

OFS – Macro Package To Manage Your Fonts

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Abstract

OFS (Olsak’s Font System) gives you a possibility to keep track of your fonts; especially if you have many fonts. It provides tools for making font catalogues, a comfortable user environment for font selection etc. The OFS was presented in EuroT_EX 2003 (Brest, France) [5] but many new features were implemented in 2004. This article presents the latest version of this package. OFS is freely available on [1].

Streszczenie

OFS (Olsak’s Font System) umożliwia wprowadzenie porządku w fontach indywidualnej instalacji. Jest to w szczególności ważne dla instalacji z wieloma fontami. Pakiet dostarcza narzędzi do przygotowywania katalogów fontów, stanowi wygodne otoczenie pozwalające na wybór fontów dla konkretnego dokumentu itp. OFS został zaprezentowany na EuroT_EX-u 2002 (Brest, Francja), ale w 2004 r. zaimplementowano w nim wiele nowych własności. Artykuł przedstawia aktualny stan tego pakietu makr.

1 What fonts are installed?

Interactive typesetting systems have one advantage: there is a simple answer to the question cited in title of this section. Everybody can call up a menu of such an interactive system and pick the item “fonts” (or something similar), click the mouse and he/she can see names of all available fonts. If the system is more powerful then samples of fonts are listed, too. The user can simply choose any font from this listing for his/her document: just click the mouse...

On the other hand, a T_EX user has a more problematic situation. Imagine that you are sitting in front of a (somebody else’s) computer where T_EX is installed and you have to make a simple poster with some attractive typeface. Your first question is: what fonts are available? You can do “kpsewhich cmr10.tfm” to find the font path, then you can “cd” to font path and “ls” font metric files. Definitely, this is not a good idea...

On the other hand, if the OFS is correctly installed on the T_EX system, then you can type the following (the user input is marked by rectangles):

```
$ tex ofstest
This is TeX, Version 3.14159 (Web2C 7.3.7x)
encTeX v. Jun. 2004, the reencoding enabled.
(/usr/TeX/texmf/tex/ofs/ofstest.tex (/usr/TeX/texmf/tex/ofs/ofs.tex
OFS (Olsak’s Font System) based on plain initialized. <Jul 2004>
(/usr/TeX/texmf/tex/ofs/ofsdef.tex)
(/usr/TeX/texmf/tex/ofs/ofs-St.tex)
(/usr/TeX/texmf/tex/ofs/ofs-8c.tex)
*
This is ofstest macro, version <May 2004>
*** Type declaration file name (allfonts for example): allfonts
```

```
(/usr/TeX/texmf/tex/ofs/allfonts.tex (/usr/TeX/texmf/tex/ofs/a117.tex
(/usr/TeX/texmf/tex/ofs/a35.tex)) (/usr/TeX/texmf/tex/ofs/ffonts.tex)
...
(/usr/TeX/texmf/tex/ofs/storm/slido.tex)
(/usr/TeX/texmf/tex/ofs/pantyk.tex)
```

```
*** Type family name without brackets (or ? or *): ☐
OFS (1.0): The list of known font families (encoding 8t):
defaults:
[CMRoman/]          \rm, \bf, \it, \bi, \sl, \bxsl
[CMSans/]           \rm, \bf, \it, \bi
[CMTypewriter/]     \rm, \bf, \it, \bi, \sl
[Times/]            \rm, \bf, \it, \bi
[Helvetica/]       \rm, \bf, \it, \bi, \nrm, \nbf, \nit, \nbi
[Courier/]          \rm, \bf, \it, \bi
a35.tex:
[AvantGarde/]       \rm, \bf, \it, \bi
[Bookman/]          \rm, \bf, \it, \bi
[NewCentury/]       \rm, \bf, \it, \bi
[Palatino/]         \rm, \bf, \it, \bi
[ZapfChancery/]     \rm, -, \it, -
[ZapfDingbats/]     \rm, -, -, -
[Symbol/]           \rm, -, \it, -
...
[Evil/]             \rm, -, -, -
[Ozdooby/]          \rm, -, -, -
[Modell/]           \rm, -, \it, -, \env
[Kompressor/]       \rm, -, \it, -, \ext, \exti
[Libcziowes/]       \rm, -, -, -
[Ohrada/]           \rm, -, -, -
[Patzcuaro/]        \rm, -, -, -
[Plagwitz/]         \rm, -, -, -
slido.tex:
[Lido/]             \rm, \bf, \it, \bi, \crm, \cbf
pantyk.tex:
[AntykwaTorunska/] \rm, \bf, \it, \bi, \lr, \li, \mr, \mi
[AntykwaTorunskaCaps/] \rm, \bf, \it, \bi, \lr, \li, \mr, \mi
[AntykwaTorunskaCond/] \rm, \bf, \it, \bi, \lr, \li, \mr, \mi
[AntykwaTorunskacondcaps/] \rm, \bf, \it, \bi, \lr, \li, \mr, \mi
[AntykwaPoltawskiego/] \rm, \bf, \it, \bi
... you can read more declaration files by \decl
```

```
*** Type family name without brackets (or ? or *): AntykwaTorunska
*** What to do with family AntykwaTorunska ?
```

```
(type command or \help): \list

[AntykwaTorunska/at10pt], encoding: 8t, variants:
\rm (Regular)      cork-antr  at10pt + exp-antr  at10pt
\bf (Bold)        cork-anttb at10pt + exp-anttb at10pt
\it (Italic)      cork-antri  at10pt + exp-antri  at10pt
\bi (BoldItalic)  cork-anttbi at10pt + exp-anttbi at10pt
\lr (Light)       cork-anttl  at10pt + exp-anttl  at10pt
\li (LightItalic) cork-anttli  at10pt + exp-anttli at10pt
\mr (Medium)      cork-anttm  at10pt + exp-anttm  at10pt
\mi (MediumItalic) cork-anttmi at10pt + exp-anttmi at10pt
Registered font encodings: 8t, 8z, 7k, 6w, 8a. Extra: 8x.
Modifications: { 8z:antt }
```

All fonts installed on your \TeX system are listed here. You can use the `ofstest` macro as an interactive tool to print more information about available fonts. The listing prints the long *human readable* font family names and the variant switches `\rm`, `\bf`, `\it`, `\bi`, etc. available for each font family. You can write one font family name on the prompt, the `\list` command then prints more information about it: long names for all variant switches, the metric names (these are usually cryptic names), encodings available for this family etc.

Fonts have typically more than 256 glyphs. This is a reason why OFS records two metric filenames for such fonts: basic metric and extra metric (see `exp-antr` metric file listed in our example). OFS handles these couples of metric files as a single one. We'll return to this problem later in section 6.

2 Interactive macro ofstest.tex

I'll present a supplementary macro `ofstest.tex` first, not the `ofs.tex` macro itself. I hope it would be no problem for reader.

