The PX Fonts

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1 Introduction

The `PX` fonts consist of

1. virtual text roman fonts using Adobe Palatino (or URWPalladioL) with some modified and additional text symbols in the OT1, T1, and TS1 encoding
2. virtual text sans serif fonts using Adobe Helvetica (or URW NimbusSanL) with additional text symbols in OT1, T1, TS1, and LY1 encodings (Provided in the `TX` fonts distribution)
3. `monospaced typewriter fonts in OT1, T1, TS1, and LY1 encodings` (Provided in the `TX` fonts distribution)
4. math alphabets using Adobe Palatino (or URWPalladioL) with modified metrics
5. math fonts of all symbols corresponding to those of Computer Modern math fonts (CMSY, CMMI, CMEX, and Greek letters of CMR)
6. math fonts of all symbols corresponding to those of $\mathcal{AMS}$ fonts (MSAM and MSBM)
7. additional math fonts of various symbols

All fonts are in the Type 1 format (in `afm` and `pfb` files). Necessary `tfm` and `vf` files together with LaTeX 2$_\varepsilon$ package files and font map files for `dvips` are provided.

The `PX` fonts and related files are distributed without any guaranty or warranty. I do not assume responsibility for any actual or possible damages or losses, directly or indirectly caused by the distributed files. The `PX` fonts are distributed under the GNU public license (GPL). The fonts will be improved and additional glyphs will be added in the future.

2 Requirements

Since sans serif fonts based on Adobe Helvetica (or URW NimbusSanL) and `monospaced typewriter fonts` of the `TX` fonts are to be used with the `PX` fonts, one must get and properly install the `TX` fonts, which are available from CTAN (or `www.utdallas.edu/˜ryoung/txfonts`).

3 Changes

0.1 (November 30, 2000) 1st public release

0.2 (Decemver 4, 2000)

- Redesign of various math symbols to be more consistent with Palatino text fonts.
- Improved Metrics

0.3 (Decemver 7, 2000)

- More large operators symbols
- Now `\lbag` (⟅) and `\rbag` (⟆) are delimiters.
- An alternative math italic g (produced by `$\varg$`)

0.4 (Decemver 12, 2000)

- T1 and TS1 encodings supported
- Various bugs fixed

1.0 (November 14, 2000)

- Minor problem fixes.
- Hopefully, this is the final version ...

4 A Problem: `DVIPS` Partial Font Downloading

It was reported that when `PX` fonts are partially downloaded with `dvips`, some HP Laserprinters (with Postscript) cannot print documents. To resolve this problem, turn the partial font downloading off. See the `dvips` document for various ways to turn off partial font downloading.

Even though one does observe such a problem, I would like to strongly recommend to turn off `dvips` partial font downloading.

5 Installation

Put all files in `afm`, `tfm`, `vf`, and `pfb` files in proper locations of your TEX system. For MikTEX, they may go

```
\localtexmf\fonts\afm\pxr\
\localtexmf\fonts\tfm\pxr\
\localtexmf\fonts\vf\pxr\
\localtexmf\fonts\type1\pxr\
```

The all files of the `input` directory must be placed where LATEX finds its package files. For MikTEX, they may go

```
\localtexmf\tex\latex\pxr\
```

Put the `pxr.map`, `pxr1.map`, and `pxr2.map` files of the `dvips` directory in a proper place that `dvips` refers to. For MikTEX, they may go

```
\localtexmf\dvips\config\
```

Also add the reference to `pxr2.map` in the `dvips` configuration file (`config.ps`)

```
. . .
% Configuration of postscript type 1 fonts:
p psfonts.map
p +pxr2.map
. . .
```

and in the PDFTEX configuration file (`pdftex.cfg`)

```
. . .
% pdftex.map is set up by texmf/dvips/config/updmap
map pdftex.map
map +pxr2.map
. . .
```

(The `pxr.map` file has only named references to the Adobe Palatino fonts; the `pxr1.map` file makes `dvips` load Adobe Palatino font files; and the `pxr2.map` file makes `dvips` load URWPalladioL font files.) Be sure to get URWPalladioL fonts included in the recent Ghostscript distribution and properly install them in your `texmf` tree. If you have the real Adobe Palatino font files, put `pxr1.map` instead of `pxr2.map` in `dvips` and PDFTEX configuration files.

6 Using the `PX` Fonts with LaTeX

It is as simple as

```
\documentclass{article}
\usepackage{pxfonts}

\begin{document}

This is a very short article.

\end{document}
```

7 Additional Symbols in the `PX` Math Fonts

All CM symbols are included in the `PX` math fonts. In addition, the `PX` math fonts provide or modify the following symbols, including all of $\mathcal{AMS}$ and most of LaTeX symbols.

