The **textgreek** package*

Leonard Michlmayr

`leonard.michlmayr at gmail.com`

2011/10/09

Abstract

The LaTeX package `textgreek` provides NFSS text symbols for Greek letters. This way the author can use Greek letters in text without changing to math mode. The usual font selection commands—e.g. `\textbf`—apply to these Greek letters as to usual text and the font is upright in an upright environment. Further, `hyperref` can use these symbols in PDF-strings such as PDF-bookmarks.

Contents

---

*This document corresponds to `textgreek` v0.7, dated 2011/10/09.

1

1 Introduction

The usual way to print Greek letters in LaTeX uses the math mode. E.g. `$\beta$` produces β. 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 "β-decay" or "μA".

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 β-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 β while `$\upbeta$` gives β**.

As textsymbols, Greek letters can also be used in unicode PDF-strings, for example in PDF-bookmarks provided by the hyperref package. See section 4.

2 Usage

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

\textalpha	α	\texttau	τ	\textXi	Ξ
\textbeta	β	\textupsilon	υ	\textOmikron	O
\textgamma	γ	\textphi	φ	\textPi	Π
\textdelta	δ	\textchi	χ	\textRho	P
\textepsilon	ε	\textpsi	ψ	\textSigma	Σ
\textzeta	ζ	\textomega	ω	\textTau	T
\texteta	η	\textAlpha	A	\textUpsilon	Υ
\texttheta	ϑ	\textBeta	B	\textPhi	Φ
\textiota	ι	\textGamma	Γ	\textChi	X
\textkappa	ϰ	\textDelta	Δ	\textPsi	Ψ
\textlambda	λ	\textEpsilon	E	\textOmega	Ω
\textmu	μ	\textZeta	Z		
\textmugreek	μ	\textEta	H	\textvarsigma	ς
\textnu	ν	\textTheta	Θ	\straightphi	ϕ
\textxi	ξ	\textIota	I	\scripttheta	ϑ
\textomikron	o	\textKappa	K	\straighttheta	θ
\textpi	π	\textLambda	Λ	\straightepsilon	ϵ
\textrho	ρ	\textMu	M		
\textsigma	σ	\textNu	N		

The textcomp package also defines `\textmu`. textgreek will not replace a prior definition of `\textmu` if recognized. Therefore it is often better to use `\textmugreek` instead to avoid unexpected results.

2.1 Package Options

You can choose the Greek fonts used.

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

euler use the Euler fonts as a companion for all fonts except Helvetica. Font sample: αβγδε ζηθικ λμνξο πρστυ φχψω ΑΒΓΔΕ ΖΗΘΙΚ ΛΜΝΞΟ ΠΡΣΤΥ ΦΨΩ φϑθε

artemisia use Artemisia fonts as a companion for all fonts except Helvetica and Euler. Font sample: αβγδε ζηθικ λμνξο πρστυ φχψω ΑΒΓΔΕ ΖΗΘΙΚ ΛΜΝΞΟ ΠΡΣΤΥ ΦΧΨΩ ςφϑθε

2.2 Advanced commands

The package provides a number of options that allows to select a font that will `\textgreekfontmap` be used. 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 euler may also be set by:

```
\renewcommand*{\textgreekfontmap}{
  {phv/*/*}{U/psy/*/*}
  {*/bx/n}{U/eur/b/n}
  {*/b/n}{U/eur/b/n}
  {*/*/n}{U/eur/m/n}
  {*/*/it}{OML/*/*/*}}
```

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 companion. The wildcard * may be used to match any family, series, or shape respectively. The first match is effective. Fonts that do not matched at all 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.

3   Examples

Most users will use this package to get upright Greek letters, but you can use it for italic letters too: for example `\textit{\textdelta}` δ.

When you are using Helvetica, the font "Symbol" is used for Greek letters: αβγδε ζηθικ λμνξο πρστυ φχψω ΑΒΓΔΕ ΖΗΘΙΚ ΛΜΝΞΟ ΠΡΣΤΥ ΦΧΨΩ ςφϑθε

Remember that TeX skips over whitespace directly following a command. Add `{}` to get an interword space after a command. E.g. σ is genereted by `\textsigma{}`.