All fonts are collected in packages of fonts. Each package can consist of one or more font families and each font family has one or more font variants. The `allfonts.tex` file has to be managed on \TeX systems in order to keep track of all font packages actually installed. These font packages are saved in `allfonts.tex` in a simple way:

```
$ cat 'kpsewhich allfonts.tex'
%%% All font packages installed on your TeX system
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\input a35      % adobe 35 base font collection (PS level2)
\input a117    % adobe 117 base font collection (PS level3)
\input ffonts  % free fonts (Charter etc.)
\input btfonts % fonts from BitStream
\input skatalog % fonts from Storm Type Foundry, typocatalog 3
\input pantyk  % Polish Antykwa
```

Some packages can have sub-packages. For example the `skatalog` package includes `slido`, `stitul`, `sjannon`, `styfa`, `sdynamo`, etc.¹ All these

packages or sub-packages are implemented by *declaration files* (`a35.tex`, `ffonts.tex`, `slido.tex` etc.). Long names of font families are declared here. A user can work only with one or more declaration files, not (directly) with all fonts. In the following example, we turn attention to `ffonts.tex` declaration file, namely the Charter font family.

```
$ \csplain ofstest "[ffonts]"
This is TeX, Version 3.14159 (Web2C 7.3.7x)
encTeX v. Feb. 2003, the reencoding enabled.
(/usr/TeX/texmf/tex/ofs/ofstest.tex The format: csplain <Feb. 2000>.
The cs-fonts are preloaded and A4 size implicitly defined.
(/usr/TeX/texmf/tex/ofs/ofs.tex
(/usr/TeX/texmf/tex/ofs/ofsdef.tex))
OFS (Olšák's Font System) based on plain initialized. <May 2004>
Czech hyphenation used (\language=5). \frenchspacing is set on.
(/usr/TeX/texmf/tex/ofs/ffonts.tex) This is ofstest macro, version
<May 2004>

*** Type family name without brackets (or ? or *): Charter

*** What to do with family Charter ?
(type command or \help): \help
commands:
\list ..... List all variants of the family Charter
\table(s) . Tables of all variants of the family Charter
\abet ..... One line alphabet/digits sample for each variant
\chars .... Print list of available characters including TeX sequences
\text ..... One paragraph in all variants of the family Charter
\mixed .... Paragraph with fonts combined from \rm, \bf, \it and \bi
\math ..... Mathematics text combined by fonts from Charter
\all ..... The same as \list \table \abet \chars \text \mixed \math
\setsize .. Set size of fonts (current size is "at10pt")
\cfam ..... Change current family
FamName ... The same as \cfam FamName
\rem ..... Remove current family or specified family from \famlist
-----
\famlist .. Show list of all declared families (as \showfonts)
\decl ..... Input next declaration file
\remdecl .. Remove all families of given declaration file from famlist
\help ..... This text
\morehelp . Show more help information
\fontusage The help screen of the OFS
\end ..... End of this session

*** What to do with family Charter ?
(type command or \help): \abet \chars \mixed \math \end

[Charter/at10pt]: \rm abet (/usr/TeX/texmf/tex/ofs/ffonts.tex)
\bf abet \it abet \bi abet
[Charter/]: \chars (/usr/TeX/texmf/tex/ofs/ofs-8z.tex)
[Charter/at10pt]: mixed text (/usr/TeX/texmf/tex/ofs/ofs-ps.tex)
[Charter/at10pt] (\fomenc: PS) [10.0pt/7.0pt/5.0pt]: math text
[1]
Output written on ofstest.dvi (1 page, 7492 bytes).
Transcript written on ofstest.log.
```

The `csplain` is a Czech alternative to plain \TeX . This format is used in this example because I prefer to have `8z` (Czech encoding) as default and the samples will be printed in Czech language (on the other hand, if `tex` command is used, the English samples are printed and `8t` encoding is used).

The `\help` command gives a self-explanatory result. In the example above, we printed short lines with font samples, a list of all \TeX sequences to ac-

¹ The `skatalog` package includes all fonts from Typocatalog 3 by Storm Type Foundry, see [2, 3].

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```
[Charter/10pt] (enc: 8z), declared in ffonts.tex:
() \rm ABCDEOPQRSVWXYZ 0123456789 &%?!-Žžščěáétů, acbdefghijklmnopqrstuvwxyz
(Bold) \bf ABCDEOPQRSVWXYZ 0123456789 &%?!-Žžščěáétů, acbdefghijklmnopqrstuvwxyz
(Italic) \it ABCDEOPQRSVWXYZ 0123456789 &%?!-Žžščěáétů, acbdefghijklmnopqrstuvwxyz
(BoldItalic) \bi ABCDEOPQRSVWXYZ 0123456789 &%?!-Žžščěáétů, acbdefghijklmnopqrstuvwxyz

Charter (8z) \* : * \ ' : * \ v : * \ u : * \ = : * \ r : * \ ^ : * \ \ : * \ H : * \ ~ : * \ " : *
\ c : * \ k : * \ m : * \ b : * \ d : * \ dotlessi : I \ dotlessj : [?] \ " i : İ \ " \ i : İ
\ SS : SS \ AE : Æ \ OE : Œ \ O : Ø \ ss : ß \ ae : æ \ oe : œ \ o : ø \ ellipsis : ... \ promile : %00
\ varhyphen : - \ flqq : « \ frqq : » \ clqq : „ \ crqq : “ \ clq : , \ crq : ‘ \ elqq : “ \ erqq : ”
\ elq : ‘ \ erq : ’ \ exclamdown : ¡ \ questiondown : ¿ \ dag : † \ ddag : ‡ \ section : § \ paragraph : ¶
\ ellipsis : ... \ textbullet : • \ sterling : £ \ currency : ¤ \ Lslash : Ľ \ lslash : ĺ \ Eth : [?]
\ eth : [?] \ texttimes : [?] \ textdiv : [?] \ ' A : À \ ' A : Á \ " A : Ä \ ' a : à \ ' a : á \ " a : ä
\ v C : Č \ v c : č \ v D : Ď \ v d : ď \ ' E : É \ v E : Ě \ ' e : é \ v e : ě \ ' I : Í \ ' i : í \ ' i : í
\ v L : Ľ \ ' L : Ĺ \ v l : ĺ \ ' l : Ĺ \ v N : Ń \ v n : ń \ ' O : Ó \ ^ O : Ô \ " O : Ö \ ' o : ó \ ^ o : ô
\ " o : ö \ ' R : Ř \ v R : Ř \ ' r : ř \ v r : ř \ v S : Š \ v s : š \ v T : Ť \ v t : ť \ r U : Ů \ ' U : Ú
\ " U : Ů \ r u : ů \ ' u : ú \ " u : ü \ ' Y : Ý \ ' y : ý \ v Z : Ž \ v z : ž \ k A : Ā \ ^ A : Ă \ u A : Ǻ
\ k a : ā \ ^ a : ă \ u a : ǻ \ ' C : Ć \ c C : ċ \ c c : ċ \ k E : Ę \ " E : Ę \ k e : ę \ " e : ę
\ ^ I : Î \ ^ i : î \ ^ \ i : î \ ' N : Ń \ ' n : ń \ H O : Ő \ H o : ő \ ' S : Ś \ c S : ś \ ' s : ś \ c s : ś
\ c T : Ţ \ c t : ţ \ H U : Ű \ H u : ű \ ' Z : Ż \ . Z : Ż \ ' z : ż \ . z : ż

Modifications { 8z:charter }
```

Charter
10pt/12.0pt

Příklad. Nyní zjistíme, zda je možné kombinovat základní řez s tučným (resp. polotučným) řezem a s kurzívou v rodině písma *Charter*. Pro vyznačování je vhodné použít *kurzivu* a už méně **tučnou variantu** a prakticky vůbec se nehodí použít *tučnou a skloněnou variantu*. Zcela nevhodné je vyznačovat podtržením nebo prostrkáním. To lidé s dobrým vychováním nedělají. *Vyznačení má být takové, aby při čtení bylo vyznačené místo zřetelně odlišné, ale při pohledu z dálky zůstal text odstavce stejnoměrně šedý.* Tomu nejlépe vyhovuje kurzíva, ale ne ve všech rodinách písma je zdařilá kuzíva k dispozici.

Charter (PX)
[10.0pt/7.0pt/5.0pt]

Poznámka. Funkci Gamma v bodě x značíme $\Gamma(x)$ a počítáme ji podle vzorce:

$$\Gamma(x) = \int_0^\infty e^{-t} t^{x-1} dt \quad (x > 0).$$

Speciálně pro $x = n \in \mathbb{N}$ je $\Gamma(n) = (n - 1)!$ a pro $\alpha \in (0, 1)$ je

$$\Gamma(\alpha) \Gamma(1 - \alpha) = \frac{\pi}{\sin \pi \alpha}.$$

Definice. Necht' A je čtvercová matice s n sloupci a řádky a s prvky a_{ij} . Pak číslo

$$\det A = |A| = \sum_{\Pi=(j_1 j_2 \dots j_n)} \text{sgn } \Pi \cdot a_{1j_1} a_{2j_2} \dots a_{nj_n}$$

nazýváme *determinantem* matice A .

Picture 1. A test of Charter font family

cess the glyphs of the tested font, more interesting samples which mix the normal variant of the tested font with bold or italic and a complex math typesetting sample of the tested font. The result (viewed by `xdvi ofstest`) is shown in picture 1. Note that the dimensions mentioned on margins are not true because the picture is scaled down in this article.

Now we'll initialize `ofstest` without any declaration file:

```
$ \csplain ofstest
This is TeX, Version 3.14159 (Web2C 7.3.7x)
...
(/usr/TeX/texmf/tex/ofs/ofs.tex
OFS (Olsak's Font System) based on plain initialized. <May 2004>
...
This is ofstest macro, version <May 2004>

*** Type declaration file name (allfonts for example): [?]
(/usr/TeX/texmf/tex/latex/tools/.tex File ignored)

*** Type family name without brackets (or ? or *): [?]
OFS (1.0): The list of known font families (encoding 8z):
defaults:
```

```

[CMRoman/]          \rm, \bf, \it, \bi, \sl, \bxs1
[CMSans/]           \rm, \bf, \it, \bi
[CMTypewriter/]     \rm, \bf, \it, \bi, \sl
[Times/]            \rm, \bf, \it, \bi
[Helvetica/]        \rm, \bf, \it, \bi, \nrm, \nbf, \nit, \nbi
[Courier/]          \rm, \bf, \it, \bi
... you can read more declaration files by \decl

*** Type family name without brackets (or ? or *): CMRoman

*** What to do with family CMRoman ?
    (type command or \help): \list

[CMRoman/at10pt], encoding: 8z, variants:
  \rm ()      csr10 at10pt + tcrm1000 at10pt
  \bf (Bold)  csbx10 at10pt + tcbx1000 at10pt
  \it (Italic) csti10 at10pt + tcti1000 at10pt
  \bi (BoldItalic) csbxti10 at10pt + tcbi1000 at10pt
  \sl (Slanted) cssl10 at10pt + tcsl1000 at10pt
  \bxs1 (BoldSlanted) csbxs10 at10pt + tcb11000 at10pt
Registered font encodings: 8z, 8t, 6a. Extra: 8c.
Modifications: { 8z:csfont }

*** What to do with family CMRoman ?
    (type command or \help): \setsize 12pt

*** What to do with family CMRoman ?
    (type command or \help): \list

[CMRoman/at12pt], encoding: 8z, variants:
  \rm ()      csr12 at12pt + tcrm1200 at12pt
  \bf (Bold)  csbx12 at12pt + tcbx1200 at12pt
  \it (Italic) csti12 at12pt + tcti1200 at12pt
  \bi (BoldItalic) csbxti12 at12pt + tcbi1200 at12pt
  \sl (Slanted) cssl12 at12pt + tcsl1200 at12pt
  \bxs1 (BoldSlanted) csbxs110 at12pt + tcb11200 at12pt
Registered font encodings: 8z, 8t, 6a. Extra: 8c.
Modifications: { 8z:csfont }

*** What to do with family CMRoman ?
    (type command or \help): \def\fotenc{8t}\list

[CMRoman/at12pt], encoding: 8t, variants:
(/usr/TeX/texmf/tex/ofs/ofs-8t.tex)
  \rm ()      ecrm1200 at12pt + tcrm1200 at12pt
  \bf (Bold)  ecbx1200 at12pt + tcbx1200 at12pt
  \it (Italic) ecti1200 at12pt + tcti1200 at12pt
  \bi (BoldItalic) ecbit1200 at12pt + tcbi1200 at12pt
  \sl (Slanted) ecssl1200 at12pt + tcsl1200 at12pt
  \bxs1 (BoldSlanted) ecbsl1200 at12pt + tcb11200 at12pt
Registered font encodings: 8z, 8t, 6a. Extra: 8c.
Modifications: { 8z:csfont }

*** What to do with family CMRoman ?
    (type command or \help): \def\fotenc{6a}\list

[CMRoman/at12pt], encoding: 6a, variants:
(/usr/TeX/texmf/tex/ofs/ofs-6a.tex)
  \rm ()      larm1200 at12pt + tcrm1200 at12pt
  \bf (Bold)  labx1200 at12pt + tcbx1200 at12pt
  \it (Italic) lati1200 at12pt + tcti1200 at12pt
  \bi (BoldItalic) labi1200 at12pt + tcbi1200 at12pt
  \sl (Slanted) lasl1200 at12pt + tcsl1200 at12pt
  \bxs1 (BoldSlanted) labl1200 at12pt + tcb11200 at12pt
Registered font encodings: 8z, 8t, 6a. Extra: 8c.
Modifications: { 8z:csfont }

```

You can see that OFS loads six font families as default. We have chosen CMRoman family and printed more information about it by `\list` command. If Czech 8z encoding is used then Computer Modern Roman family is used by CSfonts (metric `csr10.tfm` etc.). Next, we have changed the font size from default 10 pt to 12 pt. We can see that other metric files are used. Of course, OFS (like NFSS) keeps track of different metric files for different fonts

sizes if this feature is available. Next, we changed to 8t font encoding (T1 by L^AT_EX terminology). Now, the Computer Modern Roman is implemented by EC fonts. The encoding 6a mentioned last means T2A encoding for Cyrillic. The font family Computer Modern Roman is implemented by LH fonts (`larm*.tfm`) for this encoding.

Macro `ofstest.tex` gives you the possibility to make short font catalogues. For example, I have loaded `ofstest [pantyk]`, removed default families by `\remdecl defaults`, chosen all families by `*` and printed a short font catalogue by `\abet` command. You can see the result in picture 2.

I have printed for myself such a short catalogue of all fonts installed on my computer. There are hundreds families and thousands variants listed. This short catalogue is my “reference book” when I need to select some interesting font for my work. Let me circulate this “reference book” as an example around this lecture room...

It is irrelevant whether you are a plain_TE_X user, a L^AT_EX user, a ConT_EXt user or whatever else user because you can do this font test outside of your document. I hope that the `ofstest.tex` macro described in this section would be useful for you even if you have to use `tex` or `csplain` command in order to run the `ofstest.tex` macro. I mean that it is not important for you. The goal is achieved: you have a good control over your fonts. You can `\list` your chosen font family and read the metric name. Then you can use a primitive `\font` in your document. Of course it is not a very good idea...

3 Basics about OFS itself

The OFS was designed and finely tuned for plain_TE_X because I am a plain_TE_X user. Nevertheless there exists OFS for L^AT_EX too with the same user environment because L^AT_EX users ask me to do it. I never use L^AT_EX because I have no control over all aspects of my document in L^AT_EX.

OFS implements (apart from others things) features similar to NFSS: font selection independent on encoding/size/family/variant. The code for plain_TE_X does not use NFSS and implements all features by itself. On the other hand, the L^AT_EX variant of OFS is based on NFSS. Roughly speaking, the L^AT_EX version of OFS implements only a user environment and dictionary which converts the family names from human readable form to NFSS cryptic names (such as `pbk` for Bookman).

The differences between OFS for plain_TE_X and OFS for L^AT_EX are explained in detail in documen-

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```

[AntykwaTorunska/10pt] (enc: 8z), declared in pantyk.tex:
(Regular) \rm ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(Bold) \bf ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(Italic) \it ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(BoldItalic) \bi ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(Light) \lr ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(LightItalic) \li ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(Medium) \mr ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(MediumItalic) \mi ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz

[AntykwaTorunskaCaps/10pt] (enc: 8z), declared in pantyk.tex:
(Regular) \rm ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(Bold) \bf ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(Italic) \it ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(BoldItalic) \bi ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(Light) \lr ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(LightItalic) \li ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(Medium) \mr ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(MediumItalic) \mi ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ

[AntykwaTorunskaCond/10pt] (enc: 8z), declared in pantyk.tex:
(Regular) \rm ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(Bold) \bf ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(Italic) \it ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(BoldItalic) \bi ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(Light) \lr ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(LightItalic) \li ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(Medium) \mr ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz
(MediumItalic) \mi ABCDEOPQRSVWXYZ 0123456789 &?!-Źżšćéáéű, acbdefghijklmnopqrstuvwxyz

[AntykwaTorunskaCondCaps/10pt] (enc: 8z), declared in pantyk.tex:
(Regular) \rm ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(Bold) \bf ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(Italic) \it ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(BoldItalic) \bi ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(Light) \lr ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(LightItalic) \li ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(Medium) \mr ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ
(MediumItalic) \mi ABCDEOPQRSVWXYZ 0123456789 &?!-ŹŻŠĆÉÁÉŰ, ACBDEFGHIJKLMNOPQRSTUVWXYZ

