

The HEP-MATH-FONT package*

Extended Greek and sans-serif math

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Abstract

The HEP-MATH-FONT package aligns the math fonts with the document font family. It switches to italic sans-serif math in sans-serif documents, keeps Greek letters italic in math and upright in text, keeps math digits lining even when the main text uses oldstyle numerals, provides configurable symbol-font sets, and adjusts the usual math alphabets so that `\mathrm`, `\text`, `\mathbf`, `\mathsf`, `\mathscr`, `\mathbb`, `\mathtt`, and `\mathfrak` behave consistently across serif and sans-serif documents.

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

warning 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 (CM). In order to be able to easily switch large chunks 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 $\mathcal{AMS}$ 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 The `\mathrm{\langle math \rangle}` macro and the `\text{\langle text \rangle}` macro from `AMSTEXT` [7] are adjusted to produce upright Greek letters, i.e. $(\text{Ab}\Gamma\delta\text{Ab}\Gamma\delta)$, by adjusting the code from the `ALPHABETA` [3] package.

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

*This document corresponds to HEP-MATH-FONT v1.5.

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- `\mathsf` The math sans-serif alphabet is redefined to be italic sans-serif if the main text is serif and italic serif if the main text is sans-serif, i.e. (*AbΓδAbΓδ*). Ensuring that the distinction between these fonts is also kept if the (sans-)serif option of the document is switched. Digits are declared as ordinary math symbols from a lining font matching the document family so that oldstyle text numerals do not leak into math. Digits inside `\mathsf` are routed through the lining `\mathsfstext` alphabet.
- `\mathscr` The `\mathcal` font i.e. (*ABCD*) is accompanied by the `\mathscr` font i.e. (*ℳℒ℔*).
- `\mathbb` The `\mathbb` font is improved by the `DOUBLESTROKE` package [5] and adjusted depending on the (sans-)serif option of the document i.e. (*ℤℓ1*).
- `\mathtt` The `\mathtt` macro switches to LM typewriter font i.e. (*AbΓAbΓ*).
- `\mathfrak` Finally, the `\mathfrak` font is also available i.e. (*ℑℒ℔12*).
- Details about the font handling in T_EX can be found in reference [9].

2 Math alphabet allocation

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

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

The text font o) 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 o) 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]

Figure 1: Basic math fonts

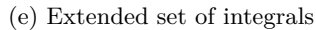
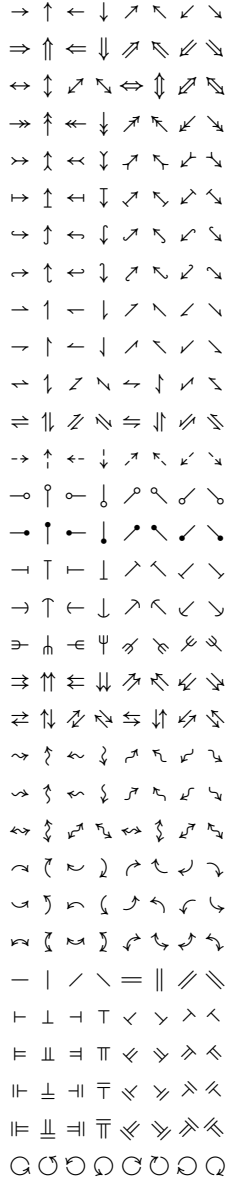
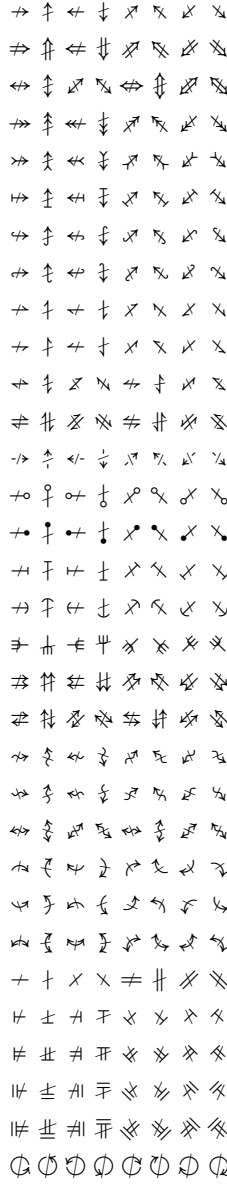


Figure 2: Math extension fonts



(a) Mn Symbol A



(b) Mn Symbol B



(c) Mn Symbol C



(d) Mn Symbol D

Figure 3: Minion symbol fonts

- 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.