3.1   Use "β-decay" in a heading

The command used for the heading was

```
\subsection{Use \textquotedblleft\textbeta
  -decay\textquotedblright {} in a heading}
```

4 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`, or use `\text` from the package amstext, e.g. `$\lambda_{\text
{\textbeta}}$`: λ_β.

5 Limitations

The variants θ, ϕ, and ϵ are not included in the LGR font encoding and ϵ is not
included in Symbol either. For the commands `\straighttheta`, `\straightphi`,
and `\straightepsilon` the missing symbols are substituted from `OML/*/*/it` or
Euler.

You may need to customize `\textgreekfontmap` if you use other fonts than
Computer Modern and Latin Modern.

The version number of this package is still below 1.0. Many details may still
change from version to version.

6 Copyright

Copyright 2010,2011 Leonard Michlmayr

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

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

7 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.}}
```

7.1 Package Options

```
7 \DeclareOption{cbgreek}{%
8 \renewcommand*{\textgreekfontmap}{%
```

```
 9    {eur/*/*}{U/eur/*/*}
10    {phv/*/*}{U/psy/*/*}}}%

11 \DeclareOption{euler}{%
12 \renewcommand*{\textgreekfontmap}{%
13    {phv/*/*}{U/psy/*/*}
14    {*/bx/n}{U/eur/b/n}
15    {*/b/n}{U/eur/b/n}
16    {*/*/n}{U/eur/m/n}
17    {*/*/it}{OML/*/*/*}}}%

18 \DeclareOption{artemisia}{%
19 \renewcommand*{\textgreekfontmap}{%
20    {eur/*/*}{U/eur/*/*}
21    {phv/*/*}{U/psy/*/*}
22    {*/b/n}{LGR/artemisia/b/n}
23    {*/bx/n}{LGR/artemisia/bx/n}
24    {*/*/n}{LGR/artemisia/m/n}
25    {*/b/it}{LGR/artemisia/b/it}
26    {*/bx/it}{LGR/artemisia/bx/it}
27    {*/*/it}{LGR/artemisia/m/it}
28    {*/b/sl}{LGR/artemisia/b/sl}
29    {*/bx/sl}{LGR/artemisia/bx/sl}
30    {*/*/sl}{LGR/artemisia/m/sl}
31    {*/*/sc}{LGR/artemisia/m/sc}
32    {*/*/sco}{LGR/artemisia/m/sco}}}%
```

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

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

7.2   Font selection

\textgreek@findfont   Chose a companion font.

```
37 \def\textgreek@setfont#1/#2/#3/#4\relax{%
38 \textgreek@ematch{#1}{*}{}{\fontencoding{#1}}%
39 \textgreek@ematch{#2}{*}{}{\fontfamily{#2}}%
40 \textgreek@ematch{#3}{*}{}{\fontseries{#3}}%
41 \textgreek@ematch{#4}{*}{}{\fontshape{#4}}}%
```

Process a list of font substitutions.

```
42 \def\textgreek@eof{}%
43 \def\textgreek@return#1#2\textgreek@eof{%
44 \fi#1}%
45 \def\textgreek@ematch#1#2#3#4{%
46   \begingroup%
47   \edef\tempa{#1}\edef\tempb{#2}\def\tempc{*}%
48   \def\return##1##2\endgroup{\fi\endgroup##1}%
49   \ifx\tempa\tempb\return{#3}\fi%
50   \ifx\tempa\tempc\return{#3}\fi%
51   \iftrue\return{#4}\fi%
52   \endgroup}%
53 \def\textgreek@matchfont#1/#2/#3\relax#4#5{%
```

5

```
54    \textgreek@ematch{#1}{\f@family}{%
55      \textgreek@ematch{#2}{\f@series}{%
56        \textgreek@ematch{#3}{\f@shape}{#4}{#5}}%
57      {#5}}%
58    {#5}%
59 }%
60 \def\textgreek@findfont@#1#2#3\textgreek@eof{%
61    \textgreek@matchfont#1\relax%
62    {\textgreek@setfont#2\relax}%
63    {\textgreek@findfont#3\textgreek@eof}}%
64 \def\textgreek@findfont#1\textgreek@eof{%
65    \begingroup%
66    \def\temp{#1}%
67    \def\return##1##2\endgroup{\fi\endgroup##1}%
68    \ifx\temp\textgreek@eof\else%
69    \return{\textgreek@findfont@#1\textgreek@eof}%
70    \fi\endgroup}%
```

\textgreekfont   Select the Greek font encoding and apply font replacements.