```

Picture 2. A short catalogue of Antykwa Toruńska

tation [4]. For example, you have to include the OFS macro in plain \TeX in a little bit different way:

```
\input ofs [declaration, files]
```

than in \LaTeX :

```
\usepackage [declaration, files] {ofs}
```

All other user-level commands have the same syntax and meaning.²

You can use the command `\fontusage`. This command prints to the terminal and to the log file the basic usage of OFS:

```
$ tex ofs \fontusage
This is TeX, Version 3.14159 (Web2C 7.3.7x)
encTeX v. Jun. 2004, the reencoding enabled.
(/usr/Tex/texmf/tex/ofs/ofs.tex
```

```

OFS (Olsak's Font System) based on plain initialized. <May 2004>
(/usr/Tex/texmf/tex/ofs/ofsdef.tex)
\fontusage: ===== Olsak's Font System, usage: =====
\input ofs [sjannon, sdynamo, a35] \loadingenc=1 ... for example
\showfonts ... shows all loaded font families (by previous \input)
\setfonts [Family/] ... local switch to the new family, after this, the
\rm, \bf, \it, \bi will switch to variants. The current size is used.
\setfonts [/size] ... local switch to new size of fonts, the family is
not changed. The "size" has the following possible formats:
at<dimen> ... the same as \font\something=file at<dimen>
<dimen> ... the same as at<dimen>
<number> ... the same as at<number>pt
scaled<number> ... the same as \font\something=file scaled<number>
mag<decimal-number> fonts will be magnified by given coefficient
depend on current size of the fonts.
\setfonts [Family/size] ... switch to the new family at given size
\setfonts [Family-bf/size] ... switch to the specified font.
\fontdef\name [Family/size] ... as \gdef\name{\setfonts[Family/size]}
The "Family" or "size" parameter may be empty.
\fontdef\name [Family-vr/size] ... \name is fixed-font switch iff:
"size" is no empty and no mag<dec-number>.

```

² Note that some parts of the article about the use of OFS have similar (or somewhere the same) text as article [5].

```
Fixed-font switch "\name" is implemented as \global\font\name=file.
\setmath [size/size/size] ... set math it/rm as current it/rm+PS-Symbol
\nofontmessages, \logfontmessages, \displayfontmessages,
\detailfontmessages ... the levels of log.
```

The `\showfonts` prints the initialised font families. You can include the OFS macro without additional declaration files in square brackets (that is, use only `\input ofs`). In such situation, the basic six font families (as mentioned in previous section) are initialized.

```
*\showfonts
OFS (1.0): The list of known font families:
defaults:
[CMRoman/]          \rm, \bf, \it, \bi, \sl
[CMSans/]           \rm, \bf, \it, -
[CMTypewriter/]     \rm, - , \it, - , \sl
[Times/]            \rm, \bf, \it, \bi
[Helvetica/]       \rm, \bf, \it, \bi, \nrm, \nbf, \nit, \nbi
[Courier/]          \rm, \bf, \it, \bi
```

This is the same listing as shown in the previous section. The family names are printed in square brackets here and followed by variant switches available for each font family.

The basic fonts from Computer Modern family (by Donald Knuth) are collected into three families here: `CMRoman`, `CMSans` and `CMTypewriter`. This is self explanatory. Note that the common variant `BoldItalic` (`\bi`) is missing in `CMSans` and `CMTypewriter`. On the other hand, the “special” variant `\sl` (slanted) is available in `CMRoman` and `CMTypewriter` families.

The declaration files (other font families are declared here) can be included in your document using syntax with square brackets or you can `\input` them explicitly. Then you need not use `\input ofs` because declaration files are able to `\input ofs` automatically if this macro is not included before.

When you write

```
$ tex allfonts \showfonts \end | less,
```

you get the listing of all font families available in your \TeX distribution. This is another way to get this listing without using the `ofstest.tex` macro.

If you need to recall what the special variant switches mean (`\nrm` in Helvetica family, for instance), you can try to switch to this family and look to the log file (or to the terminal if `\displayfontmessages` is set):

```
*\displayfontmessages \setfonts [Helvetica/]
OFS (1.0): Font family Helvetica at10pt (enc=8z) activated:
OFS (1.0): \rm () \bf (Bold) \it (Oblique) \bi (BoldOblique)
OFS (1.0): \nrm (Narrow) \nbf (NarrowBold) \nit (NarrowOblique)
\nbi (NarrowBoldOblique)
*
```

Oh yes, `\nrm` means Narrow variant of Helvetica family. You can see that `\it` sometimes means

the **Italic** variant and sometimes the **Oblique** variant.

4 The `setfonts` command

You can select the font family and/or font size by the `\setfonts` command. Two parameters separated by a slash are in square brackets. The first parameter is the font family name and the second one is the font size. If one of the parameters is missing then its aspect stays unchanged. After the font family is selected, you can use the variant switches. Most common switches are `\rm`, `\bf`, `\it`, `\bi`, but other switches can be available for some font families. See the listing produced by `\showfonts` for more detail.

The `\setfonts` command keeps the variant from previous family unchanged after setting of the new family if the current variant is available in new font family. If not then the `\rm` variant is initialized. All families have to support at least the `\rm` variant.

Examples:

```
\input ofs [pantyk]
\setfonts [AntykwaTorunska/10.5] % the normal font
\setfonts [/14]\bf              % used for titles
\setfonts [/8]\rm               % for footnotes
\setfonts [Helvetica/>\it      % for citations
\setfonts [CMTypewriter/]      % monospaced font
```

The main advantage is that you can use the same names of font families as in Typo-catalog and you need not remember the cryptic names of `tfm` files or abbreviations of family names in NFSS.

If the family name is not present in the internal OFS dictionary (perhaps misspelling), then the `\setfonts` command prints a warning plus all available families to log and to the terminal (just like the `\showfonts` command).

The font size can be specified as a decimal number without unit (the unit `pt` is appended automatically) or you can type number with an arbitrary \TeX unit (“`mm`” for example). Moreover, you can use the keyword “`scaled`” before number with the same meaning as in the `\font` primitive. OFS introduces the new keyword “`mag`” followed by a decimal number (decimal point is required). This number denotes the fraction for the current font size. For example:

```
\def\smaller{\setfonts [/mag0.8]}
This text is {\smaller typeset by small \smaller and smaller
\smaller and still smaller characters} and the normal size is used
here.
```

yields:

This text is typeset by small and smaller and still smaller characters and the normal size is used here.

