

# The `textgreek` package\*

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## 1 Introduction

The usual way to print greek letters in L<sup>A</sup>T<sub>E</sub>X uses the math mode. E.g. `\beta` produces  $\beta$ . With the default math fonts, the greek letters produced this way are *italic*. Generally, this is ok, since they represent variables and variables are typeset italic with the default math font settings. In some circumstances, however, greek letters don't represent variables and should be typeset upright. E.g. in “ $\beta$ -decay” or “ $\mu$ A”.

The package `upgreek` provides commands to set upright greek letters in math mode, but it does not provide text symbols. You could use them in text with `\upbeta`-decay, for example, which gives  $\beta$ -decay, but the font will always be the same and will not be adapted to the surrounding font.

The package `textgreek` provides text commands for greek letters in text that adapt to the surrounding font. For example in bold text, **the command `\textbeta` gives  $\beta$  while `\upbeta` gives  $\beta$** . In sans-serif text it is,  $\beta$  vs.  $\beta$ .

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\*This document corresponds to `textgreek` v0.4, dated 2011/03/30.

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### 3 Usage

The following list shows the commands provided by this package. You can use these commands in any context.

<code>\textalpha</code>	$\alpha$	<code>\textnu</code>	$\nu$	<code>\textBeta</code>	B	<code>\textOmikron</code>	O
<code>\textbeta</code>	$\beta$	<code>\textxi</code>	$\xi$	<code>\textGamma</code>	$\Gamma$	<code>\textPi</code>	$\Pi$
<code>\textgamma</code>	$\gamma$	<code>\textomikron</code>	$o$	<code>\textDelta</code>	$\Delta$	<code>\textRho</code>	$\rho$
<code>\textdelta</code>	$\delta$	<code>\textpi</code>	$\pi$	<code>\textEpsilon</code>	E	<code>\textSigma</code>	$\Sigma$
<code>\textepsilon</code>	$\epsilon$	<code>\textrho</code>	$\rho$	<code>\textZeta</code>	Z	<code>\textTau</code>	T
<code>\textzeta</code>	$\zeta$	<code>\textsigma</code>	$\sigma$	<code>\textEta</code>	H	<code>\textUpsilon</code>	$\Upsilon$
<code>\texteta</code>	$\eta$	<code>\texttau</code>	$\tau$	<code>\textTheta</code>	$\Theta$	<code>\textPhi</code>	$\Phi$
<code>\texttheta</code>	$\theta$	<code>\textupsilon</code>	$\upsilon$	<code>\textIota</code>	I	<code>\textChi</code>	X
<code>\textiota</code>	$\iota$	<code>\textphi</code>	$\phi$	<code>\textKappa</code>	K	<code>\textPsi</code>	$\Psi$
<code>\textkappa</code>	$\kappa$	<code>\textchi</code>	$\chi$	<code>\textLambda</code>	$\Lambda$	<code>\textOmega</code>	$\Omega$
<code>\textlambda</code>	$\lambda$	<code>\textpsi</code>	$\psi$	<code>\textMu</code>	M		
<code>\textmu</code>	$\mu$	<code>\textomega</code>	$\omega$	<code>\textNu</code>	N		
<code>\textmugreek</code>	$\mu$	<code>\textAlpha</code>	A	<code>\textXi</code>	$\Xi$		

#### 3.1 Advanced commands

`\textgreekfontmap` The package provides a number of options that allows to select a font that will be used instead of `cmr/m/n`. The list of font substitutions is written to the log file. If you need to customize the font substitutions, you can redefine `\textgreekfontmap`. For example, the font map for the option `artemisia` may also be set by:

```
\renewcommand*{\textgreekfontmap}{
  {eur/m/n}{U/eur/m/n}
  {eur/b/n}{U/eur/b/n}
  {cmr/m/n}{LGR/artemisia/m/n}
  {cmr/b/n}{LGR/artemisia/b/n}
  {cmr/bx/n}{LGR/artemisia/bx/n}
  {lmr/m/n}{LGR/artemisia/m/n}
  {lmr/b/n}{LGR/artemisia/b/n}
  {lmr/bx/n}{LGR/artemisia/bx/n}
  {phv/m/n}{U/psy/m/n}}
```

The list contains pairs of options: the font spec (without the encoding) of the font to be replaced and the font spec (with encoding) of the font to be used as substitute. Fonts not listed will be substituted with the same font-family, font-series, and font-shape in the encoding LGR. Since the Euler font (`eur`) does not use the encoding LGR, it has to be replaced by `U/eur/m/n`.

