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# Greek Fonts for Textual Use

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Needing to write some Greek examples for my Adult Education evening class, and being ignorant (at the time) of the existence of Silvio Levy's excellent work, I created a selection of METAFONT driver files which used the definitions of the maths font Greek characters (assembled into **GRKTX.T.MF**), together with some other useful bits. I used these to generate a Greek text font in normal and bold weights, and also in italic and typewriter styles.

The characters are mapped to the intuitive Roman alphabet equivalents, as shown in Table 1, with the use of some ligatures to handle Greek letters traditionally represented by two Roman letters. These mappings are **not** everywhere the same as Silvio Levy's; in particular, note that he uses 'H' to represent 'Y'<sup>1</sup> (which is intuitive as a capital, but not in lower-case ['h'≠'y']) — I feel that my transliteration here makes the “English” Greek more readable, since most of it tends to be in lower-case. (Incidentally, I originally started with more ligatures, for example, 'ks' and 'rh' for 'x' and 'r' respectively; the latter caused a minor disaster with the Greek for 'I start' (arhízw) which has to be input as 'arh\`izw'!)

Since I was interested only in Modern (Demotic) Greek, which adopted the “one-accent” system in 1982, I made no special provision for accents: in particular, there is no simple way of generating breathing marks. I just use the normal  $\LaTeX$  \` before the accented letter: of course, this puts the accent on capital letters in the wrong place (´Y whereas it should be `Y), but one doesn't always need to accent capitals, and \`{} works when necessary. I recognize that using this form of accenting precludes any attempt by  $\TeX$  to hyphenate the Greek words, but I'm pretty clueless on *where* to hyphenate Greek in general! Some time, I ought to get around to making `;` into a sentence-ending punctuation

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\*Because I realize that “double-barrelled” names cause confusion in the U.S., and since mine is even more unusual in that it does **not** contain a hyphen, I should point out that my **surname** is 'Hamilton Kelly', and not just 'Kelly'! (First name is 'Brian', by the way.)

<sup>1</sup>The  $\backslash\mathbf{grbf}$  font has been used in all the in-text examples in this paper

Greek Letter	Characters Typed	Greek Letter	Characters Typed
A	A	a	a
B	B	b	b
G	G	g	g
D	D	d	d
E	E	e	e
Z	Z	z	z
Y	Y	y	y
TH	TH or Th	th	th
I	I	i	i
K	K	k	k
L	L	l	l
M	M	m	m
N	N	n	n
X	X	x	x
O	O	o	o
P	P	p	p
R	R	r	r
S	S	s	s
			\s
T	T	t	t
U	U	u	u
PH	PH or Ph	ph	ph
H	H	h	h
PS	PS or Ps	ps	ps
W	W	w	w

Table 1: Transliteration from Keyboard Input to Greek

mark (since Greek uses it where English uses ‘?’), and perhaps provide a raised dot for the Greek semi-colon; at present, all punctuation marks are in the conventional (Roman) positions, without transliteration, so you type a ‘;’ to get the Greek question mark.

To facilitate the use of these fonts, I have designed a L<sup>A</sup>T<sub>E</sub>X style file option `GREEK.STY`, which ought to be usable with any normal L<sup>A</sup>T<sub>E</sub>X style; at present, it is **not** suitable for S<sub>L</sub>T<sub>E</sub>X. The commands `\gr`, `\grbf`, `\grit` and `\grtt` are defined, and will automatically track any L<sup>A</sup>T<sub>E</sub>X size changing command (*i.e.* `\Large` will invoke a 14pt `\rm` font in a 10pt document style, and then selecting `\grbf` will select the corresponding 14pt Greek bold font). Whenever a Greek font definition is in force, the macro `\s` is used to generate the variant of lower-case `\sigma` required at the ends of words. (Silvio Levy’s font takes care of all

this automatically, however, I'm pretty sure that my LN03 printer driver would fail if I needed more than 188 characters from his Greek fonts, because each  $\TeX$  font needs to be mapped to a single LN03 internal font, which has a maximum capacity of two 94-character "chunks" in the GL and GR terminology of ANSI X-3.64.)

In the last few days I've been getting my hands dirtier with METAFONT, and have changed the programs for a number of the characters; this was necessary because they still exhibited that they were originally "tuned" for maths setting. The characters changed are as follows:

- The lower-case  $\backslash\alpha$  was too wide and also extended right up to the right-hand edge of the bounding box; this has been shrunk by some judicious tweaking of points defining the pen stroke.
- The characters  $\backslash\iota$  and  $\backslash\mu$  also came right up to their right-hand sides; they have simply been redefined in a box one  $u$  wider.
- The character  $\backslash\nu$  had a vertical left stroke; this has been curved and the serif (if any) blended in.
- The character  $\backslash\lambda$  was too wide: fine for denoting wavelength and the like, but not very pretty in text; its width has been shrunk by one  $u$ .
- The character  $\backslash\kappa$  is fine for maths, but not the form ordinarily found in Greek text; what is wanted is something like the  $\backslash\text{varkappa}$  provided by  $\text{AMSTeX}$ . My first thought was to pirate that character from  $\text{YSYMBOL.MF}$  (which we have) but of course that's for the old MF-in-SAIL; I have written something in METAFONT84 which approximates that character (please don't look too closely at the awful code!)

