Typesetting Greek using Malvern fonts

P. Damian Cugley
Oxford University Computing Laboratory
(Damian.Cugley@comlab.ox.ac.uk)
April 1993

Malvern is a sanserif font family, implemented in METAFONT. This document describes an early version of Malvern encoding G (the Greek alphabet). The Greek letters used to appear in Malvern B, but I decided to give them an encoding (code page?) of their own so that there would be space for composite letters.

1 Using Malvern G

Because most Latin-alphabet languages require additional composite letter glyphs to be properly typeset by TEX, most Malvern fonts will be used as the raw material for composite fonts. In contrast, the Malvern Greek font can be used directly to typeset Greek, both with the old accent-and-breathing systems and the newer (post-1974) one-accent system. It follows the conventions of Silvio Levy's original `gr` family [1] and K. J. Dryllerakis's GreekTEX (`kd` fonts) [2]. It is almost compatible with the reduced Greek fonts (`rgr` and `mrgr` families) described by Yannis Haralambous and Karl Thull [3].

2 Macro file

The file `grhacks.tex` has some macros for setting texts in plain TEX. A future production release may instead work as an option or extension of GreekTEX, with the objective of making it possible to switch an existing document to Malvern without much editing.

Greek text is set within a ***Greek mode***, delimited by macros `\begingreek` and `\endgreek`. Each time Greek mode is entered, the contents of the token register `\everygreek` is scanned first. Since `grhacks` does *not* load a particular font by default, a manuscript using `grhacks` will want to include an assignment like

```
\everygreek={\gr}
\catcode`\*=\active \grdelimiter*
```

where `\gr` has been bound to some Greek font or another such as `ma55g12`. The macro `\grdelimiter` takes one parameter, an active character (or control sequence) and makes that character into a self-matching delimiter for Greek mode (like `$`–`$` works for mathematics mode). Thus, '`*This is Greek*`' produces 'Τηις ις Γρεεκ'.

3 The alphabet

The letters are transliterated as follows:

α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σς	ϲ	τ	υ	φ	χ	ψ	ω
a	b	g	d	e	z	h	j	i	k	l	m	n	x	o	p	r	s	c	t	u	f	q	y	w
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
A	B	G	D	E	Z	H	J	I	K	L	M	N	X	O	P	R	S	C	T	U	F	Q	Y	W

The letter Ϲ ϲ is ***lunate sigma*** (see below).

A lower case sigma ‘σ’ at the end of a word (or followed by punctuation) is automatically changed to the final form ‘ς’ through TEX’s ligature mechanism.[1]

4 Composite letters

The marks that go above the letters are obtained with the following characters, which go before the letter:

Mark	Char	Name	Name in [3]
῾	`<`	asper (rough, = h)	δασεία
᾿	`>`	lenis (smooth)	ψιλή
¨	`"` (double quote)	diaeresis	διαλυτικά
´	`´` (quote)	acute accent	ὀξεία
`	`` ` ``	grave accent	βαρεία
ˆ	`~`	circumflex	περισπωμένη

A breathing or diaeresis can be combined with an accent, thus ‘`<~a`’ for ἇ, ‘`>´e`’ for ἔ.
The vowels α, η and ω may have an iota beneath them, called ‘subscript’: ᾳ, ῃ, ῳ. These are produced with a vertical bar ‘`|`’ after the letter in Greek mode: ‘`a|`’ makes ᾳ, ‘`<a|`’ makes ‘ᾁ’, and so on.

As an example: ‘ἐν ἀρχῇ ἦν ὁ λόγος’ is generated with ‘`>en >arq~h| >~hn <o l´ogos`’.

5 Punctuation

Here’s a table of correspondences for punctuation:

.	,	·	:	!	;	’	«	»
.	,	;	:	!	?	´´	((	))

The apostrophe is also generated by a single single-quote at the end of a word: ‘δ’’ can be generated by ‘`d´`’. There are also digits, parentheses, brackets, hyphen, dashes, slash, per cent sign, asterisk, plus and equals signs.

6 One-accent Greek

The easiest way to write modern Greek is simply to use ´ for the accent and otherwise to use `\begingreek`–`\endgreek` as before: ‘εν αρχή ην ο λόγος’ is generated with ‘`en arq´h hn o l´ogos`’.