We can use this feature in the L^AT_EX logo, for example:

```
\def\LaTeX{L\kern-.2em
\raise.45ex\hbox{\setfonts[/mag.7] A}\kern-.05em\TeX}
```

This solution works in titles (the raised “A” is bold in such a situation), in normal text, footnotes, italics etc. and in all font families. This feature is not implemented in NFSS and so the L^AT_EX logo has its “A” implemented as superscript math font in L^AT_EX kernel. I think that this is not the best idea.

Another usage of mag keyword is to make corrections of not perfectly the same visual ex height of used font. This problem arises for instance if you combine the CMTypewriter family with some common PostScript font families. The CMTypewriter font seems to be smaller if you use exactly the same design size. This is no problem: you can define `\tt` as `\setfonts [CMTypewriter/mag1.1]` and the ex height is balanced. This definition works in all sizes and font variants.

The NFSS keeps track of another aspect of fonts: the “font weight”. The main reason of this feature is to keep boldface text (in titles, for example) including its italics part. I decided that this feature is not needed in OFS because users can define titles in the following way:

```
\def\chapterfont {\setfonts[/14]\bf \let\it=\bi}
```

Moreover, you can simply define macros which keep more than five aspects (NFSS keeps exactly five aspects). You can find examples in the T_EX support of Štorm’s font, where the big DynaGrotesk family implements a special font selector that keeps the level of “condensation of the font” in addition to the weight, variant (normal/italics), size and encoding.

There exist another task with font variants which cannot be solved by a simple command `\let\it\bi` (sounds like a famous song from Beatles). Imagine that you need to implement the footnote pointers as raised and smaller text which copies the `\rm` variant and `\bf` variant but we need to disable the `\it` variant. The footnote pointers have to be like this:

Normal^{1a} text, **bold^{2b} text**, *italic^{3c} text* and ***bolditalic^{4d} text***.

The solution which works for all font sizes, font families etc. is as follows:

```
\def\disableitalic{%
\ifx\currentvariant \let\currentvariant=M\fi % \it -> \rm
\ifx\currentvariant I\let\currentvariant=F\fi % \bi -> \bf
}
```

```
\def\fnmark#1{\raise.8ex\hbox{\disableitalic\setfonts[/mag.7]#1}}
```

Of course, this solution uses some “internals” from OFS for plainT_EX. You need to know something about font variant representation in OFS. These internals are documented in [4], section 3.3.

5 Font declarations

The features mentioned here are intended for plainT_EX users. NFSS has a different philosophy and L^AT_EX users can read section 2.5 from [4] for more details.

It would be best to concentrate all font declarations to one place in your macro code for your plainT_EX document. OFS is able to satisfy this need. Imagine some common document with sections, footnotes and running headers. You can declare fonts for this document by following code:

```
\input ofs [ffonts] % font Charter is in free fonts
\setfonts [Charter/10pt] % default family
\fontdef \tt [CMTypewriter/mag1.1] % monospaced font
\fontdef \headfont [!/9] % font for headers
\addcmd \headfont {\it \let\bf=\bi}
\fontdef \footnotefont [!/8] % smaller font for footnotes
\addcmd \footnotefont {\baselineskip=10pt\rm}
\fontdef \sectionfont [!/12] % section titles are bold at 12pt
\addcmd \sectionfont {\bf \let\it=\bi}
\fontdef \titlefont [!-bf/14.4] % title of the document
```

Roughly speaking, the command `\fontdef <cname> [<Family>/<size>]` defines `<cname>` as `\setfonts [<Family>/<size>]`. The `\addcmd <cname> {\<commands>}` adds to the contents of macro `<cname>` new `<commands>`.

The “!” instead font family name means that a current font family is used here. The command `\fontdef` replaces “!” by the current family (Charter in our example), thus the macro `<cname>` is defined as `\setfonts [Charter/<size>]`. This is something different from `\fontdef <cname> [/<size>]`, which defines `<cname>` as `\setfonts [/<size>]`. Such a font selector keeps the family when it is used. The “!” convention enables you to store the main font family only at one place. You can change the word `Charter` to something else at the second line in our example and the whole document will be typeset by this other font family.

You can see that the last line of our example declares the title font by `\fontdef` as “[Charter-bf/14.4]”. On the other hand the `\sectionfont` is declared as “[Charter/12]\bf”. Where is difference? The `\titlefont` is equivalent to a *single font* described as “[Charter-bf/14.4]”. It means that the `\titlefont` is the same font selector as if `\font\titlefont=...` is used. On

the other hand, `\sectionfont` is a font family selector: it initializes the whole font family and sets the `\bf` variant as default. There are consequences of this difference: variant switches will work incorrectly in the title of a document but they will work correctly in titles of sections. The author of these macros assumes that the title of a document will be printed only by a single font (for example he knows the text of this title).

You can see that plain \TeX users have to set the `\baselineskip` for each font size manually. The previous example shows that footnotes will be typeset by a different `\baselineskip`. The section titles are supposed to be short (one line), thus `\baselineskip` is not set here.

Why the `\footnotefont` and `\headfont` is declared by an explicit font family name? Why `\fontdef\footnotefont[/8]` (or `\headfont[/9]`) is not sufficient? The answer is simple: the footnote or `\output` routine (which makes headers) can be run while the `\tt` font family is active. In such a situation the solution `\fontdef\footnotefont[/8]` gives bad result.

OFS provides `\knownfam` and `\ifknownfam` commands. You can test by these commands whether given font family is installed in OFS. This feature gives you the possibility to interchange the document source between many users. Each of them can own a different font collection. The following macro code defines `\selectfam` command which selects the first available font family from the given list:

```
\input ofs [allfonts]
\def\selectfam #1[#2]{\def\tmp{#1}\doselectfam #2,]}
\def\doselectfam #1#2,{%
  \if #1\errmessage{\string\selectfam: unknown families}%
  \else
    \knownfam #1#2? % is the family #1#2 installed?
    \iftrue
      \expandafter\def\tmp{#1#2}% family is found
      \def\tmp{#1},{}% ignore rest of families
      \expandafter\expandafter\expandafter\tmp
    \else
      \expandafter\expandafter\expandafter
        \doselectfam
    \fi\fi
  }
\selectfam \antikva [TyfaText, PreissigText, AntykwaTorunska, Times]
\selectfam \grotesk [DynaGroteskR, FuturaBT, Helvetica]

\setfonts [\antikva/10]
\fontdef \sans [\grotesk/]
\fontdef \citefont [\grotesk-it/9]
...
```

The list of families in `\selectfam` parameter should be ended by a family from collection of six default families which are installed on each OFS- \TeX system.

6 Font encoding

OFS for plain \TeX ³ initializes the CSfont encoding by default. This does not matter for English users because CSfonts have absolutely the same encoding(s) as Computer Modern in slots 0 to 127. The users of T1 encoded fonts have to set the default font encoding by the code: `\def\fontenc{8t}` before OFS is loaded. The encoding names are inspired by [7] by Karl Berry.

Theoretically, you can switch between encoding inside the document but this is not a common practice:

```
\input ofs
\setfonts [Times/] text 1 % used metric: ptmr8z, CSfont encoding
\def\fontenc{8t}
\setfonts [/] text 2 % used metric: ptmr8t, T1 encoding
```

If you are using another font encoding with metric names `*xy` (for example) then you can do `\def\fontenc{xy}`, no problem there.

You can find the files `ofs-8z.tex`, `ofs-8t.tex`, `ofs-8c.tex` etc. in the OFS package. The accent declarations and other encoding-dependent macros are situated there. By default, none of these files is read. It means that the accent macros keep their original meaning from plain \TeX . You can use `\input` on one or more of these files (there are no conflicts in these files). After an encoding file is read then the original meaning of plain \TeX macros like `\'`, `\v`, `\ss` is lost, of course.

