leqslant (+ss04)

Command	Default	Variant
\leq	≤	⩽
\geq	≥	⩾
\nleq	≰	≰
\ngeq	≱	≱
\leqq	≦	⩽
\geqq	≧	⩾
\eqless	⋜	⩽
\eqgtr	⋝	⩾
\lesseqgtr	⋚	⩽
\gtreqless	⋛	⩾
\lesseqqgtr	⪋	⩽
\gtreqqless	⪌	⩾

Table 2 – Style=smaller (+ss05)

Command	Default	Variant
\mid	|	۱
\nmid	∤	∤
\parallel	‖	‖
\nparallel	∦	∦
\parallelslant	∥	∥
\nparallelslant	∦	∦

Table 3 – Style=subsetneq (+ss06)

Command	Default	Variant
\subsetneq	⊊	⊊
\supsetneq	⊋	⊋
\subsetneqq	⫋	⫋
\supsetneqq	⫌	⫌

Table 4 – Style=parallelslant (+ss07)

Command	Default	Variant
\parallel	‖	∥
\nparallel	∦	∦
\shortparallel	‖	∥
\nshortparallel	∦	∦

Example: switching styles 4 (leqslant) and 6 (subsetneq) can be achieved coding either
\setmathfont{KpMath-Regular.otf}[StylisticSet={4,6}]   or
\setmathfont{KpMath-Regular.otf}[Style={leqslant,subsetneq}]
but this second syntax is available only if kpfonts-otf.sty has been loaded (eventually with the symbols option).

Table shows the available 'Glyphs Variants':

Example: with \setmathfont{KpMath-Regular.otf}[CharacterVariant={3,6}] commands \epsilon and \phi print ε and φ instead of ϵ and ϕ. The same is true of course for all shapes and and weights (upright, bold, bolditalic, sans-derif, etc.): f.i. with math-syle=french, \epsilon and \phi print ε and φ (upright).

Note about \hbar: unicode-math defines \hbar as \hslash (U+210F) while amsmath provides two different glyphs (italic h with horizontal or diagonal stroke).
kpfonts-otf now follows unicode-math; the italic h with horizontal stroke can be printed using \hslash or \hbar together with character variant cv01 or with \mithbar (replacement for AMS' command \hbar).

Table 5 – Glyphs Variants

	Default	Variant	Command
cv00	$\Re$ I	$\mathfrak{Re}$ $\mathfrak{Im}$	\Re \Im
cv01	$\hbar$	$\hbar$	\hslash or \hbar
cv02	$\varnothing$	$\emptyset$	\emptyset
cv03	ϵ	ε	\epsilon
cv04	κ	$\varkappa$	\kappa
cv05	π	ϖ	\pi
cv06	ϕ	φ	\phi
cv07	ρ	ϱ	\rho
cv08	σ	ς	\sigma
cv09	θ	ϑ	\theta
cv10	Θ	Θ	\Theta

3 Specific commands defined in `kpfonts-otf.sty`

3.1 Integrals

Kp-fonts offers variants for integral symbols suitable for indefinite integrals, they are coded as `\varint`, `\variint`, `\variiint`, `\variiiint` and `\varidotsint`. Compare $\int f(t)\,dt$ and $\int f(t)\,dt$ and also

$$\int f(t)\,dt \qquad \text{and} \qquad \int f(t)\,dt$$

`\D{...}` prints an upright 'd' and improves kernings around the differential element: `\displaystyle\varint f(t)\D{t}` prints $\int f(t)\,\mathrm{d}t$.

3.2 Specific maths symbols

The next tables present symbols unavailable as Unicode characters, they are coded in Kp-fonts' private zone.

\mmapsto	$\mapsto$	\longmmapsto	$\longmapsto$
\mmapsfrom	$\mapsfrom$	\longmmapsfrom	$\longmapsfrom$
\Mmapsto	$\Mapsto$	\Longmmapsto	$\Longmapsto$
\Mmapsfrom	$\Mapsfrom$	\Longmmapsfrom	$\Longmapsfrom$
\leftrightdasharrow	$\leftrightarrow$	\leadsto	$\rightsquigarrow$

\boxright	$\boxright$	\boxleft	$\boxleft$
\circleright	$\circleright$	\circleleft	$\circleleft$
\Diamondright	$\Diamondright$	\Diamondleft	$\Diamondleft$
\boxdotright	$\boxdotright$	\boxdotleft	$\boxdotleft$
\circledotright	$\circledotright$	\circledotleft	$\circledotleft$
\Diamonddotright	$\Diamonddotright$	\Diamonddotleft	$\Diamonddotleft$

\boxRight	⊡⇒		\boxLeft	⇐□
\boxdotRight	⊡⇒		\boxdotLeft	⇐⊡
\DiamondRight	◇⇒		\DiamondLeft	⇐◇
\DiamonddotRight	◇⇒		\DiamonddotLeft	⇐◇

\multimapdot	⊸•		\multimapdotinv	•⊸
\multimapdotboth	•⊸•			
\multimapbothvert			\multimapdotbothvert	
\multimapdotbothAvert			\multimapdotbothBvert	

\capplus	⩌	\sqcupplus	⊎	\sqcapplus	⊞	
\parallelslant	∥	\colonsim	:∼	\colonapprox	:≈	
\parallelbackslant	∖∖	\Colonsim	::∼	\Colonapprox	::≈	
\eqqColon	=::	\Colondash	::–	\dashColon	–::	

