The HEP-MATH-FONT package*

Extended Greek and sans-serif math

Jan Hajer†

2024/11/01

Abstract

The HEP-MATH-FONT package adjust the math fonts to be italic sans-serif if the document is sans-serif. Additionally Greek letters are redefined to be always italic and upright in math and text mode, respectively. Some math font macros are adjusted to give more consistently the naively expected results.

The package is loaded using `\usepackage{hep-math-font}`.

If the document `\familydefault` font is switched to the sansserif `\sfdefault` font the math font is adjusted accordingly using fonts compatible to latin modern (LM) and computer modern

`warning` (CM). In order to be able to easily switch large chucks of math from serif to sans-serif documents the meaning of `\mathrm` and `\mathsf` is adjusted in this case so that the first generates upright sans-serif math and the second serif math. This is is neither the literal meaning of the macros nor the best behaviour if a single large document is written in sans-serif. However, it simplifies working in an environment where one copies pieces of math between serif and sans-serif documents e.g. publications vs. talks and funding applications.

Using the FIXMATH [1] and TEXTALPHA [2] packages Greek letter are adjusted so that they are always italic and upright in math and text mode, respectively. Greek letters can be written by using their unicode characters, with code following the ALPHABETA package [3].

`symbols` The `symbols=`⟨*family*⟩ class option sets the family of the symbol fonts. `symbols=ams` loads the two $\mathcal{A}_{\mathcal{M}}\mathcal{S}$ fonts [4] and the BM bold fonts. The default `symbols=true` replaces additionally the blackboard font with the DSFONT [5]. `symbols=minion` switches the symbol fonts to the Adobe MinionPro companion font from the MNSYMBOL package [6]. `symbols=false` deactivates loading any additional symbol fonts, effectively restricting the package to only switch the math font according to the sans-serif property of the main text.

1 Macros

`\text` `\mathrm` The `\mathrm{`⟨*math*⟩`}` macro and the `\text{`⟨*text*⟩`}` macro from AMSTEXT [7] are adjusted to produce upright Greek letters, i.e. (AbΓδ**AbΓδ**), by adjusting the code from the ALPHABETA [3] package.

`\mathbf` Bold math, via `\mathbf` is improved with the BM package [8], i.e. ($Ab\Gamma\delta\boldsymbol{Ab\Gamma\delta}$). Macros switching to `bfseries` such as `\section{`⟨*text*⟩`}` are ensured to also typeset math in bold.

`\mathsf` The math sans-serif alphabet is redefined to be italic sans-serif if the main text is serif and italic

*This document corresponds to HEP-MATH-FONT v1.3.

†jan.hajer@tecnico.ulisboa.pt

serif if the main text is sans-serif, i.e. ($Ab\Gamma\delta\mathbf{Ab\Gamma\delta}$). Ensuring that the distinction between these fonts is also kept if the (sans-)serif option of the document is switched.

`\mathscr` The `\mathcal` font i.e. ($\mathcal{ABCD}$) is accompanied by the `\mathscr` font i.e. ($\mathscr{ABCD}$).

`\mathbb` The `\mathbb` font is improved by the DOUBLESTROKE package [5] and adjusted depending on the (sans-)serif option of the document i.e. ($\mathbb{Ah1}$).

`\mathtt` The `\mathtt` macro switches to LM typewriter font i.e. (`AbΓAbΓ`).

`\mathfrak` Finally, the `\mathfrak` font is also available i.e. ($\mathfrak{Aa}\mathfrak{Bb12}$).

Details about the font handling in TEX can be found in reference [9].

2 Math alphabet allocation

Of the 16 available math alphabets, TEX loads four by default

0) **OT1** Text (latin, upper case greek, numerals, text symbols)

   The text font 0) of CM is **cmr10** `\OT1/cmr/m/n/10`, which is replaced by LM to be **rm-lmr10** `\OT1/lmr/m/n/10`, the `sansserif` option uses **rm-lmss10** `\OT1/lmss/m/n/10`.

1) **OML** Math Italic (latin, greek, numerals, text symbols)

   The italic math font 1) of CM is **cmmi10** `\OML/cmm/m/it/10`, and is replaced by LM to be **lmmi10** `\OML/lmm/m/it/10`, the `sansserif` options uses **cmssmi10** `\OML/cmssrm/m/it/10` from the SANSMATHFONTS package [10].

2) **OMS** Symbol (`\mathcal`, operators)

   The symbol font 2) of CM is **cmsy10** `\OMS/cmsy/m/n/10`, and is replaced by LM to be **lmsy10** `\OMS/lmsy/m/n/10`, the `sansserif` options uses **cmsssy10** `\OMS/cmsssy/m/n/10` from the SANSMATHFONTS package [10].

3) **OMX** Math Extension (big operators, delimiters)

   The extension font 3) of CM is **cmex10** `\OMX/cmex/m/n/5`, and is replaced by the EXSCALE package [11] to be **cmex10** `\OMX/cmex/m/n/10`, the `sansserif` option loads **cmssex10** `\OMX/cmssex/m/n/10`.

The AMSSYMB (AMSFONTS) packages [12] load two more symbol fonts

4) **msam10** `\U/msa/m/n/10` AMS symbol font A (special math operators)

5) **msbm10** `\U/msb/m/n/10` AMS symbol font B (`\mathbb`, negated operators)

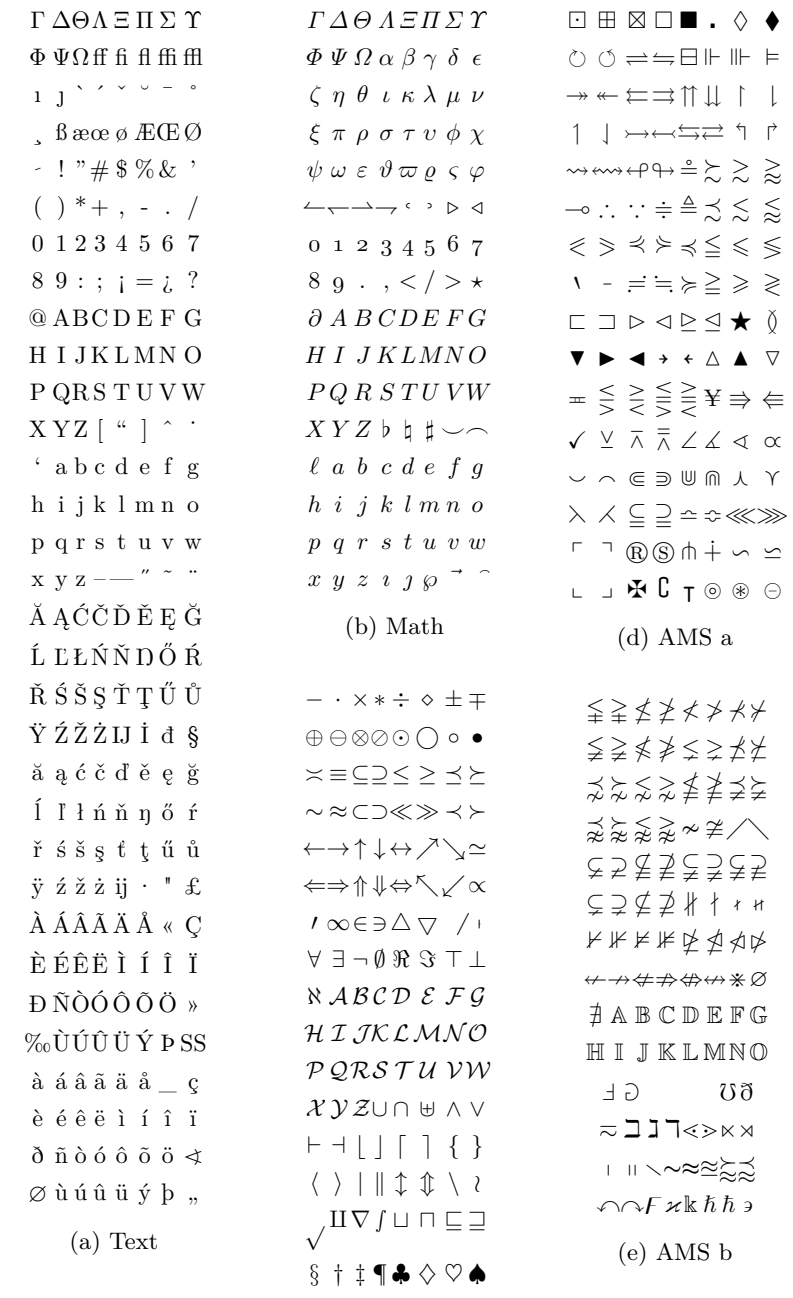
The `sansserif` option replaces them with **ssmsam10** `\U/ssmsa/m/n/10` and **ssmsbm10** `\U/ssmsb/m/n/10` from the SANSMATHFONTS package [10], respectively.