```
71 \newcommand*{\textgreekfont}{%
72    \fontencoding{LGR}%
73    \edef\textgreek@fontmap{\textgreekfontmap}%
74    \expandafter\textgreek@findfont\textgreek@fontmap\textgreek@eof%
75    \selectfont%
76 }%
```

\TextGreek   Produce a Greek letter using the correct font. If the font is Euler or Symbol, convert to the appropriate font encoding.

```
77 \DeclareRobustCommand*{\TextGreek}[1]{%
78 \begingroup%
79 \textgreekfont%
80 \edef\tempa{\f@family}%
81 \let\tempd\f@encoding%
82 \def\tempb{eur}\def\tempc{psy}%
83 \def\tempe{OML}%
84 \ifx\tempd\tempe\textgreek@return{\lgrtoeuler#1}\fi%
85 \ifx\tempa\tempb\textgreek@return{\lgrtoeuler#1}\fi%
86 \ifx\tempa\tempc\textgreek@return{\lgrtosymbol#1}\fi%
87 #1%
88 \textgreek@eof%
89 \endgroup}%
```

\TextGreek@Select   The macro \TextGreek@Select{⟨LGR⟩}{⟨OML⟩}{⟨symbol⟩} will produce a Greek letter using the font set by \textgreekfont and selcting the character from the three arguments corresponding to the font encoding.

```
90 \DeclareRobustCommand*{\TextGreek@Select}[3]{%
91 \begingroup%
92 \textgreekfont%
93 \edef\tempa{\f@family}%
94 \let\tempd\f@encoding%
95 \def\tempb{eur}\def\tempc{psy}%
96 \def\tempe{OML}%
97 \ifx\tempd\tempe\textgreek@return{#2}\fi%
```

```
 98 \ifx\tempa\tempb\textgreek@return{#2}\fi%
 99 \ifx\tempa\tempc\textgreek@return{#3}\fi%
100 #1%
101 \textgreek@eof%
102 \endgroup}%
```

7.3 Greek letter definitions

7.3.1 Utility macro

\DeclareTextGreekSymbol   \DeclareTextGreekSymbol{⟨letter⟩}{⟨LGR⟩}[⟨OML⟩][⟨U⟩]   will   define
\text*letter* using the character code ⟨LGR⟩ for LGR-encoded fonts, ⟨OML⟩ for
math fonts including Euler, and ⟨U⟩ for the Symbol font. If ⟨OML⟩ is not provided,
an LGR font will be used instead, if ⟨U⟩ is missing ⟨LGR⟩ will be used instead.

```
103 \def\DeclareTextGreekSymbol#1#2{%
104   \@ifnextchar[%
105   {\DeclareTextGreekSymbol@{#1}{#2}}%
106   {\@DeclareTextGreekSymbol{#1}{#2}%
107     {\fontencoding{LGR}\fontfamily{cmr}\selectfont#2}{#2}}%
108 }%

109 \def\@DeclareTextGreekSymbol#1#2#3#4{%
110   \expandafter\DeclareTextCommandDefault\csname text#1\endcsname%
111   {\TextGreek@Select{#2}{#3}{#4}}%
112 }%

113 \def\DeclareTextGreekSymbol@#1#2[#3]{%
114   \ifx\textgreek@eof#3\textgreek@return{%
115     \DeclareTextGreekSymbol@@{#1}{#2}%
116     {\fontencoding{LGR}\fontfamily{cmr}\selectfont#2}}%
117   \else\textgreek@return{%
118     \DeclareTextGreekSymbol@@{#1}{#2}{#3}}\fi%
119   \textgreek@eof}%

120 \def\DeclareTextGreekSymbol@@#1#2#3{%
121   \@ifnextchar[%
122   {\DeclareTextGreekSymbol@@@{#1}{#2}{#3}}%
123   {\@DeclareTextGreekSymbol{#1}{#2}{#3}{#2}}%
124 }%

