The EPIGRAFICA font family

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1 Introduction

The Epigrafica family is a derivative work of the MgOpenCosmetica fonts which has been made available by Magenta Ltd (`http://www.magenta.gr`) under the GPL license.

This is the initial release of Epigrafica and supports only monotonic Greek, and the OT1 and T1 partially. Polytonic and full OT1 and T1 support is under development. However, basic latin is supported.

The greek part is to be used with the greek option of the Babel package.

The fonts are loaded with
`\usepackage{epigrafica}`.

The package provides a true small caps font although not provided by the source fonts from Magenta. However, the text figures are currently under development. In addition to this there have been several enhancements both to glyph coverage and to some buggy splines (for example, in O, Q and others)

Finally, the math symbols are taken from the pxfonts package.

2 Installation

Copy the contents of the subdirectory afm in texmf/fonts/afm/source/public/Epigrafica/

Copy the contents of the subdirectory doc in texmf/doc/latex/Epigrafica/

Copy the contents of the subdirectory enc in texmf/fonts/enc/dvips/public/Epigrafica/

Copy the contents of the subdirectory map in texmf/fonts/map/dvips/Epigrafica/

Copy the contents of the subdirectory tex in texmf/tex/latex/Epigrafica/

Copy the contents of the subdirectory tfm in texmf/fonts/tfm/public/Epigrafica/

Copy the contents of the subdirectory type1 in texmf/fonts/type1/public/Epigrafica/

Copy the contents of the subdirectory vf in texmf/fonts/vf/public/Epigrafica/

In your installations updmap.cfg file add the line

Map epigrafica.map

Refresh your filename database and the map file database (for example, on Unix systems run mktexlsr and then run the updmap script as root).

You are now ready to use the fonts provided that you have a relatively modern installation that includes pxfonts.

3 Usage

As said in the introduction the package covers both english and greek. Greek covers only monotonic for the moment.

For example, the preample

```
\documentclass{article}
\usepackage[english,greek]{babel}
\usepackage[iso-8859-7]{inputenc}
\usepackage{epigrafica}
```

will be the correct setup for articles in Greek.

3.1 Transformations by dvips

Other than the shapes provided by the fonts themselves, this package provides a slanted shape using the standard mechanism provided by dvips.

3.2 Euro

Euro is also available in LGR enconding. `\textgreek{\euro}` gives €.

4 Samples

The next two pages provide samples in english and greek with math.

Adding up these inequalities with respect to i, we get

$$\sum c_i d_i \leq \frac{1}{p} + \frac{1}{q} = 1 \tag{1}$$

since $\sum c_i^p = \sum d_i^q = 1$. □

In the case $p = q = 2$ the above inequality is also called the *Cauchy-Schwartz inequality*.

Notice, also, that by formally defining $(\sum |b_k|^q)^{1/q}$ to be $\sup |b_k|$ for $q = \infty$, we give sense to (9) for all $1 \leq p \leq \infty$.

A similar inequality is true for functions instead of sequences with the sums being substituted by integrals.

Theorem *Let $1 < p < \infty$ and let q be such that $1/p + 1/q = 1$. Then, for all functions f, g on an interval $[a, b]$ such that the integrals $\int_a^b |f(t)|^p\,dt$, $\int_a^b |g(t)|^q\,dt$ and $\int_a^b |f(t)g(t)|\,dt$ exist (as Riemann integrals), we have*

$$\int_a^b |f(t)g(t)|\,dt \leq \left(\int_a^b |f(t)|^p\,dt\right)^{1/p} \left(\int_a^b |g(t)|^q\,dt\right)^{1/q}. \tag{2}$$

Notice that if the Riemann integral $\int_a^b f(t)g(t)\,dt$ also exists, then from the inequality $\left|\int_a^b f(t)g(t)\,dt\right| \leq \int_a^b |f(t)g(t)|\,dt$ follows that

$$\left|\int_a^b f(t)g(t)\,dt\right| \leq \left(\int_a^b |f(t)|^p\,dt\right)^{1/p} \left(\int_a^b |g(t)|^q\,dt\right)^{1/q}. \tag{3}$$

Proof: Consider a partition of the interval $[a, b]$ in n equal subintervals with endpoints $a = x_0 < x_1 < \cdots < x_n = b$. Let $\Delta x = (b - a)/n$. We have

$$\begin{aligned} \sum_{i=1}^n |f(x_i)g(x_i)|\Delta x &\leq \sum_{i=1}^n |f(x_i)g(x_i)|(\Delta x)^{\frac{1}{p}+\frac{1}{q}} \\ &= \sum_{i=1}^n \left(|f(x_i)|^p \Delta x\right)^{1/p} \left(|g(x_i)|^q \Delta x\right)^{1/q}. \end{aligned} \tag{4}$$

- Εμβαδόν επιφάνειας από περιστροφή

Πρόταση 4.1 *Έστω γ καμπύλη με παραμετρική εξίσωση $x = g(t)$, $y = f(t)$, $t \in [a, b]$ αν g', f' συνεχείς στο $[a, b]$ τότε το εμβαδόν από περιστροφή της γ γύρω από τον xx' δίνεται*
$B = 2\pi \int_a^b |f(t)| \sqrt{g'(t)^2 + f'(t^2)}dt.$
Αν η γ δίνεται από την $y = f(x)$, $x \in [a, b]$ τότε $B = 2\pi \int_a^b |f(t)| \sqrt{1 + f'(x)^2}dx$

- Όγκος στερεών από περιστροφή

Έστω $f : [a, b] \to \mathbb{R}$ συνεχής και $R = \{f, Ox, x = a, x = b\}$ είναι ο όγκος από περιστροφή του γραφήματος της f γύρω από τον Ox μεταξύ των ευθειών $x = a$, και $x = b$, τότε $V = \pi \int_a^b f(x)^2 dx$

- Αν $f, g : [a, b] \to \mathbb{R}$ και $0 \leq g(x) \leq f(x)$ τότε ο όγκος στερεού που παράγεται από περιστροφή των γραφημάτων των f και g, $R = \{f, g, Ox, x = a, x = b\}$ είναι

$V = \pi \int_a^b \{f(x)^2 - g(x)^2\}dx.$

- Αν $x = g(t)$, $y = f(t)$, $t = [t_1, t_2]$ τότε $V = \pi \int_{t_1}^{t_2} \{f(t)^2 g'(t)\}dt$ για $g(t_1) = a$, $g(t_2) = b$.

5 Ασκήσεις

Άσκηση 5.1 *Να εκφραστεί το παρακάτω όριο ως ολοκλήρωμα Riemann κατάλληλης συνάρτησης*

$$\lim_{n\to\infty} \frac{1}{n} \sum_{k=1}^{n} \sqrt[n]{e^k}$$

Υπόδειξη: Πρέπει να σκεφτούμε μια συνάρτηση της οποίας γνωρίζουμε ότι υπάρχει το ολοκλήρωμα. Τότε παίρνουμε μια διαμέριση P_n και δείχνουμε π.χ. ότι το $U(f, P_n)$ είναι η ζητούμενη σειρά.

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Έχουμε ότι

$$\begin{aligned}\frac{1}{n} \sum_{k=1}^{n} \sqrt[n]{e^k} &= \frac{1}{n} \sqrt[n]{e} + \frac{1}{n} \sqrt[n]{e^2} + \cdots + \frac{1}{n} \sqrt[n]{e^n} \\ &= \frac{1}{n} e^{\frac{1}{n}} + \frac{1}{n} e^{\frac{2}{n}} + \cdots + \frac{1}{n} e^{\frac{n}{n}}\end{aligned}$$