The BM package [8] loads the bold version for the fonts 0) to 2).

Other math alphabets are only loaded on demand, e.g. `\mathsf` uses a sans-serif font and `\mathbf` without the BM package uses a bold font. The `\mathscr` macro uses the script font from the MATHRSFS package [13]

9) **rsfs10** `\U/rsfs/m/n/10` Math script font (capital letters)

The `\mathbb` macro loads the double stroke font from the DSFONT package [5], this can be prevented with the `symbols=ams` option.



(a) Text

(b) Math

(c) Symbol

(d) AMS a

(e) AMS b

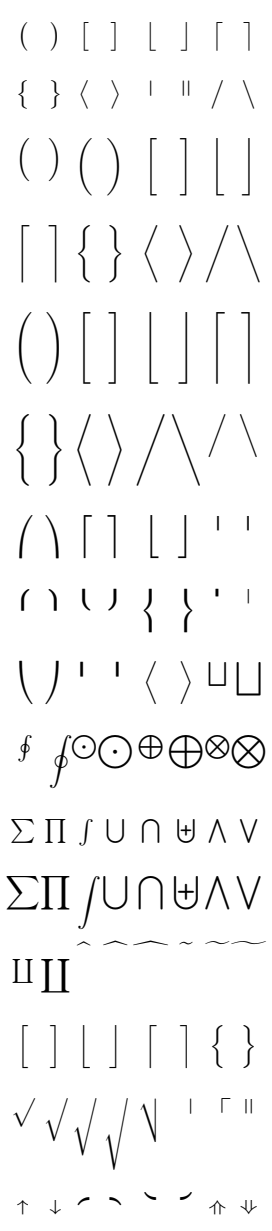
(f) Euler fraktur

(g) Euler caligraphy

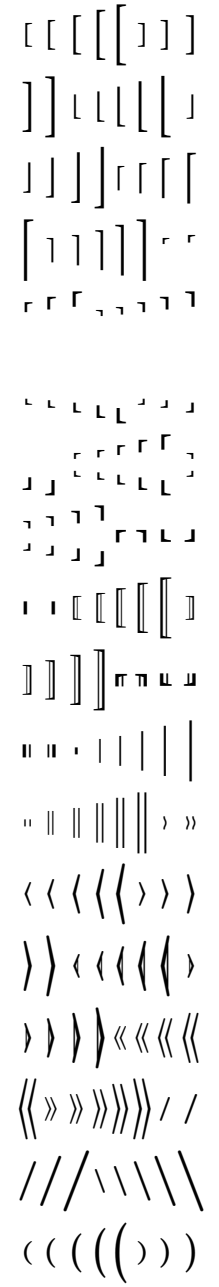
(h) Minion caligraphy

(i) Doublestroke

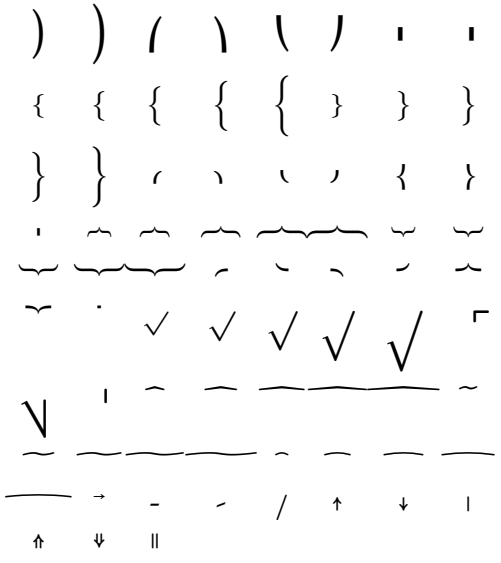
Figure 1: Basic math fonts



(a) Computer modern

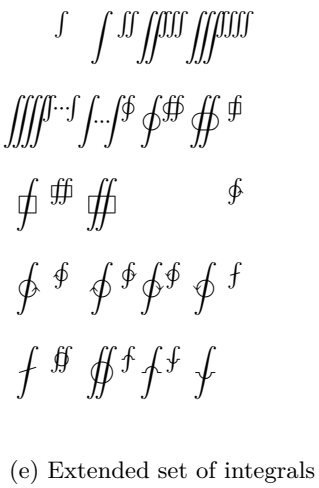


(b) Mn Symbol E 1



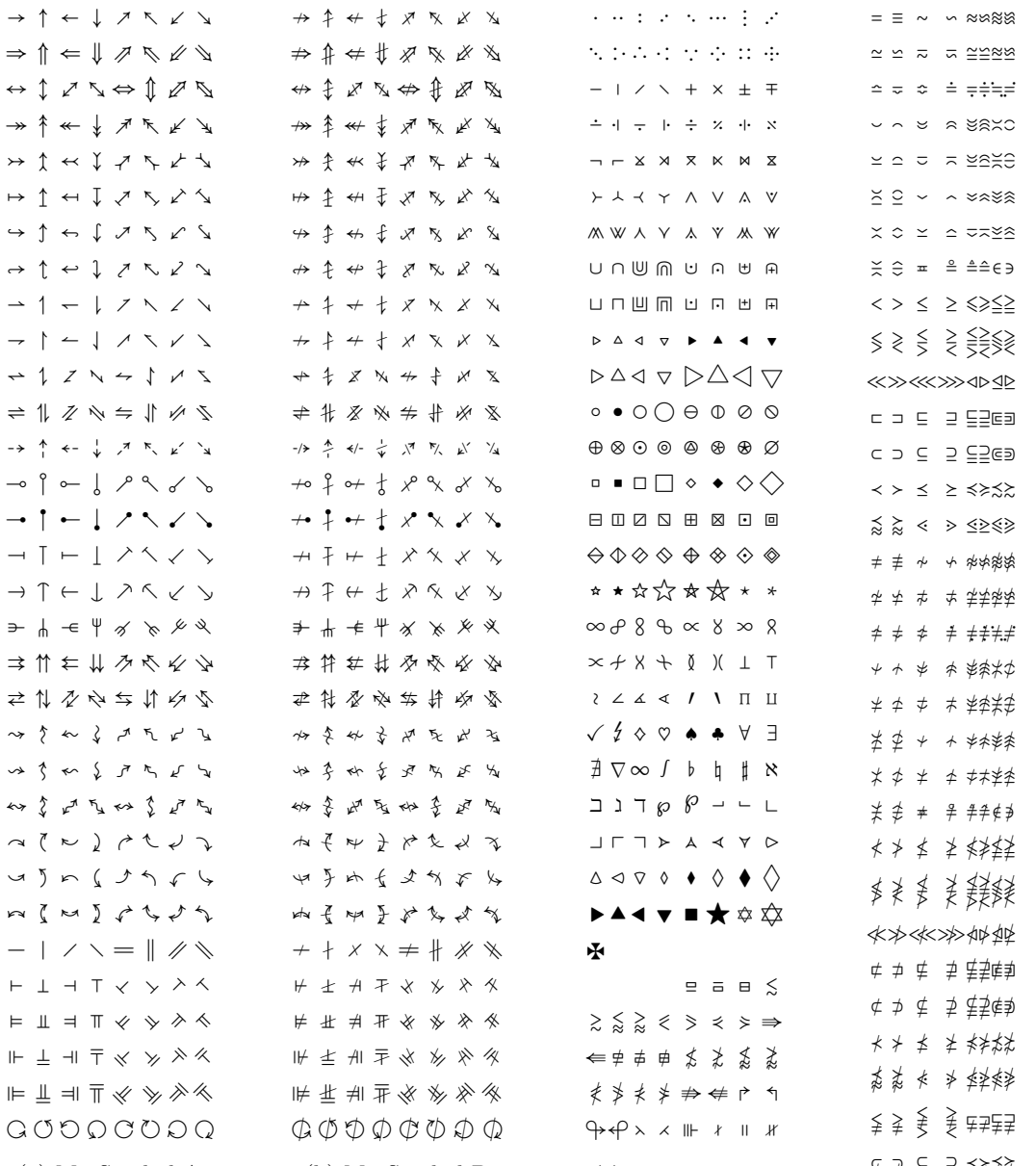
(c) Mn Symbol E 2

(d) Mn Symbols F



(e) Extended set of integrals

Figure 2: Math extension fonts



(a) Mn Symbol A (b) Mn Symbol B (c) Mn Symbol C (d) Mn Symbol D

Figure 3: Minion symbol fonts

10) **dsrom10** `\U/dsrom/m/n/10` Double stroke font

The `\mathfrak` macro loads the fractur font from the AMSSYMB package [12]

