Using common PostScript fonts with LaTeX

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This document refers to
PSNFSS version 9.0 as of 2002-04-24

Contents

1 What is PSNFSS ?

The PSNFSS collection includes a set of files that provide a complete working setup of the LaTeX font selection scheme (NFSS2) for use with common PostScript fonts. The basic distribution, which should be part of any useful LaTeX installation, covers the so-called 'Base 35' fonts (which are built into any Level 2 PostScript printing device and the Ghostscript interpreter) and the free Utopia, Charter and Pazo fonts.

2 Package overview

The easiest way to make use of the above-mentioned typefaces is to completely replace one or more of the font families used by LaTeX as 'roman', 'sans serif' and 'typewriter' family and for math. This is accomplished by the packages listed in table 1. Its first row lists the default (Computer Modern) font families. An empty column indicates that a package does not change the particular font family.

The PSNFSS distribution includes also a package pifont, which serves for accessing symbol fonts (aka 'Pi fonts'), such as Symbol and Zapf Dingbats, see section 7.

Table 1: Packages for using common PostScript fonts

package	**roman**	**sans serif**	**typewriter**	**formulas**
(none)	CM Roman	CM Sans Serif	CM Typewriter	≈ CM Roman
mathptmx	Times			≈ Times
mathpazo	Palatino			≈ Palatino
helvet		Helvetica		
avant		Avant Garde		
courier			Courier	
chancery	Zapf Chancery			
bookman	Bookman	Avant Garde	Courier	
newcent	New Century Schoolbook	Avant Garde	Courier	
utopia	Utopia			
charter	Charter			

3 Special considerations

3.1 Inter-line spacing

With certain font families, the leading of the standard LaTeX document classes may be too small. This results from the larger x-height of these fonts, as compared with Computer Modern. Since it is a question of document design and line width, the packages of the PSNFSS bundle do *not* take care of this. Issuing the command

`\linespread{`⟨*factor*⟩`}`

in the preamble will globally enlarge the leading by the given factor.

3.2 Using sans serif fonts

The packages helvet and avant do not change the default text font family from 'roman'. If required, the additional command

```
\renewcommand{\familydefault}{\sfdefault}
```

makes LaTeX use the sans serif font family (Helvetica or Avant Garde) as the default one.

3.3 Output font encoding

None of the packages listed in table 1 changes the output font encoding from its default setting OT1. It is, however, recommended to use the fonts in the extended T1 and TS1 (text symbols) encodings through the commands:

```
\usepackage[T1]{fontenc}
\usepackage{textcomp}
```

When using PostScript fonts that come from 'outside the TeX world', there is no reason at all to stay with the obsolete OT1 encoding, which would not provide access to all available glyphs. However, since these fonts were not particularly designed for use with TeX, they do *not* include all of the text companion (TS1) symbols.

3.4 Euro support

New feature
2002-04-10
v9.0

From PSNFSS version 9 on, the Palatino font family provides a built-in Euro symbol, which can be reached throgh the `\texteuro` command. This requires the textcomp package, see above.

The other Base35 fonts and the free versions of the Utopia and Charter fonts do, however, *not* include the Euro symbol. If required, the Euro needs to be taken from an extra symbol font.

4 The package helvet

Helvetica is actually somewhat larger than other typefaces of the same nominal size. As a result, mixing, e.g., Times and Helvetica within running text may look bad. This can be fixed by loading the helvet package with the option `[scaled=`⟨*scale*⟩`]`, e.g.:

```
\usepackage[scaled=.92]{helvet}
```

This will load the font family `phv` (Helvetica) for sans-serif, scaled down to 92% of its 'natural' size, which is suitable for use with Adobe Times. The ⟨*scale*⟩ can be omitted:

```
\usepackage[scaled]{helvet}
```

A default scaling of 0.95 will be assumed then, which makes the height of the Helvetica capital letters comply with most other typeface families.

5 The package mathptmx

Loading this package changes the default roman font family to Times, and the virtual 'mathptmx' fonts will be used for math.

These virtual fonts are made up basically from Times Italic, with the missing math symbols coming from CM, RSFS (for `\mathcal`) and Adobe Symbol.

5.1 Package options

`[slantedGreek]`

When the package is loaded with this option, uppercase Greek letters in math will be slanted by default.