- 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)

With the default symbol setup in a serif document, the `HEP-MATH-FONT` package reserves eleven of the available 16 math alphabets. This number can be reduced by three using `\newcommand{\bmmax}{0}` from the `BM` package [8]; the option `symbols=false` avoids the additional symbol-font block but keeps the lining digit fonts active.

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].

```

1 \RequirePackage{kvoptions}
2 \SetupKeyvalOptions{
3   family=hepmathfont,
4   prefix=hepmathfont@
5 }
```

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

```

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

Define conditionals based on the `symbols` package option using the `PDFTEXCMDs` package [15].

```

8 \RequirePackage{pdftexcmds}
9 \newif\ifhepmathfont@symbols
10 \ifnum
11   \pdf@strcmp{\hepmathfont@symbols}{false}=0
12 \else
13   \hepmathfont@symbolstrue
14 \fi
15 \newif\ifhep@ams
16 \ifnum\pdf@strcmp{\hepmathfont@symbols}{ams}=0 \hep@amstrue\fi
17 \newif\ifhep@minion
18 \ifnum\pdf@strcmp{\hepmathfont@symbols}{minion}=0 \hep@miniontrue\fi
```

Check if document is set to sans-serif using the `XSTRING` package [16].

```

19 \newif\ifhepmathfont@serif
20 \RequirePackage{xstring}
21 \IfStrEq{\familydefault}{\sfdefault}{%
22   \hepmathfont@seriffalse}{\hepmathfont@seriftrue%
23 }

```

A.1 Lualatex

Check for Lualatex using the IFTEX package [17].

```

24 \RequirePackage{iftex}
25 \iftutex

```

Load the UNICODE-MATH package [18].

```

26 \AtBeginDocument{
27   \let\mathbf\sympbf
28   \let\mathrm\sympup
29   \let\mathsf\symsf
30   \let\mathbfm\sympbfup
31   \let\mathbfsf\sympbfsf
32 }

```

Unicode implementation of Greek letters.

```

33 \AtBeginDocument{
34   \renewcommand*{\Gamma}{\Gamma}
35   \renewcommand*{\Delta}{\Delta}
36   \renewcommand*{\Lambda}{\Lambda}
37   \renewcommand*{\Phi}{\Phi}
38   \renewcommand*{\Pi}{\Pi}
39   \renewcommand*{\Psi}{\Psi}
40   \renewcommand*{\Sigma}{\Sigma}
41   \renewcommand*{\Theta}{\Theta}
42   \renewcommand*{\Upsilon}{\Upsilon}
43   \renewcommand*{\Xi}{\Xi}
44   \renewcommand*{\Omega}{\Omega}
45   \renewcommand*{\alpha}{\alpha}
46   \renewcommand*{\beta}{\beta}
47   \renewcommand*{\gamma}{\gamma}
48   \renewcommand*{\delta}{\delta}
49   \renewcommand*{\epsilon}{\epsilon}
50   \renewcommand*{\zeta}{\zeta}
51   \renewcommand*{\eta}{\eta}
52   \renewcommand*{\theta}{\theta}
53   \renewcommand*{\iota}{\iota}
54   \renewcommand*{\kappa}{\kappa}
55   \renewcommand*{\lambda}{\lambda}
56   \renewcommand*{\mu}{\mu}
57   \renewcommand*{\nu}{\nu}
58   \renewcommand*{\xi}{\xi}
59   \renewcommand*{\pi}{\pi}

```

```

60 \renewcommand*{\rho}{\rho}
61 \renewcommand*{\sigma}{\sigma}
62 \renewcommand*{\varsigma}{\varsigma}
63 \renewcommand*{\tau}{\tau}
64 \renewcommand*{\upsilon}{\upsilon}
65 \renewcommand*{\phi}{\phi}
66 \renewcommand*{\chi}{\chi}
67 \renewcommand*{\psi}{\psi}
68 \renewcommand*{\omega}{\omega}
69 }

```

A.2 PdfLatex

```
70 \else
```

A.2.1 Serif

```

71 \newcommand*\mathbfm[1]{\mathbf{\mathrm{#1}}}
72 \newcommand*\mathbfsf[1]{\mathbf{\mathsf{#1}}}

```

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.