11) **eufm10** `\U/euf/m/n/10` Math fraktur (Basic Latin)

The HEP-MATH-FONT package uses nine of the available 16 math alphabets. This number can be reduced by three using `\newcommand{\bmmax}{0}` from the BM package [8] and brought down to the default of four with the option `symbols=false`.

The `symbols=minion` options replaces the fonts 2) to 5) with corresponding fonts from the MnSymbol package [6]. Additionally, two more symbol alphabets are allocated, the BM package [8] loads one more font and now `\mathcal` triggers the use of one additional alphabet. Hence, the minion option uses three to four more math alphabets than a usual setup.

A Implementation

<*package>

Use the KVOPTIONS package [14].

```
\RequirePackage{kvoptions}
\SetupKeyvalOptions{
  family=hepmathfont,
  prefix=hepmathfont@
}
```

`symbols` Provide the `symbols` option allowing to switch the symbol font.

```
\DeclareStringOption[true]{symbols}
\ProcessKeyvalOptions*
```

`\ifxetexorluatex` Load the IFLUATEX [15] and IFXETEX [16] packages. Define the `\ifxetexorluatex` conditional checking if the package is executed by LuaLaTeX or XeLaTeX.

```
\RequirePackage{ifluatex}
\RequirePackage{ifxetex}
\newif\ifxetexorluatex
\ifxetex\xetexorluatextrue
\else\ifluatex\xetexorluatextrue
  \else\xetexorluatexfalse\fi
\fi
```

Define conditionals based on the `symbols` package option using the PDFTEXCMDS package [17].

```
\RequirePackage{pdftexcmds}
\newif\ifhepmathfont@symbols
\ifnum
  \pdf@strcmp{\hepmathfont@symbols}{false}=0
\else
  \hepmathfont@symbolstrue
\fi
\newif\ifhep@ams
```

```
\ifnum\pdf@strcmp{\hepmathfont@symbols}{ams}=0 \hep@amstrue\fi
\newif\ifhep@minion
\ifnum\pdf@strcmp{\hepmathfont@symbols}{minion}=0 \hep@miniontrue\fi
```

A.1 Sans serif

Check if document is set to sans-serif using the xstring package [18].

```
\newif\ifhepmathfont@serif
\RequirePackage{xstring}
\IfStrEq{\familydefault}{\sfdefault}{%
  \hepmathfont@seriffalse}{\hepmathfont@seriftrue%
}
```

If the `sansserif` package option is active use code adjusted from the sansmathfonts package [10]. Ensure that `\mathsf` is italic as well as sans-serif and sans for sans and sans-serif documents, respectively.

```
\ifhepmathfont@serif
```

`\mathsf` Declare `\mathsf` for serif documents.

```
  \newcommand\hep@font@sf{cmssm}
  \DeclareMathAlphabet{\mathsf}{OML}{\hep@font@sf}{m}{it}
  \SetMathAlphabet{\mathsf}{bold}{OML}{\hep@font@sf}{b}{it}
  \newcommand\hep@textfont@sf{lmss}
  \DeclareMathAlphabet{\mathsftext}{OT1}{\hep@textfont@sf}{m}{n}
  \SetMathAlphabet{\mathsftext}{bold}{OT1}{\hep@textfont@sf}{bx}{n}
```

Define fonts for sans-serif documents.

```
\else
  \newcommand\hep@font@sf{lmr}
  \newcommand\hep@font@text{lmss}
  \newcommand\hep@font@math{cmssm}
  \newcommand\hep@font@symbol{cmsssy}
  \newcommand\hep@font@extra{cmssex}
```

Declare font substitutions.

```
  \DeclareFontSubstitution{OML}{\hep@font@math}{m}{it}
  \ifhepmathfont@symbols\ifhep@minion\else
    \DeclareFontSubstitution{OMS}{\hep@font@symbol}{m}{n}
    \DeclareFontSubstitution{OMX}{\hep@font@extra}{m}{n}
  \fi\fi
```

Declare the symbol fonts.

```
  \DeclareSymbolFont{operators}{OT1}{\hep@font@text}{m}{n}
  \DeclareSymbolFont{letters}{OML}{\hep@font@math}{m}{it}
  \ifhepmathfont@symbols\ifhep@minion\else
    \DeclareSymbolFont{symbols}{OMS}{\hep@font@symbol}{m}{n}
    \DeclareSymbolFont{largesymbols}{OMX}{\hep@font@extra}{m}{n}
  \fi\fi
```

Set bold symbol fonts.

```
\SetSymbolFont{operators}{bold}{OT1}{\hep@font@text}{b}{n}
\SetSymbolFont{letters}{bold}{OML}{\hep@font@math}{b}{it}
\ifhepmathfont@symbols\ifhep@minion\else
  \SetSymbolFont{symbols}{bold}{OMS}{\hep@font@symbol}{b}{n}
\fi\fi
```

Adjust the fonts loaded by the AMSFONTS [4] and ESINT [19] packages.

```
\ifhepmathfont@symbols\ifhep@minion\else
  \DeclareSymbolFont{AMSa}{U}{ssmsa}{m}{n}
  \DeclareSymbolFont{AMSb}{U}{ssmsb}{m}{n}
\fi\fi
\AtBeginDocument{%
  \@ifpackageloaded{esint}{%
    \DeclareSymbolFont{largesymbolsA}{U}{ssesint}{m}{n}
}{}
}
```

`\mathrm` `\mathnormal` `\mathcal` Declare the symbol font alphabets.

```
\DeclareSymbolFontAlphabet{\mathrm}{operators}
\DeclareSymbolFontAlphabet{\mathnormal}{letters}
\ifhep@minion\else
  \DeclareSymbolFontAlphabet{\mathcal}{symbols}
\fi
```

`\mathit` Declare `\mathit`.

```
\DeclareMathAlphabet{\mathit}{OML}{\hep@font@text}{m}{it}
\SetMathAlphabet\mathit{bold}{OML}{\hep@font@text}{bx}{it}
```

`\mathsf` Declare `\mathsf` for sans-serif documents to produce serif.

```
\DeclareMathAlphabet{\mathsf}{OML}{\hep@font@sf}{m}{it}
\SetMathAlphabet{\mathsf}{bold}{OML}{\hep@font@sf}{bx}{it}
```

End of `sansserif`.

```
\fi
```

A.2 Greek letters

Load the FIXMATH [1] and TEXTALPHA [2] packages ensuring that upper Greek letters in math mode are italic and providing upright Greek letters in text mode, respectively. Define the `hep@greek` macro ensuring that both `\text` and `\mathrm` produce upright Greek letters using the AMSSYMB [12] and AMSTEXT [7] packages.

```
\ifhepmathfont@symbols
  \RequirePackage{amssymb}
  \RequirePackage{amstext}
  \RequirePackage{fixmath}
```

```
\RequirePackage{textalpha}
\def\hep@Greek#1#2#3{
  \protected\def#1{\TextOrMath{#3}{\ifnum\fam=0 \text{#3}\else#2\fi}}%
}
\def\hep@greek#1#2#3{\let#2=#1\hep@Greek#1#2#3}
```

The following code follows closely the ALPHABETA package [3].