New feature 2001-06-04 v8.2

5.2 New commands

```
\upDelta
\upOmega
```

Regardless of the `slantedGreek` option, these commands will always print an upright Δ and Ω.

5.3 Font size of the 'large' math symbols

With mathptmx, the 'large' math symbols are automatically scaled to fit the base font size. In contrast to standard LaTeX you need not load the package exscale for this purpose!

5.4 Known bugs and deficiencies

- There are no bold math fonts, and `\boldmath` is not supported.
- The following symbols are either missing or unusable: `\emptyset`, `\jmath`, `\coprod`, `\amalg`.

6 The package mathpazo

Loading this package changes the default roman font family to Adobe Palatino, and the virtual 'mathpazo' fonts will be used for math.

New feature 2001-06-04 v8.2

These virtual fonts are made up basically from Palatino Italic, with the missing math symbols coming from the CM and Pazo math fonts.

6.1 Package options

`[slantedGreek]`

When the package is loaded with the `[slantedGreek]` option, uppercase Greek letters in math will be slanted by default.

`[noBBpl]`

This option disables the use of the Pazo fonts as a partial `\mathbb` alphabet – see below. This option is to be specified, if you want to use a different 'blackboard bold' font.

`[sc]`
`[osf]`

By default, the package mathpazo uses the typeface family `ppl` as the roman text font family. The option `[sc]` selects `pplx` instead, i.e. Palatino with true smallcaps. Correspondingly, the option `[osf]` selects `pplj`, i.e. Palatino with smallcaps and default oldstyle figures. (Of course, oldstyle figures will only be used in text mode, not in formulas.) Note that the option `[sc]` was not yet available with version 1.x of the package.

With version 1.x of the package, equation numbers were always typeset using lining figures, unless another option `[osfeqnnum]` was specified in addition to `[osf]`. Now the style of the equation numbering always follows the other numbers in text, and the option `[osfeqnnum]` is simply ignored.

Caution: The Palatino Type 1 fonts with smallcaps and oldstyle figures are solely commercial, and they are **not** part of the Base 35 fonts.

6.2 New commands

`\upDelta`
`\upOmega`

Regardless of the `slantedGreek` option, these commands will always print an upright Δ and Ω.

`\mathbold`
`\mathbb`

`\mathbold` is a math alphabet for typesetting variables (incl. Greek) in a ***bold italic*** style. Do not mix this up with `\mathbf`, which selects a **bold upright** text font for use in math!

`\mathbb` is a 'blackboard bold' alphabet, whose characters are taken from the Pazo fonts. All upper case letters and the numeral '1' are available. If you want to use a different, external, doublestroke alphabet, this command must be disabled by specifying the option `[noBBppl]`, see above.

New feature
2002-04-10
v9.0

6.3 Font size of the 'large' math symbols

With mathpazo, the 'large' math symbols are automatically scaled to fit the base font size. In contrast to standard LaTeX you need not load the package exscale for this purpose!

7 The package pifont

Using symbol fonts is supported through the pifont package, providing commands for using the Zapf Dingbats font, as well as an interface to other families.[1]

7.1 Commands for using Zapf Dingbats

`\ding {⟨number⟩}`

A given character can be chosen via the `\ding` command. Its parameter is an integer that specifies the character to be typeset. For example, `\ding{38}` gives ✆; see table 2 on the following page.

`\begin{dinglist} {⟨number⟩}`
`\begin{dingautolist} {⟨number⟩}`

The `dinglist` environment is a special itemized list. The argument specifies the number of the character to be used as the beginning of each item. For example,

```
\begin{dinglist}{43}
  \item The first item in the list
  \item The second item in the list
  \item The third item in the list
\end{dinglist}
```

prints

- ☞ The first item in the list
- ☞ The second item in the list
- ☞ The third item in the list

There also exists an environment `dingautolist`, which allows you to build an enumerated list with a set of Zapf Dingbats characters. In this case, the argument specifies the number of the first character in the list. Subsequent items will be numbered with the character following the previous one. E.g.,

```
\begin{dingautolist}{192}
  \item The first item
  \item The second item
  \item The third item
\end{dingautolist}
```

prints

- ① The first item
- ② The second item
- ③ The third item

`\dingfill {⟨number⟩}`
`\dingline {⟨number⟩}`

`\dingfill` acts like the other filling commands in TEX, but fills the space with a chosen symbol ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ ➠ like that.

