

The mathspec package

version 0.16

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I PREAMBLE

This document describes the `mathspec` package, a package that provides an interface to typeset mathematics in X_YL^AT_EX using arbitrary text fonts. It relies on `fontspec` to work and familiarity with `fontspec` is advised. Thanks to Will Robertson for his useful advice and suggestions!

The package is in its developmental stage and later versions are likely to be incompatible with this version.

2 INTRODUCTION

Since Jonathan Kew released X_YL^AT_EX, an extension to T_EX that permits the inclusion of system wide Unicode fonts and modern font technologies in T_EX documents, users have been able to easily typeset documents using readily available fonts such as Hoefler Text and Times New Roman (This document is typeset using Sabon LT Std). Will Robertson's X_YL^AT_EX package `fontspec` provides an automatic font selection process for such arbitrary fonts. Still, mathematics typesetting has not benefited from this development to the same extent as text typesetting, which is not surprising given the font requirements that are demanded.

Will Robertson has in development a package `unicode-math` that is used to typeset mathematics using some font that has an OpenType mathematics table. Currently, the only two that are available are Cambria Math, a new design, by Microsoft and Asana Math, based on Hermann Zapf's Palatino, by Apostolos Syropoulos. It is expected that the STIX fonts, based on Times, may also be used.

Thus, it is evident that a book designer is confronted with such narrow variety in mathematics typefaces, even considering already established L^AT_EX packages such as `euler` (and Computer Modern, of course!) that are dedicated to providing mathematics typefaces; and the book designer is challenged to find a suitable pair of typefaces for mathematics and body text.

This package provides mathematics alphabets in any of the same typefaces that are available to X_EL^AT_EX, using `fontspec` as a back end. Other mathematics symbols such as arrows and operators, whose designs are largely independent of an alphabetic typeface, can be taken from collections like MnSymbol or Computer Modern and are not covered by the scope of this package.

3 IMPLEMENTATION

```
\usepackage[mathspec and fontspec options]{mathspec}
```

To use the package, put `\usepackage{mathspec}` in the preamble of the document. It is not necessary to put `\usepackage{requirepackagefontspec}` because `mathspec` will ensure that `fontspec` is loaded anyway. To load `fontspec` with some options, parse them through `mathspec`, for example, `\usepackage[quiet]{mathspec}` is equivalent to `\usepackage[quiet]{fontspec}\usepackage{mathspec}`.

Actually, `mathspec` ordinarily loads `fontspec` with the `no-math` option. To cancel this, explicitly use the `math` option: e.g. `\usepackage[math]{mathspec}`.

3.1 Letters and Digits

```
\setmathfont[Set=set],shapes,font features]{font name}
```

`\setmathfont` This single command is used to entirely describe the desired font for some use. Usually, the command would appear up to two times in a document, to specify each the Latin and the Greek fonts. The command can be used only in the preamble, that is before `\begin{document}` because L^AT_EX will not allow it to be used elsewhere. Then, there can be only one Latin mathematics typeface and one Greek mathematics typeface in the document (The different fonts in section 6.1 of this document was only achieved through trickery).

set Compulsory value for key `Set`.

Latin, Greek.

shapes Optional comma separated list of keys.

A comma separated list of keys and their values, e.g. (`Uppercase=Regular`, `Lowercase=Italic`, `Digits=Regular`). Keys are `Uppercase`, `Lowercase` and `Digits` which can each have value `Regular`, `Italic` or `Plain`; `Regular` and `Italic` respectively indicate the regular and italic fonts of the typeface, `Plain`

indicates that no font assignment is performed by `mathspec`, and that the symbols will be typeset in the default font, which is usually Computer Modern. If a key is absent, its default value, as indicated in table 1, is used.

The default values are very good and you would be wise not to change the Latin and the digit shapes. The Greek shapes can be changed to adhere to some particular style, for example all italic, or because the specified Greek font has only one shape regular.

TABLE 1: The default shapes for the symbol sets

	Latin		Greek	
Digits	Uppercase	Lowercase	Uppercase	Lowercase
Regular	Italic	Italic	Regular	Italic

`\plaindigits`

It is clear that the digits can be typeset by only one font at any one time. By default, if only one set is specified (Latin or Greek), then the digits are typeset using the font that is used for the set or if both sets are specified, then the digits are typeset using the Latin font, unless this choice is overridden. The choice can be overridden by explicitly writing `Digits=Regular` or `Digits=Plain` in the optional argument to `\setmathsfont`, or with the command `\plaindigits`, which might be an easier way to cancel the assignment of a new font for the digits.

``, `` `` optional comma separated list, `` compulsory argument.

These are the same arguments as those used by `\fontspec` and are interpreted by `fontspec`. See `fontspec`'s documentation for details.

3.2 Symbols

Support for setting the symbols font was removed in this version. I am focussing on the other areas of the package and feel that an incomplete feature should not be present at all.

You can try `MnSymbol`, which has greater (and more uniform) coverage, with the package option `MnSymbol`, e.g. `\usepackage[MnSymbol]{mathspec}`. Note that `MnSymbol` is a third party package by Achim Blumensath, which can only be used if additionally installed.

4 ALPHABETS

`\setmathrm`
`\setmathcal`
`\setmathsf`
`\setmathtt`
`\setmathfrak`
`\setmathbb`

The mathematics alphabets like `\mathrm` and `\mathcal` can be set using the commands:

- `\setmathrm[]{}` (defines `\mathrm`, `\mathit`, `\mathbf` and the font for operators)
- `\setmathcal[]{}` (defines `\mathcal`)

- `\setmathsf[⟨font features⟩]{⟨font name⟩}` (defines `\mathsf`)
- `\setmathtt[⟨font features⟩]{⟨font name⟩}` (defines `\mathtt`)
- `\setmathfrak[⟨font features⟩]{⟨font name⟩}` (defines `\mathfrak`)
- `\setmathbb[⟨font features⟩]{⟨font name⟩}` (defines `\mathbb`)

All are straight forward, but `\setmathrm` does a little more than the others. `mathspec` redefines `fontspec`'s definitions.

4.1 *Shorthands*

`\setprimaryfont[⟨font features⟩]{⟨font name⟩}`

`\setprimaryfont` `\setprimaryfont` is equivalent to:

```
\setmainfont[⟨font features⟩]{⟨font name⟩}
\setmathsf[Set=Latin,⟨font features⟩]{⟨font name⟩}
\setmathrm[⟨font features⟩]{⟨font name⟩}
```

and is useful to save typing the same information multiple times.

`\setsansfonts[⟨font features⟩]{⟨font name⟩}`
`\setmonofonts[⟨font features⟩]{⟨font name⟩}`

`\setsansfonts` Similarly, `\setsansfonts` and `\setmonofonts` (note the plurals) are equivalent to:
`\setmonofonts`

```
\setsansfont[⟨font features⟩]{⟨font name⟩}
\setmathsf[⟨font features⟩]{⟨font name⟩}
```

and

```
\setmonofont[⟨font features⟩]{⟨font name⟩}
\setmathtt[⟨font features⟩]{⟨font name⟩}
```

respectively.

See `fontspec`'s documentation for details of `\setmainfont`, `\setsansfont` and `\setmonofont`.

4.2 *Limitations*

Apparently, there is a limit on the number of math groups (symbol fonts and alphabets) that a document may contain. It seems that 16 is the limit, which is enforced by \LaTeX 2_ϵ kernel macros. I am under the impression that \XeTeX actually permits 256 math groups, but I have not found that redefined \LaTeX macros alleviates the problem.

Maybe I am going about this the wrong way, but until I truly understand what's going on and improve this area, beware 'LaTeX Error: Too many math alphabets used in version normal.'

5 GREEK CHARACTERS

For reference, the Greek alphabet and variant letter forms is given in table 2. Despite the name, `\varsigma` ς is not a variant form of `\sigma` σ , it is the final form. Digamma F is an obsolete letter of the alphabet, originally placed between epsilon ϵ and zeta ζ .