## 4 Package Options

You can choose the greek fonts used.

**cbgreek** use the default fonts. This is the default. Font sample: αβγδε ζηθικ  
λμνξο πρστυ φχψω ΑΒΓΔΕ ΖΗΘΙΚ ΛΜΝΞΟ ΠΡΣΤΥ ΦΧΨΩ

**euler** use the Euler fonts as a companion for CM Roman and LM Roman. Font sam-  
ple: αβγδε ζηθικ λμνξο πρστυ φχψω ΑΒΓΔΕ ΖΗΘΙΚ ΛΜΝΞΟ ΠΡΣΤΥ  
ΦΧΨΩ

**artemisia** use Artemisia fonts as a companion for CM Roman and LM Roman.  
Font sample αβγδε ζηθικ λμνξο πρστυ φχψω ΑΒΓΔΕ ΖΗΘΙΚ ΛΜΝΞΟ ΠΡΣΤΥ  
ΦΧΨΩ

## 5 Compatibility

If you use the package `hyperref` I recommend to use the option `unicode`, i.e. `\usepackage[unicode]{hyperref}`. `Hyperref` will recognize the `textgreek` letters and replace them with unicode in PDF-strings.

You can use `upgreek` and `textgreek` in the same document. If you want to use a `textgreek` letter inside a `math` environment, you can place it into an `\mbox` or `\textnormal`, but I use `\text` from the package `amstext`, e.g.  $\lambda_{\text{\textbeta}}$ .

## 6 Examples

Using Helvetica, the font “Symbol” is used for greek letters. Let’s try γ.

## 7 Copyright

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This work has the LPPL maintenance status ‘author-maintained’.

The Current Maintainer of this work is Leonard Michlmayr.

This work consists of the file `textgreek.dtx` and the derived files `textgreek.sty` and `textgreek.pdf`

## 8 Implementation

Load the LGR font encoding.

```
1 \InputIfFileExists{lgrenc.def}{%
2 \PackageInfo{textgreek}{Loading the definitions for the Greek font%
3 encoding.}}{%
4 \PackageError{textgreek}{Cannot find the file lgrenc.def}{%
```

```

5   lgrenc.def is a file that contains the definitions for the Greek
6   font encoding LGR. Maybe it comes with the babel package.}}

```

## 8.1 Package Options

```

7 \DeclareOption{cbgreek}{%
8 \renewcommand*{\textgreekfontmap}{%
9 {eur/m/n}{U/eur/m/n}
10 {eur/b/n}{U/eur/b/n}
11 {phv/m/n}{U/psy/m/n}}}%

12 \DeclareOption{euler}{%
13 \renewcommand*{\textgreekfontmap}{%
14 {eur/m/n}{U/eur/m/n}
15 {eur/b/n}{U/eur/b/n}
16 {cmr/m/n}{U/eur/m/n}
17 {cmr/b/n}{U/eur/b/n}
18 {cmr/bx/n}{U/eur/b/n}
19 {lmr/m/n}{U/eur/m/n}
20 {lmr/b/n}{U/eur/b/n}
21 {lmr/bx/n}{U/eur/b/n}
22 {phv/m/n}{U/psy/m/n}}}%

23 \DeclareOption{artemisias}{%
24 \renewcommand*{\textgreekfontmap}{%
25 {eur/m/n}{U/eur/m/n}
26 {eur/b/n}{U/eur/b/n}
27 {cmr/m/n}{LGR/artemisias/m/n}
28 {cmr/b/n}{LGR/artemisias/b/n}
29 {cmr/bx/n}{LGR/artemisias/bx/n}
30 {lmr/m/n}{LGR/artemisias/m/n}
31 {lmr/b/n}{LGR/artemisias/b/n}
32 {lmr/bx/n}{LGR/artemisias/bx/n}
33 {phv/m/n}{U/psy/m/n}}}%

```

Initialize `\textgreekfontmap`, set the default option and process the options.