[1] This section was adopted, with minor changes, from [1], chapter 11.9.3 and 11.9.4.

Table 2: The characters in the PostScript font Zapf Dingbats

32		33	✁	34	✂	35	✃	36	✄	37	☎	38	✆	39	✇				
40	✈	41	✉	42	☛	43	☞	44	✌	45	✍	46	✎	47	✏				
48	✐	49	✑	50	✒	51	✓	52	✔	53	✕	54	✖	55	✗				
56	✘	57	✙	58	✚	59	✛	60	✜	61	✝	62	✞	63	✟				
64	✠	65	✡	66	✢	67	✣	68	✤	69	✥	70	✦	71	✧				
72	★	73	✩	74	✪	75	✫	76	✬	77	✭	78	✮	79	✯				
80	✰	81	✱	82	✲	83	✳	84	✴	85	✵	86	✶	87	✷				
88	✸	89	✹	90	✺	91	✻	92	✼	93	✽	94	✾	95	✿				
96	❀	97	❁	98	❂	99	❃	100	❄	101	❅	102	❆	103	❇				
104	❈	105	❉	106	❊	107	❋	108	●	109	❍	110	■	111	❑				
112	❒	113	❑	114	❒	115	▲	116	▼	117	◆	118	❖	119	◗				
120	|	121	❙	122	❚	123	❛	124	❜	125	❝	126	❞						
		161	❡	162	❢	163	❣	164	❤	165	❥	166	❦	167	❧				
168	♣	169	♦	170	♥	171	♠	172	①	173	②	174	③	175	④				
176	⑤	177	⑥	178	⑦	179	⑧	180	⑨	181	⑩	182	❶	183	❷				
184	❸	185	❹	186	❺	187	❻	188	❼	189	❽	190	❾	191	❿				
192	①	193	②	194	③	195	④	196	⑤	197	⑥	198	⑦	199	⑧				
200	⑨	201	⑩	202	❶	203	❷	204	❸	205	❹	206	❺	207	❻				
208	❼	209	❽	210	❾	211	❿	212	➔	213	→	214	↔	215	↕				
216	↘	217	→	218	↗	219	➛	220	➜	221	→	222	→	223	➟				
224	➟	225	➡	226	➢	227	➢	228	➤	229	➥	230	➦	231	◗				
232	➡	233	⇨	234	➪	235	➫	236	➬	237	➪	238	➪	239	⇨				
		241	⇨	242	➲	243	➳	244	➴	245	➵	246	➶	247	➷				
248	➸	249	➹	250	➺	251	➻	252	➼	253	➽	254	➾						

`\dingline` generates a freestanding line filled with the given symbol, with a little space on the left and right:

✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂ ✂

7.2 Generic commands

The pifont package has a general mechanism for coping with Pi fonts. It provides the following generic commands with, in each case, the first argument ⟨*family*⟩ specifying the name of the Pi font family in question (such as `psy` for the Symbol font, and `pzd` for the Zapf Dingbats font, see table 3 on page 9). If indicated, a second argument ⟨*number*⟩ specifies the decimal position of a symbol in that font.

`\Pifont {`⟨*family*⟩`}`

This switches to the font family ⟨*family*⟩ and the encoding U.

`\Pisymbol {`⟨*family*⟩`} {`⟨*number*⟩`}`

This command typesets the specified symbol (compare this with the `\ding` command).

`\begin{Pilist} {`⟨*family*⟩`} {`⟨*number*⟩`}`
`\begin{Piautolist} {`⟨*family*⟩`} {`⟨*number*⟩`}`

In the `Pilist` environment the specified symbol is used in front of each item in an itemized list (compare with the `dinglist` environment).

`Piautolist` is an environment where a series of symbols starting with the one at the decimal position ⟨*number*⟩ in font family ⟨*family*⟩ is used to number the items in an enumerated list (compare with the `dingautolist` environment).

`\Pifill {`⟨*family*⟩`} {`⟨*number*⟩`}`
`\Piline {`⟨*family*⟩`} {`⟨*number*⟩`}`

`\Pifill` acts like the other filling commands in TEX, but fills the space with a chosen symbol (compare with `\dingfill`).

`\Piline` typesets a line consisting of several copies of the specified symbol, with some space at the left and right (compare with `\dingline`).

