

Greek LICR definitions with XeTeX/LuaTeX

The `textalpha` package from the `greek-fontenc` bundle is a convenient way to load Greek LICR macros for use anywhere in the document and with any TeX engine supporting the e-TeX extensions (pdfTeX, XeTeX, or LuaTeX). With XeTeX or LuaTeX, it loads the file `greek-euenc.def`.

Typesetting Greek texts requires a font containing Greek letters. With the XeTeX or LuaTeX engines, the user should ensure that the chosen font contains the required glyphs (the default Latin Modern fonts have only capital Greek letters). Examples for suitable fonts are the “Deja Vu” or the “Linux Libertine” OpenType fonts.

1 LICR input

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

Τί φηις; Ἰδὼν ἐνθέδε παῖδ' ἐλευθέραν
τὰς πλησίον Νύμφας στεφανοῦσαν, Σώστρατε,
ἔρων ἀπῆλθες εὐθύς;

1.1 Greek alphabet

Greek letters via LICR macros:

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 τ υ φ χ ψ ω

The small sigma is set with a different glyph if it ends a word:

σ `textsigma`

ς `textfinalsigma` or `textvarsigma`

In the Latin transcription, the letter ‘s’ stands for `\textautosigma` which automatically chooses the glyph according to the position.

1.2 Additional Greek symbols

Ϝ `textkoppa`

ϝ `textqoppa` (archaic koppa)

Ϟ `textQoppa` (archaic Koppa)

Ϛ `textstigma`

ϛ `textStigma` (Sigma-Tau-Ligature in CB-fonts)¹

Ϝ `textsampi`

ϝ `textSampi`

Ϛ `textdigamma`

ϛ `textDigamma`

¹the name “stigma” originally applied to a medieval sigma-tau ligature, whose shape was confusably similar to the cursive digamma

' textdexiakeriaia
, textaristerikeraia

Mathematical notation uses variant shapes for pi, kappa, rho, theta, and phi as additional symbols. These variations have no syntactic meaning in Greek text and are not given separate code-points in the LGR text encoding. Some text fonts use the variant shapes in place of the “regular” ones.

TeX's concept of “standard” vs. “variant” symbols does not map to the distinction between “Greek Letter ...” vs. “Greek Symbol ...” in the Unicode standard:

math symbol	Unicode «letter»	var math symbol	Unicode «symbol»
π	π	ϖ	ϖ
ρ	ρ	ϱ	ϱ
θ	θ	ϑ	ϑ
ϵ	ϵ	ε	ϵ
ϕ	φ	φ	ϕ
β	β	<i>missing</i>	\mathfrak{B}
κ	κ	<i>missing</i>	\mathfrak{K}
Θ	Θ	<i>missing</i>	Θ

1.3 Diacritics

Greek diacritics can be input by named macro or symbol macro. Named macros are defined in `xunicode-greek.sty` for `\LastDeclaredEncoding` (here LGR).

áá x́x́ àà x̀x̀ ü ẍẍ ãã x̃x̃ ǎǎ x̣x̣ ǎǎ x̣x̣

There are currently no definitions for accent macros combined with literal unicode characters. Combining diacritical characters are used in the output.

á á à à ï ï ã ã ǎ ǎ ǎ ǎ

Please mail a feature request if there is demand for definitions selecting precomposed characters. As proof of concept, this document defines a composite command for alpha with psili and perispomeni. Compare $\tilde{\alpha}$ with $\tilde{\alpha}$.

Composite commands for combined diacritics are defined in “greek-fontenc.def”, also for the `\LastDeclaredEncoding`. There are composite definitions for all precomposed characters, the fallback definition uses combining characters:

 $\tilde{t} \tilde{t} \tilde{t} X X X \tilde{l} \tilde{l} \tilde{l} X X X \tilde{\nu} \tilde{\nu} \tilde{\nu} X X X$
$$\begin{array}{cccccccccccccccccccc} \text{''} & \text{''} & \text{''} & \text{'} & \text{'} & \text{'} & \text{''} & \text{''} & \text{''} & \text{' } & \text{' } & \text{' } & \text{'} & \text{'} & \text{'} & \text{'} & \text{'} & \text{'} & \text{' } & \text{' } & \text{' } \\ \text{l} & \text{l} & \text{l} & \text{X} & \text{X} & \text{X} & \text{l} & \text{l} & \text{l} & \text{X} & \text{X} & \text{X} & \text{l} & \text{l} & \text{l} & \text{X} & \text{X} & \text{X} \end{array}$$
$$\begin{array}{cccccccccccccccc} \text{''} & \text{''} & \text{''} & \text{' } & \text{' } & \text{' } & \text{''} & \text{''} & \text{''} & \text{' } & \text{' } & \text{' } & \tilde{\text{'}} & \tilde{\text{'}} & \tilde{\text{'}} & \hat{\text{'}} & \hat{\text{'}} & \hat{\text{'}} \end{array}$$

Problems: Composite diacritics with breathings overlap when set using two combining characters (in the tested fonts).

Upcasing with `\MakeUppercase` drops diacritics (except dialytika and sub-iota):

$$\ddot{\Pi} \ddot{X} \ddot{X} \ddot{\Pi} \ddot{X} \ddot{X} \ddot{\Pi} \ddot{X} \ddot{X}$$
$$\Pi X X \Pi X X \Pi X X$$

However, when the *tonos*, *varia*, and *perispomeni* accents are input using the symbol macros (`\' \` \~`), they behave like standard accents with XeTeX/LuaTeX. If these accents should be dropped by `MakeUppercase`, they must be input as named macro:

The sub-iota is input after the base letter. Ligature definitions in the 8-bit LGR fonts ensure that precomposed characters are used. This does not work with Unicode fonts:²

Both, the standard LaTeX and the “xunicode” composite mechanism require the first part of a composite definition to be a macro requiring one argument. I.e. selecting pre-defined characters with sub-iota would require prefix `\accypogegrammeni` and `\accprosgegrammeni` accent macros and composite definitions for all combination of letters and letters with diacritic and sub-iota.

Greek symbols from the Greek and Coptic Unicode block are fully supported:

Q q S s F f Z z

Characters from the Greek Extended Unicode block are only partially supported, accented characters with sub-iota currently use a combining prosgegrammeni or ypoge-grammeni character.

$$\mathbb{E}\mathbb{E} \quad \mathbb{E}\mathbb{E} \quad \mathbb{E}\mathbb{E} \quad \mathbb{E}\mathbb{E} \quad \mathbb{E}\mathbb{E} \quad \mathbb{E}\mathbb{E} \quad \mathbb{E}'\mathbb{E} \quad \mathbb{E}'\mathbb{E} \quad \mathbb{E}''\mathbb{E} \quad \mathbb{E}''\mathbb{E} \quad \mathbb{E}'''\mathbb{E} \quad \mathbb{E}'''\mathbb{E}$$

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