A survey of text font families

Michael Sharpe

Abstract

This is a survey of text font families, both free in some sense and commercial, that might be considered suitable for general text use within LaTeX, seeking to tabulate the qualities that matter most there, as well as XeLaTeX and LuaLaTeX.

Introduction

In a *TUGboat* article twenty years ago, Berthold Horn [1] noted that there were over 14,000 fonts in Type 1 format but only a handful of TeX math fonts to accompany them. There are now considerably more choices of math fonts than there were then, and it seems appropriate to ask instead *where are the text fonts?* It's not that there are fewer than there were in the 1990s, but our typographic expectations are higher than they used to be. Moreover, the appropriate count should be text font families rather than individual faces, and for most purposes, one should count only serifed font families, as those are the only serious candidates for the main text family where the output may include paper or PDF.

For LaTeX usage, the current minimal standard for a text font family is, in my opinion:

(A) upright and italic shapes in both regular and bold weights (four styles);

(B) real (i.e., not faked by reducing capital letters) Small Caps in upright regular weight;

(C) full set of common f-ligatures — `f_i`, `f_l`, `f_f`, `f_f_i`, `f_f_l` (fi, fl, ff, ffi, ffl) in each style;

(D) oldstyle figures 0123456789 in regular weight, upright shape.

Both Computer Modern and its modernized form Latin Modern (lmodern) meet these expectations, and more, but many fonts derived from legacy PostScript fonts do not. Most commonly, (C) fails, but (B) and/or (D) may also be lacking, and in some cases, (A) fails, usually because there is no ***Bold Italic.***

A more demanding user would likely raise the bar to the following stronger conditions:

(A′) upright and italic shapes in two weights (four styles) and preferably three weights (six styles) such as regular, semibold and bold;

(B′) real small caps are provided in all upright styles, and preferably in all styles;

(C′) full set of common f-ligatures — `f_i`, `f_l`, `f_f`, `f_f_i`, `f_f_l` (fi, fl, ff, ffi, ffl) in each style;

(D′) oldstyle figures 0123456789 in all styles.

(E′) other figure styles (e.g., proportional lining, tab oldstyle, superior) in at least upright regular style.

The free fonts considered in this article are mostly available from CTAN and the commercial fonts are mostly from the current Adobe Folio. Only fonts with serifs are considered, as those are overwhelmingly the most common main text font types except when output is intended on a low resolution screen, where sans serif, or perhaps a slab serif, renders more clearly. In most cases, the fonts are in OpenType format, which may be used directly by LuaLaTeX and XeLaTeX, and which may be converted using utilities such as `otfinst` or `autoinst` to PostScript font families with LaTeX support files. It seems that there are now close to thirty font families, many of them free, which come very close to satisfying conditions (A′)–(E′).

I don't have licenses for most of the commercial fonts listed below, and in those cases I've relied on information from the web site `http://www.myfonts.com`, from which one may obtain glyph lists and other essential information about most commercial fonts. To search manually, go to the site and follow `Find Fonts -> Search`, and enter the font name, e.g., `Goudy Oldstyle`, which leads to a screen with broad matching to that name. If you select '`Goudy Oldstyle family of 5 fonts from Adobe`' you reach a screen showing the five individual fonts. Press the first (Regular weight, upright shape) to see a selection of its glyphs. Press `Glyphs` to see the entire glyph catalog for that selection, from which you may determine that Regular weight, upright shape has oldstyle figures, small caps, only `f_i` and `f_l` ligatures, and a limited selection `{1,2,3}` of superior figures. (This is more or less typical for fonts derived from older PostScript fonts.) Examining the other variants establishes that they all have oldstyle figures, but none has small caps.

While in the screen showing all glyphs, click on a letter to bring up an enlarged image, which may be saved for further examination. The glyph images are drawn from anti-aliased `.gif` bitmaps which seem to have been made at the scale `1px = 3em`, which is handy for estimating the vertical stem widths, which provides information about the relative weight of a font. The information provided in the tables below comes from these estimated values and from values obtained from FontForge for fonts to which I own licenses.

Table 1: Free (at least of cost) fonts, in approximate order of heaviness (VStemW)

