

Test LGR font encoding definitions

Günter Milde

2020/10/30

The file `lgrenc.def` provides a comprehensive set of macros to typeset Greek with LGR encoded fonts. It works for both, monotonic and polytonic Greek, independent of the *Babel* package.

The example from `usage.tex` in *babel-greek* input using the LICR macros:

Τῷ φήεις; Ἰδὼν ἐνθῆδε παῖδ' ἐλευθέραν
τὰς πλησίον Νύμφας στεφανοῦσαν, Σώστρατε,
ἑρῶν ἀπῆλθε εὐθύς;

1 Symbols

See the source file [lgrenc-test.tex](#) for the macros used to access the symbols.

1.1 Generic text symbols

Latin: + - = < > - — [()] { } \ | ‰ ‰ ‰ □

LGR: + - = - — [()]

```
< \textless
> \textgreater
{ \textbraceleft
} \textbraceright
\ \textbackslash
| \textbar
‰ \textperthousand (Per-mille symbol is missing in LGR.)
◻ \textvisiblespace
```

Quotes:¹ «a» «α», ‘a’ ‘α’, “a” “α” (double quotes wrong with Kerkis fonts)

Single guillemets and base-quotes (‹a› „a” ‚a’) are missing in LGR.

Ligature break up with `\textcompwordmark`: AY fi AY ï ↦ AY fi AY ï

¹Single quotes need special attention to prevent conversion to accents. Test the input conventions: ‘α’ ‘α’ ‘α’ ‘α’ but not ᾿ ᾿ ᾿ ᾿

Letter schwa and Euro symbol: `ə \textschwa`, `€ \texteuro`

Beware that " # & ' ; < > ? @ becomes ' " . ' . ' ; ' .

textcomp also provides the upright MICRO SIGN and OHM SIGN for SI units:
 $R = 5\,\mu\Omega$

1.2 Greek alphabet

Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω
α β γ δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ ς τ υ φ χ ψ ω

Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω
α β γ δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ ς τ υ φ χ ψ ω

$$\sigma \backslash \text{textsiga}$$

$$\varsigma \backslash \text{textfinalsigma}$$

1.3 additional Greek symbols

\textkappa (numeral koppa = 90)
 \textKappa (numeral Koppa = 90)³
 \textqoppa (archaic koppa)
 \textQoppa (archaic Koppa)
 \textstigma
 \textvarstigma

²loaded by default in not too old LaTeX

³In LGR, there is no separate code point for uppercase koppa.

Υ \textStigma (Sigma-Tau-Ligature in CB-fonts)⁴
 \mathfrak{A} \textsampi
 \mathfrak{A} \textSampi
 \mathfrak{F} \textdigamma
 \mathfrak{F} \textDigamma
 $\text{'}\mathfrak{A}$ \textdexiakeraia (dexia keraia)
 $\text{'}\mathfrak{A}$ \textaristerikeraia (aristeri keraia)

Up/Downcasing of the additional Symbols from the Greek And Coptic Unicode block:

' , ; ^ ' A · E H I O Υ Ω ι ĩ Ÿ á é η í ü ü ó ú ω ϑ ϑ Γ γ F f h h λ λ

MakeUppercase:

' , , ; " A · E H I O Υ Ω Ĩ Ĩ Ÿ A E H I Ÿ Ĩ Ÿ O Υ Ω ϑ ϑ Ϝ Ϝ F F ♢ ♢ λ λ

MakeLowercase:

‘, , ; ‘ “ά·έήίόύώίïüάέήίüïüόύώφφττφφψψχχζζ

1.4 aliases

Aliases are defined in the included file `greek-fontenc.def`.