Binary Operator Symbols

$\medcirc$	`\medcirc`	$\medbullet$	`\medbullet`	$\invamp$	`\invamp`
$\circledwedge$	`\circledwedge`	$\circledvee$	`\circledvee`	$\circledbar$	`\circledbar`
$\circledbslash$	`\circledbslash`	$\nplus$	`\nplus`	$\boxast$	`\boxast`
$\boxbslash$	`\boxbslash`	$\boxbar$	`\boxbar`	$\boxslash$	`\boxslash`
$\Wr$	`\Wr`	$\sqcupplus$	`\sqcupplus`	$\sqcapplus$	`\sqcapplus`
$\rhd$	`\rhd`	$\lhd$	`\lhd`	$\unrhd$	`\unrhd`
$\unlhd$	`\unlhd`				

Binary Relation Symbols

$\mappedfrom$	`\mappedfrom`	$\longmappedfrom$	`\longmappedfrom`	$\Mapsto$	`\Mapsto`
$\Longmapsto$	`\Longmapsto`	$\Mappedfrom$	`\Mappedfrom`	$\Longmappedfrom$	`\Longmappedfrom`
$\mmapsto$	`\mmapsto`	$\longmmapsto$	`\longmmapsto`	$\mmappedfrom$	`\mmappedfrom`
$\longmmappedfrom$	`\longmmappedfrom`	$\Mmapsto$	`\Mmapsto`	$\Longmmapsto$	`\Longmmapsto`
$\Mmappedfrom$	`\Mmappedfrom`	$\Longmmappedfrom$	`\Longmmappedfrom`	$\varparallel$	`\varparallel`
$\varparallelinv$	`\varparallelinv`	$\nvarparallel$	`\nvarparallel`	$\nvarparallelinv$	`\nvarparallelinv`
$\colonapprox$	`\colonapprox`	$\colonsim$	`\colonsim`	$\Colonapprox$	`\Colonapprox`
$\Colonsim$	`\Colonsim`	$\doteq$	`\doteq`	$\multimapinv$	`\multimapinv`
$\multimapboth$	`\multimapboth`	$\multimapdot$	`\multimapdot`	$\multimapdotinv$	`\multimapdotinv`
$\multimapdotboth$	`\multimapdotboth`	$\multimapdotbothA$	`\multimapdotbothA`	$\multimapdotbothB$	`\multimapdotbothB`
$\VDash$	`\VDash`	$\VvDash$	`\VvDash`	$\cong$	`\cong`
$\preceqq$	`\preceqq`	$\succeqq$	`\succeqq`	$\nprecsim$	`\nprecsim`
$\nsuccsim$	`\nsuccsim`	$\nlesssim$	`\nlesssim`	$\ngtrsim$	`\ngtrsim`
$\nlessapprox$	`\nlessapprox`	$\ngtrapprox$	`\ngtrapprox`	$\npreccurlyeq$	`\npreccurlyeq`
$\nsucccurlyeq$	`\nsucccurlyeq`	$\ngtrless$	`\ngtrless`	$\nlessgtr$	`\nlessgtr`

≏̸	`\nbumpeq`	≎̸	`\nBumpeq`	∽̸	`\nbacksim`
⋍̸	`\nbacksimeq`	≠	`\neq`, `\ne`	≭	`\nasymp`
≢	`\nequiv`	≁	`\nsim`	≉	`\napprox`
⊄	`\nsubset`	⊅	`\nsupset`	≪̸	`\nll`
≫̸	`\ngg`	≉	`\nthickapprox`	≊̸	`\napproxeq`
⪷̸	`\nprecapprox`	⪸̸	`\nsuccapprox`	⪳̸	`\npreceqq`
⪴̸	`\nsucceqq`	≄	`\nsimeq`	∉	`\notin`
∌	`\notni`, `\notowns`	⋐̸	`\nSubset`	⋑̸	`\nSupset`
⋢	`\nsqsubseteq`	⋣	`\nsqsupseteq`	≔	`\coloneqq`
≕	`\eqqcolon`	:−	`\coloneq`	−:	`\eqcolon`
::=	`\Coloneqq`	=::	`\Eqqcolon`	::−	`\Coloneq`
−::	`\Eqcolon`	⥽	`\strictif`	⥼	`\strictfi`
⥼⥽	`\strictiff`	⧀	`\circledless`	⧁	`\circledgtr`
⋉	`\lJoin`	⋊	`\rJoin`	⋈	`\Join`, `\lrJoin`
×	`\openJoin`	⋈	`\lrtimes`	×	`\opentimes`
⊏̸	`\nsqsubset`	⊐̸	`\nsqsupset`	⇠	`\dashleftarrow`
⇢	`\dashrightarrow`	⇠⇢	`\dashleftrightarrow`	⇜	`\leftsquigarrow`
⤀	`\ntwoheadrightarrow`	⬴	`\ntwoheadleftarrow`	⇗	`\Nearrow`
⇘	`\Searrow`	⇖	`\Nwarrow`	⇙	`\Swarrow`
⫫	`\Perp`	∼	`\leadstoext`	⇝	`\leadsto`
□→	`\boxright`	←□	`\boxleft`	⊡→	`\boxdotright`
←⊡	`\boxdotleft`	◇→	`\Diamondright`	←◇	`\Diamondleft`
⟐→	`\Diamonddotright`	←⟐	`\Diamonddotleft`	□⇒	`\boxRight`
⇐□	`\boxLeft`	⊡⇒	`\boxdotRight`	⇐⊡	`\boxdotLeft`
◇⇒	`\DiamondRight`	⇐◇	`\DiamondLeft`	⟐⇒	`\DiamonddotRight`
⇐⟐	`\DiamonddotLeft`	○→	`\circleright`	←○	`\circleleft`
⊙→	`\circleddotright`	←⊙	`\circleddotleft`	⫯	`\multimapbothvert`
⫰	`\multimapdotbothvert`	⫯	`\multimapdotbothAvert`	⫰	`\multimapdotbothBvert`