`\textgreekfontmap`

```

34 \newcommand*{\textgreekfontmap}{}%
35 \ExecuteOptions{cbgreek}
36 \ProcessOptions\relax%
37 \PackageInfo{textgreek}{Loaded fontmap: \textgreekfontmap.}

```

## 8.2 Font substitutions

`\textgreek@substfont` Substitute a font.

```

38 \def\textgreek@setfont#1/#2/#3/#4\relax{\usefont{#1}{#2}{#3}{#4}}%
39 \def\textgreek@skipencoding#1/#2\relax{#2}%
40 \def\textgreek@substfont#1#2{%
41 \begingroup\edef\tempa{#1}\edef\tempb{\curr@fontshape}%
42 \edef\tempc{\expandafter\textgreek@skipencoding\tempb\relax}%
43 \def\spit##1##2\endgroup{\fi\endgroup##1}%
44 \ifx\tempa\tempc\spit{\expandafter\textgreek@setfont #2\relax}\fi\endgroup}%

```

`\textgreek@substfont` Process a list of font substitutions.

```

45 \def\textgreek@eof{}%
46 \def\textgreek@return#1#2\textgreek@eof{%
47 \fi #1}
48 \newcommand{\textgreeksubstfonts}[1]{%
49 \ifx#1\textgreek@eof%
50 \else\textgreek@return{\textgreek@substfonts#1\textgreek@eof}%
51 \fi\textgreek@eof}
52 \def\textgreek@substfonts#1#2#3\textgreek@eof{%
53 \textgreek@substfont{#1}{#2}%
54 \def\textgreek@temp{#3}\ifx\textgreek@temp\textgreek@eof\else%
55 \textgreek@return{\textgreek@substfonts#3\textgreek@eof}%
56 \fi\textgreek@eof}

```

`\textgreekfont` Select the greek font encoding and apply font replacements.

```

57 \newcommand*{\textgreekfont}{%
58 \fontencoding{LGR}%
59 \expandafter\textgreeksubstfonts\expandafter{\textgreekfontmap}%
60 \selectfont}%

```

`\lgrtoeuler` Convert LGR encoded characters to Euler's U encoding.

```

61 \newcommand*{\lgrtoeuler}[1]{%
62 \if G#1\textgreek@return{\char0}\fi%
63 \if D#1\textgreek@return{\char1}\fi%
64 \if J#1\textgreek@return{\char2}\fi%
65 \if L#1\textgreek@return{\char3}\fi%
66 \if X#1\textgreek@return{\char4}\fi%
67 \if P#1\textgreek@return{\char5}\fi%
68 \if S#1\textgreek@return{\char6}\fi%
69 \if U#1\textgreek@return{\char7}\fi%
70 \if F#1\textgreek@return{\char8}\fi%
71 \if Y#1\textgreek@return{\char9}\fi%
72 \if W#1\textgreek@return{\char10}\fi%
73 \if a#1\textgreek@return{\char11}\fi%
74 \if b#1\textgreek@return{\char12}\fi%
75 \if g#1\textgreek@return{\char13}\fi%
76 \if d#1\textgreek@return{\char14}\fi%
77 \if 3#1\textgreek@return{\char15}\fi% element-of style epsilon
78 \if z#1\textgreek@return{\char16}\fi%
79 \if h#1\textgreek@return{\char17}\fi%
80 \if O#1\textgreek@return{\char18}\fi% temperature style theta
81 \if i#1\textgreek@return{\char19}\fi%
82 \if k#1\textgreek@return{\char20}\fi%
83 \if l#1\textgreek@return{\char21}\fi%
84 \if m#1\textgreek@return{\char22}\fi%
85 \if n#1\textgreek@return{\char23}\fi%
86 \if x#1\textgreek@return{\char24}\fi%
87 \if p#1\textgreek@return{\char25}\fi%
88 \if r#1\textgreek@return{\char26}\fi%
89 \if s#1\textgreek@return{\char27}\fi%
90 \if t#1\textgreek@return{\char28}\fi%
91 \if u#1\textgreek@return{\char29}\fi%
92 \if v#1\textgreek@return{\char30}\fi% o-slash style phi
93 \if q#1\textgreek@return{\char31}\fi%
94 \if y#1\textgreek@return{\char32}\fi%

```

```

95 \if w#1\textgreek@return{\char33}\fi%
Euler provides two variants of epsilon:  $\epsilon$  and  $\varepsilon$ . Use  $\varepsilon$  by default.
96 \if e#1\textgreek@return{\char34}\fi%
Euler provides two variants of theta:  $\theta$  and  $\vartheta$ . Use  $\vartheta$  by default.
97 \if j#1\textgreek@return{\char35}\fi%
Euler provides two variants of phi:  $\phi$  and  $\varphi$ . Use  $\varphi$  by default.
98 \if f#1\textgreek@return{\char39}\fi%
Use the default font for the LGR encoding, if the character is not present in Euler.
99 \fontencoding{LGR}\selectfont #1%
100 \textgreek@eof}%