Names matching mathematical variant symbols:

$$\begin{aligned}\varepsilon \text{ \texttt{\textbackslash textvarepsilon}} &= \varepsilon \text{ \texttt{\textbackslash textepsilon}} \\ \varphi \text{ \texttt{\textbackslash textvarphi}} &= \varphi \text{ \texttt{\textbackslash textphi}} \\ \varsigma \text{ \texttt{\textbackslash textvarsigma}} &= \varsigma \text{ \texttt{\textbackslash textfinalsigma}}\end{aligned}$$

Compatibility aliases for hyperref's puenc.def:

μ \texttextmugreek = μ \texttextmu
 \textkoppagreek = \textkoppa
 \textKoppagreek = \textKoppa
 \textStigmagreek = \textStigma
 \textstigmagreek = \textstigma
 \textSampigreek = \textSampi
 \textsampigreek = \textsampi
 \textdigammagreek = \textdigamma
 \textDigammagreek = \textDigamma
 $\text{\textnumeralsigngreek}$ = \textdexiakraia
 $\text{\textnumeralsignlowergreek}$ = $\text{\textaristerikakraia}$

Two Unicode code points and names for one character:

' \accoxia = ' \acctonos
' \acckoronis = ' \accpsili

⁴the name “stigma” originally applied to a medieval sigma-tau ligature, whose shape was confusingly similar to the cursive digamma

1.5 symbol variants

Mathematical notation distinguishes variant shapes for pi ($\pi|\varpi$), rho ($\rho|\varrho$), theta ($\theta|\vartheta$), beta ($\beta|\varnothing$), and kappa ($\kappa|\varkappa$) (characters for the last two variant symbols are not included in TeX's standard math fonts). These variations have no syntactic meaning in Greek text and are not given code-points in the LGR encoding. Greek text fonts use the shape variants interchangeably.

2 Diacritics

Capital Greek letters have diacritics (except dialytika, breve, macron, and subiota) to the left (instead of above) and drop them if text is set in UPPERCASE. This is implemented for all combinations that are used in Greek texts (i.e. for which pre-composed Unicode character exist), but not for, e.g., $\tilde{\Omega}$).

Different conventions exist for the treatment of the sub-iota with uppercase letters. The CB-Fonts use a capital Iota “index” (A_I , H_I , Ω_I).

LaTeX standard accents⁵ (Latin, Greek, Greek Capitals \mapsto UPPERCASE)

à á â ã ä å æ ç à á â ã ä å æ ç À Á Â Ã Ä Å Ā Ă Ą Ǻ Ȧ Ȣ Ȥ ȥ Ȧ Ȣ Ȥ ȥ

$$\grave{\alpha} \acute{\alpha} \tilde{\alpha} \ddot{\alpha} \hat{\alpha} \bar{\alpha} \acute{\alpha} \grave{\alpha} \check{\alpha} \breve{\alpha} \alpha \varphi \alpha \mapsto \text{A A A \AA \AA \AA \AA \AA \AA \AA \AA \AA \AA}$$
$$\text{'A'A}\tilde{\text{A}}\ddot{\text{A}}\hat{\text{A}}\bar{\text{A}}\text{'A}\dot{\text{A}}\ddot{\text{A}}\check{\text{A}}\text{A}\text{A}\text{A}\mapsto \text{A}\text{A}\text{A}\ddot{\text{A}}\hat{\text{A}}\bar{\text{A}}\text{'A}\dot{\text{A}}\ddot{\text{A}}\check{\text{A}}\text{A}\text{A}\text{A}$$
Additional Greek diacritics (Greek, Greek Capitals⁶ \mapsto UPPERCASE)
$$\grave{\alpha} \, \acute{\epsilon} \, \grave{\imath} \, \grave{\imath} \, \grave{\imath} \, \grave{\imath} \, \grave{\imath} \, \grave{\eta} \, \acute{o} \, \acute{o} \, \acute{u} \, \acute{\omega} \, \alpha \mapsto \text{A E I } \ddot{\text{I}} \ddot{\text{I}} \ddot{\text{I}} \text{H O O } \Upsilon \, \Omega \, \text{A},$$
$$\mathfrak{A} \text{ E I H O O } \Upsilon \Omega \text{ A}_I \mapsto \text{A E I H O O } \Upsilon \Omega \text{ A}_I$$

Input variants and their conversion with MakeUppercase:

ǎ ǎ ǎ, ǎ ǎ ǎ ǎ ǎ, ħ ħ ħ ħ ħ ħ, ħ ħ, ǝ ǝ, ǝ ǝ, ǝ ǝ ǝ.