A.2.1 Commands to access Greek letters by name

For letters defined in math mode, the commands work in both, text and math. Some Greek letters look identical to Latin letters and can therefore not be used as variable symbols in math formulas. These letters are not defined in TEX's math mode, we provide an alias to the corrsponding `\text...` command.

Mathematical notation distinguishes 'variant shape symbols' for π, φ, ϱ, ϑ (small and capital), β, and $\varkappa$ (characters for the latter three symbols are not included in TEX's math fonts). These variations have no syntactic meaning in Greek text and are not given code-points in the local Greek (LGR) encoding while Unicode defines separate code points for the symbol variants.

A.2.2 Greek Alphabet

Macros keep their meaning in mathematical mode (i.e. use the same shape as without this package) and refer to `greek letter ...` in text. For `\epsilon` and `\phi`, this means that the selected symbol variant differs in text vs. math mode. Use `\varepsilon` and `\varphi` (see section 'variant shape symbols' below) to select the `greek letter ...` in both, text and math mode.

```
\providecommand*{\Alpha}{\textAlpha} % A
\providecommand*{\Beta}{\textBeta} % B
\hep@greek\Gamma\mathGamma\textGamma % Γ
\hep@greek\Delta\mathDelta\textDelta % Δ
\providecommand*{\Epsilon}{\textEpsilon} % E
\providecommand*{\Zeta}{\textZeta} % Z
\providecommand*{\Eta}{\textEta} % H
\hep@greek\Theta\mathTheta\textTheta % Θ
\providecommand*{\Iota}{\textIota} % I
\providecommand*{\Kappa}{\textKappa} % K
\hep@greek\Lambda\mathLambda\textLambda % Λ
\providecommand*{\Mu}{\textMu} % M
\providecommand*{\Nu}{\textNu} % N
\hep@greek\Xi\mathXi\textXi % Ξ
\providecommand*{\Omicron}{\textOmicron} % O
\hep@greek\Pi\mathPi\textPi % Π
\providecommand*{\Rho}{\textRho} % P
\hep@greek\Sigma\mathSigma\textSigma % Σ
\providecommand*{\Tau}{\textTau} % T
\hep@greek\Upsilon\mathUpsilon\textUpsilon % Υ
\hep@greek\Phi\mathPhi\textPhi % Φ
\providecommand*{\Chi}{\textChi} % X
\hep@greek\Psi\mathPsi\textPsi % Ψ
\hep@greek\Omega\mathOmega\textOmega % Ω
```

Apply to minuscule Greek letters.

```
\hep@greek\alpha\mathalpha\textalpha % α
\hep@greek\beta\mathbeta\textbeta % β
\hep@greek\gamma\mathgamma\textgamma % γ
\hep@greek\delta\mathdelta\textdelta % δ
\hep@greek\epsilon\mathepsilon\textepsilon % ε
\hep@greek\zeta\mathzeta\textzeta % ζ
\hep@greek\eta\matheta\texteta % η
\hep@greek\theta\maththeta\texttheta % ϑ
\hep@greek\iota\mathiota\textiota % ι
\hep@greek\kappa\mathkappa\textkappa % ϰ
\hep@greek\lambda\mathlambda\textlambda % λ
\hep@greek\mu\mathmu\textmu % μ
\hep@greek\nu\mathnu\textnu % ν
\hep@greek\xi\mathxi\textxi % ξ
\providecommand*{\omicron}{\textomicron} % ο
\hep@greek\pi\mathpi\textpi % π
\hep@greek\rho\mathrho\textrho % ρ
\hep@greek\sigma\mathsigma\textsigma % σ
\hep@greek\varsigma\mathvarsigma\textvarsigma % ς
\providecommand*{\finalsigma}{\varsigma} % ς
\hep@greek\tau\mathtau\texttau % τ
\hep@greek\upsilon\mathupsilon\textupsilon % υ
\hep@greek\phi\mathphi\textphi % φ
\hep@greek\chi\mathchi\textchi % χ
\hep@greek\psi\mathpsi\textpsi % ψ
\hep@greek\omega\mathomega\textomega % ω
```

Archaic letters ς

```
\hep@greek\digamma\mathdigamma\textdigamma % ϝ
\providecommand*{\Digamma}{\textDigamma} % F
\providecommand*{\stigma}{\textstigma} % ϛ
\providecommand*{\varstigma}{\textvarstigma} % ϛ stigma variant (CB.enc, teubner) not in
\providecommand*{\koppa}{\textkoppa} % ϟ (greek small letter koppa)
\providecommand*{\Koppa}{\textKoppa} % ϟ (greek letter koppa)
```

babel-greek defines `\qoppa` as alias for ϟ (`\textkoppa`)!

```
\def\qoppa{\textqoppa} % ϙ (archaic koppa)
\providecommand*{\Qoppa}{\textQoppa} % Ϙ (archaic Koppa)
\providecommand*{\Stigma}{\textStigma} % Ϛ (in some fonts CT ligature)
\providecommand*{\Sampi}{\textSampi} % Ϡ
\providecommand*{\sampi}{\textsampi} % ϡ
```

A.2.3 Variant shape symbols

TEX's concept of 'standard' vs. 'variant' math symbols does not map to the distinction between `greek letter ...` vs. `greek ... symbol` in the Unicode standard (see `test-tuenc-greek.pdf`).

The `\...symbol` macros select the `greek ... symbol` in both, text and math mode. For `\epsilonsymbol` and `\phisymbol` this is the default shape in math mode. The `\var...` macros

select the shape used by TEX math (or, if not supported, the `symbol` shape)

`...symbol == var...` Does not work 8-bit

```
\hep@greek\varpi\mathvarpi\textpisymbol %
\providecommand*{\pisymbol}{\varpi} %
\hep@greek\varrho\mathvarrho\textrhosymbol %
\hep@greek\rhosymbol\mathvarrho\textrhosymbol %
\hep@greek\vartheta\mathvartheta\textthetasymbol %
\providecommand*{\thetasymbol}{\vartheta} %
```

`...symbol != var...` Does not work 8-bit

```
\hep@greek\varepsilon\mathvarepsilon\textepsilon %
\hep@Greek\epsilonsymbol\mathepsilon\textepsilonsymbol %
\hep@greek\varphi\mathvarphi\textphi %
\hep@Greek\phisymbol\mathphi\textphisymbol %
```

only text (in standard 8-bit TEX, may be defined with additional packages):

```
\ifdefined\varbeta
  \hep@greek\varbeta\mathvarbeta\textbetasymbol %
\else
  \providecommand*{\varbeta}{\textbetasymbol} %
\fi
\providecommand*{\betasymbol}{\varbeta}
\ifdefined\varkappa
  \hep@greek\varkappa\mathvarkappa\textkappasymbol
\else
  \providecommand*{\varkappa}{\textkappasymbol}
\fi
\providecommand*{\kappasymbol}{\varkappa}
```

`\Theta/\varTheta` are not a symbol variants but upright/italic shape of Theta

```
\providecommand*{\Thetasymbol}{\textThetasymbol}
```

A.2.4 TextCompositeCommands for the letter-name macros

The new font selection scheme TextComposite mechanism looks for the next token without expanding it. In order to let compositions like `\ensuregreek{\'\Alpha}` or `\ensuregreek{\>''\alpha}` work as expected we define TextComposites with the 'letter name commands'.

TextCompositeCommands are always specific for the font-encoding. Documents may use TEX Unicode (TU), LGR, and PDF Unicode (PU) in parallel. We define auxiliary commands with definitions that are required by more than one font encoding.

Select pre-composed characters Required by LGR and PU.