125 \def\DeclareTextGreekSymbol@@@#1#2#3[#4]{%
126   \ifx\textgreek@eof#4\textgreek@return{%
127     \@DeclareTextGreekSymbol{#1}{#2}{#3}{#2}}%
128   \else\textgreek@return{%
129     \@DeclareTextGreekSymbol{#1}{#2}{#3}{#4}}\fi%
130   \textgreek@eof}%
```

7.3.2 List of Greek letters

```
131 \DeclareTextGreekSymbol{alpha}{a}[\char11]
132 \DeclareTextGreekSymbol{beta}{b}[\char12]
133 \DeclareTextGreekSymbol{gamma}{g}[\char13]
134 \DeclareTextGreekSymbol{delta}{d}[\char14]
```

Euler provides two variants of epsilon: ε and ε. Use ε with \textepsilon.
```
135 \DeclareTextGreekSymbol{epsilon}{e}[\char34]
```

```
136 \DeclareTextGreekSymbol{zeta}{z}[\char16]
137 \DeclareTextGreekSymbol{eta}{h}[\char17]
```

Euler provides two variants of theta: θ and ϑ. Use θ for \texttheta.

```
138 \DeclareTextGreekSymbol{theta}{j}[\char18][q]
139 \DeclareTextGreekSymbol{iota}{i}[\char19]
140 \DeclareTextGreekSymbol{kappa}{k}[\char20]
141 \DeclareTextGreekSymbol{lambda}{l}[\char21]
```

\textmu
\textmugreek
I don't redefine \textmu if it is already provided by another package. Use \textmugreek if you mean the Greek letter rather than the micro symbol of the textcomp package.

```
142 \expandafter\ifx\csname?\string\textmu\endcsname\relax%
143 \DeclareTextGreekSymbol{mu}{m}[\char22]
144 \fi
145 \DeclareTextGreekSymbol{mugreek}{m}[\char22]

146 \DeclareTextGreekSymbol{nu}{n}[\char23]
147 \DeclareTextGreekSymbol{xi}{x}[\char24]
148 \DeclareTextGreekSymbol{omikron}{o}
149 \DeclareTextGreekSymbol{pi}{p}[\char25]
150 \DeclareTextGreekSymbol{rho}{r}[\char26]
```

Since the word-end sigma ς is implemented as a ligature in LGR encoded fonts, we have to add \noboundary to get a σ.

```
151 \DeclareTextGreekSymbol{sigma}{s\noboundary}[\char27][s]
```

\textvarsigma   Provide ς as \textvarsigma.

```
152 \DeclareTextGreekSymbol{varsigma}{c}[][V]

153 \DeclareTextGreekSymbol{tau}{t}[\char28]
154 \DeclareTextGreekSymbol{upsilon}{u}[\char29]
```

Euler provides two variants of phi: ϕ and φ. Use φ for \textphi.

```
155 \DeclareTextGreekSymbol{phi}{f}[\char39][j]
156 \DeclareTextGreekSymbol{chi}{q}[\char31][c]
157 \DeclareTextGreekSymbol{psi}{y}[\char32]
158 \DeclareTextGreekSymbol{omega}{w}[\char33]
159 \DeclareTextGreekSymbol{Alpha}{A}
160 \DeclareTextGreekSymbol{Beta}{B}
161 \DeclareTextGreekSymbol{Gamma}{G}[\char0]
162 \DeclareTextGreekSymbol{Delta}{D}[\char1]
163 \DeclareTextGreekSymbol{Epsilon}{E}
164 \DeclareTextGreekSymbol{Zeta}{Z}
165 \DeclareTextGreekSymbol{Eta}{H}
166 \DeclareTextGreekSymbol{Theta}{J}[\char2][Q]
167 \DeclareTextGreekSymbol{Iota}{I}
168 \DeclareTextGreekSymbol{Kappa}{K}
169 \DeclareTextGreekSymbol{Lambda}{L}[\char3]
170 \DeclareTextGreekSymbol{Mu}{M}
171 \DeclareTextGreekSymbol{Nu}{N}
172 \DeclareTextGreekSymbol{Xi}{X}[\char4]
173 \DeclareTextGreekSymbol{Omikron}{O}
174 \DeclareTextGreekSymbol{Pi}{P}[\char5]
175 \DeclareTextGreekSymbol{Rho}{R}
176 \DeclareTextGreekSymbol{Sigma}{S}[\char6]
```

```
177 \DeclareTextGreekSymbol{Tau}{T}
178 \DeclareTextGreekSymbol{Upsilon}{U}[\char7]
179 \DeclareTextGreekSymbol{Phi}{F}[\char8]
180 \DeclareTextGreekSymbol{Chi}{Q}[][C]
181 \DeclareTextGreekSymbol{Psi}{Y}[\char9]
182 \DeclareTextGreekSymbol{Omega}{W}[\char10]
```

7.3.3 Variants

\straightphi The phi symbol ϕ is a variant of phi φ. Sometimes this variant is used specifically, e.g. in quantum field theory. The Unicode code point is U+03D5.