Ordinary Symbols

α	`\alphaup`	β	`\betaup`	γ	`\gammaup`
δ	`\deltaup`	ϵ	`\epsilonup`	ε	`\varepsilonup`
ζ	`\zetaup`	η	`\etaup`	θ	`\thetaup`
ϑ	`\varthetaup`	ι	`\iotaup`	κ	`\kappaup`
λ	`\lambdaup`	μ	`\muup`	ν	`\nuup`
ξ	`\xiup`	π	`\piup`	ϖ	`\varpiup`
ρ	`\rhoup`	ϱ	`\varrhoup`	σ	`\sigmaup`
ς	`\varsigmaup`	τ	`\tauup`	υ	`\upsilonup`
ϕ	`\phiup`	φ	`\varphiup`	χ	`\chiup`
ψ	`\psiup`	ω	`\omegaup`	◇	`\Diamond`

⟐	`\Diamonddot`	◆	`\Diamondblack`	$\lambdaslash$	`\lambdaslash`
$\lambdabar$	`\lambdabar`	♧	`\varclubsuit`	♦	`\vardiamondsuit`
♥	`\varheartsuit`	♤	`\varspadesuit`	⫪	`\Top`
⫫	`\Bot`				

Math Alphabets

$\varg$ `\varg`

In order to replace math alphabet g by this alternative, use the `varg` option with the `pxfonts` package:

```
\usepackage[varg]{pxfonts}
```

Then, `$g$` will produce $\varg$ (instead of g).

Large Operator Symbols

$\bignplus$	`\bignplus`	$\bigsqcupplus$	`\bigsqcupplus`	$\bigsqcapplus$	`\bigsqcapplus`
$\bigsqcap$	`\bigsqcap`	$\bigsqcap$	`\bigsqcap`	$\varprod$	`\varprod`
$\oiint$	`\oiint`	$\oiiint$	`\oiiint`	$\ointctrclockwise$	`\ointctrclockwise`
$\ointclockwise$	`\ointclockwise`	$\varointctrclockwise$	`\varointctrclockwise`	$\varointclockwise$	`\varointclockwise`
$\sqint$	`\sqint`	$\sqiintop$	`\sqiintop`	$\sqiiintop$	`\sqiiintop`
$\fint$	`\fint`	$\iint$	`\iint`	$\iiint$	`\iiint`
$\iiiint$	`\iiiint`	$\idotsint$	`\idotsint`	$\oiintctrclockwise$	`\oiintctrclockwise`
$\oiintclockwise$	`\oiintclockwise`	$\varoiintctrclockwise$	`\varoiintctrclockwise`	$\varoiintclockwise$	`\varoiintclockwise`
$\oiiintctrclockwise$	`\oiiintctrclockwise`	$\oiiintclockwise$	`\oiiintclockwise`	$\varoiiintctrclockwise$	`\varoiiintctrclockwise`
$\varoiiintclockwise$	`\varoiiintclockwise`				

Delimiters

⟦	`\llbracket`	⟧	`\rrbracket`	$\lbag$	`\lbag`	$\rbag$	`\rbag`

Miscellaneous

`$\mathfrak{...}$` produces $\mathfrak{A}\ldots\mathfrak{Z}$ and $\mathfrak{a}\ldots\mathfrak{z}$. `$\mathbb{...}$` produces $\mathbb{A}\ldots\mathbb{Z}$; `$\Bbbk$` produces $\Bbbk$.

8 Remarks

8.1 Some Font Design Issues

For negated relation symbols, the CM fonts composes relation symbols with the negation slash (`"36` in CMSY). Even though the CM fonts were very carefully designed to look reasonable when negated relation symbols are composed (except '$\notin$' `\notin`, which is composed of '$\in$' and the normal slash '/'), the $\mathcal{AMS}$ font set includes many negated relation symbols, mainly because the vertical placement and height/depth of the negation slash are not optimal when composed with certain relation symbols, I guess. The `PX` fonts include the negation slash symbol (`"36` in pxsy), which could be composed with relation symbols to give reasonably looking negated related symbols. I believe, however, explicitly designed negated relation symbols are looking better than composed relation symbols. Thus, in addition to negated relation symbols matching those of the $\mathcal{AMS}$ fonts, many negated symbols such as '$\neq$' are introduced in the `PX` fonts.

Further, in order to maintain editing compatibility with vanilla LaTeX 2$_\varepsilon$ typesetting, `\not` is redefined in `pxfonts.sty` so that when `\not\XYZ` is processed, if `\notXYZ` or `\nXYZ` is defined, it will be used in place of `\not\XYZ`; otherwise, `\XYZ` is composed with the negation slash. For instance, '$\not\precsim$' is available as `\nprecsim` in the `PX` fonts. Thus, if `\not\precsim` is typed in the document, the `\nprecsim` symbol, instead of `\precsim` composed with the negation slash, is printed.

8.2 Glyph Hinting

The hinting of the `PX` fonts is far from ideal. As a result, when documents with the `PX` fonts are *viewed* with Gsview (or Ghostview), you might notice some display quality problem. When they are *viewed* with Acrobat, they look much better. However, when they are *printed* in laser printers, there will be no quality problem. (Note, hinting is to improve display quality on low resolution devices such as display screens.)

