

# The packages of the PSNFSS bundle

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PSNFSS-v9.2a – 2005/04/12

The source file `psfonts.dtx` contains suitable package files to use common PostScript fonts with  $\text{\LaTeX}$ . See the file `00readme.txt` for the installation instructions; it also explains how to obtain the related Type1 fonts, font definition files, font metrics and virtual fonts.

See the document ‘Using common PostScript fonts with  $\text{\LaTeX}$ ’, filename `psnfss2e.pdf`, for a description of the user interface.

## 1 The times package

```
1 (*times)
2 \renewcommand{\sfdefault}{phv}
3 \renewcommand{\rmdefault}{ptm}
4 \renewcommand{\ttdefault}{pcr}
5 </times>
```

## 2 The palatino package

```
6 (*palatino)
7 \renewcommand{\rmdefault}{ppl}
8 \renewcommand{\sfdefault}{phv}
9 \renewcommand{\ttdefault}{pcr}
10 </palatino>
```

## 3 The helvet package

Options processing uses the `keyval` package and a hack borrowed from `hyperref`:

```
11 (*helvet)
12 \RequirePackage{keyval}
13 \define@key{Hel}{scaled}[.95]{%
14   \def\Hv@scale{#1}}
15 \def\ProcessOptionsWithKV#1{%
16   \let\@tempc\relax
17   \let\Hv@tempa\@empty
18   \ifx\@classoptionslist\relax\else
19     \for\CurrentOption:=\@classoptionslist\do{%
20       \ifundefined{KV@#1@\CurrentOption}%
21         {}%
22         {%
23           \edef\Hv@tempa{\Hv@tempa,\CurrentOption,}%
24           \@expandtwoargs\removeelement\CurrentOption
25             \@unusedoptionlist\unusedoptionlist
26         }%
27       }%
28   \fi
29   \edef\Hv@tempa{%
30     \noexpand\setkeys{#1}{%
31       \Hv@tempa\@ptionlist{\@currname.\@current}}%
```

---

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```

32   }%
33 }%
34 \Hv@tempa
35 \let\CurrentOption\@empty
36 }
37 \ProcessOptionsWithKV{Hel}
38 \AtEndOfPackage{%
39   \let\@unprocessedoptions\relax
40 }

```

The .fd files will evaluate the macro \Hv@scale and scale Helvetica appropriately.  
 Now it's time to redefine the default sans font:

```

41 \renewcommand{\sfdefault}{phv}
42 </helvet>

```

## 4 The avant package

```

43 (*avant)
44 \renewcommand{\sfdefault}{pag}
45 </avant>

```

## 5 The newcent package

```

46 (*newcent)
47 \renewcommand{\rmdefault}{pnc}
48 \renewcommand{\sfdefault}{pag}
49 \renewcommand{\ttdefault}{pcr}
50 </newcent>

```

## 6 The bookman package

```

51 (*bookman)
52 \renewcommand{\rmdefault}{pbk}
53 \renewcommand{\sfdefault}{pag}
54 \renewcommand{\ttdefault}{pcr}
55 </bookman>

```

## 7 The courier package

```

56 (*courier)
57 \renewcommand{\ttdefault}{pcr}
58 </courier>

```

## 8 The pifont package

Some useful commands for Pi fonts (Dingbats, Symbol etc); they all assume you know the character number of the (unmapped) font

```

59 (*pifont)
60 \newcommand{\Pifont}[1]{\fontfamily{#1}\fontencoding{U}%
61 \fontseries{m}\fontshape{n}\selectfont}
62 \newcommand{\Pisymbol}[2]{\Pifont{#1}\char#2}
63 \newcommand{\Pifill}[2]{\leavevmode
64 \leaders\hbox{\makebox[0.2in]{\Pisymbol{#1}{#2}}}\hfill
65 \kern\z@}
66 \newcommand{\Piline}[2]{\par\noindent\hspace{0.5in}\Pifill{#1}{#2}%
67 \hspace{0.5in}\kern\z@\par}
68 \newenvironment{Pilist}[2]%
69 {\begin{list}{\Pisymbol{#1}{#2}}{}}%
70 {\end{list}}%

```

A Pi number generator (from ideas by David Carlisle), for use in lists where items are suffixed by symbols taken in sequence from a Pi font. Usage is in lists just like enumerate.

`\Pinumber` outputs the appropriate symbol, where #2 is the name of a L<sup>A</sup>T<sub>E</sub>X counter and #1 is the font family.

```
71 \def\Pinumber#1#2{\protect\Pisymbol{#1}{\arabic{#2}}}
72 \newenvironment{Piautolist}[2]{%
73 \ifnum \@enumdepth >3 \@toodeep\else
74 \advance\@enumdepth \@ne
```

We force the labels and cross-references into a very plain style (e.g., no brackets around ‘numbers’, or dots after them).

```
75 \edef\@enumctr{enum\romannumeral\the\@enumdepth}%
76 \expandafter\def\csname p@enum\romannumeral\the\@enumdepth\endcsname{%
77 \expandafter\def\csname labelenum\romannumeral\the\@enumdepth\endcsname{%
78 \csname theenum\romannumeral\the\@enumdepth\endcsname}%
79 \expandafter\def\csname theenum\romannumeral\the\@enumdepth\endcsname{%
80 \Pinumber{#1}{enum\romannumeral\the\@enumdepth}}%
81 \list{\csname label\@enumctr\endcsname}{%
82 \nmblisttrue
83 \def\@listctr{\@enumctr}%
84 \setcounter{\@enumctr}{#2}%
85 \addtocounter{\@enumctr}{-1}%
86 \def\makelabel##1{\hss\llap{##1}}}
87 \fi
88 }\endlist}
```

All the old Dingbat commands still work; they are now implemented using the `\Pi...` commands.