If you set `\loadingenc=1` then OFS reads the files `ofs-(encoding).tex` automatically when first `\setfonts` with given `\fontenc` occurs. The declarations are then stored globally and files are read in special mode where spaces at end of lines and empty lines are ignored. Default is `\loadingenc=0` (users have to load encoding files manually) but `\loadingenc=1` is highly recommended.

After encoding files are read then accent macros (such as `\v`, `\'` etc.) followed by a character, or glyph macros (such as `\promile`) expand to character codes depending on the actual content of `\fontenc` macro.

You can look at some parts of `ofs-8z.tex` and `ofs-8t.tex` files:

```
%% Default accents in CM
\accentdef \' * 8z {\accent 18 } % grave
\accentdef \' * 8z {\accent 19 } % acute
\accentdef \v * 8z {\accent 20 } % caron
\accentdef \u * 8z {\accent 21 } % breve
```

³ OFS for L \TeX does not solve font encoding, use NFSS tools for font encoding manipulation


```

...
%%% Standard characters in plain (redefined here)
\def\aa{\r a}
\def\AA{\r A}
\characterdef \i      8z 16
\characterdef \j      8z 17
\characterdef \SS     8z {SS}
\characterdef \AE     8z 29
...
%%% Extra characters from CS fonts
\characterdef \promile 8z 141
\characterdef \varhyphen 8z 156
\characterdef \flqq     8z 158
\characterdef \frqq     8z 159
\characterdef \clqq     8z 254
\characterdef \crqq     8z 255
...
%%% Accented letters from CS fonts
\accentdef \' A      8z 152
\accentdef \' A      8z 193
\accentdef \" A      8z 196
\accentdef \' a      8z 184
\accentdef \' a      8z 225
...
%%% Default accents in Cork
\accentdef \' *      8t {\accent 0 }
\accentdef \' *      8t {\accent 1 }
\accentdef \^ *      8t {\accent 2 }
\accentdef \ ` *      8t {\accent 3 }
\accentdef \" *      8t {\accent 4 }
...
%%% Standard characters in plain (redefined here)
\def\aa{\r a}
\def\AA{\r A}
\characterdef \i      8t 25
\characterdef \j      8t 26
\characterdef \SS     8t 223
\characterdef \AE     8t 198
...
\characterdef \promile      8t {\%\char 24 }
\characterdef \textpertenthousand 8t {\%\char 24\char 24 }
...
%%% Accented letters from T1 encoding
\accentdef \. i      8t \i
\accentdef \u A      8t 128
\accentdef \k A      8t 129
\accentdef \' C      8t 130
\accentdef \v C      8t 131
...

```

This example is self-explanatory and illustrates the language for accents and encoding-dependent macro declarations. You can find more information in documentation [4].

OFS takes into account the possibility of existence of a special metric with extra characters (like `\euro`). Each basic metric can be connected with such an “extra metric” into a couple. These couples are used (for example) for CMRoman family, where basic metric depends on `\fotenc` and extra metric is an EC companion font encoded by `8c` encoding. If the extra metric is declared and a user calls the `\characterdefed` or `\accentdefed` macro and this macro is not declared for current encoding but only for the extra metric encoding, then the font with extra metric is temporarily used without any user intervention. Example:

```

\characterdef \euro      8c 191
Now the \euro{} works in all fonts with extra metric *8c.
If basic encoding includes \euro{} then basic metric is used
else extra metric is used for printing of this single character.

```

Unfortunately, not all fonts have exactly all characters equal to characters defined in used encoding. Sometimes some glyphs are missing or there are more glyphs in a font than characters declared by encoding. These *exceptions* can be saved by OFS macros for each font family, thus OFS exactly knows what characters are available and what characters are unavailable in the current family. Each font family can be connected to a list of modifications of standard encoding. For example, font `ptmr8c` which is used as an extension for Times family does not include the Euro symbol, but `8c` encoding defines it at slot 191. This is the reason why the `\characterdel\euro` command is used in `ofs-8c.tex` file in a special list of modifications (named `8c:poor`). The Times family is connected to this `8c:poor` list in its declaration file (see the next section). You can try the following code:

```

\input ofs \loadingenc=1
\setfonts [CMRoman/] I try to use \euro{} in Computer Modern.
\setfonts [Times/] I try to use \euro{} in Times.

```

OFS uses Euro symbol from an extra metric in the CMRoman family, but when Times is activated then the Euro is lost. OFS prints the following warning:

```
OFS (1.3): WARNING. Command \euro is unavailable in Times (8z)
```

You can define the default behavior for `\euro`, for example:

```

\input ofs \loadingenc=1
\characterdef \euro * {Euro} % print the text “Euro”
\setfonts [CMRoman/] I try to use \euro{} in Computer Modern.
\setfonts [Times/] I try to use \euro{} in Times.

```

Now the missing `\euro` will be substituted by text “Euro” for all font families where `\euro` is unavailable. If `\euro` is available then the character from basic or extension metric will be used, of course.

A similar feature is implemented for `\accentdefed` characters. You can find more information about exceptions from standard encodings in [4].

I think that Knuth’s `\mathhexbox` macro for text characters (like `\S`) is a somewhat bad idea because the result is dependent on setting of math fonts (no text fonts), it is independent of text font size and text font variant. This is the reason why OFS defines `\ofshexbox` macro which respects font size and font variant (if the current variant is a “standard” one `\rm`, `\it`, `\bf`, `\bi`). First, you can declare the “special font family” by:

```
\ofshexboxdef {<name>} {<rm>} {<bf>} {<it>} {<bi>}
```

where $\langle name \rangle$ is a name of this special family, $\langle rm \rangle$, $\langle bf \rangle$, $\langle it \rangle$, $\langle bi \rangle$ are metric files for given variants. Then the command `\ofshexbox $\langle name \rangle \langle hexa code \rangle$` prints the glyph from slot of $\langle hexa code \rangle$ from one of four declared metric files. It keeps the current variant and current font size (the metric files are internally loaded by `\font \dots $\langle metric file \rangle$ at $\langle current fontsize \rangle$`). For example:

```
\ofshexboxdef {eurosym}{feymr10}{feybr10}{feymo10}{feybo10}
\characterdef \euro * {\ofshexbox{eurosym}65}
```

is another solution of “missing Euro” problem for families where `\euro` is unavailable.⁴

7 Declaration files

Look into `a35.tex` now for an example of language of declaration files:

```
%% Times, Helvetica, Courier is in OFS defaults

\ofsdeclarefamily [AvantGarde] {% ----- AvantGarde
  \loadtextfam (Book)      pagk\fontenc;%      \rm
  (Demi)                  pagd\fontenc;%      \bf
  (BookOblique)          pagko\fontenc;%      \it
  (DemiOblique)          pagdo\fontenc;8c;%    \bi
  \def\TeX{T\kern-.08em\lower.3333ex\hbox{E}\kern-.09emX}%
  \modifyenc 8z:badaccents;%
  \modifyenc 8t:losschars;%
  \modifyenc 8c:poor;%
}
\registerenc: 8z \registerenc: 8t

\ofsdeclarefamily [Bookman] {% ----- Bookman
  \loadtextfam (Light)     pbkl\fontenc;%      \rm
  (Demi)             pbkd\fontenc;%      \bf
  (LightItalic)     pbkli\fontenc;%      \it
  (DemiItalic)     pbkdi\fontenc;8c;%    \bi
  \def\TeX{T\kern-.14em\lower.4ex\hbox{E}\kern-.125emX}%
  \modifyenc 8z:badaccents;%
  \modifyenc 8t:losschars;%
  \modifyenc 8c:poor;%
}
\registerenc: 8z \registerenc: 8t
...
```

The mapping between font family names and metric files is defined here.⁵ Each family declares four metric files for four common variants `\rm`, `\bf`, `\it` and `\bi`. Empty parameter means that the variant is missing. The metric names include `\fontenc` in order to get names `pagk8z`, `pagk8t`, etc. after expansion. The extra metric `8c` is declared before the last semicolon. The commands from parameter of the `\ofsdeclarefamily` are processed when `\setfonts` is used. You can see the alternative definition of T_EX logo here. It optimizes the visual aspect of this logo specially for each font family.