```
73 \ifhepmathfont@serif
```

`\mathsf` Declare `\mathsf` for serif documents. The `SANSMATHFONTS` `cmssm` family provides OML sans-serif math with Greek letters.

```

74 \newcommand*\hep@font@sf{cmssm}
75 \DeclareMathAlphabet{\mathsf}{OML}{\hep@font@sf}{m}{it}
76 \SetMathAlphabet{\mathsf}{bold}{OML}{\hep@font@sf}{b}{it}
77 \newcommand*\hep@textfont@sf{lms}
78 \DeclareSymbolFont{hep@mathsf}{OT1}{\hep@textfont@sf}{m}{n}
79 \SetSymbolFont{hep@mathsf}{bold}{OT1}{\hep@textfont@sf}{bx}{n}
80 \DeclareSymbolFontAlphabet{\mathsf}{hep@mathsf}
81 \DeclareMathVersion{sfmath}
82 \SetSymbolFont{letters}{sfmath}{OT1}{\hep@textfont@sf}{m}{it}
83 \SetSymbolFont{operators}{sfmath}{OT1}{\hep@textfont@sf}{m}{n}
84 \SetSymbolFont{hep@mathsf}{sfmath}{OT1}{\hep@textfont@sf}{m}{n}
85 \RequirePackage{xpatch}
86 \xapptocmd{\sffamily}{\mathversion{sfmath}}{}{}

```

A.2.2 Sans serif

Define fonts for sans-serif documents.

```

87 \else
88 \newcommand*\hep@font@sf{lmr}
89 \newcommand*\hep@font@text{lms}
90 \newcommand*\hep@font@math{cmssm}
91 \newcommand*\hep@font@symbol{cmssy}
92 \newcommand*\hep@font@extra{cmssex}

```


Declare font substitutions.

```

93     \DeclareFontSubstitution{OML}{\hep@font@math}{m}{it}
94     \ifhepmathfont@symbols\ifhep@minion\else
95         \DeclareFontSubstitution{OMS}{\hep@font@symbol}{m}{n}
96         \DeclareFontSubstitution{OMX}{\hep@font@extra}{m}{n}
97     \fi\fi

```

Declare the symbol fonts.

```

98     \DeclareSymbolFont{operators}{OT1}{\hep@font@text}{m}{n}
99     \DeclareSymbolFont{letters}{OML}{\hep@font@math}{m}{it}
100    \ifhepmathfont@symbols\ifhep@minion\else
101        \DeclareSymbolFont{symbols}{OMS}{\hep@font@symbol}{m}{n}
102        \DeclareSymbolFont{largesymbols}{OMX}{\hep@font@extra}{m}{n}
103    \fi\fi

```

Set bold symbol fonts.

```

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

```

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

```

109    \ifhepmathfont@symbols\ifhep@minion\else
110        \DeclareSymbolFont{AMSA}{U}{ssmsa}{m}{n}
111        \DeclareSymbolFont{AMSb}{U}{ssmsb}{m}{n}
112    \fi\fi
113    \ifhepmathfont@symbols\RequirePackage{alphabeta}\fi %fix compilation error
114    \AtBeginDocument{%
115        \@ifpackageloaded{esint}{%
116            \DeclareSymbolFont{largesymbolsA}{U}{ssesint}{m}{n}
117        }{}
118    }

```

`\mathrm` Declare the symbol font alphabets.

`\mathnormal`

`\mathcal`

```

119    \DeclareSymbolFontAlphabet{\mathrm}{operators}
120    \DeclareSymbolFontAlphabet{\mathnormal}{letters}
121    \ifhep@minion\else
122        \DeclareSymbolFontAlphabet{\mathcal}{symbols}
123    \fi

```

`\mathit` Declare `\mathit`.

```

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

```

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

```

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

```

End of sansserif.

```

128 \fi

```

A.3 Lining digits

Declare digits as ordinary math symbols from a dedicated lining font. This follows the approach used by SANSMATH and prevents math alphabets such as `\mathsf` from selecting the OML digit glyphs.