```
183 \DeclareTextCommand{\straightphi}{PU}%
184   {\83\325} % U+03D5 GREEK PHI SYMBOL
```

The Greek fonts aim at Greek text. Therefore the phi symbol is not included. I use the math symbol for italic fonts and euler else.

```
185 \DeclareTextCommandDefault{\straightphi}{%
186 \begingroup\textgreekfont%
187 \edef\tempa{\f@family}%
188 \edef\tempb{\f@shape}%
189 \def\tempc{eur}\def\tempd{psy}%
190 \def\tempe{it}%
191 \ifx\tempa\tempc\textgreek@return{\char30}\fi%
192 \ifx\tempa\tempd\textgreek@return{f}\fi%
193 \ifx\tempb\tempe\textgreek@return{%
194   \fontencoding{OML}\selectfont\char30}\fi%
195 \textgreek@ematch{\f@series}{bx}{\fontseries{b}}{}%
196 \fontencoding{U}\fontfamily{eur}\selectfont\char30%
197 \textgreek@eof%
198 \endgroup}%
```

\scripttheta The theta symbol ϑ is a variant of theta ϑ. The Unicode code point is U+03D1. It is available as \scripttheta.

```
199 \DeclareTextCommand{\scripttheta}{PU}%
200   {\83\321}% U+03D1 GREEK THETA SYMBOL
```

```
201 \DeclareTextCommandDefault{\scripttheta}{%
202   \TextGreek@Select{j}{\char35}{J}}%
```

\straighttheta The theta θ is presumably the common variant of theta ϑ. The cbgreek fonts and artemisia use the script variant.

```
203 \DeclareTextCommand{\straighttheta}{PU}%
204   {\83\270} % U+03B8 GREEK THETA SYMBOL
```

```
205 \DeclareTextCommandDefault{\straighttheta}{%
206 \begingroup\textgreekfont%
207 \edef\tempa{\f@family}%
208 \edef\tempb{\f@shape}%
209 \def\tempc{eur}\def\tempd{psy}%
210 \def\tempe{it}%
211 \ifx\tempa\tempc\textgreek@return{\char18}\fi%
212 \ifx\tempa\tempd\textgreek@return{q}\fi%
213 \ifx\tempb\tempe\textgreek@return{%
214   \fontencoding{OML}\selectfont\char18}\fi%
215 \textgreek@ematch{\f@series}{bx}{\fontseries{b}}{}%
```

9

```
216 \fontencoding{U}\fontfamily{eur}\selectfont\char18%
217 \textgreek@eof%
218 \endgroup}%
```

\straightepsilon   The epsilon ϵ is a variant of epsilon ε.

```
219 %% U+03F5 GREEK LUNATE EPSILON SYMBOL
220 \DeclareTextCommand{\straightepsilon}{PU}{\83\365}%

221 \DeclareTextCommandDefault{\straightepsilon}{%
222 \begingroup\textgreekfont%
223 \edef\tempa{\f@family}%
224 \edef\tempb{\f@shape}%
225 \def\tempc{eur}\def\tempd{psy}%
226 \def\tempe{it}%
227 \ifx\tempa\tempc\textgreek@return{\char15}\fi%
228 \ifx\tempa\tempd\textgreek@return{%
229    \fontfamily{eur}\fontseries{b}\selectfont\char15}\fi%
230 \ifx\tempb\tempe\textgreek@return{%
231    \fontencoding{OML}\selectfont\char15}\fi%
232 \textgreek@ematch{\f@series}{bx}{\fontseries{b}}{}%
233 \fontencoding{U}\fontfamily{eur}\selectfont\char15%
234 \textgreek@eof%
235 \endgroup}%
```

8   Change History

9 Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.