8.3 Glyphs in Low Positions

It is known that Acrobat often does not properly handle CM font glyphs placed between `"00` and `"1F`. Thus, most Type 1 versions of CM fonts publicly available have these glyphs in higher positions above `"7F`. When the `-G` flag is used with `dvips`, those glyphs in low positions are shifted to higher positions. The `PX` text fonts have glyphs in the low positions between `"00` and `"1F`. As of now, these glyphs are not available in higher positions above `"7F`. Thus, when run `dvips`, do not use the `-G` flag (or remove `G` in the `dvips` configuration file). Especially, do not use `config.pdf`. In my computer systems, Acrobat correctly handles glyphs in low positions. However, if this known Acrobat problem occurs in other computer systems, I will modify the `PX` fonts so that glyphs in low positions are also available in higher positions.

9 Font Charts

The original Computer Modern (CM) text fonts (aka TeX text fonts) have the OT1 encoding. The OT1 `PX` text fonts follow the CM fonts' encoding as much as possible, but have some variations and additions:

- The position `"24` of text italic fonts has the dollar symbol (*$*), not the sterling symbol (*£*).
- The uppercase and lowercase lslash (Ł, ł) and aring (Å, å) letters are added.
- The cent (¢) and sterling (£) symbols are added.

The original CM text fonts have somewhat different encodings in cap & small cap and `typewriter` fonts. `PX` fonts corresponding to them have the original CM encodings, not the strict OT1 encoding.

The T1 encoding text fonts (known as EC fonts) are designed to replace the CM text fonts in the OT1 encoding. The LY1 encoding is another text font encoding, which is based on both TeX and ANSI encodings. Both T1 and LY1 encoding fonts are especially useful to typeset European languages with proper hyphenation. The TS1 encoding text companion fonts (known as TC fonts) have additional text symbols. All corresponding `PX` fonts are implemented.

The Computer Modern (CM) math fonts (aka TEX math fonts) consist of three fonts: math italic (CMMI), math symbols (CMSY), and math extension (CMEX). The American Mathematical Society provided two additional math symbol fonts (MSAM and MSBM). The `PX` math fonts include those exactly corresponding to them. In addition, the `PX` math fonts include math italic A, math symbols C, and math extension A fonts.

9.1 OT1 (CM) Encoding Text Fonts

These fonts' encodings are identical to those of corresponding CM fonts, except 6 additional glyphs.

Text Roman Upright – `pxr`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Γ	Δ	Θ	Λ	Ξ	Π	Σ	ϒ	Φ	Ψ	Ω	ff	fi	fl	ffi	ffl	0
1	ı	ȷ	`	´	ˇ	˘	¯	˚	¸	ß	æ	œ	ø	Æ	Œ	Ø	1
2	ˊ	!	”	#	$	%	&	’	(	)	*	+	,	-	.	/	2
3	0	1	2	3	4	5	6	7	8	9	:	;	¡	=	¿	?	3
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	“	]	ˆ	˙	5
6	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	6
7	p	q	r	s	t	u	v	w	x	y	z	–	—	˝	˜	¨	7
8											Ł						8
A			¢	£							ł						A
C						Å											C
E						å											E
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Text Roman Italic – `pxi`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	*Γ*	*Δ*	*Θ*	*Λ*	*Ξ*	*Π*	*Σ*	*ϒ*	*Φ*	*Ψ*	*Ω*	*ff*	*fi*	*fl*	*ffi*	*ffl*	0
1	*ı*	*ȷ*	`	´	ˇ	˘	¯	˚	¸	*ß*	*æ*	*œ*	*ø*	*Æ*	*Œ*	*Ø*	1
2	ˊ	!	”	#	$	%	&	’	(	)	*	+	,	-	.	/	2
3	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	:	;	¡	=	¿	?	3
4	@	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*	*M*	*N*	*O*	4
5	*P*	*Q*	*R*	*S*	*T*	*U*	*V*	*W*	*X*	*Y*	*Z*	[	“	]	ˆ	˙	5
6	‘	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*	*o*	6
7	*p*	*q*	*r*	*s*	*t*	*u*	*v*	*w*	*x*	*y*	*z*	–	—	˝	˜	¨	7
8											*Ł*						8
A			¢	£							*ł*						A
C						*Å*											C
E						*å*											E
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Text Roman Slanted – `pxsl`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	*Γ*	*Δ*	*Θ*	*Λ*	*Ξ*	*Π*	*Σ*	*Υ*	*Φ*	*Ψ*	*Ω*	*ff*	*fi*	*fl*	*ffi*	*ffl*	0
1	*ı*	*ȷ*	`	´	ˇ	˘	¯	˚	¸	*ß*	*æ*	*œ*	*ø*	*Æ*	*Œ*	*Ø*	1
2	ˊ	*!*	”	*#*	*$*	*%*	*&*	’	*(*	*)*	***	*+*	,	-	.	*/*	2
3	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*:*	*;*	*¡*	*=*	*¿*	*?*	3
4	*@*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*	*M*	*N*	*O*	4
5	*P*	*Q*	*R*	*S*	*T*	*U*	*V*	*W*	*X*	*Y*	*Z*	*[*	“	*]*	ˆ	˙	5
6	‘	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*	*o*	6
7	*p*	*q*	*r*	*s*	*t*	*u*	*v*	*w*	*x*	*y*	*z*	–	—	˝	˜	¨	7
8											*Ł*						8
A			*¢*	*£*							*ł*						A
C						*Å*											C
E						*å*											E
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

TEXT ROMAN CAP & SMALL CAP – `pxsc`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Γ	Δ	Θ	Λ	Ξ	Π	Σ	Υ	Φ	Ψ	Ω	↑	↓	'	¡	¿	0
1	I	J	`	´	ˇ	˘	¯	˚	¸	SS	Æ	Œ	Ø	Æ	Œ	Ø	1
2	ˊ	!	”	#	$	%	&	’	(	)	*	+	,	-	.	/	2
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	3
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	“	]	ˆ	˙	5
6	‘	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	6
7	P	Q	R	S	T	U	V	W	X	Y	Z	–	—	˝	˜	¨	7
8											Ł						8
A			¢	£							Ł						A
C						Å											C
E						Å											E
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

9.2 T1 (EC) Cork Encoding Text Fonts

These fonts’ encodings are identical to those of corresponding EC fonts.