```
89 \newcommand{\ding}{\Pisymbol{pzd}}
90 \def\dingfill#1{\Pifill{pzd}{#1}}
91 \def\dingline#1{\Piline{pzd}{#1}}
92 \newenvironment{dinglist}[1]{\begin{Pilist}{pzd}{#1}}%
93 {\end{Pilist}}
94 \newenvironment{dingautolist}[1]{\begin{Piautolist}{pzd}{#1}}%
95 {\end{Piautolist}}
96 {\Pifont{pzd}}
97 {\Pifont{psy}}
98 </pifont}
```

## 9 The chancery package

```
99 <*chancery>
100 \renewcommand{\rmdefault}{pzc}
101 </chancery>
```

## 10 The mathptm and mathptmx packages

Setting up the fonts for mathptm:

```
102 <*mathptm>
103 \PackageWarningNoLine{mathptm}{%
104 This package is to be regarded as obsolete.\MessageBreak
105 See the PSNFSS documentation}
106 \def\rmdefault{ptm}
107 \DeclareSymbolFont{operators} {OT1}{ptmcm}{m}{n}
108 \DeclareSymbolFont{letters} {OML}{ptmcm}{m}{it}
109 \DeclareSymbolFont{symbols} {OMS}{pzccm}{m}{n}
110 \DeclareSymbolFont{largesymbols}{OMX}{psycm}{m}{n}
111 \DeclareSymbolFont{bold} {OT1}{ptm}{bx}{n}
112 \DeclareSymbolFont{italic} {OT1}{ptm}{m}{it}
113 </mathptm>
```

Setting up the fonts for mathptmx:

```
114 <*mathptmx>
115 \def\rmdefault{ptm}
```

```

116 \DeclareSymbolFont{operators}    {OT1}{zmtmcm}{m}{n}
117 \DeclareSymbolFont{letters}     {OML}{zmtmcm}{m}{it}
118 \DeclareSymbolFont{symbols}     {OMS}{zmtmcm}{m}{n}
119 \DeclareSymbolFont{largesymbols}{OMX}{zmtmcm}{m}{n}
120 \DeclareSymbolFont{bold}        {OT1}{ptm}{bx}{n}
121 \DeclareSymbolFont{italic}      {OT1}{ptm}{m}{it}
122 </mathptmx>
    Define \mathbf and \mathit:
123 (*mathptm | mathptmx)
124 \@ifundefined{mathbf}{-}{\DeclareMathAlphabet{\mathbf}{OT1}{ptm}{bx}{n}}
125 \@ifundefined{mathit}{-}{\DeclareMathAlphabet{\mathit}{OT1}{ptm}{m}{it}}
    An \omicron command, to fill the gap:
126 \DeclareMathSymbol{\omicron}{0}{operators}{'\o}
    Lock unavailable symbols:
127 \renewcommand{\jmath}{%
128   \PackageError
129 (mathptm)  {mathptm}
130 (mathptmx) {mathptmx}
131 {The symbols \protect\jmath, \protect\amalg\space and
132  \protect\coprod\MessageBreak
133  are not available with this package}
134 {Type \space <return> \space to proceed;
135  your command will be ignored.}}
136 \let\amalg=\jmath
137 \let\coprod=\jmath
    Reduce the space around math operators:
138 \thinmuskip=2mu
139 \medmuskip=2.5mu plus 1mu minus 1mu
140 \thickmuskip=4mu plus 1.5mu minus 1mu
141 </mathptm | mathptmx>
    Make \hbar work with Times.
142 (*mathptm)
143 \def\hbar{\mskip1.6mu\mathchar'26\mkern-7.6muh}
144 </mathptm>
With mathptmx, PSNFSS 9.0 and later is using an improved definition, which was
adopted from Frank Mittelbach's mathtime package:
145 (*mathptmx)
146 \DeclareRobustCommand\hbar{%
147   \dimen@.03em%
148   \dimen@ii.06em%
149   \def\@tempa##1##2{%
150     \lower##1\dimen@\rlap{\kern##1\dimen@ii\the##2 0\char22}}%
151   \mathchoice\@tempa\@ne\textfont
152             \@tempa\@ne\textfont
153             \@tempa\defaultscriptratio\scriptfont
154             \@tempa\defaultscriptscriptratio\scriptscriptfont
155   h}}
156 </mathptmx>
    No bold math:
157 (*mathptm | mathptmx)
158 \def\boldmath{%
159   \PackageWarning%
160 (mathptm)  {mathptm}%
161 (mathptmx) {mathptmx}%
162   {There are no bold math fonts}%
163   \global\let\boldmath=\relax
164 }
165 </mathptm | mathptmx>

```

Use larger font sizes for super- and subscripts:

```
166 <mathptmx>
167 \def\defaultscrisptraio{.74}
168 \def\defaultscrisptraio{.6}
169 </mathptmx>
170 <mathptm | mathptmx>
171 \DeclareMathSizes{5}{5}{5}{5}
172 \DeclareMathSizes{6}{6}{5}{5}
173 \DeclareMathSizes{7}{7}{5}{5}
174 \DeclareMathSizes{8}{8}{6}{5}
175 \DeclareMathSizes{9}{9}{7}{5}
176 \DeclareMathSizes{10}{10}{7.4}{6}
177 \DeclareMathSizes{10.95}{10.95}{8}{6}
178 \DeclareMathSizes{12}{12}{9}{7}
179 \DeclareMathSizes{14.4}{14.4}{10.95}{8}
180 \DeclareMathSizes{17.28}{17.28}{12}{10}
181 \DeclareMathSizes{20.74}{20.74}{14.4}{12}
182 \DeclareMathSizes{24.88}{24.88}{17.28}{14.4}
183 </mathptm | mathptmx>
```

Option: Use slanted greek capitals (with mathptmx only):

```
184 <mathptmx>
185 \DeclareOption{slantedGreek}{%
186   \DeclareMathSymbol{\Gamma}{\mathalpha}{letters}{0}
187   \DeclareMathSymbol{\Delta}{\mathalpha}{letters}{1}
188   \DeclareMathSymbol{\Theta}{\mathalpha}{letters}{2}
189   \DeclareMathSymbol{\Lambda}{\mathalpha}{letters}{3}
190   \DeclareMathSymbol{\Xi}{\mathalpha}{letters}{4}
191   \DeclareMathSymbol{\Pi}{\mathalpha}{letters}{5}
192   \DeclareMathSymbol{\Sigma}{\mathalpha}{letters}{6}
193   \DeclareMathSymbol{\Upsilon}{\mathalpha}{letters}{7}
194   \DeclareMathSymbol{\Phi}{\mathalpha}{letters}{8}
195   \DeclareMathSymbol{\Psi}{\mathalpha}{letters}{9}
196   \DeclareMathSymbol{\Omega}{\mathalpha}{letters}{10}
197 }
198 \DeclareMathSymbol{\upGamma}{\mathord}{operators}{0}
199 \DeclareMathSymbol{\upDelta}{\mathord}{operators}{1}
200 \DeclareMathSymbol{\upTheta}{\mathord}{operators}{2}
201 \DeclareMathSymbol{\upLambda}{\mathord}{operators}{3}
202 \DeclareMathSymbol{\upXi}{\mathord}{operators}{4}
203 \DeclareMathSymbol{\upPi}{\mathord}{operators}{5}
204 \DeclareMathSymbol{\upSigma}{\mathord}{operators}{6}
205 \DeclareMathSymbol{\upUpsilon}{\mathord}{operators}{7}
206 \DeclareMathSymbol{\upPhi}{\mathord}{operators}{8}
207 \DeclareMathSymbol{\upPsi}{\mathord}{operators}{9}
208 \DeclareMathSymbol{\upOmega}{\mathord}{operators}{10}
```

Options processing:

```
209 \ProcessOptions\relax
210 </mathptmx>
211 <mathptm | mathptmx>
212 \let\s@vedhbar\hbar
213 \AtBeginDocument{%
214 </mathptm | mathptmx>
```

Ensure proper scaling of the AMS fonts, even when not used through the amssymb or amsfonts packages (mathptmx only):

```
215 <mathptmx>
216 \DeclareFontFamily{U}{msa}{}%
217 \DeclareFontShape{U}{msa}{m}{n}{<->msam10}{}%
218 \DeclareFontFamily{U}{msb}{}%
219 \DeclareFontShape{U}{msb}{m}{n}{<->msbm10}{}%
220 \DeclareFontFamily{U}{euf}{}%
```

```

221 \DeclareFontShape{U}{euf}{m}{n}{<-6>eufm5<6-8>eufm7<8->eufm10}{}%
222 \DeclareFontShape{U}{euf}{b}{n}{<-6>eufb5<6-8>eufb7<8->eufb10}{}%
223 </mathptmx>

```

In case the `amsfonts` package is loaded additionally, we must restore our `\hbar`:

```

224 (*mathptm | mathptmx)
225 \@ifpackageloaded{amsfonts}{\let\hbar\svedhbar}{}

```

Take care of `\big` & friends working with scaled math extension font, unless `amsmath.sty` is also loaded:

```

226 \@ifpackageloaded{amsmath}{}{%
227   \newdimen\big@size
228   \addto@hook\every@math@size{\setbox\z@\vbox{\hbox{$(\$)\kern\z@}}%
229     \global\big@size 1.2\ht\z@}
230   \def\bigg@#1#2{%
231     {\hbox{${\left#2\center to#1\big@size}\right.\n@space$}}
232   \def\big{\bigg@{1.5}}
233   \def\Big{\bigg@{2.5}}
234   \def\bigg{\bigg@{1.5}}
235   \def\Bigg{\bigg@{2.5}}
236 }
237 }
238 </mathptm | mathptmx>

```

## Credits

The virtual `mathptm` and `mathptmx` fonts and the related packages were created by Alan Jeffrey, Sebastian Rahtz and Ulrik Vieth.

## 11 The `mathpple` package

Suppress info about math fonts being redefined:

```

239 (*mathpple)
240 \PackageWarningNoLine{mathpple}{}
241 This package is to be regarded as obsolete.\MessageBreak
242 See the PSNFSS documentation}
243 \let\s@ved@info\@font@info
244 \let\@font@info\@gobble

```

Make Palatino the default roman font:

```

245 \renewcommand{\rmdefault}{ppl}

```

Typeset mathematics using the `mathpple` fonts:

```

246 \DeclareSymbolFont{operators} {OT1}{zpple}{m}{n}
247 \DeclareSymbolFont{letters} {OML}{zpple}{m}{it}
248 \DeclareSymbolFont{symbols} {OMS}{zpple}{m}{n}
249 \DeclareSymbolFont{largesymbols}{OMX}{zpple}{m}{n}
250 \DeclareMathAlphabet{\mathbf} {OT1}{zpple}{b}{n}
251 \DeclareMathAlphabet{\mathit} {OT1}{ppl}{m}{it}

```

Support for bold mathversion:

```

252 \SetSymbolFont{operators}{bold}{OT1}{zpple}{b}{n}
253 \SetSymbolFont{letters}{bold}{OML}{zpple}{b}{it}
254 \SetSymbolFont{symbols}{bold}{OMS}{zpple}{b}{n}
255 \SetSymbolFont{largesymbols}{bold}{OMX}{zpple}{m}{n}
256 \SetMathAlphabet\mathit{bold}{OT1}{ppl}{b}{it}

```

Reduce the space around math operators:

```

257 %\thinmuskip=2.5mu
258 \medmuskip=3.5mu plus 1mu minus 1mu
259 %\thickmuskip=4.5mu plus 1.5mu minus 1mu

```

Compensate for increased letter spacing

```

260 \def\joinrel{\mathrel{\mkern-3.45mu}}

```

Make `\hbar` work with Palatino:

```
261 \def\hbar{\mathchar'26\mkern-7muh}
```

Define a new math alphabet for bold italic variables:

```
262 \DeclareMathAlphabet{\mathbold}{OML}{zpple}{b}{it}
```

Make `\mathbold` act on lowercase greek, too:

```
263 \DeclareMathSymbol{\alpha}{\mathalpha}{letters}{11}
264 \DeclareMathSymbol{\beta}{\mathalpha}{letters}{12}
265 \DeclareMathSymbol{\gamma}{\mathalpha}{letters}{13}
266 \DeclareMathSymbol{\delta}{\mathalpha}{letters}{14}
267 \DeclareMathSymbol{\epsilon}{\mathalpha}{letters}{15}
268 \DeclareMathSymbol{\zeta}{\mathalpha}{letters}{16}
269 \DeclareMathSymbol{\eta}{\mathalpha}{letters}{17}
270 \DeclareMathSymbol{\theta}{\mathalpha}{letters}{18}
271 \DeclareMathSymbol{\iota}{\mathalpha}{letters}{19}
272 \DeclareMathSymbol{\kappa}{\mathalpha}{letters}{20}
273 \DeclareMathSymbol{\lambda}{\mathalpha}{letters}{21}
274 \DeclareMathSymbol{\mu}{\mathalpha}{letters}{22}
275 \DeclareMathSymbol{\nu}{\mathalpha}{letters}{23}
276 \DeclareMathSymbol{\xi}{\mathalpha}{letters}{24}
277 \DeclareMathSymbol{\pi}{\mathalpha}{letters}{25}
278 \DeclareMathSymbol{\rho}{\mathalpha}{letters}{26}
279 \DeclareMathSymbol{\sigma}{\mathalpha}{letters}{27}
280 \DeclareMathSymbol{\tau}{\mathalpha}{letters}{28}
281 \DeclareMathSymbol{\upsilon}{\mathalpha}{letters}{29}
282 \DeclareMathSymbol{\phi}{\mathalpha}{letters}{30}
283 \DeclareMathSymbol{\chi}{\mathalpha}{letters}{31}
284 \DeclareMathSymbol{\psi}{\mathalpha}{letters}{32}
285 \DeclareMathSymbol{\omega}{\mathalpha}{letters}{33}
286 \DeclareMathSymbol{\varepsilon}{\mathalpha}{letters}{34}
287 \DeclareMathSymbol{\vartheta}{\mathalpha}{letters}{35}
288 \DeclareMathSymbol{\varpi}{\mathalpha}{letters}{36}
289 \DeclareMathSymbol{\varphi}{\mathalpha}{letters}{39}
290 \let\varrho\rho
291 \let\varsigma\sigma
```

We redefine the default sizes for super- and subscripts. Palatino, like most other type 1 fonts, is scaled linearly, so the default ratios (.7 and .5) may produce unreadably small characters:

```
292 \def\defaultscriptratio{.76}
293 \def\defaultscriptscriptratio{.6}
```

These default ratios are not used for any sizes that have been explicitly declared, so we redeclare the sizes used by the standard classes. At least for the lower sizes this is important as we don't want to end up with a 5pt font being reduced even further:

```
294 \DeclareMathSizes{5} {5} {5} {5}
295 \DeclareMathSizes{6} {6} {5} {5}
296 \DeclareMathSizes{7} {7} {5} {5}
297 \DeclareMathSizes{8} {8} {6} {5}
298 \DeclareMathSizes{9} {9} {7} {5}
299 \DeclareMathSizes{10} {10} {7.6} {6}
300 \DeclareMathSizes{10.95}{10.95}{8} {6}
301 \DeclareMathSizes{12} {12} {9} {7}
302 \DeclareMathSizes{14.4} {14.4} {10} {8}
303 \DeclareMathSizes{17.28}{17.28}{12} {10}
304 \DeclareMathSizes{20.74}{20.74}{14.4} {12}
305 \DeclareMathSizes{24.88}{24.88}{20.74}{14.4}
```

Option: Use slanted greek capitals:

```
306 \DeclareOption{slantedGreek}{%
307 \DeclareMathSymbol{\Gamma}{\mathalpha}{letters}{0}
308 \DeclareMathSymbol{\Delta}{\mathalpha}{letters}{1}}
```

```

309 \DeclareMathSymbol{\Theta}{\mathalpha}{letters}{2}
310 \DeclareMathSymbol{\Lambda}{\mathalpha}{letters}{3}
311 \DeclareMathSymbol{\Xi}{\mathalpha}{letters}{4}
312 \DeclareMathSymbol{\Pi}{\mathalpha}{letters}{5}
313 \DeclareMathSymbol{\Sigma}{\mathalpha}{letters}{6}
314 \DeclareMathSymbol{\Upsilon}{\mathalpha}{letters}{7}
315 \DeclareMathSymbol{\Phi}{\mathalpha}{letters}{8}
316 \DeclareMathSymbol{\Psi}{\mathalpha}{letters}{9}
317 \DeclareMathSymbol{\Omega}{\mathalpha}{letters}{10}
318 }
319 \let\upOmega\Omega
320 \let\upDelta\Delta

```

Options processing:

```

321 \ProcessOptions\relax
322 \let\s@vedhbar\hbar
323 \AtBeginDocument{%

```

Ensure proper scaling of the AMS fonts, even when not used through the amssymb or amsfonts packages:

```

324 \DeclareFontFamily{U}{msa}{}%
325 \DeclareFontShape{U}{msa}{m}{n}{<->s*[1.042]msam10}{}%
326 \DeclareFontFamily{U}{msb}{}%
327 \DeclareFontShape{U}{msb}{m}{n}{<->s*[1.042]msbm10}{}%
328 \DeclareFontFamily{U}{euf}{}%
329 \DeclareFontShape{U}{euf}{m}{n}{<-6>eufm5<6-8>eufm7<8->eufm10}{}%
330 \DeclareFontShape{U}{euf}{b}{n}{<-6>eufb5<6-8>eufb7<8->eufb10}{}%

```

In case the amsfonts package is loaded additionally, we must restore our `\hbar`:

```

331 \@ifpackageloaded{amsfonts}{\let\hbar\s@vedhbar}{}

```

Take care of `\big` & friends working with scaled math extension font, unless `amsmath.sty` is also loaded:

```

332 \@ifpackageloaded{amsmath}{}{%
333   \newdimen\big@size
334   \addtohook\every@math@size{\setbox\z@\vbox{\hbox{$(\$)\kern\z@}%
335     \global\big@size 1.2\ht\z@}
336   \def\bigg@#1#2{%
337     {\hbox{${\left#2\center to#1\big@size}\right.\n@space$}}}
338   \def\big{\bigg@\@ne}
339   \def\Big{\bigg@\@1.5}
340   \def\bigg{\bigg@\tw@}
341   \def\Bigg{\bigg@\2.5}
342 }
343 }

```

Restore font info:

```

344 \let\@font@info\s@ved@info
345 </mathpple>

```

## Credits

`mathpple` is based on the package `mathppl` and the related virtual fonts, created by Aloysius Helminck. These were distributed in conjunction with `FONTINST v1.335`, but are no longer available from CTAN. The main changes with regard to Helminck's model are:

- italic Greek letters from the Euler fonts;
- `\mathcal` from CM instead of Zapf Chancery;
- positioning of math accents substantially improved;
- improved spacing;



- use those Type 1 fonts only, which are part of the free ‘BlueSky’ distribution.

Special thanks to Daniel Schlieper, who suggested the development of the `mathppl` package, contributed many good ideas and helped with testing.

## 12 The `charter` package

```
346 (*charter)
347 \renewcommand{\rmdefault}{bch}
348 \renewcommand{\bfdefault}{b}
349 </charter>
```

## 13 The `utopia` package

```
350 (*utopia)
351 \PackageWarningNoLine{utopia}{%
352   This package is to be regarded as obsolete.\MessageBreak
353   See the PSNFSS documentation}
354 \renewcommand{\rmdefault}{put}
355 \renewcommand\bfdefault{b}
356 </utopia>
```

## 14 The `mathpazo` package

Suppress info about math fonts being redefined:

```
357 (*mathpazo)
358 \let\s@ved@info\@font@info
359 \let\@font@info\@gobble

  Options processing:
360 \newif\ifpazo@osf
361 \newif\ifpazo@sc
362 \newif\ifpazo@slGreek
363 \newif\ifpazo@BB \pazo@BBtrue
364 \DeclareOption{osf}{\pazo@osftrue}
365 \DeclareOption{sc}{\pazo@sctrue}
366 \DeclareOption{slantedGreek}{\pazo@slGreektrue}
367 \DeclareOption{noBBpl}{\pazo@BBfalse}
368 \DeclareOption{osfeqnum}{\OptionNotUsed}
369 \ProcessOptions\relax
```

Make Palatino (`ppl`) the default roman font. If the options `osf` or `sc` were specified, use `pplj` or `pplx` instead, and make sure that `\oldstylenums` switches to `pplj`, too.