Malvern also has glyphs for a symmetrical accent (΄) and composite letters (such as ά, ΰ). The macro `\monotoniko`[2] in Greek mode makes ´ an active character, expanding to the symmetrical accent. Then ‘`En´w`’ produces ‘Ενώ’. In fact, the other accent characters ` and ~ are also made to substitute ‘΄’, and `<`, `>` and `|` expand

[1] Occasionally TEX’s notion of word boundaries causes the wrong glyph to appear. There are two special invisible glyphs that can be used to control this in obscure circumstances. The so-called ***compound word mark*** (or cwm) acts as a word-boundary in the middle of a word. It has code 32, so ‘`as^^`a`’ produces ‘ασα’, for example. The ***null glyph*** is invisible, but, because it is not a boundary character, it can be used to prevent a ligature with a following word boundary. It has code 64, so ‘`as@`’ produces ‘ασ’.

[2] This macro is so named for compatibility with the `rgr/mrgr` macros [3]. It might usefully go in `\everygreek`.

to the null glyph, so that a text with all the breathings and accents and be hacked into almost-correct one-accent Greek.[3] For example, '>En~w|' becomes 'Ενώ'.

7 Variant glyphs

Sigma has a variant called lunate sigma, written Ϲϲ. These letters can be obtained directly (produced by the character 'c' in the manuscript). So that a given text can be switched between the two styles, there is also a macro \grlunatesigma, which redefines 's' is as active character equivalent to 'c'. Obviously this is only useful when Greek mode is only used for plain texts, since it prevents 's' from being used in control sequence names.

Similarly, there are two ways to write lower case phi: ϕ and φ ('f' and glyph 92). There is no difference in meaning between ϕ and φ; the choice of one or the other is only made on aesthetic grounds. The macro \grvarphi redefines 'f' as an active character equivalent to 'φ', in effect replacing ϕ with φ.

Normally these macros, if used, will go in \everygreek.

8 References

Since I don't speak a word of Greek – the only word I know is βαρβαροι and I don't know how to spell it – I have relied on reading between the lines of the documentation for other systems for typesetting Greek, including Hart's Rules [4].

CTAN is the Comprehensive TEX Archive Network, a collection of FTP sites (such as ftp.tex.ac.uk, under directory tex-archive).

[1] Silvio Levy, Using Greek Fonts with TEX, *TUGboat* 9 (1988), pp. 20–24 (CTAN fonts/greek/levy).

[2] K. J. Dryllerakis (kd@doc.ic.ac.uk), *Typesetting Greek Texts with GreekTEX*, GreekTEX 3.1 (also known as KDGreek) (CTAN fonts/greek/kd).

[3] Yannis Haralambous and Klaus Thull, Typesetting Modern Greek with 128 Character Codes, *TUGboat* 10 (1989), pp. 354–359 (CTAN fonts/greek/yannis).

[4] Horace Hart, *Hart's Rules for Compositors and Readers at the University Press, Oxford*, 39th Edition, revised (Oxford University Press, 1989), pp. 111–116.

[3] Again, for compatibility with the rgr/mrgr macros. Because monosyllables should not have accents at all in one-accent Greek, a complete conversion from old-style to new-style requires changes to the manuscript anyway, so the usefulness of this feature is debatable!

9 Examples of text in Malvern 55 and 56

The following paragraph is set in 11-point Malvern 55 (11-point Malvern has comprable x-height to 12-point Computer Modern). This quotation is used as one of the examples in Levy's article [1]:

᾿Αλλ᾿ ἀκούσονται, ἐνπερ εὖ δοκῇς λέγειν. τόδε δέ σου ἐνεόησα ἅμα λέγοντος, καὶ πρὸς ἐμαυτὸν σκοπῶ· εἰ ὅτι μάλιστά με Εὐθύφρων διδάξειεν, ὡς οἱ θεοὶ ἅπαντες τὸν τοιοῦτον θάνατον ἡγοῦνται ἄδικον εἶναι, τί μᾶλλον ἐγὼ μεμάθηκα παρ᾿ Εὐθύφρονος, τί ποτ᾿ ἐστὶν τὸ ὅσιόν τε καὶ τὸ ἀνόσιον; θεομισὲς μὲν γὰρ τοῦτο τὸ ἔπγον, ὡς ἔοικεν, εἴν ἄν· ἀλλὰ γὰρ οὐ τούτῳ ἐφάνη ἄρτι ὡρισμένα τὸ ὅσιον καὶ μή· τὸ γὰρ θεομισὲς ὂν καὶ θεοφιλὲς ἐφάνη. ὥστε τούτου μὲν ἀφίημί σε, ὦ Εὐθύφρον· εἰ βούλει, πάντες αὐτὸ ἡγείσθων θεοὶ ἄδικον καὶ πάντες μισούντων. ἀλλ᾿ ἆρα τοῦτο νῦν ἐπανορθώμεθα ἐν τῷ λόγῳ, ὡς ὃ μὲν πάντες οἱ θεοὶ μισῶσιν, ἀνόσιόν ἐστιν, ὃ δ᾿ ἂν φιλῶσιν, ὅσιον· ὃ δ᾿ ἂν οἱ μὲν φιλῶσιν, οἱ δὲ μισῶσιν, οὐδέτερα ἢ αμφότερα; ἆρ᾿ οὕτω βούλει ἡμῖν ὡρίσθαι νῦν περὶ τοῦ ὁσίου καὶ τοῦ ἀνοσίου;

Plato, 'Euthyphro'

This quotation (similarly stolen) is in Malvern 56 and has `\grvarphi` and `\grlunatesigma` in effect:

Τὴ ϲτιγμὴ τούτη νιώθω πόϲο βαρύ ᾿ναι τὸ μυϲτήριο τῆϲ ξομολόγηϲηϲ. ῾Ωϲ τώρα, κανεὶϲ δὲν ξέρει πῶϲ πέραϲα τὰ δυὸ χρόνια μου ϲτὸ ῞Αγιον ῎Οροϲ. Οἱ φίλοι μου θαρροῦν πὼϲ πῆγα νὰ δῶ βυζαντινὰ κονίϲματα ἢ ἀπὸ μυϲτικοπάθεια νὰ ζήϲω μιὰ περαϲμένη ἐποχή. Καὶ τώρα, νά, ντρέπομαι νὰ μιλήϲω.

Πῶϲ νὰ τὸ πῶ; Θυμοῦμαι ἕνα ἀνοιξιάτικο δειλινό, ποὺ κατέβαινα τὸν Ταΰγετο, μιὰ ξαφνικὴ θύελλα μὲ κύκλωϲε κοντὰ ϲτούϲ Πενταυλούϲ. Τόϲο φοβερὸϲ ἀνεμοϲίφουναϲ, ποὺ ἔπεϲα καταγῆϲ γιὰ νὰ μὴν γκρεμιϲτῶ. Οἱ ἀϲτραπὲϲ μ᾿ ἔξωϲαν ὁλοῦθε κι ἔκλειϲα τὰ μάτια μὴν τυφλωθῶ, καὶ κατάχαμα, πίϲτομα, περίμενα. ῞Ολο τὸ πανύψηλο βουνὸ ἔτρεμε, καὶ δυὸ ἔλατα δίπλα μου τϲακίϲτηκαν ἀπ᾿ τὴ μέϲη καὶ βρόντηξαν χάμου. ῎Ενιωθα τὸ θειάφι τοῦ κεραυνοῦ ϲτὸν ἀέρα, καὶ ξαφνικὰ ξέϲπαϲε ἡ μπόρα, ἔπεϲεν ὁ ἄνεμοϲ, καὶ χοντρέϲ, θερμέϲ ϲτάλεϲ βροχὴ χτύπηϲαν τὰ δεντρὰ καὶ τὸ χῶμα. Τὸ θυμάρι, ἡ θρούμπα, τὸ φαϲκόμηλο, τὸ φλιϲκούνι, χτυπημένα ἀπ᾿ τὸ νερό, τίναξαν τὶϲ μυρωδιέϲ τουϲ κι ὅλη ἡ γῆϲ μύριϲε.

Kazantzakis, 'Symposium'

«ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣϹΤΥΦΧΨΩ»

](αβγδεζηθικλμνξοπρσςϲτυφϕχψω)[

=0123456789—%*+/–'!,·:;.-

ˈ ´ ` ῀ ῾ ῞ ῝ ῟ ᾿ ῎ ῍ ῏ ¨ ΅ ῭ ῁ ͺ