There is considerable scope for further work:

- As mentioned above, because the Greek character definitions were stolen from the maths fonts, spacing of some other characters is not yet perfect; furthermore, the actual form of some other characters (notably  $z$  and  $x$ ) is not that normally expected in Greek text. Eventually, I shall have to tweek them myself, or steal the appropriate bits of Levy's fonts. (As mentioned above, I feel that use of his full 256-character font would cause problems at this site.)
- To make  $\text{GREEK.STY}$  work with  $\text{SLiTeX}$  as well, I shall have to re-write  $\text{SFONTS.TEX}$  to use a font size changing strategy akin to that used by  $\text{LFONTS.TEX}$ , this will also permit the use of  $\text{CYRILLIC.STY}$  (which we have also modified to track automatically  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  size changes) with  $\text{SLiTeX}$ ; quite frankly, I could never understand why  $\text{SFONTS.TEX}$  preloads all those fonts, when load-on-demand would seem much more useful for the contexts in which  $\text{SLiTeX}$  is used.

- I haven't made any "guillemets" style quotation marks.

Finally, an example; I don't know whether Silvio Levy asked the copyright holder's permission to reproduce his example from Kazantzakis' "Symposium", but I haven't! I have, however, followed modern usage of the one-accent system. (I have also corrected what I presume to be a "typo"; it may be, of course, that Kazantzakis actually wrote what was printed in Levy's article, but I feel that *m' ézwsan* ["encircled me"] makes more sense when referring to lightning than *m' éxwsan* ["evicted me"] — my *Megálo epítomo lexikón ty Ellyniký glwssa* [*ca.* 1500pp.] doesn't suggest any other sensible meaning for this verb!)

Ty stigmý toúty niwthw póso barú 'nai to mustýrio ty xomológysy. W tóra, kanei den xerei p'w pérasa ta duó hrónia mou sto 'Agion 'Oro. Oi phíloi mou tharroún pw pýga na dw buzantiná konísmata ý apó mustikopátheia na zýsw miá perasmény epohý. Kai tóra, na, ntrépomai na milýsw.

P'w na to pw; Thumoúmai éna anoixiátiko deilinó, pou katébaina ton Taúgeto, miá xaphniký thúella me kúklwse kontá stou Pentauloú. Tóso phoberó anemosíphouna, pou épesa katagý giá na mýn gkremistw. Oi astrapé m' ézwsan oloúthe ki ékleisa ta mátia mýn tuphlwthw, kai katáhama, pístoma, perímena. 'Olo to panúpsylo bounó étreme, kai duó élata dípla mou tsakístykan ap' ty mésy kai bróntyxan hámou. 'Eniwtha to theiáphi tou keraounó ston aéra, kai xaphniká xéspase y mpóra, épesen o ánemo, kai hontré, thermé stále brohý htúpysan ta dentrá kai to hwma. To thumári, y throúmpa, to phaskómylo, to phliskoúni, htupyména ap' to neró, tínaxan ti murwdié tou ki óly y gy múrise.

And here is the text input to generate that:

```
\begin{flushleft}\parskip 5pt plus 1pt
{\gr Ty stigm\`y to\`uty ni\`wthw p\`oso bar\`u
'nai to must\`yrío ty\s\ xomol\`ogysy\s. W\s\ t\`wra,
kane\`i\s\ den x\`erei p\`w\s\ p\`erasa ta du\`o hr\`onia mou
sto \`\}Agion \`\}Oro\s. Oi ph\`iloi mou tharro\`un pw\s\
p\`yga na dw buzantin\`a kon\`ismata \`y ap\`o
mustikop\`atheia na z\`ysw mi\`a perasm\`eny epoh\`y. Kai
t\`wra, na, ntr\`epomai na mil\`ysw.
```

```
P\`w\s\ na to pw\@; Thumo\`umai \`ena anoixi\`atiko
deilin\`o, pou kat\`ebaina ton Ta\`ugeto, mi\`a xaphnik\`y
th\`uella me k\`uklwse kont\`a stou\s\ Pentaulo\`u\s.
T\`oso phober\`o\s\ anemos\`iphouna\s, pou \`epesa
katag\`y\s\ gi\`a na m\`yn gkremist\`w. Oi astrap\`e\s\
m\`~\`ezwsan olo\`uthe ki \`ekleisa ta m\`atia m\`yn
tuphlwth\`w, kai kat\`ahama, p\`istoma, per\`imena. \`\}Olo
```

to pan\`upsylo boun\`o \`etreme, kai du\`o \`elata d\`ipla  
mou tsak\`istykan ap\` ty m\`esy kai br\`ontyxan h\`amou.  
\`{ }Eniwtha to thei\`aphi tou kerauno\`u ston a\`era, kai  
xaphnik\`a x\`espase y mp\`ora, \`epesen o \`anemo\`s, kai  
hontr\`e\`s, therm\`e\`s\` st\`ale\`s\` broh\`y ht\`upysan ta  
dentr\`a kai to h\`wma. To thum\`ari, y thro\`umpa, to  
phask\`omylo, to phlisko\`uni, htupym\`ena ap\` to ner\`o,  
t\`inaxan ti\`s\` murwdi\`e\`s\` tou\`s\` ki \`oly y gy\`s\`  
m\`urise.}