The optional parameters of `\loadtextfam` macro are written in brackets and these parameters declare mapping from short variant switches to the full variant names printed to the log and terminal. For example, `\it` variant is `BookOblique` in `AvantGarde` font family. If the common name is used (`Bold/Italics/BoldItalics`) then this parameter can be missing.

The `\modifyenc` commands make connections of the family to exception lists from standard encoding. For example, the `8c:poor` list was mentioned in the previous section.

Finally, the `\registerenc` commands say that the declared family is ready to be used in specified encodings. The `AvantGarde` and `Bookman` family have registered only `8z` and `8t` basic encodings. It means that these families are not available in other encodings.

How is the `CMRoman` family declared? This family includes two special features. First: the metric file names do not include the `8z` or `8t` acronym for encoding. Second: different metric names are used for different font sizes. Both problems are solved by the command `\registertfm` (see the `ofsdef.tex` file):

```
\registertfm cmr8z - csr10 % metric for all sizes
\registertfm cmr8z 0pt-6pt csr5
\registertfm cmr8z 6pt-7pt csr6
\registertfm cmr8z 7pt-8pt csr7
\registertfm cmr8z 8pt-9pt csr8
\registertfm cmr8z 9pt-10pt csr9
\registertfm cmr8z 10pt-12pt csr10
\registertfm cmr8z 12pt-17pt csr12
\registertfm cmr8z 17pt-* csr17
...
\registertfm cmr8t - dcr10 % metris for all sizes
...
\ofsdeclarefamily [CMRoman] {% ----- Computer Modern Roman
  \loadtextfam cmr\fontenc;%      \rm
  cmbx\fontenc;%      \bf
  cmti\fontenc;%      \it
  cmbxti\fontenc;8c;%    \bi
  \newvariant8 \sl (Slanted) cmsl\fontenc;8c;%
  \newvariant9 \bxsl (BoldSlanted) cmbxsl\fontenc;8c;%
  \modifyenc 8z:csfont;%
}
\registerenc: 8z \registerenc: 8t \registerenc: 6a
```

Look at other declaration files for more examples. Look at documentation [4] for detailed information about syntax and semantic of commands used here.

8 Math fonts

The math fonts are collected in math families (three fonts per one family) by `\textfont`, `\scriptfont` and `\scriptscriptfont` primitives. The math fam-

⁴ The metric files in this example are loaded from `eurosym` package.

⁵ OFS for L^AT_EX uses other declaration files `*.sty`. The mapping between family names and NFSS short names are defined there.

ilies with number 0, 1, 2, 3 have special meaning in math typesetting. The declaration of a new math family by \TeX primitives is not too comfortable. Plain \TeX users can declare a new math family by OFS macro `\loadmathfam`. This command will be described below.

Plain \TeX user have to initialize the math fonts in OFS by `\setmath` command. The math fonts are in the same state as declared in plain \TeX macro until the `\setmath` command is used. It means that the Computer Modern at 10/7/5 pt size are used. The `\setmath` command has three parameters separated by slashes enclosed in square brackets. These parameters describe the text/script/scriptscript size of the math fonts. An empty parameter means that the mag1.0/mag.7/mag.5 (relatively to the current size of textual font) is substituted:

```
\setmath [/] is the same as \setmath [mag1.0/mag.7/mag.5]
```

The `\setmath` command calculates the needed sizes from given parameters and starts the `\mathfonts` macro followed by macro `\mathchars`. A plain \TeX user can define these macros in his own way but OFS gives the reasonable default meaning of these macros. The outcome of these default macros depends on the values of the `\fomenc` and `\mathversion` macros.

If `\def\fomenc{PS}` is used (it is default value in OFS) then `\setmath` initializes math fonts in the following way: math italic is loaded from text italics of the current text font family, family 0 is loaded from `\rm` variant of the current family. The math symbols are loaded (if it is possible) from common PostScript font Symbol. The rest (which is not included in Symbol font) is loaded from Computer Modern fonts. The math encoding is redefined (by `\mathchardef` etc. primitives) for many symbols in order to keep the accessibility of all math characters declared in plain \TeX . For example the lower letter Greek characters are loaded from slanted variant of PostScript Symbol font.

If you write `\def\fomenc{CM}` then `\setmath` loads the math fonts from Computer Modern family (like in plain \TeX) and does not change the math encoding. In this case, the `\setmath[/]/]` command only sets the actual sizes of these fonts depending on current text font size.

After `\input txfn.tex` you can write `\def\fomenc{TX}` or `{PX}`. The free available TX fonts are used in such case for math typesetting. They are very similar to Times and Helvetica families and they include a large set of math glyphs.

`\def\fomenc{TX}` means that all math typesetting will be realized by TX fonts. If `\def\fomenc{PX}` is set then math italic and family 0 is copied from the current text font family.⁶

After `\input amsfn.tex` you can write `\def\fomenc{AMS}`. AMS fonts will be used.

If you buy the MathTimes family, you can do `\input mtfn.tex` and you can use `\def\fomenc{MT}`.

You can control the math families collection loaded by `\setmath` by the value of `\mathversion` macro. OFS declares two math family collections: `\def\mathversion{normal}` and `{bold}`. You can declare more collections if you need it. The “bold” collection is the same as “normal”, but bold variants of italics, family 0 and math symbols (if accessible) are loaded instead normal variants.

The example from `ofsdef.tex` file illustrates the language of declarations of the math fonts:

```
\def\loadPSnormalmath{%
  \loadmathfam 0[-rm]/%           Actual Roman font
  \loadmathfam 1[-it]/%         Actual Italic font
  \defaultskewchar=48
  \loadmathfam 2[/cmsy]%       Standard symbols from CM
  \defaultskewchar=-1
  \noindexsize\loadmathfam 3[tenex]/% Standard extra symbols from CM
  \chardef\symbfam 4
  \loadmathfam \symbfam [/psyr]% PostScript Symbol
  \chardef\symbfam 5
  \loadmathfam \symbfam [/psyro]% PostScript Symbol Oblique
  \chardef\bffam 6
  \loadmathfam \bffam [-bf]/%   Actual Bold font
  \chardef\bifam 7
  \loadmathfam \bifam [-bi]/%   Actual Bold Italic
  \lastfam = 7
  \chardef\itfam 1
  \let\slfam\undefined \let\ttfam\undefined
  \setfsize \tmpa mag1.44:%
  \font \bigsymbofont=psyr \tmpa% Big variant for \displaysize
  \fontloadmessage{bigsymbofont}{psyr\space\tmpa}%
}
\def\loadPSboldmath{%
  \loadmathfam 0[-bf]/%       Actual Bold font
  \loadmathfam 1[-bi]/%       Actual Bold-Italic font
  \defaultskewchar=48
  \loadmathfam 2[/cmsy]%     Bold symbols from CM
  \defaultskewchar=-1
  \noindexsize\loadmathfam 3[tenex]/% Standard extra symbols from CM
  \chardef\symbfam 4
  \loadmathfam \symbfam [/psyr]% PostScript Symbol
  \chardef\symbfam 5
  \loadmathfam \symbfam [/psyro]% PostScript Symbol Oblique
  \lastfam = 7 % needs to be the same as in normal version
  \chardef\itfam 1
  \chardef\bifam 1
  \chardef\bffam 0
  \let\slfam\undefined \let\ttfam\undefined
  \setfsize \tmpa mag1.44:%
  \font \bigsymbofont=psyr \tmpa% Big variant for \displaysize
  \fontloadmessage{bigsymbofont}{psyr\space\tmpa}%
}
\def\loadCMnormalmath{%
  \loadmathfam 0[/cmr&sz]%     Roman font
  \defaultskewchar=128
  ...
  \lastfam =7
}
```

⁶ Please, return to the section 2, picture 1. This picture does not illustrate exactly the output from `ofstest` example mentioned in this section. In fact, the math typesetting sample was printed by `\def\mathenc{PX} \math` commands.

