Writing Greek with the `greek` option of the `babel` package

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Abstract
This document describes the use of the Latin transliteration for Greek
that is defined by the LGR font encoding. Today, all modern La-
TeX distributions support literal input of Greek, which is the preferred
method for new documents. [G. Milde 2013/12/02]

1 Overview

The `greek` option of the `babel` package is an attempt to make it pos-
sible for someone to write Greek text with \LaTeX{}. The current version
of the `greek` option supports the μονοτονικό and πολυτονικό accentual
systems of the Greek language. Moreover, there is now support for
Greek numerals. One can produce easily valid Greek numerals both
in uppercase and lowercase forms, e.g, \textbackslash{͵αϡϙζʹ} and
\textbackslash{͵ΑϠϘΖʹ}. The labels
in second and fourth level enumerations are lowercase and uppercase
Greek numerals correspondingly.

2 Typing Greek Text

By default, \TeX{} understands only 7-bit ASCII characters, so it is not
possible to enter directly Greek letters.\footnote{Literal input of Greek
characters is possible with XeTeX, LuaTeX, or the greek-
inputenc LaTeX package. G. Milde, 2013/07/19} Instead, someone enters Latin
letters which are mapped to their Greek “counterparts” by \TeX{}. The
following table shows the transliteration employed:

\begin{tabular}{|c|c|}
\hline
Latin & Greek \\
\hline
A & \textbackslash{͵Α} \\
B & \textbackslash{͵Β} \\
C & \textbackslash{͵Σ} \\
D & \textbackslash{Ͳ} \\
E & \textbackslash{͵Ε} \\
F & \textbackslash{͵Ϝ} \\
G & \textbackslash{͵Γ} \\
H & \textbackslash{ͺ} \\
I & \textbackslash{͵Ι} \\
J & \textbackslash{ͺ} \\
K & \textbackslash{͵Κ} \\
L & \textbackslash{ͺ} \\
M & \textbackslash{ͺ} \\
N & \textbackslash{ͺ} \\
O & \textbackslash{ͺ} \\
P & \textbackslash{ͺ} \\
Q & \textbackslash{ͺ} \\
R & \textbackslash{ͺ} \\
S & \textbackslash{ͺ} \\
T & \textbackslash{ͺ} \\
U & \textbackslash{ͺ} \\
V & \textbackslash{ͺ} \\
W & \textbackslash{ͺ} \\
X & \textbackslash{ͺ} \\
Y & \textbackslash{ͺ} \\
Z & \textbackslash{ͺ} \\
\hline
\end{tabular}
Please, note that in order to produce the letter σ in isolation on has to type sv. This feature is due to the strong ligature that \TeX{} employs. In the “modern” μονοτονικό accentual system only one accent is used—οξεία (acute). In the traditional πολυτονικό accentual system we need more accents and breathing signs. We can produce an accented letter by prefixing the letter with he symbol that denotes the accent, e.g., >a’erac produces the word ἀέρας.\footnote{For the technically inclined reader, we must say that \TeX{} uses the ligature table of the font in order to determine the character that corresponds to the input character sequence.} Here are the symbols that are recognized:

<table>
<thead>
<tr>
<th>Accent</th>
<th>Symbol</th>
<th>Example</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>acute</td>
<td>'</td>
<td>g’ata</td>
<td>γάτα</td>
</tr>
<tr>
<td>grave</td>
<td>'</td>
<td>dad’i</td>
<td>δαδὶ</td>
</tr>
<tr>
<td>circumflex</td>
<td>“</td>
<td>ful“hc</td>
<td>φυλῆς</td>
</tr>
<tr>
<td>rough breathing</td>
<td>&lt;</td>
<td>&lt;‘otan</td>
<td>ὡταν</td>
</tr>
<tr>
<td>smooth breathing</td>
<td>&gt;</td>
<td>&gt;’aneu</td>
<td>άνευ</td>
</tr>
<tr>
<td>subscript</td>
<td></td>
<td>&gt;anate’ilh</td>
<td>ἀνατείλῃ</td>
</tr>
<tr>
<td>dieresis</td>
<td>”</td>
<td>qa‘ide’uh</td>
<td>χαϊδεύῃ</td>
</tr>
</tbody>
</table>

Note that the subscript symbol is placed after the letter. The last thing someone must know in order to be able to write normal Greek text is the punctuation marks used in the language:

<table>
<thead>
<tr>
<th>Punctuation Sign</th>
<th>Symbol</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>period</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>semicolon</td>
<td>;</td>
<td>;</td>
</tr>
<tr>
<td>exclamation mark</td>
<td>!</td>
<td>!</td>
</tr>
<tr>
<td>comma</td>
<td>,</td>
<td>,</td>
</tr>
<tr>
<td>colon</td>
<td>:</td>
<td>:</td>
</tr>
<tr>
<td>question mark</td>
<td>?</td>
<td>;</td>
</tr>
<tr>
<td>left apostrophe</td>
<td>‘‘</td>
<td>‘</td>
</tr>
<tr>
<td>right apostrophe</td>
<td>‘’</td>
<td>’</td>
</tr>
<tr>
<td>left quotation mark</td>
<td>(</td>
<td>(</td>
</tr>
<tr>
<td>right quotation mark</td>
<td>)</td>
<td>)</td>
</tr>
</tbody>
</table>

Using these conventions it is a straightforward exercise to write Greek πολυτονικό text. For example the following excerpt from Δύσκολος of Μένανδρος

Τί φής; Ἦδον ἐνθέδε παῖδ’ ἐλευθέραν
τὰς πλησίον Νύμφας στεφανοῦσαν, Σώστρατε,
ἐρῶν ἀπήλθες εὐθὺς;

2
can be produced by the following \LaTeX code:

\texttt{T'i f'hic? <Id'wn >enj'ede pa?id'\'\'>eleuj'eran
t\'ac pIha\'ion N'umfac stefano\'usan, S'wstrate,
>er\'wn 'ap\'hljec e>uj'uc?}

## 3 Producing Greek Text

Once the Greek language is selected with the command

\texttt{\selectlanguage{greek}}

whatever we type will be typeset with the Greek fonts. The command \texttt{\textlatin} can be used for short passages in some language that uses the Latin alphabet, while the \texttt{\latintext} command changes the base fonts to the ones used by languages that use the Latin alphabet. However, all words will be hyphenated by following the Greek hyphenation rules! Similar commands are available once someone has selected some other language. The commands \texttt{\textgreek} and \texttt{\greektext} behave exactly like their “latin” counterparts. For example, the word Μίμης has been produced with the command \texttt{\textgreek{M'imhc}}.

Please note that certain symbols cannot have their expected result for Greek text, unless someone has selected the Greek language, e.g., " is such a symbol.

As we have mentioned above this version of the \texttt{greek} option of the \texttt{babel} package supports the use of Greek numerals. The commands \texttt{\greeknumeral} and \texttt{\Greeknumeral} produce the lowercase and the uppercase Greek numeral, e.g.,

<table>
<thead>
<tr>
<th>Command</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>greeknumeral{9999}</td>
<td>(\varphi\lambda\vartheta)</td>
</tr>
<tr>
<td>\greeknumeral{9999}</td>
<td>(\Phi\Lambda\Theta)</td>
</tr>
</tbody>
</table>

In order to correctly typeset the greek numerals the greek option file provides the following commands:

<table>
<thead>
<tr>
<th>Command</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>\qoppa</td>
<td>(\gamma)</td>
</tr>
<tr>
<td>\sampi</td>
<td>(\alpha)</td>
</tr>
<tr>
<td>\stigma</td>
<td>(\sigma)</td>
</tr>
</tbody>
</table>

In traditional Greek typography the first paragraph after a header is always indented, contrary to the habit of, say, American typography. This effect can be achieved by using the package \texttt{indentfirst}.

Additional greek symbols are available:
\begin{tabular}{ll}
\textbf{Command} & \textbf{Output} \\
\textbackslash Digamma & F \\
\textbackslash ddigamma & \varphi \\
\textbackslash euro & € \\
\textbackslash permill & \%\text{e} \\
\end{tabular}

The package \texttt{athnum} provides the command \texttt{\textbackslash athnum}, with which one can produce the so called \textit{Athenian numerals}:

\begin{tabular}{ll}
\textbf{Command} & \textbf{Output} \\
\textbackslash athnum\{1997\} & ΧΗΗΗΗΔΔΔΔΠΙΙ \\
\end{tabular}

The package \texttt{grmath} renames the basic log-like functions with their greek counterparts:

\begin{tabular}{ll}
\textbf{Command} & \textbf{Output} \\
$\sin^{-1}(2)x+\cos^{-1}(2)x=1$ & ημ $x + ζν $x = 1$ \\
\end{tabular}