TABLE 2: The Greek alphabet and variant letter forms with control sequences

Uppercase		Lowercase		Uppercase		Lowercase	
A	<code>\Alpha</code>	α	<code>\alpha</code>	Ξ	<code>\Xi</code>	ξ	<code>\xi</code>
B	<code>\Beta</code>	β	<code>\beta</code>	O	<code>\Omicron</code>	o	<code>\omicron</code>
Γ	<code>\Gamma</code>	γ	<code>\gamma</code>	Π	<code>\Pi</code>	π	<code>\pi</code>
Δ	<code>\Delta</code>	δ	<code>\delta</code>	P	<code>\Rho</code>	ρ	<code>\rho</code>
E	<code>\Epsilon</code>	ϵ	<code>\epsilon</code>	Σ	<code>\Sigma</code>	ς	<code>\varsigma</code>
Z	<code>\Zeta</code>	ζ	<code>\zeta</code>			σ	<code>\sigma</code>
H	<code>\Eta</code>	η	<code>\eta</code>	T	<code>\Tau</code>	τ	<code>\tau</code>
Θ	<code>\Theta</code>	θ	<code>\theta</code>	Y	<code>\Upsilon</code>	υ	<code>\upsilon</code>
I	<code>\Iota</code>	ι	<code>\iota</code>	Φ	<code>\Phi</code>	ϕ	<code>\phi</code>
K	<code>\Kappa</code>	κ	<code>\kappa</code>	X	<code>\Chi</code>	χ	<code>\chi</code>
Λ	<code>\Lambda</code>	λ	<code>\lambda</code>	Ψ	<code>\Psi</code>	ψ	<code>\psi</code>
M	<code>\Mu</code>	μ	<code>\mu</code>	Ω	<code>\Omega</code>	ω	<code>\omega</code>
N	<code>\Nu</code>	ν	<code>\nu</code>	F	<code>\Digamma</code>	f	<code>\digamma</code>
Normal form		Variant form		Normal form		Variant form	
	β	ℓ	<code>\varbeta</code>		π	ϖ	<code>\varpi</code>
	ϵ	ϵ	<code>\varepsilon</code>		ρ	ϱ	<code>\varrho</code>
	θ	ϑ	<code>\vartheta</code>		ϕ	φ	<code>\varphi</code>
	κ	\varkappa	<code>\varkappa</code>		Θ	Θ	<code>\varTheta</code>

Initially, `mathspec` defines control sequences for the Greek characters that are absent in Computer Modern, because they are similar in form to Latin characters, from ASCII, thus control sequences like `\Alpha` and `\omicron` are defined. Any variant forms that are absent are equivalent to the normal forms. The meanings of these control sequences are preserved by a control sequence of the same name with the prefix `cm` (e.g. `\cmAlpha`), which may be recalled after the Greek mathematics font is changed.

`\normalvarforms`

Since not all fonts contain all variant forms, there might be the odd variant letter that remains in Computer Modern while other Greek letters have changed font. For these characters, the command `\normalvarforms` will make them equivalent to their corresponding normal forms. Note that this command only adjusts those that are absent in the font. Of course, this might mean that, for example, `\vartheta` and `\theta` would print the same glyph, which would be dubious if they are used in the same document, with different meanings.

`\varforms`

If an author does not agree with the font designer's choice of normal and variant forms, for example, I prefer `\phi` to print ‘ ϕ ’ and `\varphi` to print ‘ φ ’, which is not the default behaviour for many fonts, the forms can be exchanged by putting the list of letters to the command `\varforms`, e.g. `\varforms{theta,kappa,phi}` might be used if the Greek mathematics font is Garamond Premier Pro Italic.

It should be noted that `\epsilon` prints the lunate epsilon ‘ ϵ ’ and `\varepsilon` prints the usual (double loop) epsilon ‘ ε ’ in Plain \TeX and \LaTeX . This is in contrast to other fonts, which contain the lunate style epsilon separately from the Greek alphabet among variant letter forms and symbols (where Unicode assigns ‘Greek Lunate Epsilon Symbol’). The definition of `\LaTeXe`, which prints ‘ \LaTeX 2_ϵ ’ uses `\varepsilon` and care should be taken to ensure that `\LaTeXe` uses the usual epsilon either by using one of the methods that were presented in this section or by redefining `\LaTeXe` (possibly using my `metalogo` package), because ‘ \LaTeX 2_ϵ ’ is not as good as ‘ $\text{\LaTeX 2}_\varepsilon$ ’.

6 ADDITIONAL INFORMATION

This section describes the shortcomings of this package. I wonder whether the benefits of being able to use an arbitrary font for mathematics outweigh the detriments; in a production environment, it might be best to seek an alternative approach and use some \LaTeX set, like MathTime, MinionPro, Math Design or the `tx` or `px` fonts, that is dedicated to producing good mathematics with one font.

6.1 *Glyph bounds*

In using this package to provide arbitrary fonts for mathematics, there are issues with glyph bounds (similar to italic correction), as illustrated in the equations:

$$f(x) = \sum_{n=-\infty}^{\infty} c_n e^{jnx} \quad (1)$$

$$c_n = \frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) e^{-jnx} dx \quad (2)$$

where the function f is too close the parenthesis (and the exponent jnx is so close to its base e that there is actually a collision! The reason is that the font has metrics that are suitable for use in text, but not for mathematics.

6.1.1 *Discussion*

Comparing the alphabets typeset in Computer Modern Italic, in table 3, it is shown that many characters have greater space around them in the mathematics version, which does not exist in the text version. The tracked alphabet shows the alphabet typeset as text, but also with a constant `\mu` intercharacter space (poor man’s tracking). Since the adjusted alphabet is approximately as long as the mathematics alphabet, on average, this is a fair method to increase the space between alphabetic characters in mathematics.

TABLE 3: Computer Modern Italic in text and mathematics

Text	<i>abcdefghijklmnopqrstuvwxyz</i>
Mathematics	<i>abcdefghijklmnopqrstuvwxyz</i>
Tracked	<i>abcdefghijklmnopqrstuvwxyz</i>

Now, the problem lies with implementing this behaviour. The best way would be to adjust \TeX ’s mathematics spacing rules to add this `\mu` extra space after each

`\mathalpha`, but not after the `\mathords`. I do not know whether it is possible to separate the two types as such, since they are almost equivalent. Otherwise, would it look worse if `\mathords` also have this extra space?

As it turns out, T_EX's mathematics spacing rules are hardwired into T_EX and can not be adjusted by the user. The table that is used to determine the spacing between pairs of adjacent atoms, from *The T_EXbook*, is reproduced below:

Left atom	Right atom							
	Ord.	Op.	Bin.	Rel.	Open	Close	Punct.	Inner
Ordinary, et al. (Ord.)	o	1	2	3	o	o	o	1
Large operator (Op.)	1	1		3	o	o	o	1
Binary operation (Bin.)	2	2			2			2
Relation (Rel.)	3	3		o	3	o	o	3
Opening (Open)	o	o		o	o	o	o	o
Closing (Close)	o	1	2	3	o	o	o	1
Punctuation (Punct.)	1	1		1	1	1	1	1
Delimited subformula (Inner)	1	1	2	3	1	o	1	1

where o, 1, 2 and 3 represent zero, thin, medium and thick skips respectively and coloured entries indicate that space is to be inserted only in display and text styles and not in script and scriptscript styles. Both Plain T_EX and L^AT_EX define the three skips as:

<code>\thinmuskip</code>	3mu
<code>\medmuskip</code>	4mu plus 3mu minus 4mu
<code>\thickmuskip</code>	5mu plus 5mu

and unless the option `normalskips` to the package is used (e.g. `\usepackage[normalskips]{mathspec}`), `mathspec` increases each skip by 1 mu:

<code>\thinmuskip</code>	4mu
<code>\medmuskip</code>	5mu plus 3mu minus 4mu
<code>\thickmuskip</code>	6mu plus 5mu

As far as I can tell, nothing can be done about the zero skip.

If X_ƎT_EX is able to get information about the ‘ink box’ of a character, this elaborate, awkward and ugly hack, which is not even good anyway, might be replaced with something that is more elegant (or at least yields better results); better yet, if X_ƎT_EX allows customisation of the mathematics spacing rules. It is impossible at the moment, for now, this described method is the best that is possible.

6.1.2 Solution

$\!+[\langle size \rangle]$

- $\!+$ The command `\+` is used to produce fine control over the spacing in mathematics. Without its optional argument, it inserts a 1 mu ($\frac{1}{18}$ em) skip. `\+[\langle size \rangle]` inserts a

$\langle size \rangle$ mu skip. The spacing of equations (1, 2) are improved by the replacements that are described in table 4:

$$f(x) = \sum_{n=-\infty}^{\infty} c_n e^{jnx} \qquad f(x) = \sum_{n=-\infty}^{\infty} c_n e^{jnx} \qquad (3)$$

$$c_n = \frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) e^{-jnx} dx \qquad c_n = \frac{1}{2\pi} \int_{-\pi}^{\pi} f(x) e^{-jnx} dx \qquad (4)$$

TABLE 4: Example replacements that improve spacing

Original	Replacement
f(x)	\+f\left(x\right)
e^{jnx}	e^{\+[5]jn\+x}
e^{-jnx}	e^{\+ -jn\+x}

This procedure is indeed awkward for the user, but still necessary to produce decent results. Note that (x) is replaced with `\left(x\right)`, which should always be done anyway (or with a more convenient macro, perhaps `\grp()\{x}` defined by `\newcommand\grp[3]{\left#1#3\right#2}`).