Text Roman Upright – `p1xr`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	`	´	ˆ	˜	¨	˝	˚	ˇ	˘	¯	˙	¸	˛	‚	‹	›	0
1	“	”	„	«	»	–	—		o	ı	ȷ	ff	fi	fl	ffi	ffl	1
2	␣	!	"	#	$	%	&	’	(	)	*	+	,	-	.	/	2
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	3
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	5
6	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	6
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	-	7
8	Ă	Ą	Ć	Č	Ď	Ě	Ę	Ğ	Ĺ	Ľ	Ł	Ń	Ň	Ŋ	Ő	Ŕ	8
9	Ř	Ś	Š	Ş	Ť	Ţ	Ű	Ů	Ÿ	Ź	Ž	Ż	Ĳ	İ	đ	§	9
A	ă	ą	ć	č	ď	ě	ę	ğ	ĺ	ľ	ł	ń	ň	ŋ	ő	ŕ	A
B	ř	ś	š	ş	ť	ţ	ű	ů	ÿ	ź	ž	ż	ĳ	¡	¿	£	B
C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï	C
D	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	Œ	Ø	Ù	Ú	Û	Ü	Ý	Þ	SS	D
E	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï	E
F	ð	ñ	ò	ó	ô	õ	ö	œ	ø	ù	ú	û	ü	ý	þ	ß	F
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Text Roman Italic – `p1xi`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	`	´	ˆ	˜	¨	˝	˚	ˇ	˘	¯	˙	¸	˛	‚	‹	›	0
1	“	”	„	«	»	–	—		o	ı	ȷ	ff	fi	fl	ffi	ffl	1
2	␣	!	″	#	$	%	&	’	(	)	*	+	,	-	.	/	2
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	3
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	5
6	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	6
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	-	7
8	Ă	Ą	Ć	Č	Ď	Ě	Ę	Ğ	Ĺ	Ľ	Ł	Ń	Ň	Ŋ	Ő	Ŕ	8
9	Ř	Ś	Š	Ş	Ť	Ţ	Ű	Ů	Ÿ	Ź	Ž	Ż	Ĳ	İ	đ	§	9
A	ă	ą	ć	č	ď	ě	ę	ğ	ĺ	ľ	ł	ń	ň	ŋ	ő	ŕ	A
B	ř	ś	š	ş	ť	ţ	ű	ů	ÿ	ź	ž	ż	ĳ	¡	¿	£	B
C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï	C
D	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	Œ	Ø	Ù	Ú	Û	Ü	Ý	Þ	SS	D
E	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï	E
F	ð	ñ	ò	ó	ô	õ	ö	œ	ø	ù	ú	û	ü	ý	þ	ß	F
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Text Roman Slanted – `p1xsl`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	`	´	ˆ	˜	¨	˝	˚	ˇ	˘	¯	˙	¸	˛	‚	‹	›	0
1	“	”	„	«	»	–	—		o	ı	ȷ	ff	fi	fl	ffi	ffl	1
2	␣	!	"	#	$	%	&	’	(	)	*	+	,	-	.	/	2
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	3
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	5
6	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	6
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	-	7
8	Ă	Ą	Ć	Č	Ď	Ě	Ę	Ğ	Ĺ	Ľ	Ł	Ń	Ň	Ŋ	Ő	Ŕ	8
9	Ř	Ś	Š	Ş	Ť	Ţ	Ű	Ů	Ÿ	Ź	Ž	Ż	Ĳ	İ	đ	§	9
A	ă	ą	ć	č	ď	ě	ę	ğ	ĺ	ľ	ł	ń	ň	ŋ	ő	ŕ	A
B	ř	ś	š	ş	ť	ţ	ű	ů	ÿ	ź	ž	ż	ĳ	¡	¿	£	B
C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï	C
D	Đ	Ñ	Ò	Ó	Ô	Õ	Ö	Œ	Ø	Ù	Ú	Û	Ü	Ý	Þ	SS	D
E	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï	E
F	ð	ñ	ò	ó	ô	õ	ö	œ	ø	ù	ú	û	ü	ý	þ	ß	F
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Text Roman Cap & Small Cap – `p1xsc`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	`	´	ˆ	˜	¨	˝	˚	ˇ	˘	¯	˙	¸	˛	‚	‹	›	0
1	“	”	„	«	»	–	—		o	I	J	FF	FI	FL	FFI	FFL	1
2	␣	!	"	#	$	%	&	’	(	)	*	+	,	-	.	/	2
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	3
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	5
6	‘	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	6
7	P	Q	R	S	T	U	V	W	X	Y	Z	{	|	}	~	-	7
8	Ă	Ą	Ć	Č	Ď	Ě	Ę	Ğ	Ĺ	Ľ	Ł	Ń	Ň	Ŋ	Ő	Ŕ	8
9	Ř	Ś	Š	Ş	Ť	Ţ	Ű	Ů	Ÿ	Ź	Ž	Ż	Ĳ	İ	Đ	§	9
A	Ă	Ą	Ć	Č	Ď	Ě	Ę	Ğ	Ĺ	Ľ	Ł	Ń	Ň	Ŋ	Ő	Ŕ	A
B	Ř	Ś	Š	Ş	Ť	Ţ	Ű	Ů	Ÿ	Ź	Ž	Ż	IJ	¡	¿	£	B
C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï	C
D	Đ	Ñ	Ò	Ó	Ô	Õ	Ö	Œ	Ø	Ù	Ú	Û	Ü	Ý	Þ	SS	D
E	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï	E
F	Đ	Ñ	Ò	Ó	Ô	Õ	Ö	Œ	Ø	Ù	Ú	Û	Ü	Ý	Þ	SS	F
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