```

129 \ifhepmathfont@serif
130 \newcommand*\hep@font@digits{lmr}
131 \else
132 \newcommand*\hep@font@digits{lmss}
133 \fi
134 \DeclareSymbolFont{hep@digits}{OT1}{\hep@font@digits}{m}{n}
135 \SetSymbolFont{hep@digits}{bold}{OT1}{\hep@font@digits}{bx}{n}
136 \ifhepmathfont@serif
137 \SetSymbolFont{hep@digits}{sfmath}{OT1}{lmss}{m}{n}
138 \fi
139 \DeclareMathSymbol{0}{\mathord}{hep@digits}{'0}
140 \DeclareMathSymbol{1}{\mathord}{hep@digits}{'1}
141 \DeclareMathSymbol{2}{\mathord}{hep@digits}{'2}
142 \DeclareMathSymbol{3}{\mathord}{hep@digits}{'3}
143 \DeclareMathSymbol{4}{\mathord}{hep@digits}{'4}
144 \DeclareMathSymbol{5}{\mathord}{hep@digits}{'5}
145 \DeclareMathSymbol{6}{\mathord}{hep@digits}{'6}
146 \DeclareMathSymbol{7}{\mathord}{hep@digits}{'7}
147 \DeclareMathSymbol{8}{\mathord}{hep@digits}{'8}
148 \DeclareMathSymbol{9}{\mathord}{hep@digits}{'9}
149 \let\hep@mathsf\mathsf
150 \ifhepmathfont@serif
151 \DeclareMathSymbol{\hep@mathsf@zero}{\mathord}{hep@mathsf@text}{'0}
152 \DeclareMathSymbol{\hep@mathsf@one}{\mathord}{hep@mathsf@text}{'1}
153 \DeclareMathSymbol{\hep@mathsf@two}{\mathord}{hep@mathsf@text}{'2}
154 \DeclareMathSymbol{\hep@mathsf@three}{\mathord}{hep@mathsf@text}{'3}
155 \DeclareMathSymbol{\hep@mathsf@four}{\mathord}{hep@mathsf@text}{'4}
156 \DeclareMathSymbol{\hep@mathsf@five}{\mathord}{hep@mathsf@text}{'5}
157 \DeclareMathSymbol{\hep@mathsf@six}{\mathord}{hep@mathsf@text}{'6}
158 \DeclareMathSymbol{\hep@mathsf@seven}{\mathord}{hep@mathsf@text}{'7}
159 \DeclareMathSymbol{\hep@mathsf@eight}{\mathord}{hep@mathsf@text}{'8}
160 \DeclareMathSymbol{\hep@mathsf@nine}{\mathord}{hep@mathsf@text}{'9}
161 \else
162 \newcommand*\hep@mathsf@zero{\hep@mathsf{0}}
163 \newcommand*\hep@mathsf@one{\hep@mathsf{1}}
164 \newcommand*\hep@mathsf@two{\hep@mathsf{2}}
165 \newcommand*\hep@mathsf@three{\hep@mathsf{3}}
166 \newcommand*\hep@mathsf@four{\hep@mathsf{4}}

```

```

167 \newcommand*\hepmathsf@five{\hepmathsf{5}}
168 \newcommand*\hepmathsf@six{\hepmathsf{6}}
169 \newcommand*\hepmathsf@seven{\hepmathsf{7}}
170 \newcommand*\hepmathsf@eight{\hepmathsf{8}}
171 \newcommand*\hepmathsf@nine{\hepmathsf{9}}
172 \fi
173 \ExplSyntaxOn
174 \cs_new_protected:Npn \hep_mathsf:n #1 {
175   \tl_map_function:nN {#1} \hep_mathsf_token:N
176 }
177 \cs_new_protected:Npn \hep_mathsf_token:N #1 {
178   \token_if_eq_charcode:NNTF #1 0 {\hepmathsf@zero} {
179     \token_if_eq_charcode:NNTF #1 1 {\hepmathsf@one} {
180       \token_if_eq_charcode:NNTF #1 2 {\hepmathsf@two} {
181         \token_if_eq_charcode:NNTF #1 3 {\hepmathsf@three} {
182           \token_if_eq_charcode:NNTF #1 4 {\hepmathsf@four} {
183             \token_if_eq_charcode:NNTF #1 5 {\hepmathsf@five} {
184               \token_if_eq_charcode:NNTF #1 6 {\hepmathsf@six} {
185                 \token_if_eq_charcode:NNTF #1 7 {\hepmathsf@seven} {
186                   \token_if_eq_charcode:NNTF #1 8 {\hepmathsf@eight} {
187                     \token_if_eq_charcode:NNTF #1 9 {\hepmathsf@nine}
188                     {\hepmathsf{#1}}
189                   }
190                 }
191               }
192             }
193           }
194         }
195       }
196     }
197   }
198 }
199 \protected\def\mathsf#1{\hep_mathsf:n {#1}}
200 \ExplSyntaxOff

```

A.4 Greek letters

Load the `FIXMATH` [1] and `ALPHABETA` [3] packages ensuring that upper Greek letters in math mode are italic and providing upright Greek letters in text mode, respectively.