```
370 \ifpazo@osf
371   \renewcommand{\rmdefault}{pplj}
372   \renewcommand{\oldstylenums}[1]{%
373     {\fontfamily{pplj}\selectfont #1}}
374 \else\ifpazo@sc
375   \renewcommand{\rmdefault}{pplx}
376   \renewcommand{\oldstylenums}[1]{%
377     {\fontfamily{pplj}\selectfont #1}}
378 \else
379   \renewcommand{\rmdefault}{ppl}
380 \fi\fi
```

The Pazo fonts provide an Euro symbol, which is now available in the Palatino text companion fonts. For the sake of compatibility, we still define the macro `\ppleuro`, which was introduced with version 8.2, and we make it work with the `euroman` and `europs` packages:

```
381 \newcommand{\ppleuro}{\fontencoding{U}\fontfamily{fplm}\selectfont \char160}
382 \AtBeginDocument{\@ifpackageloaded{europs}{\renewcommand{\EURtm}{\ppleuro}}{}}
```

Now we declare the math fonts. The `mathpazo` package uses a Palatino text font family with OT1 encoding as the `operators` and `\mathit` alphabets. If the `sc` option was specified, we use the family `pplx`. Otherwise we just take `ppl`, thus making sure that no oldstyle digits are used in math mode. Note that specifying both `sc` and `osf` gives oldstyle numbers in text and uses the family `pplx` in math mode, so that the `ppl` family is not required at all. Thus, the number of TFM's loaded by  $\TeX$  is minimized.

```

383 \ifpazo@sc
384 \DeclareSymbolFont{operators}      {OT1}{pplx}{m}{n}
385 \SetSymbolFont{operators}{bold}    {OT1}{pplx}{b}{n}
386 \DeclareMathAlphabet{\mathit}     {OT1}{pplx}{m}{it}
387 \SetMathAlphabet{\mathit}{bold}   {OT1}{pplx}{b}{it}
388 \else
389 \DeclareSymbolFont{operators}      {OT1}{ppl}{m}{n}
390 \SetSymbolFont{operators}{bold}    {OT1}{ppl}{b}{n}
391 \DeclareMathAlphabet{\mathit}     {OT1}{ppl}{m}{it}
392 \SetMathAlphabet{\mathit}{bold}   {OT1}{ppl}{b}{it}
393 \fi

```

Uppercase upright Greek and math symbols such as ‘plus’, ‘equal’ and others are taken from a new symbol font named `upright`. Its spacing is less tight than in the text font.

```

394 \DeclareSymbolFont{upright}        {OT1}{zplm}{m}{n}
395 \DeclareSymbolFont{letters}        {OML}{zplm}{m}{it}
396 \DeclareSymbolFont{symbols}        {OMS}{zplm}{m}{n}
397 \DeclareSymbolFont{largesymbols}   {OMX}{zplm}{m}{n}

398 \SetSymbolFont{upright}{bold}      {OT1}{zplm}{b}{n}
399 \SetSymbolFont{letters}{bold}      {OML}{zplm}{b}{it}
400 \SetSymbolFont{symbols}{bold}      {OMS}{zplm}{b}{n}
401 \SetSymbolFont{largesymbols}{bold}{OMX}{zplm}{m}{n}

402 \DeclareMathAlphabet{\mathbf}     {OT1}{zplm}{b}{n}
403 \DeclareMathAlphabet{\mathbold}   {OML}{zplm}{b}{it}

404 \DeclareSymbolFontAlphabet{\mathrm} {operators}
405 \DeclareSymbolFontAlphabet{\mathnormal}{letters}
406 \DeclareSymbolFontAlphabet{\mathcal} {symbols}

```

The following symbols used to come from ‘operators’; we take them from the ‘upright’ symbol font now:

```

407 \DeclareMathSymbol{!}{\mathclose}{upright}{"21}
408 \DeclareMathSymbol{+}{\mathbin}{upright}{"2B}
409 \DeclareMathSymbol{:}{\mathrel}{upright}{"3A}
410 % \DeclareMathSymbol{;}{\mathpunct}{operators}{"3B} % punctuation!
411 \DeclareMathSymbol{=}{\mathrel}{upright}{"3D}
412 \DeclareMathSymbol{?}{\mathclose}{upright}{"3F}
413 \DeclareMathDelimiter{()}{\mathopen} {upright}{"28}{largesymbols}{"00}
414 \DeclareMathDelimiter{)}{\mathclose}{upright}{"29}{largesymbols}{"01}
415 \DeclareMathDelimiter{[]}{\mathopen} {upright}{"5B}{largesymbols}{"02}
416 \DeclareMathDelimiter{[]}{\mathclose}{upright}{"5D}{largesymbols}{"03}
417 \DeclareMathDelimiter{/}{\mathord}{upright}{"2F}{largesymbols}{"0E}
418 % \DeclareMathSymbol{\colon}{\mathpunct}{operators}{"3A} % punctuation!
419 \DeclareMathAccent{\acute}{\mathalpha}{upright}{"13}
420 \DeclareMathAccent{\grave}{\mathalpha}{upright}{"12}
421 \DeclareMathAccent{\ddot}{\mathalpha}{upright}{"7F}
422 \DeclareMathAccent{\tilde}{\mathalpha}{upright}{"7E}
423 \DeclareMathAccent{\bar}{\mathalpha}{upright}{"16}
424 \DeclareMathAccent{\breve}{\mathalpha}{upright}{"15}
425 \DeclareMathAccent{\check}{\mathalpha}{upright}{"14}
426 \DeclareMathAccent{\hat}{\mathalpha}{upright}{"5E}
427 \DeclareMathAccent{\dot}{\mathalpha}{upright}{"5F}
428 \DeclareMathAccent{\mathring}{\mathalpha}{upright}{"17}
429 \DeclareMathSymbol{\mathdollar}{\mathord}{upright}{"24}

```

As to uppercase Greek, see below!

The following symbols used to come from ‘letters’. Now they are taken from ‘operators’, with respect to correct spacing of decimal numbers:

```
430 \DeclareMathSymbol{,}{\mathpunct}{operators}{44}
431 \DeclareMathSymbol{.}{\mathord}{operators}{46}
```

Use Pazo as (partial) `\mathbb` font:

```
432 \ifpazo@BB
433 \AtBeginDocument{%
434 \let\mathbb\relax
435 \DeclareMathAlphabet\PazoBB{U}{fplmbb}{m}{n}
436 \newcommand{\mathbb}{\PazoBB}
437 }
438 \fi
```

Reduce the space around math operators:

```
439 %\thinmuskip=2.5mu
440 \medmuskip=3.5mu plus 1mu minus 1mu
441 %\thickmuskip=4.5mu plus 1.5mu minus 1mu
```

Compensate for increased letter spacing:

```
442 \def\joinrel{\mathrel{\mkern-3.45mu}}
```

Make `\hbar` work with Palatino:

```
443 \renewcommand{\hbar}{\mkern0.8mu\mathchar'26\mkern-6.8mu}}
```

Optionally use slanted greek capitals:

```
444 \ifpazo@slGreek
445 \DeclareMathSymbol{\Gamma} {\mathalpha}{letters}{"00}
446 \DeclareMathSymbol{\Delta} {\mathalpha}{letters}{"01}
447 \DeclareMathSymbol{\Theta} {\mathalpha}{letters}{"02}
448 \DeclareMathSymbol{\Lambda} {\mathalpha}{letters}{"03}
449 \DeclareMathSymbol{\Xi} {\mathalpha}{letters}{"04}
450 \DeclareMathSymbol{\Pi} {\mathalpha}{letters}{"05}
451 \DeclareMathSymbol{\Sigma} {\mathalpha}{letters}{"06}
452 \DeclareMathSymbol{\Upsilon} {\mathalpha}{letters}{"07}
453 \DeclareMathSymbol{\Phi} {\mathalpha}{letters}{"08}
454 \DeclareMathSymbol{\Psi} {\mathalpha}{letters}{"09}
455 \DeclareMathSymbol{\Omega} {\mathalpha}{letters}{"0A}
456 \else
457 \DeclareMathSymbol{\Gamma}{\mathalpha}{upright}{"00}
458 \DeclareMathSymbol{\Delta}{\mathalpha}{upright}{"01}
459 \DeclareMathSymbol{\Theta}{\mathalpha}{upright}{"02}
460 \DeclareMathSymbol{\Lambda}{\mathalpha}{upright}{"03}
461 \DeclareMathSymbol{\Xi}{\mathalpha}{upright}{"04}
462 \DeclareMathSymbol{\Pi}{\mathalpha}{upright}{"05}
463 \DeclareMathSymbol{\Sigma}{\mathalpha}{upright}{"06}
464 \DeclareMathSymbol{\Upsilon}{\mathalpha}{upright}{"07}
465 \DeclareMathSymbol{\Phi}{\mathalpha}{upright}{"08}
466 \DeclareMathSymbol{\Psi}{\mathalpha}{upright}{"09}
467 \DeclareMathSymbol{\Omega}{\mathalpha}{upright}{"0A}
468 \fi
```

These symbols should always be upright:

```
469 \DeclareMathSymbol{\upGamma}{\mathord}{upright}{0}
470 \DeclareMathSymbol{\upDelta}{\mathord}{upright}{1}
471 \DeclareMathSymbol{\upTheta}{\mathord}{upright}{2}
472 \DeclareMathSymbol{\upLambda}{\mathord}{upright}{3}
473 \DeclareMathSymbol{\upXi}{\mathord}{upright}{4}
474 \DeclareMathSymbol{\upPi}{\mathord}{upright}{5}
475 \DeclareMathSymbol{\upSigma}{\mathord}{upright}{6}
476 \DeclareMathSymbol{\upUpsilon}{\mathord}{upright}{7}
477 \DeclareMathSymbol{\upPhi}{\mathord}{upright}{8}
478 \DeclareMathSymbol{\upPsi}{\mathord}{upright}{9}
479 \DeclareMathSymbol{\upOmega}{\mathord}{upright}{10}
```

Make `\mathbold` act on lowercase greek too