9.3 TS1 (TC) Encoding Text Companion Fonts

These fonts’ encodings are identical to those of corresponding TC fonts.

Text Companion Roman Upright – `pcxr`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	`	´	ˆ	˜	¨	˝	˚	ˇ	˘	¯	˙						0
1			"			—	—		←	→	⁀	¸⁀	˛⁀	'⁀			1
2	ƀ				$			'			*		,	=	.	/	2
3	0	1	2	3	4	5	6	7	8	9			〈	−	〉		3
4														℧		◯	4
5								Ω				⟦		⟧	↑	↓	5
6	`		★	o|o	†								🍃	⚭	♪		6
7															~	=	7
8	˘	ˇ	˝	˵	†	‡	‖	‰	•	℃	$	¢	ƒ	₡	₩	₦	8
9	₲	₱	₤	℞	‽	⸘	₫	™	‱	¶	฿	№	⁒	℮	◦	℠	9
A	{	}	¢	£	¤	¥	¦	§	¨	©	ª	🄯	¬	℗	®	¯	A
B	°	±	²	³	´	µ	¶	·	※	¹	º	√	¼	½	¾	€	B
D							×										D
F							÷										F
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Text Companion Roman Italic – `pcxi`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	`	´	ˆ	˜	¨	˝	˚	ˇ	˘	¯	˙						0
1			″			—	—		←	→	⁀	¸⁀	˛⁀	′⁀			1
2	ƀ				$			′			*		,	=	.	/	2
3	0	1	2	3	4	5	6	7	8	9			〈	−	〉		3
4														℧		◯	4
5								Ω				⟦		⟧	↑	↓	5
6	`		★	o|o	†								🍃	⚭	♪		6
7															~	=	7
8	˘	ˇ	˝	˵	†	‡	‖	‰	•	℃	$	¢	ƒ	₡	₩	₦	8
9	₲	₱	₤	℞	‽	⸘	₫	™	‱	¶	฿	№	⁒	℮	◦	℠	9
A	{	}	¢	£	¤	¥	¦	§	¨	©	ª	🄯	¬	℗	®	¯	A
B	°	±	²	³	´	µ	¶	·	※	¹	º	√	¼	½	¾	€	B
D							×										D
F							÷										F
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Text Companion Roman Slanted – `pcxsl`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	`	´	ˆ	˜	¨	˝	˚	ˇ	˘	¯	˙	¸	˛	‚			0
1			″			—	—		←	→	⁀	⁀	⁀	⁀			1
2	ƀ				$			'			*		,	=	.	⁄	2
3	0	1	2	3	4	5	6	7	8	9			〈	−	〉		3
4														℧		◯	4
5								Ω				⟦		⟧	↑	↓	5
6	`		★	⚮	†								🍃	⚭	♪		6
7															˷	=	7
8	˘	ˇ	˝	˵	†	‡	‖	‰	•	℃	$	¢	ƒ	₡	₩	₦	8
9	₲	₱	₤	℞	‽	⸘	₫	™	‱	¶	฿	№	⁒	℮	◦	℠	9
A	{	}	¢	£	¤	¥	¦	§	¨	©	ª	🄯	¬	℗	®	¯	A
B	°	±	²	³	´	µ	¶	·	※	¹	º	√	¼	½	¾	€	B
D							×										D
F							÷										F
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

9.4 Math Fonts

These fonts' encodings are identical to those of corresponding CM and $\mathcal{AMS}$ Math fonts. Additional math fonts are provided.