\strictif	⥿	\strictfi	⥾	\strictiff	⥿⥾	
\circledvee	⊚	\circledwedge	⊚	\circledbar	⦶	
\openJoin	×	\opentimes	×	\VvDash	⊪	
\lambdaslash	ƛ	\lambdabar	ƛ	\Wr	≀≀	

\idotsint	∫⋯∫	∫⋯∫			
\ointclockwise	∮	∮	\varointctrclockwise	∮	∮
\oiintclockwise	∯	∯	\oiintctrclockwise	∯	∯
\varoiintclockwise	∯	∯	\varoiintctrclockwise	∯	∯
\oiiintclockwise	∰	∰	\oiiintctrclockwise	∰	∰
\varoiiintclockwise	∰	∰	\varoiiintctrclockwise	∰	∰
\sqiint	⨌	⨌	\sqiiint	⨌	⨌

The full list of Unicode symbols available with Kp-fonts is shown in file unimath-kpfonts.pdf.

3.3 Wide accents

— \wideoverbar and \mathunderbar [7]

$$\overline{x} \quad \overline{xy} \quad \overline{xyz} \quad \overline{A \cup B} \quad \overline{A \cup (B \cap C) \cup D} \quad \underline{m + n + p}$$

---

7. \overline and \underline are not font related, they are based on \rule.

— `\widehat` and `\widetilde`

$$\hat{x} \quad \widehat{xx} \quad \widehat{xxx} \quad \widehat{xxxx} \quad \widehat{xxxxx} \quad \widehat{xxxxxx} \quad \tilde{x} \quad \widetilde{xx} \quad \widetilde{xxx} \quad \widetilde{xxxx} \quad \widetilde{xxxxx} \quad \widetilde{xxxxxx}$$

— `\widecheck` and `\widebreve`

$$\check{x} \quad \widecheck{xxxx} \quad \widecheck{xxxxxx} \quad \breve{x} \quad \widebreve{xxxx} \quad \widebreve{xxxxxx}$$

— `\overparen` and `\underparen`

$$\overparen{x} \quad \overparen{xy} \quad \overparen{xyz} \quad \overset{\circ}{\overparen{A \cup B}} \quad \overset{\circ}{\overparen{A \cup (B \cap C) \cup D}} \quad \overset{2}{\overparen{x+y}} \quad \overset{26}{\overparen{a+b+...+z}}$$

$$\underparen{x} \quad \underparen{xz} \quad \underparen{xyz} \quad \underset{2}{\underparen{x+z}} \quad \underset{26}{\underparen{a+b+...+z}}$$

— `\overbrace` and `\underbrace`

$$\overbrace{a} \quad \overbrace{ab} \quad \overbrace{abc} \quad \overbrace{abcd} \quad \overbrace{abcde} \quad \overset{3}{\overbrace{a+b+c}} \quad \overset{26}{\overbrace{a+b+...+z}}$$

$$\underbrace{a} \quad \underbrace{ab} \quad \underbrace{abc} \quad \underbrace{abcd} \quad \underbrace{abcde} \quad \underset{3}{\underbrace{a+b+c}} \quad \underset{26}{\underbrace{a+b+...+z}}$$

— `\overrightarrow` and `\overleftarrow`

$$\vec{v} \quad \overrightarrow{M} \quad \overrightarrow{vv} \quad \overrightarrow{AB} \quad \overrightarrow{ABC} \quad \overrightarrow{ABCD} \quad \overrightarrow{ABCDEFGH}.$$

$$\overleftarrow{v} \quad \overleftarrow{M} \quad \overleftarrow{vv} \quad \overleftarrow{AB} \quad \overleftarrow{ABC} \quad \overleftarrow{ABCD} \quad \overleftarrow{ABCDEFGH}$$

— Enfin `\widearc` and `\widearcarrow` (or `\overrightarc`)

$$\widearc{AMB} \quad \widearcarrow{AMB}$$

3.4 Maths Versions

Different versions of the **KpMath** fonts may be defined in the document's preamble:
`\setmathfont{KpMath-Regular.otf}[version=base, ` *options* ` ]`
`\setmathfont{KpMath-Bold.otf}[version=bold, ` *options* ` ]`
`\setmathfont{KpMath-Semibold.otf}[version=semibold, ` *options* ` ]`
`\setmathfont{KpMath-Sans.otf}[version=sans, ` *options* ` ]`
`\setmathfont{KpMath-Light.otf}[version=light, ` *options* ` ]`
then, it is easy to switch from one version to another one with `\mathversion{`*name*`}`.

Example [8] :

```
\setmathfont{KpMath-Regular.otf}[Style=leqslant, CharacterVariant=3]
\setmathfont{KpMath-Bold.otf}[version=bold,
                 Style=leqslant, CharacterVariant=3]
\setmathfont{KpMath-Sans.otf}[version=sans,
                 Style=leqslant, CharacterVariant=3]
```

Here is the same equation in three versions, normal, bold and Sans-Serif:

$$\mathbb{E}_i(N_i) = \sum_{n \geq 1} P_i(N_i \geq n) = \frac{\varepsilon_i}{1 - \varepsilon_i} < +\infty$$

```
\mathversion{bold}
```

$$\mathbb{E}_i(N_i) = \sum_{n \geqslant 1} P_i(N_i \geqslant n) = \frac{\varepsilon_i}{1 - \varepsilon_i} < +\infty$$

```
\mathversion{sans}
```

$$\mathbb{E}_i(N_i) = \sum_{n \geqslant 1} P_i(N_i \geqslant n) = \frac{\varepsilon_i}{1 - \varepsilon_i} < +\infty$$

---

8. Option CharacterVariant=3 changes ϵ into ε.