```

193 \ifhepmathfont@symbols
194   \RequirePackage{amssymb}
195   \RequirePackage{amstext}
196   \RequirePackage{fixmath}
197   \RequirePackage{alphabet}

```

Define the `hep@greek` macro ensuring that both `\text` and `\mathrm` produce upright Greek letters using the `AMSSYMB` [12] and `AMSTEXT` [7] packages.

```

198 \newcommand*\hep@greek[2]{%
199   \TextOrMath{#1}{\ifnum\fam=0 \text{#1}\else#2\fi}%
200 }
201 \AtBeginDocument{
202   \renewcommand*{\alpha}{\hep@greek{\textalpha}{\mathalpha}}
203   \renewcommand*{\beta}{\hep@greek{\textbeta}{\mathbeta}}
204   \renewcommand*{\gamma}{\hep@greek{\textgamma}{\mathgamma}}
205   \renewcommand*{\delta}{\hep@greek{\textdelta}{\mathdelta}}
206   \renewcommand*{\epsilon}{\hep@greek{\textepsilon}{\mathepsilon}}
207   \renewcommand*{\zeta}{\hep@greek{\textzeta}{\mathzeta}}

```

```

208 \renewcommand*{\eta}{\hepgreek{\texteta}{\matheta}}
209 \renewcommand*{\theta}{\hepgreek{\texttheta}{\maththeta}}
210 \renewcommand*{\iota}{\hepgreek{\textiota}{\mathiota}}
211 \renewcommand*{\kappa}{\hepgreek{\textkappa}{\mathkappa}}
212 \renewcommand*{\lambda}{\hepgreek{\textlambda}{\mathlambda}}
213 \renewcommand*{\mu}{\hepgreek{\textmu}{\mathmu}}
214 \renewcommand*{\nu}{\hepgreek{\textnu}{\mathnu}}
215 \renewcommand*{\xi}{\hepgreek{\textxi}{\mathxi}}
216 \renewcommand*{\pi}{\hepgreek{\textpi}{\mathpi}}
217 \renewcommand*{\rho}{\hepgreek{\textrho}{\mathrho}}
218 \renewcommand*{\sigma}{\hepgreek{\textsigma}{\mathsigma}}
219 \renewcommand*{\finalsigma}{\hepgreek{\textfinalsigma}{\mathvarsigma}}
220 \renewcommand*{\tau}{\hepgreek{\texttau}{\mathtau}}
221 \renewcommand*{\upsilon}{\hepgreek{\textupsilon}{\mathupsilon}}
222 \renewcommand*{\phi}{\hepgreek{\textphi}{\mathphi}}
223 \renewcommand*{\chi}{\hepgreek{\textchi}{\mathchi}}
224 \renewcommand*{\psi}{\hepgreek{\textpsi}{\mathpsi}}
225 \renewcommand*{\omega}{\hepgreek{\textomega}{\mathomega}}
226 \renewcommand*{\digamma}{\hepgreek{\textdigamma}{\mathdigamma}}
227 \renewcommand*{\varpi}{\hepgreek{\textpisymbol}{\mathvarpi}}
228 \renewcommand*{\varrho}{\hepgreek{\textrhosymbol}{\mathvarrho}}
229 \renewcommand*{\rhosymbol}{\hepgreek{\textrhosymbol}{\mathvarrho}}
230 \renewcommand*{\vartheta}{\hepgreek{\textthetasymbol}{\mathvartheta}}
231 \renewcommand*{\varepsilon}{\hepgreek{\textepsilon}{\mathvarepsilon}}
232 \renewcommand*{\epsilonsymbol}{%
233 \hepgreek{\textepsilonsymbol}{\mathepsilon}%
234 }
235 \renewcommand*{\varphi}{\hepgreek{\textphi}{\mathvarphi}}
236 \renewcommand*{\phisymbol}{\hepgreek{\textphisymbol}{\mathphi}}
237 \ifdefined\mathvarbeta
238 \renewcommand*{\varbeta}{\hepgreek{\textbetasymbol}{\mathvarbeta}}
239 \else
240 \renewcommand*{\varbeta}{\textbetasymbol}
241 \fi
242 \ifdefined\mathvarkappa
243 \renewcommand*{\varkappa}{\hepgreek{\textkappasymbol}{\mathvarkappa}}
244 \else
245 \renewcommand*{\varkappa}{\textkappasymbol}
246 \fi
247 \ifdefined\mathvarTheta
248 \renewcommand*{\varTheta}{\hepgreek{\textTheta}{\mathvarTheta}}
249 \else
250 \renewcommand*{\varTheta}{\textTheta}
251 \fi
252 \renewcommand*{\Thetasymbol}{\textThetasymbol}
253 }

```

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