8 NFSS classification

Table 3 on the following page lists all text and symbol font shapes and the related PostScript fonts that are supported through the basic PSNFSS distribution. Available encodings are OT1, T1, TS1 and 8r, except for Symbol and Zapf Dingbats, which are implemented with encoding U. See [3] for how to access a given font shape directly.

Note, that none of the font families provides true small capitals, so the shape 'sc' refers to so-called 'faked' small capitals, whose typographical quality is—at least—questionable.

The math font families loaded by the mathptm, mathptmx, mathpazo and mathpple packages are not listed here. See the documented source file `psfonts.dtx` for information on this topic.

9 Obsolete packages

The macro packages listed in table 4 on page 10 are obsolete; they are provided for compatibility with existing documents only.

9.1 The packages times and palatino

These packages do not scale the Helvetica fonts appropriately to match Times and Palatino—see section 4. Use mathptmx or mathpazo in conjunction with helvet and courier instead!

In case you want to load Times or Palatino *without* the related math fonts of the PSNFSS bundle, you can still use the basic NFSS commands. For instance,

```
\renewcommand{\rmdefault}{ptm}
```

will change the default roman font family to `ptm`, i.e. Times.

9.2 The package mathptm

The package mathptm is a predecessor to mathptmx. In contrast to the latter and to LATEX's standard behavior, lowercase Greek in math is typeset upright. Zapf Chancery is used as the calligraphic math alphabet, which causes some problems with proper spacing. mathptm needs the font `cmex9`, which may not be available in Type 1 format.

Table 3: Font shapes supported by the basic PSNFSS distribution

family	series	shape(s)	PostScript font names
Times			
ptm	m	n, sl, it, sc	Times-Roman, Times-Italic
ptm	b	n, sl, it, sc	Times-Bold, Times-BoldItalic
Palatino			
ppl	m	n, sl, it, sc	Palatino-Roman, Palatino-Italic
ppl	b	n, sl, it, sc	Palatino-Bold, Palatino-BoldItalic
New Century Schoolbook			
pnc	m	n, sl, it, sc	NewCenturySchlbk-Roman, NewCenturySchlbk-Italic
pnc	b	n, sl, it, sc	NewCenturySchlbk-Bold, NewCenturySchlbk-BoldItalic
Bookman			
pbk	m	n, sl, it, sc	Bookman-Light, Bookman-LightItalic
pbk	b	n, sl, it, sc	Bookman-Demi, Bookman-DemiItalic
Helvetica			
phv	m	n, sl, sc	Helvetica, Helvetica-Oblique
phv	b	n, sl, sc	Helvetica-Bold, Helvetica-BoldOblique
phv	mc	n, sl, sc	Helvetica-Narrow, Helvetica-Narrow-Oblique
phv	bc	n, sl, sc	Helvetica-Narrow-Bold, Helvetica-Narrow-BoldOblique
Avant Garde			
pag	m	n, sl, sc	AvantGarde-Book, AvantGarde-BookOblique
pag	b	n, sl, sc	AvantGarde-Demi, AvantGarde-DemiOblique
Courier			
pcr	m	n, sl, sc	Courier, CourierOblique
pcr	b	n, sl, sc	Courier-Bold, Courier-BoldOblique
Zapf Chancery			
pzc	m	it	ZapfChancery-MediumItalic
Utopia			
put	m	n, sl, it, sc	Utopia-Regular, Utopia-Italic
put	b	n, sl, it, sc	Utopia-Bold, Utopia-BoldItalic
Charter			
bch	m	n, sl, it, sc	CharterBT-Roman, CharterBT-Italic
bch	b	n, sl, it, sc	CharterBT-Bold, CharterBT-BoldItalic
Symbol			
psy	m	n	Symbol
Zapf Dingbats			
pzd	m	n	ZapfDingbats

Table 4: Obsolete packages in the PSNFSS collection

package	roman	sans serif	typewriter	math
times	Times	Helvetica	Courier	
palatino	Palatino	Helvetica	Courier	
mathptm	Times			≈ Times
mathpple	Palatino			≈ Palatino

9.3 The package mathpple

mathpple is a predecessor to mathpazo, using also a set of virtual math fonts to go with Palatino. The Greek alphabet is, however, taken from the 'Euler' fonts (which get slanted), instead of the Pazo fonts. The package mathpple does not support the `[sc]` and `[osf]` options, and there is no blackboard bold math alphabet, either. Further flaws are:

- The spacing within numbers and function names in formulas is somewhat too loose.
- The `\coprod` symbol is missing.
- There are no boldface variants of `\partial` and `\infty`.
- `\jmath` is taken from the CM math italic font, which does not blend well witg Palatino.