\end{flushleft}

(Note particularly the ‘\@;’ to make the Greek question mark end the sentence;  
also the use of ‘\`{ }’ to put the accents *before* the capital letters.)

Here it is again, but this time in the italic face:

Ty stigmý touýti niwthw póso barú `nai to mustýrio ty xomológysy. W tóra,  
kaneí den xerei pów pérasa ta duó hrónia mou sto `Agion `Oro. Oi phíloi mou  
tharroún pw pýga na dw buzantiná konísmata ý apó mustikopátheia na zýsw  
miá perasmény epohý. Kai tóra, na, ntrépomai na milýsw.

Pów na to pw; Thumoúmai éna anoixiátiko deilinó, pou katébaina ton Taúgeto,  
miá xaphniký thúella me kúklwse kontá stou Pentaulou. Tóso phoberó  
anemosíphouna, pou épesa katagý giá na mýn gkremistw. Oi astrapé  
m' ézwsan oloúthe ki ékleisa ta mátia mýn tuphlwthw, kai katáhama, pístoma,  
perímena. `Olo to panúpsylo bounó étreme, kai duó élata dípla mou  
tsakístykan ap' ty mésey kai bróntyxan há mou. `Eniwtha to theiáphi tou  
keraounó ston aéra, kai xaphniká xéspase y mpóra, épesen o ánemo, kai  
hontré, thermé stále brohý htúpysan ta dentrá kai to hwma. To thumári, y  
throúmpa, to phaskómylo, to phliskoúni, htupyména ap' to neró, tínaxan ti  
murwdié tou ki óly y gy múrise.

And again, but in the bold extended form:

Ty stigmý touýti niwthw póso barú `nai to mustýrio ty xomológysy. W tóra,  
kaneí den xerei pów pérasa ta duó hrónia mou sto `Agion `Oro. Oi phíloi mou  
tharroún pw pýga na dw buzantiná konísmata ý apó mustikopátheia na zýsw  
miá perasmény epohý. Kai tóra, na, ntrépomai na milýsw.

Pów na to pw; Thumoúmai éna anoixiátiko deilinó, pou katébaina ton Taúgeto,  
miá xaphniký thúella me kúklwse kontá stou Pentaulou. Tóso phoberó  
anemosíphouna, pou épesa katagý giá na mýn gkremistw. Oi astrapé  
m' ézwsan oloúthe ki ékleisa ta mátia mýn tuphlwthw, kai katáhama, pístoma,  
perímena. `Olo to panúpsylo bounó étreme, kai duó élata dípla mou  
tsakístykan ap' ty mésey kai bróntyxan há mou. `Eniwtha to theiáphi tou  
keraounó ston aéra, kai xaphniká xéspase y mpóra, épesen o ánemo, kai  
hontré, thermé stále brohý htúpysan ta dentrá kai to hwma. To thumári, y

throúmpa, to phaskómylo, to phliskoúni, htupyména ap' to neró, tínaxan ti murwdié tou ki óly y gy múrise.

And one last time, in the Greek typewriter font:

Ty stigmý touýty niwthw póso barú 'nai to mustýrio ty xomológysy. W tóra, kaneí den xérei p'w pérasa ta duó hrónia mou sto 'Agion 'Oro. Oi phíloi mou tharroún pw pýga na dw buzantiná konísmata ý apó mustikopátheia na zýsw miá perasmény epohý. Kai tóra, na, ntrépomai na milýsw.

P'w na to pw; Thumoúmai éna anoixiátiko deilinó, pou katébaina ton Taúgeto, miá xaphniký thúella me kúklwse kontá stou Pentauloú. Tóso phoberó anemosíphouna, pou épesa katagý giá na mýn gkremistw. Oi astrapé m' ézwsan oloúthe ki ékleisa ta mátia mýn tuphlwthw, kai katáhama, pístoma, perímena. 'Olo to panúpsylo bounó étreme, kai duó élata dípla mou tsakístykan ap' ty mésy kai bróntyxan hámou. 'Eniwtha to theiáphi tou keraounó ston aéra, kai xaphniká xéspase y mpóra, épesen o ánemo, kai hontré, thermé stále brohý htúpysan ta dentrá kai to hwma. To thumári, y throúmpa, to phaskómylo, to phliskoúni, htupyména ap' to neró, tínaxan ti murwdié tou ki óly y gy múrise.