```

254 \AtBeginDocument{\@ifpackageloaded{nfssex-cfr}{
255 \DeclareFontFamily{LGR}{clmj}{

```

```

256      \DeclareFontFamilySubstitution{LGR}{clmj}{lmr}
257      \DeclareFontFamily{LGR}{clm2j}{}
258      \DeclareFontFamilySubstitution{LGR}{clm2j}{lmr}
259      \DeclareFontFamily{LGR}{clm2}{}
260      \DeclareFontFamilySubstitution{LGR}{clm2}{lmr}
261      \DeclareFontFamily{LGR}{clm2s}{}
262      \DeclareFontFamilySubstitution{LGR}{clm2s}{lmss}
263      \DeclareFontFamily{LGR}{clm2js}{}
264      \DeclareFontFamilySubstitution{LGR}{clm2js}{lmss}
265      \DeclareFontFamily{LGR}{clmjs}{}
266      \DeclareFontFamilySubstitution{LGR}{clmjs}{lmss}
267      }{}
268 %      \fi

```

A.5 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].

```

269      \ifhep@minion
270      \RequirePackage{MnSymbol}
271      \else
272      \RequirePackage{exscale}
273      \RequirePackage{amssymb}
274      \fi

```

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

```

275      \ifx\bmmax\@undefined\chardef\bmmax=3 \fi
276      \RequirePackage{bm}
277      \AtBeginDocument{\let\mathbf\bm}
278      \g@addto@macro\bfseries{\boldmath}

```

`\mathtt` Typewriter math font using the XPATCH package [20].

```

279      \RequirePackage{xpatch}
280      \newcommand*{\hep@font@tt}{lmtt}
281      \DeclareMathAlphabet{\mathtt}{OT1}{\hep@font@tt}{m}{it}
282      \SetMathAlphabet{\mathtt}{bold}{OT1}{\hep@font@tt}{bx}{n}
283      \DeclareMathVersion{ttmath}
284      \SetSymbolFont{letters}{ttmath}{OT1}{\hep@font@tt}{m}{it}
285      \SetSymbolFont{operators}{ttmath}{OT1}{\hep@font@tt}{m}{n}
286      \xapptocmd{\ttfamily}{\mathversion{ttmath}}{}{}

```

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

```

287      \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].

```

288 \ifhep@minion
289 \DeclareMathAlphabet{\mathbb}{U}{%
290 \ifhepmathfont@serif dsrom\else dsss\fi%
291 }{m}{n}
292 \else
293 \ifhep@ams\else
294 \SetMathAlphabet{\mathbb}{normal}{U}{%
295 \ifhepmathfont@serif dsrom\else dsss\fi%
296 }{m}{n}
297 \fi
298 \fi

```

End of symbols conditional.

```
299 \fi
```

End of xetex conditional.

```
300 \fi
```

```
</package>
```

B Tests

```
<*testserif|testsans>
```

```

301 \documentclass{article}
302
303 %<testserif>\usepackage[oldstyle]{hep-font}
304 %<testsans>\usepackage[oldstyle,sans]{hep-font}
305 \usepackage{hep-math-font}
306
307 \usepackage{fancyvrb}\DefineShortVerb{\|}
308 \newenvironment{vrb}{\begin{tabular}{@{}p{6cm}l@{}}}{\end{tabular}}
309
310 \begin{document}
311
312 \begin{vrb}
313 || & $Ab\Gamma\delta_{123}$ \\
314 |\mathbf{ } & & $\mathbf{Ab\Gamma\delta_{123}}$ \\
315 |\mathrm{ } & & $\mathrm{Ab\Gamma\delta_{123}}$ \\
316 | \mathbf{ } & & $\mathbf{frm{Ab\Gamma\delta_{123}}}$ !! \\
317 |\text{ } & & $\text{Ab\Gamma\delta_{123}}$ \\
318 | \textbf{ } & & $\textbf{\text{Ab\Gamma\delta_{123}}}$ \\
319 |\mathsf{ } & & $\mathsf{Ab\Gamma\delta_{123}}$ \\
320 | \mathbf{ } & & $\mathbf{sf{Ab\Gamma\delta_{123}}}$ \\
321 |\mathtt{ } & & $\mathtt{Ab\Gamma_{123}}$ \\
322 | \mathbf{ } & & $\mathbf{\mathtt{Ab\Gamma_{123}}}$