`a@select@precomposed` With TU, most pre-composed characters are selected by the the engine. (Actually by the 'Harfbuzz' renderer which is default for XHTEX and can be selected with fontspec for LuaTEX).

```
\newcommand*{\alphabeta@select@precomposed}[1]{
```

Minuscule letters.

```
\DeclareTextCompositeCommand{\accvaria}{#1}{\alpha}{\accvaria\textalpha}
\DeclareTextCompositeCommand{\accdasia}{#1}{\alpha}{\accdasia\textalpha}
\DeclareTextCompositeCommand{\accpsili}{#1}{\alpha}{\accpsili\textalpha}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\alpha}{\accdasiavaria\textalpha}
\DeclareTextCompositeCommand{\acctonos}{#1}{\alpha}{\acctonos\textalpha}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\alpha}{\accdasiaoxia\textalpha}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\alpha}{\accpsilioxia\textalpha}
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\alpha}{\accpsilivaria\textalpha}
\DeclareTextCompositeCommand{\accperispomeni}{#1}{\alpha}{\accperispomeni\textalpha}
\DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\alpha}{\accdasiaperispomeni\text
\DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\alpha}{\accpsiliperispomeni\text
\DeclareTextCompositeCommand{\accvaria}{#1}{\eta}{\accvaria\texteta}
\DeclareTextCompositeCommand{\accdasia}{#1}{\eta}{\accdasia\texteta}
\DeclareTextCompositeCommand{\accpsili}{#1}{\eta}{\accpsili\texteta}
\DeclareTextCompositeCommand{\acctonos}{#1}{\eta}{\acctonos\texteta}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\eta}{\accdasiaoxia\texteta}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\eta}{\accpsilioxia\texteta}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\eta}{\accdasiavaria\texteta}
\DeclareTextCompositeCommand{\accperispomeni}{#1}{\eta}{\accperispomeni\texteta}
\DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\eta}{\accdasiaperispomeni\textet
\DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\eta}{\accpsiliperispomeni\textet
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\eta}{\accpsilivaria\texteta}
\DeclareTextCompositeCommand{\accvaria}{#1}{\omega}{\accvaria\textomega}
\DeclareTextCompositeCommand{\accdasia}{#1}{\omega}{\accdasia\textomega}
\DeclareTextCompositeCommand{\accpsili}{#1}{\omega}{\accpsili\textomega}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\omega}{\accdasiavaria\textomega}
\DeclareTextCompositeCommand{\acctonos}{#1}{\omega}{\acctonos\textomega}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\omega}{\accdasiaoxia\textomega}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\omega}{\accpsilioxia\textomega}
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\omega}{\accpsilivaria\textomega}
\DeclareTextCompositeCommand{\accperispomeni}{#1}{\omega}{\accperispomeni\textomega}
\DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\omega}{\accdasiaperispomeni\text
\DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\omega}{\accpsiliperispomeni\text
\DeclareTextCompositeCommand{\accvaria}{#1}{\iota}{\accvaria\textiota}
\DeclareTextCompositeCommand{\accdasia}{#1}{\iota}{\accdasia\textiota}
\DeclareTextCompositeCommand{\accpsili}{#1}{\iota}{\accpsili\textiota}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\iota}{\accdasiavaria\textiota}
\DeclareTextCompositeCommand{\acctonos}{#1}{\iota}{\acctonos\textiota}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\iota}{\accdasiaoxia\textiota}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\iota}{\accpsilioxia\textiota}
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\iota}{\accpsilivaria\textiota}
\DeclareTextCompositeCommand{\accperispomeni}{#1}{\iota}{\accperispomeni\textiota}
\DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\iota}{\accdasiaperispomeni\texti
\DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\iota}{\accpsiliperispomeni\texti
\DeclareTextCompositeCommand{\accdialytika}{#1}{\iota}{\accdialytika\textiota}
\DeclareTextCompositeCommand{\accdialytikavaria}{#1}{\iota}{\accdialytikavaria\textiota}
\DeclareTextCompositeCommand{\accdialytikatonos}{#1}{\iota}{\accdialytikatonos\textiota}
\DeclareTextCompositeCommand{\accdialytikaperispomeni}{#1}{\iota}{\accdialytikaperispome
\DeclareTextCompositeCommand{\accvaria}{#1}{\upsilon}{\accvaria\textupsilon}
```

```
\DeclareTextCompositeCommand{\accdasia}{#1}{\upsilon}{\accdasia\textupsilon}
\DeclareTextCompositeCommand{\accpsili}{#1}{\upsilon}{\accpsili\textupsilon}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\upsilon}{\accdasiavaria\textupsilon}
\DeclareTextCompositeCommand{\acctonos}{#1}{\upsilon}{\acctonos\textupsilon}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\upsilon}{\accdasiaoxia\textupsilon}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\upsilon}{\accpsilioxia\textupsilon}
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\upsilon}{\accpsilivaria\textupsilon}
\DeclareTextCompositeCommand{\accperispomeni}{#1}{\upsilon}{\accperispomeni\textupsilon}
\DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\upsilon}{\accdasiaperispomeni\te
\DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\upsilon}{\accpsiliperispomeni\te
\DeclareTextCompositeCommand{\accdialytika}{#1}{\upsilon}{\accdialytika\textupsilon}
\DeclareTextCompositeCommand{\accdialytikavaria}{#1}{\upsilon}{\accdialytikavaria\textup
\DeclareTextCompositeCommand{\accdialytikatonos}{#1}{\upsilon}{\accdialytikatonos\textup
\DeclareTextCompositeCommand{\accdialytikaperispomeni}{#1}{\upsilon}{\accdialytikaperisp
\DeclareTextCompositeCommand{\accvaria}{#1}{\epsilon}{\accvaria\textepsilon}
\DeclareTextCompositeCommand{\accdasia}{#1}{\epsilon}{\accdasia\textepsilon}
\DeclareTextCompositeCommand{\accpsili}{#1}{\epsilon}{\accpsili\textepsilon}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\epsilon}{\accdasiavaria\textepsilon}
\DeclareTextCompositeCommand{\acctonos}{#1}{\epsilon}{\acctonos\textepsilon}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\epsilon}{\accdasiaoxia\textepsilon}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\epsilon}{\accpsilioxia\textepsilon}
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\epsilon}{\accpsilivaria\textepsilon}
\DeclareTextCompositeCommand{\accvaria}{#1}{\omicron}{\accvaria\textomicron}
\DeclareTextCompositeCommand{\accdasia}{#1}{\omicron}{\accdasia\textomicron}
\DeclareTextCompositeCommand{\accpsili}{#1}{\omicron}{\accpsili\textomicron}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\omicron}{\accdasiavaria\textomicron}
\DeclareTextCompositeCommand{\acctonos}{#1}{\omicron}{\acctonos\textomicron}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\omicron}{\accdasiaoxia\textomicron}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\omicron}{\accpsilioxia\textomicron}
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\omicron}{\accpsilivaria\textomicron}
```

