

Using common PostScript fonts with L^AT_EX

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This document refers to
PSNFSS version 8.2

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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, that 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 from the default setting.

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	math
(none)	CM Roman	CM Sans Serif	CM Typewriter	\approx CM Roman
<code>mathptmx</code>	Times			\approx Times
<code>mathpazo</code>	Palatino			\approx Palatino
<code>helvet</code>		Helvetica		
<code>avant</code>		Avant Garde		
<code>courier</code>			Courier	
<code>chancery</code>	Zapf Chancery			
<code>bookman</code>	Bookman	Avant Garde	Courier	
<code>newcent</code>	New Century Schoolbook	Avant Garde	Courier	
<code>utopia</code>	Utopia			
<code>charter</code>	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* care for this. Issuing the command

`\linespread { $\langle factor \rangle$ }`

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}
```

will make the sans serif font family (Helvetica or Avant Garde) be used 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 PostScript fonts in the extended T1 and TS1 (text symbols) encodings through the commands:

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

When using PostScript fonts, there is no reason at all to stay with the obsolete OT1 encoding, which does not provide access to all available glyphs. Note, however, that common PostScript fonts do *not* provide *all* of the TS1 (text companion) symbols!

New
description
2001-06-04

In case your \TeX system does not provide the T1 encoded versions of the default CM fonts (aka EC), it must be prevented from trying to load these before finally switching to the desired PostScript font family. This is accomplished by the following sequence of commands:

1. loading the required PSNFSS package(s)
2. redefine `\familydefault` (if required—see above)
3. `\normalfont`
4. switching the encoding as shown above

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= $\langle scale \rangle$]`, 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 $\langle scale \rangle$ can be omitted:

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

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

5 The package `mathptmx`

Loading this package changes the default roman font family to Adobe 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. All these fonts are available in Type1 format, so that one can create documents which do not require any bitmap fonts.

5.1 Package options

[slantedGreek]

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

New feature
2001-06-04
v8.2

5.2 New commands

$\backslash\mathrm{upDelta}$
 $\backslash\mathrm{upOmega}$

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 $\mathrm{\LaTeX}$ 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 fonts and Pazo math fonts. They are provided in Type 1 format, so one can create documents which do not require any bitmap fonts.

6.1 Package options

[slantedGreek]

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

[noBBppl]

This option disables the use of the Pazo fonts as a partial \mathtt{bb} 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. The `fd`, `tfm` and `vf` files of the `pplx` and `pplj` families are **not** part of the PSNFSS distribution; they can, for instance, be obtained from <http://home.vr-web.de/was/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 partial blackboard bold alphabet, whose characters are taken from the Pazo fonts. Only the letters C, I, N, Q, R, and Z are available. If you want to use a different, external, blackboard bold alphabet, this command must be disabled by specifying the option `[noBBppl]`, see above.

`\ppleuro`

The command `\ppleuro` typesets the Euro symbol in a way that suits Palatino using the appropriate glyphs from the Pazo Math font family. It is compatible with both the `eurofont` and `europs` packages, and one can continue to use either one of these packages, using the `\euro` command from the `eurofont` package or the `\EUR` command from the `europs` package.

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 L^AT_EX 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

¹This 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	⑪	183	⑫
184	⑬	185	⑭	186	⑮	187	⑯	188	⑰	189	⑱	190	⑲	191	⑳
192	①	193	②	194	③	195	④	196	⑤	197	⑥	198	⑦	199	⑧
200	⑨	201	⑩	202	⑪	203	⑫	204	⑬	205	⑭	206	⑮	207	⑯
208	⑰	209	⑱	210	⑲	211	⑳	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	➡		

<code>\dingfill</code>	$\{\langle number \rangle\}$
<code>\dingline</code>	$\{\langle number \rangle\}$

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

`\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 10). If indicated, a second argument *⟨number⟩* specifies the decimal position of a symbol in that font.

\Pifont {*⟨family⟩*}

This switches to the font family $\langle family \rangle$ and the encoding U.

`\Pisymbol {family} {number}`

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

<code>\begin{Pilist} {<family>} {<number>}</code> <code>\begin{Piautolist} {<family>} {<number>}</code>
--

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).

<code>\Pifill {<family>} {<number>}</code> <code>\Piline {<family>} {<number>}</code>
--

`\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 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	<i>To Hermann Zapf – whose strokes are the best.</i>

9 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 `mathppl` packages are not listed here. See the documented source file `psfonts.dtx` for information on this topic.

10 Obsolete packages

The macro packages listed in table 4 on page 11 are obsolete; they are provided for compatibility with existing documents only.

Table 3: Font shapes supported by the basic PSNFSS distribution

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

10.1 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 (`\rmdefault`) to `ptm`, i.e. Times.

10.2 The package `mathptm`

The package `mathptm` is a predecessor of `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.

10.3 The package `mathppl`

This is a predecessor of the `mathpazo` package. It does not use the Pazo fonts; instead, it uses the ‘Symbol’ and ‘Euler’ fonts for the math symbols, which are not available from Palatino. There are no options to use Palatino with oldstyle figures or true smallcaps, there is no matching blackboard bold alphabet, a few math symbols are either bad or missing, and there is no Euro symbol. The main drawback is, however, that the spacing of numbers and operator names in math mode is too loose.

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 `mathppl` package and its virtual fonts are based on earlier work by Aloysius Helminck.

The Pazo math fonts and 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] L^AT_EX3 Project Team (Ed.): *LaTeX2e font selection*. CTAN: macros/latex/doc/html/fntguide/fntguide.html (Part of the L^AT_EX online documentation)