```

```

\TextGreek Produce a greek letter using the correct font. If the font is Euler, convert to Euler's
generic font encoding U.
101 \DeclareRobustCommand*\TextGreek}[1]{%
102 \begingroup%
103 \textgreekfont%
104 \def\tempa{eur}\edef\tempb{\f@family}%
105 \ifx\tempa\tempb\expandafter\lgrtoeuler\expandafter#1\else#1\noboundary\fi%
106 \endgroup}

```

### 8.3 List of greek letters

```

\DeclareTextGreekSymbol Define the symbol name with \DeclareTextCommandDefault.
107 \newcommand*\DeclareTextGreekSymbol}[2]{%
108 \expandafter\DeclareTextCommandDefault\csname text#1\endcsname%
109 {\TextGreek#2}}%

110 \DeclareTextGreekSymbol{alpha}{a}
111 \DeclareTextGreekSymbol{beta}{b}
112 \DeclareTextGreekSymbol{gamma}{g}
113 \DeclareTextGreekSymbol{delta}{d}
114 \DeclareTextGreekSymbol{epsilon}{e}
115 \DeclareTextGreekSymbol{zeta}{z}
116 \DeclareTextGreekSymbol{eta}{h}
117 \DeclareTextGreekSymbol{theta}{j}
118 \DeclareTextGreekSymbol{iota}{i}
119 \DeclareTextGreekSymbol{kappa}{k}
120 \DeclareTextGreekSymbol{lambda}{l}

```

```

\textmu Don't redefine \textmu if it is also provided by another package. Use \textmugreek
\textmugreek if you mean the greek letter rather than the micro symbol of the textcomp package.
121 \expandafter\ifx\csname?\string\textmu\endcsname\relax%
122 \DeclareTextGreekSymbol{mu}{m}\fi
123 \DeclareTextGreekSymbol{mugreek}{m}

124 \DeclareTextGreekSymbol{nu}{n}
125 \DeclareTextGreekSymbol{xi}{x}
126 \DeclareTextGreekSymbol{omikron}{o}
127 \DeclareTextGreekSymbol{pi}{p}
128 \DeclareTextGreekSymbol{rho}{r}
129 \DeclareTextGreekSymbol{sigma}{s}

```

```

130 \DeclareTextGreekSymbol{tau}{t}
131 \DeclareTextGreekSymbol{upsilon}{u}
132 \DeclareTextGreekSymbol{phi}{f}
133 \DeclareTextGreekSymbol{chi}{q}
134 \DeclareTextGreekSymbol{psi}{y}
135 \DeclareTextGreekSymbol{omega}{w}
136 \DeclareTextGreekSymbol{Alpha}{A}
137 \DeclareTextGreekSymbol{Beta}{B}
138 \DeclareTextGreekSymbol{Gamma}{G}
139 \DeclareTextGreekSymbol{Delta}{D}
140 \DeclareTextGreekSymbol{Epsilon}{E}
141 \DeclareTextGreekSymbol{Zeta}{Z}
142 \DeclareTextGreekSymbol{Eta}{H}
143 \DeclareTextGreekSymbol{Theta}{J}
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151 \DeclareTextGreekSymbol{Pi}{P}
152 \DeclareTextGreekSymbol{Rho}{R}
153 \DeclareTextGreekSymbol{Sigma}{S}
154 \DeclareTextGreekSymbol{Tau}{T}
155 \DeclareTextGreekSymbol{Upsilon}{U}
156 \DeclareTextGreekSymbol{Phi}{F}
157 \DeclareTextGreekSymbol{Chi}{Q}
158 \DeclareTextGreekSymbol{Psi}{Y}
159 \DeclareTextGreekSymbol{Omega}{W}

```

## 9 Change History

v0.1	General: Initial Version . . . . .	<b>1</b>	v0.4	<code>\TextGreek</code> : Avoid the ligature that changes sigma to a word-final sigma with the help of <code>\noboundary</code> . . . . .	<b>6</b>
v0.2	<code>\textgreekfont</code> : apply font replacements before <code>\setfont</code> . . . . .	<b>5</b>	<code>\textmu</code> : Don't override <code>textcomp</code> 's <code>textmu</code> . . . . .	<b>6</b>	
v0.3	<code>\textgreek@substfonts</code> : Make font substitutions customizable. . . . .	<b>4</b>	Don't provide <code>\textmicro</code> anymore. . . . .	<b>6</b>	

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