The newer mathpazo package can be considered as superior, but you may still use mathpple, if you prefer the shape of its Greek math alphabet

10 Typeface samples

The following samples show the regular font of each typeface family supported by PSNFSS. The particular font size and baselineskip is indicated below the font name. Note that Helvetica is scaled to 92 % of the nominal size.

Times
10/12pt

The sun was just rising as Dr. Robert entered his wife's room. An orange glow, and against it the jagged silhouette of the mountains. Then suddenly a dazzling sickle of incandescence between two peaks. The sickle became a half circle and the first long shadows, the first shafts of golden light crossed the garden outside the window. And when one looked up again at the mountains there was the whole unbearable glory of the risen sun.

Palatino
10/12.4pt

The sun was just rising as Dr. Robert entered his wife's room. An orange glow, and against it the jagged silhouette of the mountains. Then suddenly a dazzling sickle of incandescence between two peaks. The sickle became a half circle and the first long shadows, the first shafts of golden light crossed the garden outside the window. And when one looked up again at the mountains there was the whole unbearable glory of the risen sun.

Bookman 9.6/11.5pt

The sun was just rising as Dr. Robert entered his wife's room. An orange glow, and against it the jagged silhouette of the mountains. Then suddenly a dazzling sickle of incandescence between two peaks. The sickle became a half circle and the first long shadows, the first shafts of golden light crossed the garden outside the window. And when one looked up again at the mountains there was the whole unbearable glory of the risen sun.

Charter 10/12.4pt

The sun was just rising as Dr. Robert entered his wife's room. An orange glow, and against it the jagged silhouette of the mountains. Then suddenly a dazzling sickle of incandescence between two peaks. The sickle became a half circle and the first long shadows, the first shafts of golden light crossed the garden outside the window. And when one looked up again at the mountains there was the whole unbearable glory of the risen sun.

New Century Schoolbook 9.6/12pt

The sun was just rising as Dr. Robert entered his wife's room. An orange glow, and against it the jagged silhouette of the mountains. Then suddenly a dazzling sickle of incandescence between two peaks. The sickle became a half circle and the first long shadows, the first shafts of golden light crossed the garden outside the window. And when one looked up again at the mountains there was the whole unbearable glory of the risen sun.

Utopia 9.6/12pt

The sun was just rising as Dr. Robert entered his wife's room. An orange glow, and against it the jagged silhouette of the mountains. Then suddenly a dazzling sickle of incandescence between two peaks. The sickle became a half circle and the first long shadows, the first shafts of golden light crossed the garden outside the window. And when one looked up again at the mountains there was the whole unbearable glory of the risen sun.

Helvetica 10/12pt

The sun was just rising as Dr. Robert entered his wife's room. An orange glow, and against it the jagged silhouette of the mountains. Then suddenly a dazzling sickle of incandescence between two peaks. The sickle became a half circle and the first long shadows, the first shafts of golden light crossed the garden outside the window. And when one looked up again at the mountains there was the whole unbearable glory of the risen sun.

Avant Garde 9.6pt

Don't use Avant Garde for typesetting larger portions of text!

Courier 10/12pt

```
A monospaced typeface, suitable for typesetting
filenames, URLs etc.
```

Zapf Chancery 14.4pt

To Hermann Zapf – whose strokes are the best.

Credits

The PSNFSS system was originally developed by Sebastian Rahtz.

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

The mathpple package and its virtual fonts are based on earlier work by Aloysius Helminck.

The Pazo math fonts and the related virtual fonts were created by Diego Puga.

References

[1] Michel Goossens, Frank Mittelbach, and Alexander Samarin: *The LaTeX Companion*. Addison Wesley, 1994.

[2] Michel Goossens, Sebastian Rahtz, and Frank Mittelbach: *The LaTeX Graphics Companion*. Addison Wesley Longman, 1997.

[3] LaTeX3 Project Team (Ed.): *LaTeX2e font selection.* CTAN: `macros/latex/doc/html/fntguide/fntguide.html` (Part of the LaTeX online documentation)