```

```

323 |\mathcal | & $\mathcal{ABC}$ \\
324 |\mathscr | & $\mathscr{ABC123}$ \\
325 |\mathbb | & $\mathbb{ABC1}$ \\
326 |\mathfrak | & $\mathfrak{ABC123}$ \\
327 \end{vrb}
328
329 $\Gamma\Delta\Lambda\Phi\Pi\Psi\Sigma\Theta\Upsilon\Xi\Omega$
330
331 $\mathrm{\Gamma\Delta\Lambda\Phi\Pi\Psi\Sigma\Theta\Upsilon\Xi\Omega}$
332
333 \Gamma\Delta\Lambda\Phi\Pi\Psi\Sigma\Theta\Upsilon\Xi\Omega
334
335 $\alpha\beta\gamma\delta\epsilon\zeta\eta\theta\iota\kappa\lambda$
336 $\mu\nu\xi\pi\rho\sigma\varsigma\tau\upsilon\phi\chi\psi\omega$
337
338 $\mathrm{\alpha\beta\gamma\delta\epsilon\zeta\eta\theta\iota\kappa\lambda}$
339 $\mathrm{\mu\nu\xi\pi\rho\sigma\varsigma\tau\upsilon\phi\chi\psi\omega}$
340
341 \alpha\beta\gamma\delta\epsilon\zeta\eta\theta\iota\kappa\lambda
342 \mu\nu\xi\pi\rho\sigma\varsigma\tau\upsilon\phi\chi\psi\omega
343
344 \end{document}
</testserif|testsans>

```

C Readme

<*readme>

```

345 # The 'hep-math-font' package
346
347 Extended Greek and sans-serif math
348
349 ## Introduction
350
351 The 'hep-math-font' package aligns the math fonts with the document font
352 family. It switches to italic sans-serif math in sans-serif documents,
353 keeps Greek letters italic in math and upright in text, keeps math
354 digits lining even when the main text uses oldstyle numerals, provides
355 configurable symbol-font sets, and adjusts the usual math alphabets so
356 that '\mathrm', '\text', '\mathbf', '\mathsf', '\mathscr', '\mathbb',
357 '\mathtt', and '\mathfrak' behave consistently across serif and
358 sans-serif documents.
359
360 The package is loaded using '\usepackage{hep-math-font}'.
361
362 ## Author
363
364 Jan Hajer
365

```

366 ## License
367
368 This file may be distributed and/or modified under the conditions of the
369 ‘LaTeX’ Project Public License, either version 1.3c of this license or
370 (at your option) any later version. The latest version of this license is
371 in ‘<http://www.latex-project.org/lppl.txt>’ and version 1.3c or later is
372 part of all distributions of LaTeX version 2005/12/01 or later.
</readme>

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Change History

v1.0 General: Created the dedicated math-font package with serif and sans-serif math switching, Greek text and math handling, symbol package selection, and math alphabets. 1	<code>\hepgreek</code>, added <code>nfssex-cfr</code> LGR substitutions, and made symbol and math-alphabet loading conditional. . . . 1
v1.1 General: Protected Greek redefinitions, adjusted symbol-package documentation, and refined sans-serif and MinionPro handling. 1	v1.4 General: Simplified the Greek-letter implementation, removed older Unicode and case-list code, updated LGR substitution handling, and applied starred command definitions. 1
v1.2 General: Added <code>\mathsf</code>text, fixed symbols option processing, and refreshed documentation and README formatting. 1	v1.5 General: Raised the LaTeX format requirement, bumped release metadata, refreshed math-font documentation and README, restored an active checksum, removed the active <code>\mathsf</code> digit wrapper, made math digits lining symbols, and routed <code>\mathsf</code> digits through a matching lining digit font. . . 1
v1.3 General: Reworked Greek handling with <code>fixmath</code> and <code>alphabeta</code>, added	