Math Italic (Corresponding to CMMI) – `pxmi`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Γ	Δ	Θ	Λ	Ξ	Π	Σ	Υ	Φ	Ψ	Ω	α	β	γ	δ	ϵ	0
1	ζ	η	θ	ι	κ	λ	μ	ν	ξ	π	ρ	σ	τ	υ	ϕ	χ	1
2	ψ	ω	ε	ϑ	ϖ	ϱ	ς	φ	↼	↽	⇀	⇁	˓	˒	▹	◃	2
3	0	1	2	3	4	5	6	7	8	9	.	,	<	/	>	⋆	3
4	∂	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4
5	P	Q	R	S	T	U	V	W	X	Y	Z	♭	♮	♯	⌢	⌣	5
6	ℓ	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	6
7	p	q	r	s	t	u	v	w	x	y	z	ı	ȷ	℘	⃗	⁀	7
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Math Italic (Corresponding to CMMI) used with the `varg` option – `pxmi1`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Γ	Δ	Θ	Λ	Ξ	Π	Σ	Υ	Φ	Ψ	Ω	α	β	γ	δ	ϵ	0
1	ζ	η	θ	ι	κ	λ	μ	ν	ξ	π	ρ	σ	τ	υ	ϕ	χ	1
2	ψ	ω	ε	ϑ	ϖ	ϱ	ς	φ	↼	↽	⇀	⇁	˓	˒	▹	◃	2
3	0	1	2	3	4	5	6	7	8	9	.	,	<	/	>	⋆	3
4	∂	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4
5	P	Q	R	S	T	U	V	W	X	Y	Z	♭	♮	♯	⌢	⌣	5
6	ℓ	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	6
7	p	q	r	s	t	u	v	w	x	y	z	ı	ȷ	℘	⃗	⁀	7
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Math Italic A – `pxmia`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Γ	Δ	Θ	Λ	Ξ	Π	Σ	ϒ	Φ	Ψ	Ω	α	β	γ	δ	ϵ	0
1	ζ	η	θ	ι	κ	λ	μ	ν	ξ	π	ρ	σ	τ	υ	ϕ	χ	1
2	ψ	ω	ε	ϑ	ϖ	ϱ	ς	φ									2
3		𝑔															3
4		𝔄	𝔅	ℭ	𝔇	𝔈	𝔉	𝔊	ℌ	ℑ	𝔍	𝔎	𝔏	𝔐	𝔑	𝔒	4
5	𝔓	𝔔	ℜ	𝔖	𝔗	𝔘	𝔙	𝔚	𝔛	𝔜	ℨ						5
6		𝔞	𝔟	𝔠	𝔡	𝔢	𝔣	𝔤	𝔥	𝔦	𝔧	𝔨	𝔩	𝔪	𝔫	𝔬	6
7	𝔭	𝔮	𝔯	𝔰	𝔱	𝔲	𝔳	𝔴	𝔵	𝔶	𝔷					⁀	7
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Math Symbols (Corresponding to CMSY) – `pxsy`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	−	·	×	∗	÷	⋄	±	∓	⊕	⊖	⊗	⊘	⊙	◯	∘	•	0
1	≍	≡	⊆	⊇	≤	≥	⪯	⪰	∼	≈	⊂	⊃	≪	≫	≺	≻	1
2	←	→	↑	↓	↔	↗	↘	≃	⇐	⇒	⇑	⇓	⇔	↖	↙	∝	2
3	′	∞	∈	∋	△	▽	/	ı	∀	∃	¬	∅	ℜ	ℑ	⊤	⊥	3
4	ℵ	𝒜	ℬ	𝒞	𝒟	ℰ	ℱ	𝒢	ℋ	ℐ	𝒥	𝒦	ℒ	ℳ	𝒩	𝒪	4
5	𝒫	𝒬	ℛ	𝒮	𝒯	𝒰	𝒱	𝒲	𝒳	𝒴	𝒵	∪	∩	⊎	∧	∨	5
6	⊢	⊣	⌊	⌋	⌈	⌉	{	}	⟨	⟩	|	‖	↕	⇕	∖	≀	6
7	√	⨿	∇	∫	⊔	⊓	⊑	⊒	§	†	‡	¶	♣	♢	♡	♠	7
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Math Symbols A (Corresponding to MSAM) – `pxsya`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	⊡	⊞	⊠	□	■	▪	◊	⧫	↻	↺	⇌	⇋	⊟	⊩	⊪	⊨	0
1	↠	↞	⇇	⇉	⇈	⇊	↾	⇂	↿	⇃	↣	↢	⇆	⇄	↰	↱	1
2	⇝	↭	↫	↬	≗	≿	≳	⪆	⊸	∴	∵	≑	≜	≾	≲	⪅	2
3	≼	≽	⋞	⋟	⪕	≦	⩽	≶	‵	-	≓	≒	⪖	≧	⩾	≷	3
4	⊏	⊐	⊳	⊲	⊵	⊴	★	≬	▼	▶	◀	›	‹	△	▲	▽	4
5	≖	⋚	⋛	⪋	⪌	¥	⇛	⇚	✓	⊻	⊼	⩞	∠	∡	∢	∝	5
6	⌣	⌢	⋐	⋑	⋓	⋒	⋏	⋎	⋋	⋌	⫅	⫆	≏	≎	⋘	⋙	6
7	⌜	⌝	®	Ⓢ	⋔	∔	∽	⋍	⌞	⌟	✠	∁	⊺	⊚	⊛	⊝	7
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Math Symbols B (Corresponding to MSBM) – `pxsyb`

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	≨	≩	≰	≱	≮	≯	⊀	⊁	≨	≩	⩽̸	⩾̸	⪇	⪈	⋠	⋡	0
1	⋨	⋩	⋦	⋧	≦̸	≧̸	⪵	⪶	⪹	⪺	⪉	⪊	≁	≇	╱	╲	1
2	⊊	⊋	⫅̸	⫆̸	⫋	⫌	⫋	⫌	⊊	⊋	⊈	⊉	∦	∤	∤	∦	2
3	⊬	⊮	⊭	⊯	⋭	⋬	⋪	⋫	↚	↛	⇍	⇏	⇎	↮	⋇	∅	3
4	∄	𝔸	𝔹	ℂ	𝔻	𝔼	𝔽	𝔾	ℍ	𝕀	𝕁	𝕂	𝕃	𝕄	ℕ	𝕆	4
5	ℙ	ℚ	ℝ	𝕊	𝕋	𝕌	𝕍	𝕎	𝕏	𝕐	ℤ	ˆ	ˆ	˜	˜		5
6	Ⅎ	⅁					℧	ð	≂	ℶ	ℷ	ℸ	⋖	⋗	⋉	⋊	6
7	∣	∥	∖	∼	≈	≊	⪷	⪸	↶	↷	Ϝ	ϰ	𝕜	ℏ	ħ	϶	7
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