Majuscule letters.

```
\DeclareTextCompositeCommand{\accdasia}{#1}{\Alpha}{\accdasia\textAlpha}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\Alpha}{\accdasiavaria\textAlpha}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\Alpha}{\accdasiaoxia\textAlpha}
\DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\Alpha}{\accdasiaperispomeni\text
\DeclareTextCompositeCommand{\accpsili}{#1}{\Alpha}{\accpsili\textAlpha}
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\Alpha}{\accpsilivaria\textAlpha}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\Alpha}{\accpsilioxia\textAlpha}
\DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\Alpha}{\accpsiliperispomeni\text
\DeclareTextCompositeCommand{\acctonos}{#1}{\Alpha}{\acctonos\textAlpha}
\DeclareTextCompositeCommand{\accvaria}{#1}{\Alpha}{\accvaria\textAlpha}
\DeclareTextCompositeCommand{\accdasia}{#1}{\Epsilon}{\accdasia\textEpsilon}
\DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\Epsilon}{\accdasiaoxia\textEpsilon}
\DeclareTextCompositeCommand{\accdasiavaria}{#1}{\Epsilon}{\accdasiavaria\textEpsilon}
\DeclareTextCompositeCommand{\accpsili}{#1}{\Epsilon}{\accpsili\textEpsilon}
\DeclareTextCompositeCommand{\accpsilioxia}{#1}{\Epsilon}{\accpsilioxia\textEpsilon}
\DeclareTextCompositeCommand{\accpsilivaria}{#1}{\Epsilon}{\accpsilivaria\textEpsilon}
\DeclareTextCompositeCommand{\acctonos}{#1}{\Epsilon}{\acctonos\textEpsilon}
\DeclareTextCompositeCommand{\accvaria}{#1}{\Epsilon}{\accvaria\textEpsilon}
```

```
  \DeclareTextCompositeCommand{\accdasia}{#1}{\Eta}{\accdasia\textEta}
  \DeclareTextCompositeCommand{\accdasiavaria}{#1}{\Eta}{\accdasiavaria\textEta}
  \DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\Eta}{\accdasiaoxia\textEta}
  \DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\Eta}{\accdasiaperispomeni\textEt
  \DeclareTextCompositeCommand{\accpsili}{#1}{\Eta}{\accpsili\textEta}
  \DeclareTextCompositeCommand{\accpsilivaria}{#1}{\Eta}{\accpsilivaria\textEta}
  \DeclareTextCompositeCommand{\accpsilioxia}{#1}{\Eta}{\accpsilioxia\textEta}
  \DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\Eta}{\accpsiliperispomeni\textEt
  \DeclareTextCompositeCommand{\acctonos}{#1}{\Eta}{\acctonos\textEta}
  \DeclareTextCompositeCommand{\accvaria}{#1}{\Eta}{\accvaria\textEta}
  \DeclareTextCompositeCommand{\accdasia}{#1}{\Iota}{\accdasia\textIota}
  \DeclareTextCompositeCommand{\accdasiavaria}{#1}{\Iota}{\accdasiavaria\textIota}
  \DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\Iota}{\accdasiaoxia\textIota}
  \DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\Iota}{\accdasiaperispomeni\textI
  \DeclareTextCompositeCommand{\accdialytika}{#1}{\Iota}{\accdialytika\textIota}
  \DeclareTextCompositeCommand{\accpsili}{#1}{\Iota}{\accpsili\textIota}
  \DeclareTextCompositeCommand{\accpsilivaria}{#1}{\Iota}{\accpsilivaria\textIota}
  \DeclareTextCompositeCommand{\accpsilioxia}{#1}{\Iota}{\accpsilioxia\textIota}
  \DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\Iota}{\accpsiliperispomeni\textI
  \DeclareTextCompositeCommand{\acctonos}{#1}{\Iota}{\acctonos\textIota}
  \DeclareTextCompositeCommand{\accvaria}{#1}{\Iota}{\accvaria\textIota}
  \DeclareTextCompositeCommand{\accdasia}{#1}{\Omicron}{\accdasia\textOmicron}
  \DeclareTextCompositeCommand{\accdasiavaria}{#1}{\Omicron}{\accdasiavaria\textOmicron}
  \DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\Omicron}{\accdasiaoxia\textOmicron}
  \DeclareTextCompositeCommand{\accpsili}{#1}{\Omicron}{\accpsili\textOmicron}
  \DeclareTextCompositeCommand{\accpsilivaria}{#1}{\Omicron}{\accpsilivaria\textOmicron}
  \DeclareTextCompositeCommand{\accpsilioxia}{#1}{\Omicron}{\accpsilioxia\textOmicron}
  \DeclareTextCompositeCommand{\acctonos}{#1}{\Omicron}{\acctonos\textOmicron}
  \DeclareTextCompositeCommand{\accvaria}{#1}{\Omicron}{\accvaria\textOmicron}
  \DeclareTextCompositeCommand{\accdasia}{#1}{\Upsilon}{\accdasia\textUpsilon}
  \DeclareTextCompositeCommand{\accdasiavaria}{#1}{\Upsilon}{\accdasiavaria\textUpsilon}
  \DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\Upsilon}{\accdasiaoxia\textUpsilon}
  \DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\Upsilon}{\accdasiaperispomeni\te
  \DeclareTextCompositeCommand{\accdialytika}{#1}{\Upsilon}{\accdialytika\textUpsilon}
  \DeclareTextCompositeCommand{\acctonos}{#1}{\Upsilon}{\acctonos\textUpsilon}
  \DeclareTextCompositeCommand{\accvaria}{#1}{\Upsilon}{\accvaria\textUpsilon}
  \DeclareTextCompositeCommand{\accdasia}{#1}{\Rho}{\accdasia\textRho}
  \DeclareTextCompositeCommand{\accdasia}{#1}{\Omega}{\accdasia\textOmega}
  \DeclareTextCompositeCommand{\accdasiavaria}{#1}{\Omega}{\accdasiavaria\textOmega}
  \DeclareTextCompositeCommand{\accdasiaoxia}{#1}{\Omega}{\accdasiaoxia\textOmega}
  \DeclareTextCompositeCommand{\accdasiaperispomeni}{#1}{\Omega}{\accdasiaperispomeni\text
  \DeclareTextCompositeCommand{\accpsili}{#1}{\Omega}{\accpsili\textOmega}
  \DeclareTextCompositeCommand{\accpsilivaria}{#1}{\Omega}{\accpsilivaria\textOmega}
  \DeclareTextCompositeCommand{\accpsilioxia}{#1}{\Omega}{\accpsilioxia\textOmega}
  \DeclareTextCompositeCommand{\accpsiliperispomeni}{#1}{\Omega}{\accpsiliperispomeni\text
  \DeclareTextCompositeCommand{\acctonos}{#1}{\Omega}{\acctonos\textOmega}
  \DeclareTextCompositeCommand{\accvaria}{#1}{\Omega}{\accvaria\textOmega}
}
```

Drop 'capital' accents Definitions in `babel-greek_` let `\MakeUppercase` convert standard accents `\'`, `\`, `\~`, and `\"` to 'capital' versions.

In LGR, the 'capital' accents are generally dropped. In PU and TU, they must be kept on Latin letters but dropped from Greek letters.

```
\newcommand*{\alphabeta@drop@capital@accents}[1]{
```

acute

```
  \DeclareTextCompositeCommand{\accACUTE}{#1}{\Alpha}{\alphabeta@alpha@hiatus}
  \DeclareTextCompositeCommand{\accACUTE}{#1}{\Epsilon}{\alphabeta@epsilon@hiatus}
  \DeclareTextCompositeCommand{\accACUTE}{#1}{\Eta}{\textEta}
  \DeclareTextCompositeCommand{\accACUTE}{#1}{\Iota}{\textIota}
  \DeclareTextCompositeCommand{\accACUTE}{#1}{\Upsilon}{\textUpsilon}
  \DeclareTextCompositeCommand{\accACUTE}{#1}{\Omega}{\textOmega}
```

grave

```
  \DeclareTextCompositeCommand{\accGRAVE}{#1}{\Alpha}{\textAlpha}
  \DeclareTextCompositeCommand{\accGRAVE}{#1}{\Epsilon}{\textEpsilon}
  \DeclareTextCompositeCommand{\accGRAVE}{#1}{\Eta}{\textEta}
  \DeclareTextCompositeCommand{\accGRAVE}{#1}{\Iota}{\textIota}
  \DeclareTextCompositeCommand{\accGRAVE}{#1}{\Upsilon}{\textUpsilon}
  \DeclareTextCompositeCommand{\accGRAVE}{#1}{\Omega}{\textOmega}
```

tilde

```
  \DeclareTextCompositeCommand{\accTILDE}{#1}{\Alpha}{\textAlpha}
  \DeclareTextCompositeCommand{\accTILDE}{#1}{\Eta}{\textEta}
  \DeclareTextCompositeCommand{\accTILDE}{#1}{\Iota}{\textIota}
  \DeclareTextCompositeCommand{\accTILDE}{#1}{\Upsilon}{\textUpsilon}
  \DeclareTextCompositeCommand{\accTILDE}{#1}{\Omega}{\textOmega}
}
```

Hiatus feature Look ahead and place a diaeresis on I or ϒ. Leads to errors in PU.

```
\newcommand*{\alphabeta@hiatus@composites}[1]{
  \DeclareTextCommand{\alphabeta@alpha@hiatus}{#1}{%
    \csname LGR@ifnextchar\endcsname {\Iota}{\Alpha\"}{%
      \csname LGR@ifnextchar\endcsname {\Upsilon}{\Alpha\"}{\Alpha}%
}%
}
  \DeclareTextCommand{\alphabeta@epsilon@hiatus}{#1}{%
    \csname LGR@ifnextchar\endcsname {\Iota}{\Epsilon\"}{%
      \csname LGR@ifnextchar\endcsname {\Upsilon}{\Epsilon\"}{\Epsilon}%
}%
}
  \DeclareTextCompositeCommand{\LGR@hiatus}{#1}{\Alpha}{\alphabeta@alpha@hiatus}
  \DeclareTextCompositeCommand{\LGR@hiatus}{#1}{\Epsilon}{\alphabeta@epsilon@hiatus}
}
```