ට ට, ට ට, ට ට, ට, ට, ට ට, ට ට, ආ ආ

A A A, A A A A, H H H H H, H H, I I, I I, İ İ

$$\Upsilon \Upsilon, \Upsilon \Upsilon, \ddot{\Upsilon} \ddot{\Upsilon}, \Omega, \Omega, \Omega \Omega, \Omega \Omega, A_I A_I$$

ǎ ẽ ĩ ñ ñ õ ö Ƶ ‘A ’E İ ¨H °O ˇΥ ˇΩ, α α

$$A E \ddot{I} H H O \Upsilon \Omega A E \ddot{I} H O \Upsilon \Omega, A_1 A_2$$
$${}^{\circ}\mathbf{A} \, {}^{\circ}\mathbf{A} \, {}^{\circ}\mathbf{A} \, {}^{\circ}\mathbf{A} \mapsto \mathbf{A} \, \mathbf{A} \, \mathbf{A} \, \mathbf{A}.$$

Input variants and their conversion with MakeLowercase:

$${}^3\text{A} \text{ } ^3\text{A} \text{ } ^3\text{A}, \text{ } ^3\text{A} \text{ } ^3\text{A} \text{ } ^3\text{A} \text{ } ^3\text{A}, \text{ } ^3\text{H} \text{ } ^3\text{H} \text{ } ^3\text{H} \text{ } ^3\text{H} \text{ } ^3\text{H}_\text{I}, \text{ } ^3\text{H} \text{ } ^3\text{H}, \text{ } ^3\text{I} \text{ } ^3\text{I}, \text{ } ^3\text{I} \text{ } ^3\text{I}$$

ǎ ǎ ǎ, ǎ ǎ ǎ ǎ, ħ ħ ħ ħ ħ, ħ ħ, ỉ ỉ, ỉ ỉ

⁵The ogonek (*little hook*) accent $\text{(\k{)}$ is not defined in LGR.

⁶The dialytika is not used on Initial letters.

$\Upsilon \Upsilon \Upsilon, \Omega, \Omega, \Omega \Omega, \Omega \Omega, A_1 A_1 A_1,$
 $\mathfrak{U} \mathfrak{U}, \acute{\omega}, \acute{\omega}, \mathfrak{W} \mathfrak{W}, \mathfrak{W} \mathfrak{W}, \alpha \alpha \alpha.$
 $\acute{\alpha} \acute{\epsilon} \acute{\eta} \acute{\delta} \mathfrak{U} \mathfrak{W} \mathfrak{A} \mathfrak{E} \mathfrak{I} \mathfrak{H} \mathfrak{O} \Upsilon \Omega A_1 A_1 A_1$
 $\acute{\alpha} \acute{\epsilon} \acute{\eta} \acute{\delta} \mathfrak{U} \mathfrak{W} \acute{\alpha} \acute{\epsilon} \acute{\eta} \acute{\delta} \mathfrak{U} \mathfrak{W} \alpha \alpha \alpha$
 $\mathfrak{A} \mathfrak{A} \mathfrak{A} \mathfrak{A} \mapsto \check{\alpha} \check{\alpha} \check{\alpha} \check{\alpha}$

The tilde character can be used in combined accents. However, in documents not defining the Babel language *greek* or *polutonikogreek*, better use the tilde-accent macro, as the tilde produces a no-break space if converted with `\MakeUppercase` or `\MakeLowercase`:

combined accent with tilde character:

$$\begin{array}{l} \tilde{I} \tilde{I} \tilde{U} \tilde{U} \tilde{U} \mapsto \cdot I \ I \cdot Y \ Y \ Y \\ \tilde{I} \tilde{I} \tilde{I} \tilde{Y} \tilde{Y} \tilde{Y} \mapsto \cdot I^c \ I^c \cdot U^c \ U^c \ U^c \end{array}$$

combined accent with tilde-accent macro:

$$\begin{array}{l} \tilde{\mathfrak{I}} \tilde{\mathfrak{U}} \mapsto \mathfrak{I} \mathfrak{Y} \\ \mathfrak{I} \mathfrak{Y} \mapsto \tilde{\mathfrak{I}} \tilde{\mathfrak{U}} \end{array}$$