...

If you need to add next math families (math alphabets in NFSS terminology) then you can use the code similar as the following:

```
\addcmd\mathfonts{%
  \newmathfam\bbfam
  \loadmathfam \bbfam [/bold12]% BBfonts
  \def\bb{\fam\bbfam}%
}
\addcmd\mathchars{%
  \mathchardef\balpha "0\hex\bbfam 0B
  \mathchardef\bbeta "0\hex\bbfam 0C
  ...
}
```

We can re-write the example from section 5 in order to support the math typesetting:

```
\input ofs [ffonts] \loadingenc=1 % font Charter is in free fonts
\setfonts [Charter/10pt] % default family
\input txfn \def\fomenc{PX}
\setmath[//] % math initialisation
\fontdef\tt [CMTypewriter/mag1.1] % monospaced font
\fontdef\headfont [!/9] % font for headers
\addcmd\headfont {\it \let\bf=\bi \emath}
\fontdef\footnotefont [!/8] % smaller font for footnotes
\addcmd\footnotefont {\baselineskip=10pt\rm \emath}
\fontdef\sectionfont [!/12] % titles are bold at 12pt
\addcmd\sectionfont {\bf \let\it=\bi
  \def\mathversion{bold}\emath}
\fontdef\titlefont [!-bf/14.4] % title of the document
\def\emath{\everymath={\setmath[//]}} % \setmath[//] only if $ is used
```

The math fonts will work in all sizes (besides `\titlefont`) in our virtual example. The math formulae are in bold variant and in right size in section titles. For normal font, `\setmath[//]` is initialized on line 4 of our example. Other font selectors do not run `\setmath[//]` when called, this command will be run only when TeX enters to math mode (see `\everymath` trick).

Let me do the last test in this article. The following code is appended to the previous example:

```
\def\section #1{\bigskip\sectionfont#1\par\nobreak\medskip}
\detailfontmessages

\section {Theorem $a^2+b^2=c^2$}

\hbox to0pt{Normal text.} % Test of overfull message
\end
```

The log file after `tex test` follows:

```
This is TeX, Version 3.14159 (Web2C 7.3.7x) (format=plain 2003.2.18)
...
OFS (Olsak's Font System) based on plain initialized. <May 2004>
...
OFS (1.2): Font family Charter at10pt (enc=8z) activated:
(/usr/TeX/texmf/tex/ofs/ofs-8z.tex
OFS (1.57): Characters + accents of 8z encoding defined.
)
OFS (1.2): \rm () \bf (Bold) \it (Italic) \bi (BoldItalic)
(/usr/TeX/texmf/tex/ofs/txfn.tex)
OFS (1.4): \setmath [at10.0pt/at7.0pt/at5.0pt] (enc=PX, version=normal)
(/usr/TeX/texmf/tex/ofs/ofs-px.tex)
OFS (1.4): Math codes are set for PX encoding.
(/usr/TeX/texmf/tex/ofs/ofs-ams.tex)
OFS (1.4): Math symbols are set for AMS encoding.
```

```
(/usr/TeX/texmf/tex/ofs/ofs-tx.tex)
OFS (1.4): Math symbols are set for TX encoding.
OFS (1.5): Define \tt as \setfonts [CMTypewriter/mag1.1].
OFS (1.6): Define \headfont as \setfonts [Charter/9].
OFS (1.8): Define \footnotefont as \setfonts [Charter/8].
OFS (1.10): Define \sectionfont as \setfonts [Charter/12].
OFS (1.13): Define \titlefont as fixed font [Charter-bf/14.4].
OFS (1.13): Loading single font Charter-bf at14.4pt (enc=8z).
\detailfontmessages:
OFS (1.19): Font family Charter at12pt (enc=8z) activated:
OFS (1.19): \font\tenrm = bchr8z at12pt
OFS (1.19): \font\tenbf = bchb8z at12pt
OFS (1.19): \font\tenit = bchri8z at12pt
OFS (1.19): \font\tenbi = bchbi8z at12pt
OFS (1.19): \rm () \bf (Bold) \it (Italic) \bi (BoldItalic)
OFS (1.19): \setmath [at12.0pt/at8.4pt/at6.0pt] (enc=PX, version=bold)
OFS (1.19): \font\bf-Mt = bchb8z at12.0pt (fam:0)
OFS (1.19): \font\bf-Ms = bchb8z at8.4pt (fam:0)
OFS (1.19): \font\bf-Mss = bchb8z at6.0pt (fam:0)
OFS (1.19): \font\bi-Mt = bchbi8z at12.0pt (fam:1)
OFS (1.19): \font\bi-Ms = bchbi8z at8.4pt (fam:1)
OFS (1.19): \font\bi-Mss = bchbi8z at6.0pt (fam:1)
OFS (1.19): \font\txbsy-Mt = txbsy at12.0pt (fam:2)
OFS (1.19): \font\txbsy-Ms = txbsy at8.4pt (fam:2)
OFS (1.19): \font\txbsy-Mss = txbsy at6.0pt (fam:2)
OFS (1.19): \font\txbex-Mt = txbex at12.0pt (fam:3)
OFS (1.19): \font\txbmi-Mt = txbmi at12.0pt (fam:\mifam=4)
OFS (1.19): \font\txbmi-Ms = txbmi at8.4pt (fam:\mifam=4)
OFS (1.19): \font\txbmi-Mss = txbmi at6.0pt (fam:\mifam=4)
...
OFS (1.19): \font\txb-Mt = txb at12.0pt (fam:\rmsyfam=12)
OFS (1.19): \font\txb-Ms = txb at8.4pt (fam:\rmsyfam=12)
OFS (1.19): \font\txb-Mss = txb at6.0pt (fam:\rmsyfam=12)

Overfull \hbox (53.83992pt too wide) detected at line 21
\Charter-rm/at10pt Normal text.
...
[1] )
Output written on test.dvi (1 page, 436 bytes).
```

You can see that the text encoding file `ofs-8z.tex` and math encoding files `ofs-px.tex`, `ofs-ams.tex`, `ofs-tx.tex` are read automatically.

A detailed report about the processing of all `\font` primitives is logged as the outcome of `\detailfontmessages` command. The initialization of math fonts family at 12/8.4/6 in “bold” version is shown.

The “overfull message” prints the font identifier like `\Charter-rm/at10pt`. This is more legible than cryptic font identifiers used in NFSS.

References

1. <ftp://math.feld.cvut.cz/pub/olsak/ofs>.
2. www.stormtype.com
3. www.cstug.cz/stormtype/slido.html.
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5. Petr Olšák, Petr Sojka. *The Font Management with the OFS*. EuroTeX2003, Brest. The article is available only in draft version on <ftp://math.feld.cvut.cz/pub/olsak/ofs/papers/>
6. Petr Olšák. *Jak TeX k fontům ze Střešovic přišel*. Bulletin of CSTUG, number 4/2001, pp 153–180.
7. Karl Berry. *Fontname*, March 1999. The documentation is included in web2c TeX, file `fontname.texi`, `fontname.pdf`