6.2 Compatibility

If the package `amsmath` is used, it must be loaded before `mathspec`.

7 mathspec.sty

7.1 *Initialising and options processing*

```

1 \let\eu@ifnot@normalskips \@firstofone
2 \let\eu@if@MnSymbol \@gobble
3 \def\eu@zf@math{no-math}
4 \DeclareOption{normalskips}{\let\eu@ifnot@normalskips \@gobble}
5 \DeclareOption{no-math}{\relax}
6 \DeclareOption{MnSymbol}{\let\eu@if@MnSymbol \@firstofone}
7 \DeclareOption{math}{\def\eu@zf@math{math}}
8 \DeclareOption*{\PassOptionsToPackage{\CurrentOption}{fontspec}}
9 \ProcessOptions\relax
10 \RequirePackage[\eu@zf@math]{fontspec}[2008/08/09]
11 \eu@if@MnSymbol{\RequirePackage{MnSymbol}}
12 \RequirePackage{xkeyval}
13 \RequirePackage{xifthen}
14 \newif\if@eu@LatinUppercase@
15 \newif\if@eu@LatinLowercase@
16 \newif\if@eu@LatinDigits@
17 \newif\if@eu@GreekUppercase@
18 \newif\if@eu@GreekLowercase@
19 \newif\if@eu@GreekDigits@
20 \newif\if@eu@Symbols@
21 \newif\if@eu@Digits@
22 \let\eu@if@varforms \@gobble
23 \let\eu@ifset@mathrm \@gobble
24 \let\eu@ifset@mathcal \@gobble
25 \let\eu@ifset@mathsf \@gobble
26 \let\eu@ifset@mathtt \@gobble
27 \let\eu@ifset@mathfrak \@gobble
28 \let\eu@ifset@mathbb \@gobble

```

Redefine the skips.

```

29 \eu@ifnot@normalskips{
30   \thinmuskip=4mu
31   \medmuskip=5mu plus 2mu minus 4mu
32   \thickmuskip=6mu plus 5mu}

```

`\eu@isloaded` A command to test whether a package is loaded and puts the result in a Boolean. Used to test for amsmath here and `\AtBeginDocument` because amsmath, if used, must be loaded before mathspec.

```

33 \newcommand\eu@isloaded[2][]{
34   \expandafter\ifx\csname if@eu@#2loaded@\endcsname\relax
35     \expandafter\newif\csname if@eu@#2loaded@\endcsname
36     \fi
37     \@ifpackageloaded{#2}
38     {\csname @eu@#2loaded@true\endcsname #1}
39     {\csname @eu@#2loaded@false\endcsname}}
40 \eu@isloaded{amsmath}

```

7.2 *Greek characters and digits*

Complete the missing Greek characters from ASCII. Easier done now than later.

```

41 \DeclareMathSymbol{\Alpha}{\mathalpha}{operators}{"41}
42 \DeclareMathSymbol{\Beta}{\mathalpha}{operators}{"42}
43 \DeclareMathSymbol{\Epsilon}{\mathalpha}{operators}{"45}
44 \DeclareMathSymbol{\Zeta}{\mathalpha}{operators}{"5A}
45 \DeclareMathSymbol{\Eta}{\mathalpha}{operators}{"48}
46 \DeclareMathSymbol{\Iota}{\mathalpha}{operators}{"49}
47 \DeclareMathSymbol{\Kappa}{\mathalpha}{operators}{"4B}
48 \DeclareMathSymbol{\Mu}{\mathalpha}{operators}{"4D}
49 \DeclareMathSymbol{\Nu}{\mathalpha}{operators}{"4E}
50 \DeclareMathSymbol{\Omicron}{\mathalpha}{operators}{"4F}
51 \DeclareMathSymbol{\Rho}{\mathalpha}{operators}{"50}
52 \DeclareMathSymbol{\Tau}{\mathalpha}{operators}{"54}
53 \DeclareMathSymbol{\Chi}{\mathalpha}{operators}{"58}
54 \DeclareMathSymbol{\omicron}{\mathord}{letters}{"6F}

```

Unavailable variant forms are equivalent to normal forms. Using Latin ‘F’ for digamma F is better than nothing.

```

55 \let\varbeta\beta
56 \@ifundefined{varkappa}
57   {\let\varkappa\kappa}
58   {\relax}
59 \let\varTheta\Theta
60 \@ifundefined{digamma}
61   {\DeclareMathSymbol{\Digamma}{\mathalpha}{operators}{"46}
62     \DeclareMathSymbol{\digamma}{\mathord}{operators}{"46}}
63   {\let\Digamma\digamma}

```

Preserve the original definitions of the Greek control sequences with cm prefix.

```

64 \let\cmAlpha\Alpha
65 \let\cmBeta\Beta
66 \let\cmGamma\Gamma
67 \let\cmDelta\Delta
68 \let\cmEpsilon\Epsilon
69 \let\cmZeta\Zeta
70 \let\cmEta\Eta
71 \let\cmTheta\Theta
72 \let\cmIota\Iota
73 \let\cmKappa\Kappa
74 \let\cmLambda\Lambda
75 \let\cmMu\Mu
76 \let\cmNu\Nu
77 \let\cmXi\Xi
78 \let\cmOmicron\Omicron
79 \let\cmPi\Pi
80 \let\cmRho\Rho
81 \let\cmSigma\Sigma
82 \let\cmTau\Tau
83 \let\cmUpsilon\Upsilon
84 \let\cmPhi\Phi
85 \let\cmChi\Chi
86 \let\cmPsi\Psi
87 \let\cmOmega\Omega
88 \let\cmDigamma\Digamma
89 \let\cmalpha\alpha
90 \let\cmbeta\beta

```

```

91 \let\cmgamma\gamma
92 \let\cmdelta\delta
93 \let\cmepsilon\epsilon
94 \let\cmzeta\zeta
95 \let\cmeta\eta
96 \let\cmtheta\theta
97 \let\cmiota\iota
98 \let\cmkappa\kappa
99 \let\cmlambda\lambda
100 \let\cmmu\mu
101 \let\cmnu\nu
102 \let\cmxi\xi
103 \let\cmomicron\omicron
104 \let\cmpi\pi
105 \let\cmrho\rho
106 \let\cmvarsigma\varsigma
107 \let\cmsigma\sigma
108 \let\cmtau\tau
109 \let\cmupsilon\upsilon
110 \let\cmphi\phi
111 \let\cmchi\chi
112 \let\cmpsi\psi
113 \let\cmomega\omega
114 \let\cmdigamma\digamma
115 \let\cmvarbeta\varbeta
116 \let\cmvarepsilon\varepsilon
117 \let\cmvartheta\vartheta
118 \let\cmvarkappa\varkappa
119 \let\cmvarpi\varpi
120 \let\cmvarrho\varrho
121 \let\cmvarphi\varphi
122 \let\cmvarTheta\varTheta

```

7.3 *Internal commands*

`\ernewcommand` Useful macros and internal commands.

```

123 \RequirePackage{etoolbox}
124 \@gobble{\providecommand\expandonce[1]{\unexpanded\expandafter{#1}}}
125 \providecommand\expanded[1]{\edef\@tempa{#1}\@tempa}
126 \providecommand\ernewcommand[1]{
127   \@ifundefined{\expandafter\@gobble\string#1}%
128   {\let\er@newcommand\newcommand}%
129   {\let\er@newcommand\renewcommand
130     \PackageWarning{mathspec}{Redefining command `\'string#1'}}%
131   \er@newcommand#1}
132 \newcommand\eu@setkeys[3][]{
133   \ifthenelse{\isempty{#1}}{
134     {\relax}
135     {\presetkeys[eu]{#2}{#1}}}
136   \expanded{\noexpand\setkeys*[eu]{#2}{\expandonce#3}}
137 \newcommand\eu@fontspec[2]{\expanded{\noexpand\zf@fontspec{\expandonce#1}{\expandonce#2}}}