Accents input via the Latin transliteration are not dropped with `MakeUppercase`, unless `Babel` is loaded and the current language is Greek (because the required local re-definitions of the `uccode` are done in `greek.ldf` from the *babel-greek* package).

$$\acute{\alpha} \ddot{\alpha} \grave{\alpha} \check{\alpha} \tilde{\alpha} \alpha \mapsto 'A \ddot{I} 'A 'A 'A A,$$

Accent macros can start with `\a` instead of `\` when the short form is redefined, e.g. inside a *tabbing* environment. This also works for the locally defined *dasia* and *psili* shortcuts `\<` and `\>`:

COL1	COL2	COL3	COL4
COL1		COL3	
Viele	Grüße	ô	ô

Combinations with named accents: $\check{\alpha}$ $\hat{\alpha}$ $\tilde{\alpha}$.

The dialytika must be kept in UPPERCASE, e. g.

μαῖστρος \mapsto ΜΑΪΣΤΡΟΣ or εὐζωΐα \mapsto ΕΥΖΩΪΑ.

This is implemented for all input variants of diacritics with dialytika:

$$\mathfrak{t} \mathfrak{t} \mathfrak{t} \mathfrak{t} \mathfrak{u} \mathfrak{u} \mathfrak{u} \mathfrak{u} \mapsto \mathfrak{i} \mathfrak{i} \mathfrak{i} \mathfrak{i} \mathfrak{y} \mathfrak{y} \mathfrak{y} \mathfrak{y},$$

Tonos and dasia mark a *hiatus* (break-up of a diphthong) if placed on the first vowel of a diphthong (άι, άυ, έι). A dialytika must be placed on the second vowel if they are dropped: (Αῖ, Ἀῦ, Εῖ).

ἄυλος \mapsto AÿΛΟΣ, ἄυλος \mapsto AÿΛΟΣ, μάινα \mapsto MAÏNA, κείκ \mapsto KEÏK,
 ἄυπνία \mapsto AÿΠΝΙΑ, ρωμείκα \mapsto ΡΩΜΕÏKA

Test the auto-hiatus feature for side-effects:

A B (must keep space after A).

Kerning (see the input):

```

AO AΨ AI AΥ PA OA TA ΔΥ [
˘ AO AΨ AI AΥ PA OA TA ΔΥ [
˘ AO AΨ AĬ AŸ PA OA TA ΔΥ [
˘ AO AΨ AĬ AŸ PA OA TA ΔΥ [
˘ AO AΨ AĬ AŸ PA OA TA ΔΥ [
˘ AO AΨ AĬ AŸ PA OA TA ΔΥ [
˘ AO AΨ AĬ AŸ PA OA TA ΔΥ [
˘ AO AΨ AI AΥ PA OA TA ΔΥ [
˘ AO AΨ AI AΥ PA OA TA ΔΥ [
˘ AO AΨ AI AΥ PA OA TA ΔΥ [
˘ AO AΨ AI AΥ PA OA TA ΔΥ [
˘ AO AΨ AI AΥ PA OA TA ΔΥ [
˘ AO AΨ AI AΥ PA OA TA ΔΥ [
˘ AO AΨ AĬ AŸ PA OA TA ΔΥ [
˘ AÖ AΨ AĬ AŸ PÄ ÖA TA ΔŸ [
˘ AÖ AΨ AĬ AŸ PÄ ÖA TA ΔŸ [

```

Rows 3 . . . 7: Look-ahead (to check for a hiatus) breaks kerning before ‘A’ with tonos or psili.

Rows 15 and 16: Like in any font encoding, there is no kerning for non-defined accent-letter-combinations (dialytica on A O Δ).

Downcasing should keep diacritics (of course, it cannot regenerate “manually” dropped ones): ‘A Ĭ Ÿ ˘A ↦ á ĭ ü ž