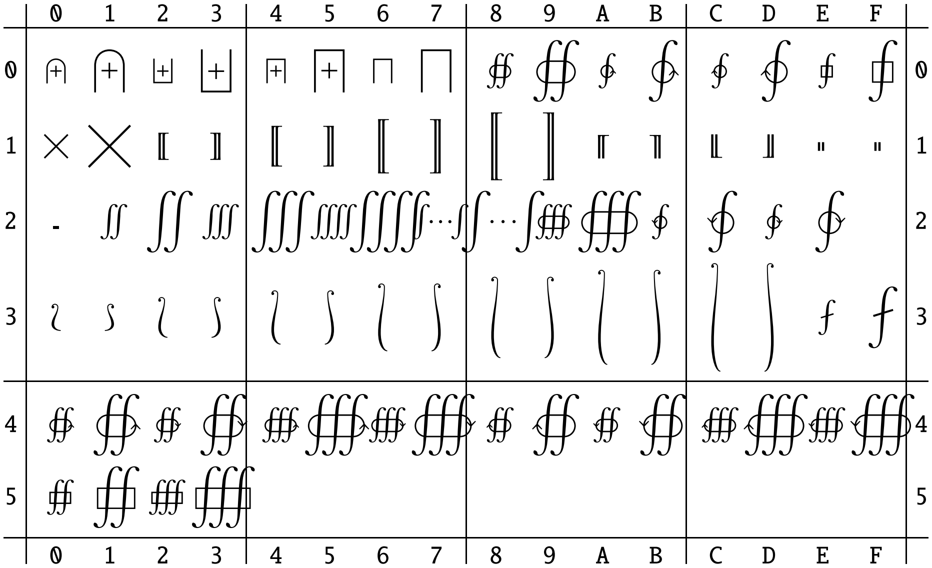
Math Symbols C – pxsyc

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	⊣	⊢	⊣	⊩	⫣	⊩	⫣	○	●	⫽	⑊	⫲	⫲	:≈	:∼	::≈	0
1	::∼	≐	⟜	⧟	—●	●—	●—●	○—●	●—○	⊫	⊪	≅	≦	≧	≴	≵	1
2	≴	≵	⪉	⪊	⊀	⊁	⋠	⋡	≠	≄	≁	≭	≠	≭	≢	≁	2
3	≉	⊄	⊅	≪̸	≫̸	≉	≇	⪹	⪺	≰	≱	≄	∉	∌	⋹̸	⋽̸	3
4	⋢	⋣	≔	≕	:−	−:	::=	=::	::−	−::	⥽	⥼	⥼⥽	⥾	≀	∫	4
5	≀	∫	⧀	⧁	∧⃝	∨⃝	⦶	⦸	⋉	⋊	⋈	×	⋈	×	◇	◆	5
6	⩀	⊏̸	⊐̸	⇠	⇢	⇠⇢	↜	⤀	⬴	⧆	⧅	◫	⧄	≀	ƛ	ƛ	6
7	♧	♦	♥	♤	⇗	⇘	⇖	⇙	⫪	⫫	∼	⇝	⊞	⊞	⟦	⟧	7
8	□⟶	⟵□	⊡⟶	⟵⊡	◇⟶	⟵◇	⟐⟶	⟵⟐	□⟹	⟸□	⊡⟹	⟸⊡	◇⟹	⟸◇	⟐⟹	⟸⟐	8
9	⟐	○⟶	⟵○	⊙⟶	⟵⊙	⧟	●—●	●—○	○—●								9
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Math Extension (Corresponding to CMEX) – pxex

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	(	)	[	]	⌊	⌋	⌈	⌉	{	}	⟨	⟩	|	‖	/	∖	0
1	(	)	(	)	[	]	⌊	⌋	⌈	⌉	{	}	⟨	⟩	/	∖	1
2	(	)	[	]	⌊	⌋	⌈	⌉	{	}	⟨	⟩	/	∖	/	∖	2
3	⎛	⎞	⎡	⎤	⎣	⎦	⎢	⎥	⎧	⎫	⎩	⎭	⎨	⎬	⎪	|	3
4	⎝	⎠	⎜	⎟	⟨	⟩	⨆	⨆	∮	∮	⨀	⨀	⨁	⨁	⨂	⨂	4
5	∑	∏	∫	⋃	⋂	⨄	⋀	⋁	∑	∏	∫	⋃	⋂	⨄	⋀	⋁	5
6	∐	∐	⌒	⌒	⌒	∼	∼	∼	[	]	⌊	⌋	⌈	⌉	{	}	6
7	√	√	√	√	√	|	┌	‖	↑	↓	◜	◝	◟	◞	⇑	⇓	7
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

Math Extension A – `pxexa`


0 1 2 3 4 5 6 7 8 9 A B C D E F
0
1
2
3
4
5

Bold versions of all fonts are available.