```

`\eu@DeclareRobustCommand` `breqn's` `\@ifnext` replaces `\@ifnextchar` in the definition of L^AT_EX's `\DeclareRobustCommand`. This is needed for the definition of `\+`.

```

138 \def\@ifnnext#1#2#3{%
139   \let\@tempd=#1%
140   \def\@tempa{#2}%
141   \def\@tempb{#3}%
142   \futurelet\@tempc\@ifnnexta}
143 \def\@ifnnexta{%
144   \ifx\@tempc\@tempd%
145     \let\@tempb\@tempa%
146   \fi\@tempb}
147 \def\eu@DeclareRobustCommand{\@star@or@long\eu@declare@robustcommand}
148 \def\eu@declare@robustcommand#1{%
149   \ifx#1\@undefined\else\ifx#1\relax\else
150     \@latex@info{Redefining \string#1}%
151   \fi\fi
152   \edef\reserved@a{\string#1}%
153   \def\reserved@b{#1}%
154   \edef\reserved@b{\expandafter\strip@prefix\meaning\reserved@b}%
155   \edef#1{%
156     \ifx\reserved@a\reserved@b
157       \noexpand\x@protect
158     \noexpand#1%
159   \fi
160   \noexpand\protect
161   \expandafter\noexpand\csname\expandafter\@gobble\string#1\endcsname}%
162   \let\@ifdefinable\@rc@ifdefinable
163   \expandafter\eu@new@command\csname\expandafter\@gobble\string#1\endcsname}
164 \def\eu@new@command#1{\eu@@testopt{\eu@@newcommand#1}0}
165 \def\eu@@newcommand#1[#2]{\@ifnnext[\@xargdef#1[#2]]{\@argdef#1[#2]}}
166 \long\def\eu@@testopt#1#2{\@ifnnext[\#1]{\#1[#2]}}

```

7.4 *End user commands*

`\normalvarforms` If, after the Greek font is assigned, variant forms retain their original definitions, this command will cause them to be equivalent to the normal forms.

```

167 \newcommand\normalvarforms[1][\AtBeginDocument{
168   \ifx\varbeta\cmvarbeta
169     \let\varbeta\beta
170   \fi
171   \ifx\ varepsilon\cmvarepsilon
172     \let\ varepsilon\epsilon
173   \fi
174   \ifx\vartheta\cmvartheta
175     \let\vartheta\theta
176   \fi
177   \ifx\varkappa\cmvarkappa
178     \let\varkappa\kappa
179   \fi
180   \ifx\varpi\cmvarpi
181     \let\varpi\pi
182   \fi
183   \ifx\varrho\cmvarrho
184     \let\varrho\rho
185   \fi

```

```

186 \ifx\varphi\cmvarphi
187   \let\varphi\phi
188   \fi
189 \ifx\varTheta\cmvarTheta
190   \let\varTheta\Theta
191   \fi}}

```

`\plaindigits` This command is used to easily disable digits redefinitions.

```

192 \let\eu@ifnot@plaindigits@firstofone
193 \newcommand\plaindigits{\let\eu@ifnot@plaindigits@gobble}

```

The quintessential command. From here, the code branches to four locations.

`\setmathsfont`

```

194 \providecommand\setmathsfont{\eu@setmathsfont}
195 \let\setmathfont\setmathsfont

```

`\+` This command inserts a horizontal skip in mathematics. It must be robust and any white space between the control sequence and a next `[` must not be ignored, so that legitimate (square) brackets in mathematics is not interpreted as an optional argument.

```

196 \eu@DeclareRobustCommand\+[1][1]{\ensuremath{\mskip#1mu}}

```

`\varforms` This command exchanges variant and normal forms for the specified letters.

```

197 \newcommand\varforms[1]{\def\eu@if@varforms##1{##1{#1}}}

```

`\setmathrm` Mathematics alphabet commands.

```

\setmathcal 198 \ernewcommand\setmathrm[2][1]{
\setmathsf 199   \zf@fontspec{#1}{#2}
\setmathtt 200   \let\eu@mathrm\zf@family
\setmathfrak 201   \let\eu@ifset@mathrm\@firstofone
\setmathbb 202   \providecommand\eu@mathbf@shape{n}}
203 \ernewcommand\setmathcal[2][1]{
204   \zf@fontspec{#1}{#2}
205   \let\eu@mathcal\zf@family
206   \let\eu@ifset@mathcal\@firstofone
207   \providecommand\eu@mathcal@series{m}
208   \providecommand\eu@mathcal@shape{n}}
209 \ernewcommand\setmathsf[2][1]{
210   \zf@fontspec{#1}{#2}
211   \let\eu@mathsf\zf@family
212   \let\eu@ifset@mathsf\@firstofone}
213 \ernewcommand\setmathtt[2][1]{
214   \zf@fontspec{#1}{#2}
215   \let\eu@mathtt\zf@family
216   \let\eu@ifset@mathtt\@firstofone}
217 \ernewcommand\setmathfrak[2][1]{
218   \zf@fontspec{#1}{#2}
219   \let\eu@mathfrak\zf@family
220   \let\eu@ifset@mathfrak\@firstofone
221   \providecommand\eu@mathfrak@series{m}}
222 \ernewcommand\setmathbb[2][1]{
223   \zf@fontspec{#1}{#2}

```

```

224 \let\eu@mathbb\zf@family
225 \let\eu@ifset@mathbb\@firstofone
226 \providecommand\eu@mathbb@series{m}}

\setprimaryfont Shorthands
\setsansfonts 227 \newcommand\setprimaryfont[2][]{
\setmonofonts 228 \setmainfont[#1]{#2}
229 \setmathsf{Set=Latin,#1}{#2}
230 \setmathrm[#1]{#2}}
231 \newcommand\setsansfonts[2][]{
232 \setsansfont[#1]{#2}
233 \setmathsf[#1]{#2}}
234 \newcommand\setmonofonts[2][]{
235 \setmonofont[#1]{#2}
236 \setmathtt[#1]{#2}}

```

7.5 More internal commands

7.5.1 \setmathsf{font} branches

```

237 \newcommand\eu@setmathsf[1][Set=Special]{
238 \eu@setkeys{Scope}{#1}
239 \ifcase\eu@ScopeSet@@value
240 \let\eu@ScopeSet@Value\eu@ScopeSet@Special
241 \or
242 \let\eu@ScopeSet@Value\eu@ScopeSet@Latin
243 \or
244 \let\eu@ScopeSet@Value\eu@ScopeSet@Greek
245 \or
246 \let\eu@ScopeSet@Value\eu@ScopeSet@Symbols
247 \fi
248 \eu@ScopeSet@Value}

```

Special set. This command can be used as a hook to some external code.

```
249 \providecommand\eu@ScopeSet@Special[1]{\relax}
```

Latin set.

```

250 \newcommand\eu@ScopeSet@Latin[1]{
251 \eu@setkeys[Uppercase=Italic,Lowercase=Italic,Digits=Regular]{Latin}{\XKV@rm}
252 \eu@fontspec{\XKV@rm}{#1}
253 \ifcase\eu@LatinUppercase@@value
254 \ernewcommand\eu@LatinUppercase@symfont{Lmn}
255 \let\eu@Latinmathsf\zf@family
256 \@eu@LatinUppercase@true
257 \def\operator@font{\mathgroup\symLmn}
258 \or
259 \ernewcommand\eu@LatinUppercase@symfont{Lmit}
260 \let\eu@Latinmathsf\zf@family
261 \@eu@LatinUppercase@true
262 \or\fi
263 \ifcase\eu@LatinLowercase@@value
264 \ernewcommand\eu@LatinLowercase@symfont{Lmn}
265 \let\eu@Latinmathsf\zf@family
266 \@eu@LatinLowercase@true
267 \or