```

480 \DeclareMathSymbol{\alpha}{\mathalpha}{letters}{"0B}
481 \DeclareMathSymbol{\beta}{\mathalpha}{letters}{"0C}
482 \DeclareMathSymbol{\gamma}{\mathalpha}{letters}{"0D}
483 \DeclareMathSymbol{\delta}{\mathalpha}{letters}{"0E}
484 \DeclareMathSymbol{\epsilon}{\mathalpha}{letters}{"0F}
485 \DeclareMathSymbol{\zeta}{\mathalpha}{letters}{"10}
486 \DeclareMathSymbol{\eta}{\mathalpha}{letters}{"11}
487 \DeclareMathSymbol{\theta}{\mathalpha}{letters}{"12}
488 \DeclareMathSymbol{\iota}{\mathalpha}{letters}{"13}
489 \DeclareMathSymbol{\kappa}{\mathalpha}{letters}{"14}
490 \DeclareMathSymbol{\lambda}{\mathalpha}{letters}{"15}
491 \DeclareMathSymbol{\mu}{\mathalpha}{letters}{"16}
492 \DeclareMathSymbol{\nu}{\mathalpha}{letters}{"17}
493 \DeclareMathSymbol{\xi}{\mathalpha}{letters}{"18}
494 \DeclareMathSymbol{\pi}{\mathalpha}{letters}{"19}
495 \DeclareMathSymbol{\rho}{\mathalpha}{letters}{"1A}
496 \DeclareMathSymbol{\sigma}{\mathalpha}{letters}{"1B}
497 \DeclareMathSymbol{\tau}{\mathalpha}{letters}{"1C}
498 \DeclareMathSymbol{\upsilon}{\mathalpha}{letters}{"1D}
499 \DeclareMathSymbol{\phi}{\mathalpha}{letters}{"1E}
500 \DeclareMathSymbol{\chi}{\mathalpha}{letters}{"1F}
501 \DeclareMathSymbol{\psi}{\mathalpha}{letters}{"20}
502 \DeclareMathSymbol{\omega}{\mathalpha}{letters}{"21}
503 \DeclareMathSymbol{\varepsilon}{\mathalpha}{letters}{"22}
504 \DeclareMathSymbol{\vartheta}{\mathalpha}{letters}{"23}
505 \DeclareMathSymbol{\varpi}{\mathalpha}{letters}{"24}
506 \DeclareMathSymbol{\varrho}{\mathalpha}{letters}{"25}
507 \DeclareMathSymbol{\varsigma}{\mathalpha}{letters}{"26}
508 \DeclareMathSymbol{\varphi}{\mathalpha}{letters}{"27}

```

Finally, we save our new definition of `\hbar` and defer some code until `\begin{document}`:

```

509 \let\s@vedhbar\hbar
510 \AtBeginDocument{%

```

Ensure proper scaling of the AMS fonts, even when not used through the `amssymb` or `amsfonts` packages:

```

511 \DeclareFontFamily{U}{msa}{}%
512 \DeclareFontShape{U}{msa}{m}{n}{<->s*[1.042]msam10}{}%
513 \DeclareFontFamily{U}{msb}{}%
514 \DeclareFontShape{U}{msb}{m}{n}{<->s*[1.042]msbm10}{}%
515 \DeclareFontFamily{U}{euf}{}%
516 \DeclareFontShape{U}{euf}{m}{n}{<-6>eufm5<6-8>eufm7<8->eufm10}{}%
517 \DeclareFontShape{U}{euf}{b}{n}{<-6>eufb5<6-8>eufb7<8->eufb10}{}%

```

In case the `amsfonts` package is loaded additionally, we must restore our `\hbar`:

```

518 \@ifpackageloaded{amsfonts}{\let\hbar\s@vedhbar}{}

```

Take care of `\big` & friends working with scaled math extension font, unless `amsmath.sty` is also loaded:

```

519 \@ifpackageloaded{amsmath}{}{}%
520 \newdimen\big@size
521 \addto@hook\every@math@size{\setbox\z@\vbox{\hbox{$(\$)\kern\z@}}%
522 \global\big@size 1.2\ht\z@}
523 \def\bigg@#1#2{%
524   {\hbox{$(\left#2\center to#1\big@size}\right.\n@space$)}}
525 \def\big{\bigg@\@one}
526 \def\Big{\bigg@\@1.5}
527 \def\bigg{\bigg@\@tw@}
528 \def\Bigg{\bigg@\@2.5}
529 }
530 }

```

We redefine the default sizes for super and subscripts. Palatino, like most other type 1 fonts, is scaled linearly, so the default ratios (0.7 and 0.5) may produce unreadably small characters.

```
531 \def\defaultscritratio{.76}
532 \def\defaultscriptscritratio{.6}
```

These default ratios are not used for any sizes that have been explicitly declared, so we redeclare the sizes used by the standard classes. At least for the lower sizes this is important as we don't want to end up with a 5pt font being reduced even further.

```
533 \DeclareMathSizes{5} {5} {5} {5}
534 \DeclareMathSizes{6} {6} {5} {5}
535 \DeclareMathSizes{7} {7} {5} {5}
536 \DeclareMathSizes{8} {8} {6} {5}
537 \DeclareMathSizes{9} {9} {7} {5}
538 \DeclareMathSizes{10} {10} {7.6} {6}
539 \DeclareMathSizes{10.95}{10.95}{8} {6}
540 \DeclareMathSizes{12} {12} {9} {7}
541 \DeclareMathSizes{14.4} {14.4} {10} {8}
542 \DeclareMathSizes{17.28}{17.28}{12} {10}
543 \DeclareMathSizes{20.74}{20.74}{14.4} {12}
544 \DeclareMathSizes{24.88}{24.88}{20.74}{14.4}
```

Restore font info:

```
545 \let\@font@info\s@ved@info
546 \end{mathpazo}
```

## Credits

The Pazo fonts and the related virtual fonts were created by Diego Puga. The `mathpazo` package was written by D. Puga and W. Schmidt.