Composites for TU With font encoding TU, pre-composed characters are selected by the the Harfbuzz renderer (default for XeTeX, select with fontspec for LuaTeX). Exception: the (standard) combining tilde.

```
\@ifl@aded{def}{tuenc-greek}{
  \DeclareUnicodeComposite{\~}{\alpha}{"1FB6} % ᾶ
  \DeclareUnicodeComposite{\~}{\eta}{"1FC6} % ῆ
  \DeclareUnicodeComposite{\~}{\iota}{"1FD6} % ῖ
  \DeclareUnicodeComposite{\~}{\upsilon}{"1FE6} % ῦ
  \DeclareUnicodeComposite{\~}{\omega}{"1FF6} % ῶ
  \alphabeta@drop@capital@accents{\UnicodeEncodingName}
  \alphabeta@hiatus@composites{\UnicodeEncodingName}
}{}
```

Composites for LGR

```
\@ifl@aded{def}{lgrenc}{
  \alphabeta@select@precomposed{LGR}
  \alphabeta@hiatus@composites{LGR}
}{}
```

Composites for PU Load composite defs

```
\@ifl@aded{def}{puenc}{
  \alphabeta@select@precomposed{PU}
  \alphabeta@drop@capital@accents{PU}
```

The hiatus feature leads to errors in PU

```
  \DeclareTextCompositeCommand{\LGR@hiatus}{PU}{\Alpha}{\textAlpha}
  \DeclareTextCompositeCommand{\LGR@hiatus}{PU}{\Epsilon}{\textEpsilon}
```

fix `\'\alpha` and `\'\epsilon` (ά works):

```
  \DeclareTextCompositeCommand{\accACUTE}{PU}{\Alpha}{\textAlpha}
  \DeclareTextCompositeCommand{\accACUTE}{PU}{\Epsilon}{\textEpsilon}
}{}
```

Drop auxiliary definitions to free memory

```
\renewcommand*{\alphabeta@select@precomposed}{\relax}
\renewcommand*{\alphabeta@drop@capital@accents}{\relax}
\renewcommand*{\alphabeta@hiatus@composites}{\relax}
```

A.2.5 Case changing

We need to extend the case-mapping `\@uclclist` for characters that are defined with `\DeclareTextCommandDefault`.

The definition of an auxiliary, self-resetting macro makes this idempotent (only the first use of this function will expand the `@uclclist`). The second and third lines are TeX's way of writing `@uclclist += ....`

Since 2022, `\MakeUppercase` expects the default for ambiguous mappings in first position, before, the default was in last position.

```
\providecommand*\alphabeta@update@uclclist{%
  \expandafter\def\expandafter\@uclclist\expandafter{%
    \@uclclist
    \alpha          \Alpha
    \epsilon        \Epsilon
    \epsilonsymbol \Epsilon
    \varepsilon     \Epsilon
    \eta            \Eta
    \iota           \Iota
    \omicron        \Omicron
    \rho            \Rho
    \varrho         \Rho
    \rhosymbol      \Rho
    \upsilon        \Upsilon
    \omega          \Omega
```

repeat default for pre-2022 `\MakeUppercase`

```
    \epsilon        \Epsilon
    \rho            \Rho
}%
  \let\alphabeta@update@uclclist\relax
}
```

Expand the `@uclclist` using the just defined macro::

```
\alphabeta@update@uclclist
```

A.2.6 Re-definition for Greek Unicode input in math mode

Check with `\ifdefined` for the definition of `\DeclareUnicodeCharacter`. In contrast to `\@ifdefined`, this works without side-effects. It makes the package dependent on the ε-TEX extensions but these are standard in all current TEX distributions anyway. Map Greek characters that are also defined in math mode to the generic macros.

```
  \ifdefined\DeclareUnicodeCharacter
```

Majuscule

```
    \DeclareUnicodeCharacter{0393}{\Gamma} % Γ
    \DeclareUnicodeCharacter{0394}{\Delta} % Δ
    \DeclareUnicodeCharacter{0398}{\Theta} % Θ
    \DeclareUnicodeCharacter{039B}{\Lambda} % Λ
    \DeclareUnicodeCharacter{039E}{\Xi} % Ξ
    \DeclareUnicodeCharacter{03A0}{\Pi} % Π
    \DeclareUnicodeCharacter{03A3}{\Sigma} % Σ
    \DeclareUnicodeCharacter{03A5}{\Upsilon} % ϒ
    \DeclareUnicodeCharacter{03A6}{\Phi} % Φ
    \DeclareUnicodeCharacter{03A8}{\Psi} % Ψ
    \DeclareUnicodeCharacter{03A9}{\Omega} % Ω
```

Minuscule

```
    \DeclareUnicodeCharacter{03B1}{\alpha} % α
    \DeclareUnicodeCharacter{03B2}{\beta} % β
    \DeclareUnicodeCharacter{03B3}{\gamma} % γ
    \DeclareUnicodeCharacter{03B4}{\delta} % δ
    \DeclareUnicodeCharacter{03B5}{\varepsilon} % ε textepsilon/varepsilon
    \DeclareUnicodeCharacter{03B6}{\zeta} % ζ
    \DeclareUnicodeCharacter{03B7}{\eta} % η
    \DeclareUnicodeCharacter{03B8}{\theta} % ϑ
    \DeclareUnicodeCharacter{03B9}{\iota} % ι
    \DeclareUnicodeCharacter{03BA}{\kappa} % ϰ
    \DeclareUnicodeCharacter{03BB}{\lambda} % λ
    \DeclareUnicodeCharacter{03BC}{\mu} % μ
    \DeclareUnicodeCharacter{03BD}{\nu} % ν
    \DeclareUnicodeCharacter{03BE}{\xi} % ξ
    \DeclareUnicodeCharacter{03C0}{\pi} % π
    \DeclareUnicodeCharacter{03C1}{\rho} % ρ
    \DeclareUnicodeCharacter{03C2}{\varsigma} % ς
    \DeclareUnicodeCharacter{03C3}{\sigma} % σ
    \DeclareUnicodeCharacter{03C4}{\tau} % τ
    \DeclareUnicodeCharacter{03C5}{\upsilon} % υ
    \DeclareUnicodeCharacter{03C6}{\varphi} % φ textphi/varphi
    \DeclareUnicodeCharacter{03C7}{\chi} % χ
    \DeclareUnicodeCharacter{03C8}{\psi} % ψ
    \DeclareUnicodeCharacter{03C9}{\omega} % ω
```

Symbols (Does not work 8-bit)

```
    \DeclareUnicodeCharacter{03D1}{\thetasymbol} %
    \DeclareUnicodeCharacter{03D5}{\phisymbol} %
    \DeclareUnicodeCharacter{03D6}{\pisymbol}
    \DeclareUnicodeCharacter{03DD}{\digamma}
    \DeclareUnicodeCharacter{03F1}{\rhosymbol}
    \DeclareUnicodeCharacter{03F5}{\epsilonsymbol}
  \fi
```

Ensure that this works also after loading other fonts packages such as CFR-LM.

```
  \ifxetexorluatex
    % missing code
  \else
    \DeclareFontFamilySubstitution{LGR}{\rmdefault}{lmr}
    \DeclareFontFamily{LGR}{\rmdefault}{}
    \DeclareFontShape{LGR}{\rmdefault}{b}{n}{<->ssub*lmr/bx/n}{}
    \DeclareFontShape{LGR}{\rmdefault}{b}{sc}{<->ssub*lmr/bx/sc}{}
    \DeclareFontFamilySubstitution{LGR}{\ttdefault}{lmtt}
    \DeclareFontFamily{LGR}{\ttdefault}{}
    \DeclareFontShape{LGR}{\ttdefault}{b}{n}{<->ssub*lmtt/bx/n}{}
    \DeclareFontFamilySubstitution{LGR}{\sfdefault}{lmss}
    \DeclareFontFamily{LGR}{\sfdefault}{}
    \DeclareFontShape{LGR}{\sfdefault}{b}{n}{<->ssub*lmss/bx/n}{}
```

```
    \DeclareFontShape{LGR}{\sfdefault}{b}{sc}{<->ssub*lmss/bx/sc}{}
  \fi
```