```

```

268 \ernewcommand\eu@LatinLowercase@symfont{Lmit}
269 \let\eu@Latinmathsfont\zf@family
270 \@eu@LatinLowercase@true
271 \or\fi
272 \ifcase\eu@LatinDigits@@value
273 \ernewcommand\eu@LatinDigits@symfont{Lmn}
274 \let\eu@Latinmathsfont\zf@family
275 \@eu@LatinDigits@true
276 \or
277 \ernewcommand\eu@LatinDigits@symfont{Lmit}
278 \let\eu@Latinmathsfont\zf@family
279 \@eu@LatinDigits@true
280 \or\fi}

Greek set
281 \newcommand\eu@ScopeSet@Greek[1]{
282 \eu@setkeys[Uppercase=Regular,Lowercase=Italic,Digits=Plain]{Greek}{\XKV@rm}
283 \eu@fontspec{\XKV@rm}{#1}
284 \ifcase\eu@GreekUppercase@@value
285 \ernewcommand\eu@GreekUppercase@symfont{Gmn}
286 \let\eu@Greekmathsfont\zf@family
287 \@eu@GreekUppercase@true
288 \or
289 \ernewcommand\eu@GreekUppercase@symfont{Gmit}
290 \let\eu@Greekmathsfont\zf@family
291 \@eu@GreekUppercase@true
292 \or\fi
293 \ifcase\eu@GreekLowercase@@value
294 \ernewcommand\eu@GreekLowercase@symfont{Gmn}
295 \let\eu@Greekmathsfont\zf@family
296 \@eu@GreekLowercase@true
297 \or
298 \ernewcommand\eu@GreekLowercase@symfont{Gmit}
299 \let\eu@Greekmathsfont\zf@family
300 \@eu@GreekLowercase@true
301 \or\fi
302 \ifcase\eu@GreekDigits@@value
303 \ernewcommand\eu@GreekDigits@symfont{Gmn}
304 \let\eu@Greekmathsfont\zf@family
305 \@eu@GreekDigits@true
306 \or
307 \ernewcommand\eu@GreekDigits@symfont{Gmit}
308 \let\eu@Greekmathsfont\zf@family
309 \@eu@GreekDigits@true
310 \or\fi}

Symbols set. This command actually does not do a lot.
311 \newcommand\eu@ScopeSet@Symbols[1]{
312 \@eu@Symbols@true
313 \zf@fontspec{}{#1}
314 \let\eu@Symbolsmathsfont\zf@family
315 \def\eu@Symbols@symfont{Smn}}
316 \renewcommand\eu@ScopeSet@Symbols[1]{
317 \@eu@Symbols@false}

```

7.5.2 Exchanging variant and normal forms

```

318 \newcommand\eu@VarForms[1]{
319   \fontfamily\eu@Greekmathsfnt\selectfont
320   \eu@setkeys{VarForms}{#1}
321   \ifeu@VarForms@beta
322     \eu@DeclareMathSymbol{\beta}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3D0}{\beta}
323     \eu@DeclareMathSymbol{\eth}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3B}{\varbeta}
324   \fi
325   \ifeu@VarForms@epsilon
326     \eu@DeclareMathSymbol{\epsilon}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3E}{\varepsilon}
327     \eu@DeclareMathSymbol{\epsilon}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3F5}{\epsilon}
328   \fi
329   \ifeu@VarForms@theta
330     \eu@DeclareMathSymbol{\eth}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3D1}{\vartheta}
331     \eu@DeclareMathSymbol{\eth}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3D1}{\theta}
332   \fi
333   \ifeu@VarForms@kappa
334     \eu@DeclareMathSymbol{\kappa}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3F0}{\varkappa}
335     \eu@DeclareMathSymbol{\kappa}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3F0}{\kappa}
336   \fi
337   \ifeu@VarForms@pi
338     \eu@DeclareMathSymbol{\pi}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3D6}{\varpi}
339     \eu@DeclareMathSymbol{\pi}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3D6}{\pi}
340   \fi
341   \ifeu@VarForms@rho
342     \eu@DeclareMathSymbol{\rho}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3F1}{\varrho}
343     \eu@DeclareMathSymbol{\rho}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3F1}{\rho}
344   \fi
345   \ifeu@VarForms@phi
346     \eu@DeclareMathSymbol{\phi}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3D5}{\varphi}
347     \eu@DeclareMathSymbol{\phi}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3D5}{\phi}
348   \fi
349   \ifeu@VarForms@Theta
350     \eu@DeclareMathSymbol{\Theta}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3F4}{\varTheta}
351     \eu@DeclareMathSymbol{\Theta}{\mathalpha}{\eu@GreekLowercase@symfont}{\`3F4}{\Theta}
352   \fi}

```

7.6 xkeyval things

```

353 \define@choicekey[eu]{Scope}{Set}
354   [\eu@ScopeSet@value\eu@ScopeSet@@value]
355   {Special, Latin, Greek, Symbols}[Special]{\relax}
356 \define@choicekey[eu]{Latin}{Uppercase}
357   [\eu@LatinUppercase@value\eu@LatinUppercase@@value]
358   {Regular, Italic, Plain}[Italic]{\relax}
359 \define@choicekey[eu]{Latin}{Lowercase}
360   [\eu@LatinLowercase@value\eu@LatinLowercase@@value]
361   {Regular, Italic, Plain}[Italic]{\relax}
362 \define@choicekey[eu]{Latin}{Digits}
363   [\eu@LatinDigits@value\eu@LatinDigits@@value]
364   {Regular, Italic, Plain}[Regular]{\relax}
365 \define@choicekey[eu]{Greek}{Uppercase}
366   [\eu@GreekUppercase@value\eu@GreekUppercase@@value]
367   {Regular, Italic, Plain}[Regular]{\relax}

```



```

368 \define@choicekey[eu]{Greek}{Lowercase}
369     [\eu@GreekLowercase@value\eu@GreekLowercase@@@value]
370     {Regular,Italic,Plain}[Italic]{\relax}
371 \define@choicekey[eu]{Greek}{Digits}
372     [\eu@GreekDigits@value\eu@GreekDigits@@@value]
373     {Regular,Italic,Plain}[Regular]{\relax}
374 \define@boolkey[eu]{VarForms}{beta}[True]{\relax}
375 \define@boolkey[eu]{VarForms}{epsilon}[True]{\relax}
376 \define@boolkey[eu]{VarForms}{theta}[True]{\relax}
377 \define@boolkey[eu]{VarForms}{kappa}[True]{\relax}
378 \define@boolkey[eu]{VarForms}{pi}[True]{\relax}
379 \define@boolkey[eu]{VarForms}{rho}[True]{\relax}
380 \define@boolkey[eu]{VarForms}{phi}[True]{\relax}
381 \define@boolkey[eu]{VarForms}{Theta}[True]{\relax}

```

7.7 Extending L^AT_EX commands

`\eu@XeTeXDeclareMathSymbol` A crude extension of L^AT_EX's `\DeclareMathSymbol` to allow the greater set of Unicode characters.

```

382 \newcommand\eu@XeTeXDeclareMathSymbol[4]{
383     \expandafter\XeTeXmathcode`#1\mathchar@type#2\csname sym#3\endcsname#4}

```

`\eu@DeclareMathSymbol` This command declares a symbol only if it appears in the font and optionally defines an equivalent control sequence.

```

384 \newcommand\eu@DeclareMathSymbol[4]{
385     \ifnum\XeTeXcharglyph#4>0
386         \eu@XeTeXDeclareMathSymbol#1#2#3#4
387     \fi
388     \let\eu@character#1
389     \def\eu@@@character{#4}
390     \futurelet\@tempa\eu@@@DeclareMathSymbol}
391 \def\eu@@@DeclareMathSymbol{
392     \ifx\@tempa[
393         \let\eu@@@DeclareMathSymbol\eu@DeclareMathSymbol@option
394     \else
395         \let\eu@@@DeclareMathSymbol\relax
396     \fi
397     \eu@@@DeclareMathSymbol}
398 \def\eu@DeclareMathSymbol@option[#1]{%
399     \ifnum\XeTeXcharglyph\eu@@@character>0
400         \let#1\eu@character
401     \fi}

```

A modification of L^AT_EX's `\DeclareMathSymbol` to perform only if the glyph appears in the font.

```

402 \let\LaTeXe@DeclareMathSymbol\DeclareMathSymbol
403 \newcommand\eu@LaTeXe@DeclareMathSymbol[4]{
404     \ifnum\XeTeXcharglyph#4>0
405         \LaTeXe@DeclareMathSymbol{#1}{#2}{#3}{#4}
406     \fi}
407 \let\DeclareMathSymbol\eu@LaTeXe@DeclareMathSymbol

```

7.8 Declarations

Fonts.

```

408 \newcommand\eu@DeclareFonts{
409   \let\eu@if@Latin\@gobble
410   \if@eu@LatinUppercase@\let\eu@if@Latin\@firstofone\fi
411   \if@eu@LatinLowercase@\let\eu@if@Latin\@firstofone\fi
412   \if@eu@LatinDigits@\let\eu@if@Latin\@firstofone\fi
413   \let\eu@if@Greek\@gobble
414   \if@eu@GreekUppercase@\let\eu@if@Greek\@firstofone\fi
415   \if@eu@GreekLowercase@\let\eu@if@Greek\@firstofone\fi
416   \if@eu@GreekDigits@\let\eu@if@Greek\@firstofone\fi
417   \eu@if@Latin{
418     \DeclareSymbolFont{Lmn}{EU1}{\eu@Latinmathsfnt}{m}{n}
419     \DeclareSymbolFont{Lmit}{EU1}{\eu@Latinmathsfnt}{m}{it}
420   }
421   \eu@if@Greek{
422     \DeclareSymbolFont{Gmn}{EU1}{\eu@Greekmathsfnt}{m}{n}
423     \DeclareSymbolFont{Gmit}{EU1}{\eu@Greekmathsfnt}{m}{it}}
424   \if@eu@Symbols@
425     \DeclareSymbolFont{Smn}{EU1}{\eu@Symbolmathsfnt}{m}{n}
426   \fi}

```

Digits.

```

427 \newcommand\eu@DeclareDigits{
428   \let\eu@if@Digits\@gobble
429   \if@eu@GreekDigits@
430     \let\eu@if@Digits\@firstofone
431     \let\eu@Digits@symfont\eu@GreekDigits@symfont
432     \let\eu@Digitmathsfnt\eu@Greekmathsfnt
433   \else
434     \if@eu@LatinDigits@
435       \let\eu@if@Digits\@firstofone
436       \let\eu@Digits@symfont\eu@LatinDigits@symfont
437       \let\eu@Digitmathsfnt\eu@Latinmathsfnt
438     \fi
439   \fi
440   \eu@if@Digits{
441     \fontfamily\eu@Digitmathsfnt\selectfont
442     \DeclareMathSymbol{0}{\mathord}{\eu@Digits@symfont}{`0}
443     \DeclareMathSymbol{1}{\mathord}{\eu@Digits@symfont}{`1}
444     \DeclareMathSymbol{2}{\mathord}{\eu@Digits@symfont}{`2}
445     \DeclareMathSymbol{3}{\mathord}{\eu@Digits@symfont}{`3}
446     \DeclareMathSymbol{4}{\mathord}{\eu@Digits@symfont}{`4}
447     \DeclareMathSymbol{5}{\mathord}{\eu@Digits@symfont}{`5}
448     \DeclareMathSymbol{6}{\mathord}{\eu@Digits@symfont}{`6}
449     \DeclareMathSymbol{7}{\mathord}{\eu@Digits@symfont}{`7}
450     \DeclareMathSymbol{8}{\mathord}{\eu@Digits@symfont}{`8}
451     \DeclareMathSymbol{9}{\mathord}{\eu@Digits@symfont}{`9}}

```

Uppercase Latin.

```

452 \newcommand\eu@DeclareLatinUppercase{
453   \if@eu@LatinUppercase@
454     \fontfamily\eu@Latinmathsfnt\selectfont
455     \DeclareMathSymbol{A}{\mathalpha}{\eu@LatinUppercase@symfont}{`A}

```

```

456 \DeclareMathSymbol{B}{\mathalpha}{\eu@LatinUppercase@symfont}{`B}
457 \DeclareMathSymbol{C}{\mathalpha}{\eu@LatinUppercase@symfont}{`C}
458 \DeclareMathSymbol{D}{\mathalpha}{\eu@LatinUppercase@symfont}{`D}
459 \DeclareMathSymbol{E}{\mathalpha}{\eu@LatinUppercase@symfont}{`E}
460 \DeclareMathSymbol{F}{\mathalpha}{\eu@LatinUppercase@symfont}{`F}
461 \DeclareMathSymbol{G}{\mathalpha}{\eu@LatinUppercase@symfont}{`G}
462 \DeclareMathSymbol{H}{\mathalpha}{\eu@LatinUppercase@symfont}{`H}
463 \DeclareMathSymbol{I}{\mathalpha}{\eu@LatinUppercase@symfont}{`I}
464 \DeclareMathSymbol{J}{\mathalpha}{\eu@LatinUppercase@symfont}{`J}
465 \DeclareMathSymbol{K}{\mathalpha}{\eu@LatinUppercase@symfont}{`K}
466 \DeclareMathSymbol{L}{\mathalpha}{\eu@LatinUppercase@symfont}{`L}
467 \DeclareMathSymbol{M}{\mathalpha}{\eu@LatinUppercase@symfont}{`M}
468 \DeclareMathSymbol{N}{\mathalpha}{\eu@LatinUppercase@symfont}{`N}
469 \DeclareMathSymbol{O}{\mathalpha}{\eu@LatinUppercase@symfont}{`O}
470 \DeclareMathSymbol{P}{\mathalpha}{\eu@LatinUppercase@symfont}{`P}
471 \DeclareMathSymbol{Q}{\mathalpha}{\eu@LatinUppercase@symfont}{`Q}
472 \DeclareMathSymbol{R}{\mathalpha}{\eu@LatinUppercase@symfont}{`R}
473 \DeclareMathSymbol{S}{\mathalpha}{\eu@LatinUppercase@symfont}{`S}
474 \DeclareMathSymbol{T}{\mathalpha}{\eu@LatinUppercase@symfont}{`T}
475 \DeclareMathSymbol{U}{\mathalpha}{\eu@LatinUppercase@symfont}{`U}
476 \DeclareMathSymbol{V}{\mathalpha}{\eu@LatinUppercase@symfont}{`V}
477 \DeclareMathSymbol{W}{\mathalpha}{\eu@LatinUppercase@symfont}{`W}
478 \DeclareMathSymbol{X}{\mathalpha}{\eu@LatinUppercase@symfont}{`X}
479 \DeclareMathSymbol{Y}{\mathalpha}{\eu@LatinUppercase@symfont}{`Y}
480 \DeclareMathSymbol{Z}{\mathalpha}{\eu@LatinUppercase@symfont}{`Z}
481 \fi}

```

Lowercase Latin.

```

482 \newcommand\eu@DeclareLatinLowercase{
483   \if@eu@LatinLowercase@
484     \fontfamily\eu@Latinmathsfnt\selectfont
485     \DeclareMathSymbol{a}{\mathalpha}{\eu@LatinLowercase@symfont}{`a}
486     \DeclareMathSymbol{b}{\mathalpha}{\eu@LatinLowercase@symfont}{`b}
487     \DeclareMathSymbol{c}{\mathalpha}{\eu@LatinLowercase@symfont}{`c}
488     \DeclareMathSymbol{d}{\mathalpha}{\eu@LatinLowercase@symfont}{`d}
489     \DeclareMathSymbol{e}{\mathalpha}{\eu@LatinLowercase@symfont}{`e}
490     \DeclareMathSymbol{f}{\mathalpha}{\eu@LatinLowercase@symfont}{`f}
491     \DeclareMathSymbol{g}{\mathalpha}{\eu@LatinLowercase@symfont}{`g}
492     \DeclareMathSymbol{h}{\mathalpha}{\eu@LatinLowercase@symfont}{`h}
493     \DeclareMathSymbol{i}{\mathalpha}{\eu@LatinLowercase@symfont}{`i}
494     \DeclareMathSymbol{j}{\mathalpha}{\eu@LatinLowercase@symfont}{`j}
495     \DeclareMathSymbol{k}{\mathalpha}{\eu@LatinLowercase@symfont}{`k}
496     \DeclareMathSymbol{l}{\mathalpha}{\eu@LatinLowercase@symfont}{`l}
497     \DeclareMathSymbol{m}{\mathalpha}{\eu@LatinLowercase@symfont}{`m}
498     \DeclareMathSymbol{n}{\mathalpha}{\eu@LatinLowercase@symfont}{`n}
499     \DeclareMathSymbol{o}{\mathalpha}{\eu@LatinLowercase@symfont}{`o}
500     \DeclareMathSymbol{p}{\mathalpha}{\eu@LatinLowercase@symfont}{`p}
501     \DeclareMathSymbol{q}{\mathalpha}{\eu@LatinLowercase@symfont}{`q}
502     \DeclareMathSymbol{r}{\mathalpha}{\eu@LatinLowercase@symfont}{`r}
503     \DeclareMathSymbol{s}{\mathalpha}{\eu@LatinLowercase@symfont}{`s}
504     \DeclareMathSymbol{t}{\mathalpha}{\eu@LatinLowercase@symfont}{`t}
505     \DeclareMathSymbol{u}{\mathalpha}{\eu@LatinLowercase@symfont}{`u}
506     \DeclareMathSymbol{v}{\mathalpha}{\eu@LatinLowercase@symfont}{`v}
507     \DeclareMathSymbol{w}{\mathalpha}{\eu@LatinLowercase@symfont}{`w}
508     \DeclareMathSymbol{x}{\mathalpha}{\eu@LatinLowercase@symfont}{`x}