A.3 Additional math fonts

Either load the MnSymbol package [6] or the the exscale package [11] in order to fix Latin Modern `lmex` fonts. Additionally, load the amssymb package [4] which provides further math symbols and also loads the amsfonts package [4].

```
  \ifhep@minion
    \RequirePackage{MnSymbol}
  \else
    \RequirePackage{exscale}
    \RequirePackage{amssymb}
  \fi
```

`\mathbf` Load the bm package [8] for superior boldmath. Make math symbols bold whenever they appear in bold macros such as `\section{`⟨*text*⟩`}`.

```
  \RequirePackage{bm}
  \AtBeginDocument{\let\mathbf\bm}
  \g@addto@macro\bfseries{\boldmath}
```

`\mathtt` Typewriter math font

```
  \DeclareMathAlphabet{\mathtt}{OT1}{lmtt}{m}{n}
  \SetMathAlphabet{\mathtt}{bold}{OT1}{lmtt}{bx}{n}
```

`\mathscr` Provid the `\mathscr` math script font from the mathrsfs package [13].

```
  \DeclareMathAlphabet{\mathscr}{U}{rsfs}{m}{n}
```

`\mathbb` Redefine the the `\mathbb` math blackboard style font according to the (sans-)serif option with the font from the dsfont package [5].

```
  \ifhep@minion
    \DeclareMathAlphabet{\mathbb}{U}{%
      \ifhepmathfont@serif dsrom\else dsss\fi%
}{m}{n}
  \else
    \ifhep@ams\else
      \SetMathAlphabet{\mathbb}{normal}{U}{%
        \ifhepmathfont@serif dsrom\else dsss\fi%
}{m}{n}
    \fi
  \fi
```

End of symbols conditional.

```
\fi
```

</package>

B Tests

<*testserif|testsans>

```
\documentclass{article}

%<testsans>\renewcommand{\familydefault}{\sfdefault}
\usepackage[oldstyle]{hep-font}
\usepackage{hep-math-font}

\usepackage{fancyvrb}\DefineShortVerb{\|}
\newenvironment{vrb}{\begin{tabular}{@{}p{6cm}l@{}}}{\end{tabular}}

\begin{document}

\begin{vrb}
|| & $Ab\Gamma\delta123$ \\
|\mathbf | & $\mathbf{Ab\Gamma\delta123}$ \\
|\mathrm | & $\mathrm{Ab\Gamma\delta123}$ \\
|   \mathbf | & $\mathbf{\mathrm{Ab\Gamma\delta123}}$ !! \\
|\text | & $\text{Ab\Gamma\delta123}$ \\
|   \textbf | & $\textbf{\text{Ab\Gamma\delta123}}$ \\
|\mathsf | & $\mathsf{Ab\Gamma\delta123}$ \\
|   \mathbf | & $\mathbf{\mathsf{Ab\Gamma\delta123}}$ \\
|\mathtt | & $\mathtt{Ab\Gamma123}$ \\
|   \mathbf | & $\mathbf{\mathtt{Ab\Gamma123}}$ \\
|\mathcal | & $\mathcal{ABC}$ \\
|\mathscr | & $\mathscr{ABC123}$ \\
|\mathbb | & $\mathbb{ABC1}$ \\
|\mathfrak | & $\mathfrak{ABC123}$ \\
\end{vrb}

$\Gamma\Delta\Lambda\Phi\Pi\Psi\Sigma\Theta\Upsilon\Xi\Omega$

$\rm\Gamma\Delta\Lambda\Phi\Pi\Psi\Sigma\Theta\Upsilon\Xi\Omega$

\Gamma\Delta\Lambda\Phi\Pi\Psi\Sigma\Theta\Upsilon\Xi\Omega

$\alpha\beta\gamma\delta\epsilon\zeta\eta\theta\iota\kappa\lambda
\mu\nu\xi\pi\rho\sigma\varsigma\tau\upsilon\phi\chi\psi\omega$

$\rm\alpha\beta\gamma\delta\epsilon\zeta\eta\theta\iota\kappa\lambda
\mu\nu\xi\pi\rho\sigma\varsigma\tau\upsilon\phi\chi\psi\omega$

\alpha\beta\gamma\delta\epsilon\zeta\eta\theta\iota\kappa\lambda
\mu\nu\xi\pi\rho\sigma\varsigma\tau\upsilon\phi\chi\psi\omega

\end{document}
```

</testserif|testsans>

C Readme

<*readme>

```
# The ‘hep-math-font‘ package

Extended Greek and sans-serif math

## Introduction

The ‘hep-math-font‘ package adjust the math fonts to be sans-serif if the
document is sans-serif. Additionally Greek letters are redefined to be
always italic and upright in math and text mode respectively. Some math
font macros are adjusted to give more consistently the naively expected
results.

The package is loaded using ‘\usepackage{hep-math-font}‘.

## Author

Jan Hajer

## License

This file may be distributed and/or modified under the conditions of the
‘LaTeX‘ Project Public License, either version 1.3c of this license or
(at your option) any later version. The latest version of this license is
in ‘http://www.latex-project.org/lppl.txt‘ and version 1.3c or later is
part of all distributions of LaTeX version 2005/12/01 or later.
```

</readme>

References

[1] W. Schmidt. ‘The fixmath package for LaTeX 2ε: Make maths comply with ISO 31-0:1992 to ISO 31-13:1992’ (2000). CTAN: fixmath.

[2] G. Milde. ‘The textalpha package: LICR macros and encoding definition files for Greek’ (2010). CTAN: greek-fontenc.

[3] G. Milde. ‘The alphabeta package: LICR macros and encoding definition files for Greek’ (2013). CTAN: greek-fontenc.

[4] *American Mathematical Society.* ‘The amsfonts package: TEX fonts from the American Mathematical Society’ (1995). CTAN: amsfonts. URL: ams.org/tex/amsfonts.

[5] O. Kummer. ‘The doublestroke font: Typeset mathematical double stroke symbols’ (1995). CTAN: doublestroke.

[6] A. Blumensath. ‘The MnSymbol package: Mathematical symbol font for Adobe MinionPro’ (2005). CTAN: MnSymbol.

[7] *LaTeX Team.* ‘The amstext package: Typeset text fragments in mathematics’ (1995). CTAN: amstext. URL: ams.org/tex/amslatex.

[8] *LaTeX Team.* ‘The bm package: Access bold symbols in maths mode’ (1993). CTAN: bm.

[9] *LaTeX Team.* ‘LaTeX 2ε font selection: Docmentation of LaTeX font commands’ (1995). CTAN: fntguide.

[10] A. Barton. 'The sansmathfonts package: Correct placement of accents in sans-serif maths' (2013). CTAN: sansmathfonts.
[11] F. Mittelbach and R. Schöpf. 'The exscale package: Implements scaling of the "cmex" fonts' (1993). CTAN: exscale.
[12] *American Mathematical Society.* 'The amssymb package' (1995). CTAN: amsfonts.
[13] J. Knappen. 'The mathrsfs package: Support for using RSFS fonts in maths' (1995). CTAN: mathrsfs.
[14] H. Oberdiek. 'The kvoptions package: Key value format for package options' (2004). CTAN: kvoptions. GitHub: ho-tex/kvoptions.
[15] *LaTeX Team.* 'The ifluatex package: Provides the \ifluatex switch' (2007). CTAN: ifluatex.
[16] *LaTeX Team.* 'The iftex package: Am I running under XeTeX?' (2006). CTAN: ifxetex. GitHub: latex3/iftex.
[17] H. Oberdiek. 'The pdftexcmds package: LuaTeX support for pdfTeX utility functions' (2007). CTAN: pdftexcmds.
[18] C. Tellechea. 'The xstring package: String manipulation for LaTeX' (2008). CTAN: xstring.
[19] E. Saudrais. 'The esint package: Extended set of integrals for Computer Modern' (2005). CTAN: esint.