```

```

509 \DeclareMathSymbol{y}{\mathalpha}{\eu@LatinLowercase@symfont}{`y}
510 \DeclareMathSymbol{z}{\mathalpha}{\eu@LatinLowercase@symfont}{`z}
511 \fi}

```

Uppercase Greek.

```

512 \newcommand\eu@DeclareGreekUppercase{
513 \if@eu@GreekUppercase@
514 \fontfamily\eu@Greekmathsfnt\selectfont
515 \eu@DeclareMathSymbol{A}{\mathalpha}{\eu@GreekUppercase@symfont}{`A}[\Alpha]
516 \eu@DeclareMathSymbol{B}{\mathalpha}{\eu@GreekUppercase@symfont}{`B}[\Beta]
517 \eu@DeclareMathSymbol{Γ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Γ}[\Gamma]
518 \eu@DeclareMathSymbol{Δ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Δ}[\Delta]
519 \eu@DeclareMathSymbol{Ε}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ε}[\Epsilon]
520 \eu@DeclareMathSymbol{Ζ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ζ}[\Zeta]
521 \eu@DeclareMathSymbol{Η}{\mathalpha}{\eu@GreekUppercase@symfont}{`Η}[\Eta]
522 \eu@DeclareMathSymbol{Θ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Θ}[\Theta]
523 \eu@DeclareMathSymbol{Ι}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ι}[\Iota]
524 \eu@DeclareMathSymbol{Κ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Κ}[\Kappa]
525 \eu@DeclareMathSymbol{Λ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Λ}[\Lambda]
526 \eu@DeclareMathSymbol{Μ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Μ}[\Mu]
527 \eu@DeclareMathSymbol{Ν}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ν}[\Nu]
528 \eu@DeclareMathSymbol{Ξ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ξ}[\Xi]
529 \eu@DeclareMathSymbol{Ο}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ο}[\Omicron]
530 \eu@DeclareMathSymbol{Π}{\mathalpha}{\eu@GreekUppercase@symfont}{`Π}[\Pi]
531 \eu@DeclareMathSymbol{Ρ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ρ}[\Rho]
532 \eu@DeclareMathSymbol{Σ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Σ}[\Sigma]
533 \eu@DeclareMathSymbol{Τ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Τ}[\Tau]
534 \eu@DeclareMathSymbol{Υ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Υ}[\Upsilon]
535 \eu@DeclareMathSymbol{Φ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Φ}[\Phi]
536 \eu@DeclareMathSymbol{Χ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Χ}[\Chi]
537 \eu@DeclareMathSymbol{Ψ}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ψ}[\Psi]
538 \eu@DeclareMathSymbol{Ω}{\mathalpha}{\eu@GreekUppercase@symfont}{`Ω}[\Omega]
539 \eu@DeclareMathSymbol{Θ}{\mathalpha}{\eu@GreekUppercase@symfont}{`3F4}[\varTheta]
540 \eu@DeclareMathSymbol{F}{\mathalpha}{\eu@GreekUppercase@symfont}{`3DC}[\Digamma]
541 \fi}

```

Lowercase Greek.

```

542 \newcommand\eu@DeclareGreekLowercase{
543 \if@eu@GreekLowercase@
544 \fontfamily\eu@Greekmathsfnt\selectfont
545 \eu@DeclareMathSymbol{α}{\mathalpha}{\eu@GreekLowercase@symfont}{`α}[\alpha]
546 \eu@DeclareMathSymbol{β}{\mathalpha}{\eu@GreekLowercase@symfont}{`β}[\beta]
547 \eu@DeclareMathSymbol{γ}{\mathalpha}{\eu@GreekLowercase@symfont}{`γ}[\gamma]
548 \eu@DeclareMathSymbol{δ}{\mathalpha}{\eu@GreekLowercase@symfont}{`δ}[\delta]
549 \eu@DeclareMathSymbol{ε}{\mathalpha}{\eu@GreekLowercase@symfont}{`ε}[\epsilon]
550 \eu@DeclareMathSymbol{ζ}{\mathalpha}{\eu@GreekLowercase@symfont}{`ζ}[\zeta]
551 \eu@DeclareMathSymbol{η}{\mathalpha}{\eu@GreekLowercase@symfont}{`η}[\eta]
552 \eu@DeclareMathSymbol{θ}{\mathalpha}{\eu@GreekLowercase@symfont}{`θ}[\theta]
553 \eu@DeclareMathSymbol{ι}{\mathalpha}{\eu@GreekLowercase@symfont}{`ι}[\iota]
554 \eu@DeclareMathSymbol{κ}{\mathalpha}{\eu@GreekLowercase@symfont}{`κ}[\kappa]
555 \eu@DeclareMathSymbol{λ}{\mathalpha}{\eu@GreekLowercase@symfont}{`λ}[\lambda]
556 \eu@DeclareMathSymbol{μ}{\mathalpha}{\eu@GreekLowercase@symfont}{`μ}[\mu]
557 \eu@DeclareMathSymbol{ν}{\mathalpha}{\eu@GreekLowercase@symfont}{`ν}[\nu]
558 \eu@DeclareMathSymbol{ξ}{\mathalpha}{\eu@GreekLowercase@symfont}{`ξ}[\xi]
559 \eu@DeclareMathSymbol{ο}{\mathalpha}{\eu@GreekLowercase@symfont}{`ο}[\omicron]

```

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560 \eu@DeclareMathSymbol{\pi}{\mathalpha}{\eu@GreekLowercase@symfont}{`\pi}[\pi]
561 \eu@DeclareMathSymbol{\rho}{\mathalpha}{\eu@GreekLowercase@symfont}{`\rho}[\rho]
562 \eu@DeclareMathSymbol{\sigma}{\mathalpha}{\eu@GreekLowercase@symfont}{`\sigma}[\sigma]
563 \eu@DeclareMathSymbol{\tau}{\mathalpha}{\eu@GreekLowercase@symfont}{`\tau}[\tau]
564 \eu@DeclareMathSymbol{\upsilon}{\mathalpha}{\eu@GreekLowercase@symfont}{`\upsilon}[\upsilon]
565 \eu@DeclareMathSymbol{\phi}{\mathalpha}{\eu@GreekLowercase@symfont}{`\phi}[\phi]
566 \eu@DeclareMathSymbol{\chi}{\mathalpha}{\eu@GreekLowercase@symfont}{`\chi}[\chi]
567 \eu@DeclareMathSymbol{\psi}{\mathalpha}{\eu@GreekLowercase@symfont}{`\psi}[\psi]
568 \eu@DeclareMathSymbol{\omega}{\mathalpha}{\eu@GreekLowercase@symfont}{`\omega}[\omega]
569 \eu@DeclareMathSymbol{\varsigma}{\mathalpha}{\eu@GreekLowercase@symfont}{`\varsigma}[\varsigma]
570 \eu@DeclareMathSymbol{\vartheta}{\mathalpha}{\eu@GreekLowercase@symfont}{`\vartheta}[\vartheta]
571 \eu@DeclareMathSymbol{\varepsilon}{\mathalpha}{\eu@GreekLowercase@symfont}{`\varepsilon}[\varepsilon]
572 \eu@DeclareMathSymbol{\vartheta}{\mathalpha}{\eu@GreekLowercase@symfont}{`\vartheta}[\vartheta]
573 \eu@DeclareMathSymbol{\varkappa}{\mathalpha}{\eu@GreekLowercase@symfont}{`\varkappa}[\varkappa]
574 \eu@DeclareMathSymbol{\varpi}{\mathalpha}{\eu@GreekLowercase@symfont}{`\varpi}[\varpi]
575 \eu@DeclareMathSymbol{\varrho}{\mathalpha}{\eu@GreekLowercase@symfont}{`\varrho}[\varrho]
576 \eu@DeclareMathSymbol{\varphi}{\mathalpha}{\eu@GreekLowercase@symfont}{`\varphi}[\varphi]
577 \eu@DeclareMathSymbol{\digamma}{\mathalpha}{\eu@GreekLowercase@symfont}{`\digamma}[\digamma]
578 \fi}

```

Symbols.

```

579 \newcommand\eu@DeclareSymbols{
580 \if@eu@Symbols@
581 \fontfamily\eu@Symbolsmathsfont\selectfont
582 \eu@DeclareMathSymbol{!}{\mathclose}{\eu@Symbols@symfont}{`\!}[\exclam]
583 \eu@DeclareMathSymbol{+}{\mathbin}{\eu@Symbols@symfont}{`\+}[\plus]
584 \eu@DeclareMathSymbol{,}{\mathpunct}{\eu@Symbols@symfont}{`,`}[,]
585 \eu@DeclareMathSymbol{.}{\mathord}{\eu@Symbols@symfont}{`.`}[\dot]
586 \XeTeXmathchardef\ldotp=6\symSmn` .
587 \eu@DeclareMathSymbol{:}{\mathrel}{\eu@Symbols@symfont}{`\:}[\colon]
588 \XeTeXmathchardef\colon=6\symSmn` :
589 \eu@DeclareMathSymbol{;}{\mathpunct}{\eu@Symbols@symfont}{`;}[\semicolon]
590 \eu@DeclareMathSymbol{<}{\mathrel}{\eu@Symbols@symfont}{`<}[\less]
591 \eu@DeclareMathSymbol{=}{\mathrel}{\eu@Symbols@symfont}{`=}[\eq]
592 \let\eq==
593 \eu@DeclareMathSymbol{>}{\mathrel}{\eu@Symbols@symfont}{`>}[\greater]
594 \eu@DeclareMathSymbol{?}{\mathclose}{\eu@Symbols@symfont}{`?}[\question]
595 \eu@DeclareMathSymbol{-}{\mathord}{\eu@Symbols@symfont}{`\-}[\neg]
596 \let\not\neg
597 \eu@DeclareMathSymbol{^}{\mathord}{\eu@Symbols@symfont}{`^}[\degree]
598 \eu@DeclareMathSymbol{\pm}{\mathbin}{\eu@Symbols@symfont}{`\pm}[\pm]
599 \eu@DeclareMathSymbol{\mu}{\mathord}{\eu@Symbols@symfont}{`\mu}[\micro]
600 \eu@DeclareMathSymbol{\times}{\mathbin}{\eu@Symbols@symfont}{`\times}[\times]
601 \eu@DeclareMathSymbol{\div}{\mathbin}{\eu@Symbols@symfont}{`\div}[\div]
602 \eu@DeclareMathSymbol{\forall}{\mathord}{\eu@Symbols@symfont}{`\forall}[\forall]
603 \eu@DeclareMathSymbol{\partial}{\mathord}{\eu@Symbols@symfont}{`\partial}[\partial]
604 \eu@DeclareMathSymbol{\exists}{\mathord}{\eu@Symbols@symfont}{`\exists}[\exists]
605 \eu@DeclareMathSymbol{\varnothing}{\mathord}{\eu@Symbols@symfont}{`\varnothing}[\varnothing]
606 \eu@DeclareMathSymbol{\Delta}{\mathord}{\eu@Symbols@symfont}{`\Delta}[\Delta]
607 \eu@DeclareMathSymbol{\nabla}{\mathord}{\eu@Symbols@symfont}{`\nabla}[\nabla]
608 \eu@DeclareMathSymbol{\in}{\mathrel}{\eu@Symbols@symfont}{`\in}[\in]
609 \eu@DeclareMathSymbol{\notin}{\mathrel}{\eu@Symbols@symfont}{`\notin}[\notin]
610 \eu@DeclareMathSymbol{\ni}{\mathrel}{\eu@Symbols@symfont}{`\ni}[\ni]
611 \let\owns\ni
612 \eu@DeclareMathSymbol{-}{\mathbin}{\eu@Symbols@symfont}{`\-}[\minus]

```

```

613 \eu@DeclareMathSymbol{-}{\mathbin}{\eu@Symbols@symfont}{`-}[\minus]
614 \eu@DeclareMathSymbol{/}{\mathbin}{\eu@Symbols@symfont}{`/}[\slash]
615 \eu@DeclareMathSymbol{*}{\mathbin}{\eu@Symbols@symfont}{`*}
616 \eu@DeclareMathSymbol{\mathbin}{\eu@Symbols@symfont}{`\ast}
617 \eu@DeclareMathSymbol{.}{\mathbin}{\eu@Symbols@symfont}{`.`}[\vysmbllkcrcle]
618 \let\bullet\vysmbllkcrcle
619 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\propto}
620 \eu@DeclareMathSymbol{\infty}{\mathord}{\eu@Symbols@symfont}{`\infty}
621 \eu@DeclareMathSymbol{\rightangle}{\eu@Symbols@symfont}{`\rightangle}
622 \eu@DeclareMathSymbol{\angle}{\mathord}{\eu@Symbols@symfont}{`\angle}
623 \eu@DeclareMathSymbol{\mathbin}{\eu@Symbols@symfont}{`\wedge}
624 \let\land\wedge
625 \eu@DeclareMathSymbol{\mathbin}{\eu@Symbols@symfont}{`\vee}
626 \let\lor\vee
627 \eu@DeclareMathSymbol{n}{\mathbin}{\eu@Symbols@symfont}{`n}[\cap]
628 \eu@DeclareMathSymbol{\mathbin}{\eu@Symbols@symfont}{`\cup}
629 \eu@DeclareMathSymbol{\mathord}{\eu@Symbols@symfont}{`\therefore}
630 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\sim}
631 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\cong}
632 \eu@DeclareMathSymbol{=}{\mathrel}{\eu@Symbols@symfont}{`\approx}
633 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\neq}
634 \let\neq\neq
635 \eu@DeclareMathSymbol{=}{\mathrel}{\eu@Symbols@symfont}{`\equiv}
636 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\leq}
637 \let\leq\leq
638 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\geq}
639 \let\geq\geq
640 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\subset}
641 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\supset}
642 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\nsubset}
643 \let\nsubset\nsubset
644 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\subseteq}
645 \eu@DeclareMathSymbol{\mathrel}{\eu@Symbols@symfont}{`\supseteq}
646 \eu@DeclareMathSymbol{\mathbin}{\eu@Symbols@symfont}{`\oplus}
647 \eu@DeclareMathSymbol{\mathbin}{\eu@Symbols@symfont}{`\otimes}
648 \eu@DeclareMathSymbol{\mathord}{\eu@Symbols@symfont}{`\bot}
649 \let\perp\bot
650 \eu@DeclareMathSymbol{\mathbin}{\eu@Symbols@symfont}{`\cdot}
651 \XeTeXmathchardef\cdotp=6\symSmn`
652 \fi}

```

The main work.

```

653 \AtBeginDocument{
654   \if@eu@amsmathloaded@else
655     \eu@isloaded[\PackageError{mathspec}{Package amsmath must be loaded be-
656       fore mathspec}{}]{amsmath}
657   \fi
658   \eu@DeclareFonts
659   \eu@ifnot@plaindigits{\eu@DeclareDigits}
660   \eu@DeclareLatinUppercase
661   \eu@DeclareLatinLowercase
662   \eu@DeclareGreekUppercase
663   \eu@DeclareGreekLowercase
664   \eu@DeclareSymbols
665   \eu@if@varforms{\eu@VarForms}

```

```

665 \eu@ifset@mathrm{
666   \DeclareMathAlphabet{\mathrm}{EU1}{\eu@mathrm}{m}{n}
667   \SetMathAlphabet{\mathrm}{bold}{EU1}{\eu@mathrm}{bx}{n}
668   \DeclareMathAlphabet{\mathit}{EU1}{\eu@mathrm}{m}{it}
669   \DeclareMathAlphabet{\mathbf}{EU1}{\eu@mathrm}{bx}{\eu@mathbf@shape}
670   \SetMathAlphabet{\mathit}{bold}{EU1}{\eu@mathrm}{bx}{it}
671   \@ifundefined{symLmn}{\relax}{\def\operator@font{\mathgroup\symLmn}}
672 \eu@ifset@mathcal{
673   \DeclareMathAlphabet{\mathcal}{EU1}{\eu@mathcal}{\eu@mathcal@series}{\eu@mathcal@shape}}
674 \eu@ifset@mathsf{
675   \DeclareMathAlphabet{\mathsf}{EU1}{\eu@mathsf}{m}{n}
676   \SetMathAlphabet{\mathsf}{bold}{EU1}{\eu@mathsf}{bx}{n}}
677 \eu@ifset@mathtt{
678   \DeclareMathAlphabet{\mathtt}{EU1}{\eu@mathtt}{m}{n}}
679 \eu@ifset@mathfrak{
680   \DeclareMathAlphabet{\mathfrak}{EU1}{\eu@mathfrak}{\eu@mathfrak@series}{n}}
681 \eu@ifset@mathbb{
682   \DeclareMathAlphabet{\mathbb}{EU1}{\eu@mathbb}{\eu@mathbb@series}{n}}
683 \fontfamily\rmdefault\selectfont
684 \let\DeclareMathSymbol\LaTeXe@DeclareMathSymbol}

```

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