Name	Source	fLigs	Smc	VStemW	OsF	OF	XH	CH	IA	Notes	TL
quattrocento	impallari	2		70/113			459	660	−13	28	✓
kpfonts	public	A	A	73/89/117/135	A	A	441	670	−11	10, 20	✓
antt	public	A	A	75/97/118/143	A	A	473	703	−9.5	17	✓
EBGaramond	public	A	RI	80	2	2	405	656	−17	26	✓
GFSBodoni	public	A	R	84/117	A		476	705	−12	1, 24	✓
venturis	arkandis	A	A	84/139/178	A		432	643	−16	16	✓
LinLibertine	public	A	A	85/123/140	A	A	431	647	−12	14	✓
GFSArtemisia	public	A	R	85/132	A		470	692	−12	22	✓
Computer Modern	public	A	A	89/144	A		431	683	−14	1, 10	✓
Latin Modern	public–GUST	A	A	89/144	A		431	683	−14	1, 3, 10	✓
garamondx	URW–AFPL	A	A	91/133	A		426	692	−16	2, 14	○
garamond	mathdesign	2		91/133			426	692	−16	10, 21	○
mathpazo	public	A	R	96/141	R		459	689	−10	5, 10	✓
Pagella	TEX Gyre	A	A	96/141	A	A	459	689	−10	5, 13, 19	✓
newpxtext	public	A	A	96/141	A	A	459	689	−10	5, 18, 19	✓
pxfonts	public	A	RB	96/141	A		459	689	−10	5, 10, 13	✓
PT Serif	public	2		96/150			500	700	−12	25	✓
fourier	GUT	2		99/160			490	693	−13	9, 10, 12	✓
kerkis	public	A	RB	99/117/174	RB		485	681	−10.3	4, 10	✓
utopia	mathdesign	2		99/160			490	693	−13	10, 21	✓
GFSDidot	public	A	R	100/140	A		456	689	−12	5, 23	✓
Bonum	TEX Gyre	A	A	100/176	A	A	485	681	−10.3	4, 13	✓
charter	mathdesign	2		102/145			488	679	−11	10, 21	✓
CharisSIL	SIL	A	A	102/145			488	679	−11	8, 11	○
mathptmx	public	2	RB	102/162	A		450	662	−15.5	7, 10, 12, 13	✓
newtxtext	public	A	A	102/162	A		450	662	−15.5	7, 14	✓
Termes	TEX Gyre	A	A	102/162	A	A	450	662	−15.5	7, 13, 14	✓
baskervald	arkandis	A		103/153/180			415	667	−16	15	✓
librebaskerville	impallari	A		104/146		A	530	770	−15	27	✓
Schola	TEX Gyre	A	A	112/180	A	A	466	722	−15	6, 13	✓

Keys to font tables

In the font property tables, the following abbreviations are used:

fLigs indicates the type of f-ligatures available: A indicates that all (fi, fl, ff, ffi, ffl) are available in all variants, and 2 indicates that only the two basic ones (fi, fl) are provided;

Smc indicates availability of real small caps: A indicates all variants, R indicates only regular weight, upright shape, RI indicates regular weight, upright and italic shapes, RB indicates regular and bold weights, upright shape only, and blank indicates none;

VStemW indicates the vertical stem widths (in `em` units, which in most cases is 100`em` = 1`pt`) of each weight available in an upright shape — these provide one simple measure of the relative weights of fonts, though other factors such as contrast (ratio of widest to narrowest stems) and side-bearings play a rôle as well;

OsF indicates availability of oldstyle figures: A means all variants have oldstyle figures available as the default text figures, R means they are available only in regular weight, upright shape, and blank means they are not available at all;

OF indicates, if A, that other figures sets are available: e.g., superior figures other than $\{1, 2, 3\}$, or proportional figures other than oldstyle;

XH gives the x-height in `em` units;

CH gives the cap height in `em` units;

IA gives the italic angle, e.g., −10 means slanted 10 degrees clockwise from vertical;

Notes are given after the tables;

TL indicates whether the font is included in TEX Live.

Table 2: Commercial fonts

Name	Source	fLigs	Smc	VStemW	OsF	OF	XH	CH	IA	Notes
StempelSchneidlerStd	Adobe	2		50/68/96/151/184			450	715	−12	B
ChaparralPro	Adobe	A	A	55/80/120/172	A	A	420	650	−10	H
CaeciliaLT	Adobe	2	A	55/86/113/147	A		516	699	−5	F
BriosoPro	Adobe	A	A	57/78/86/108/131	A	A	405	622	−10	E
RockwellStd	Adobe	2		57/102/176/264			472	679	−13	B, F
GaramondPremierPro	Adobe	A	A	60/83/90/119/140	A	A	393	646	−18	K, Q
ArnoPro	Adobe	A	A	61/84/124/142	A	A	398	618	−11	D
UsherwoodStd	Adobe	2		63/83/114/168			467	627	−12	B
NovareseStd	Adobe	2		64/99/149/218			460	640	−12	B, O
KinesisStd	Adobe	A	A	66/84/114/132	A	A	439	629	−6	M
HorleyOldStyleMTStd	Adobe	2		66/85/106/142			419	705	−9	B
BerkeleyStd	Adobe	2		66/87/116			426	635	−8	B
CentaurMTStd	Adobe	A	R	66/100	A	A	363	631	−13	G
VersaillesLTStd	Adobe	2		67/93/141/206			496	712	−12	B
WeidemannStd	Adobe	2		69/97/129/160			507	711	−12	B
WarnockPro	Adobe	A	A	76/90/129/142	A	A	440	659	−15	
KeplerStd	Adobe	A	A	73/98/132/158/180	A	A	430	634	−13	L
MaiolaPro	Adobe	A	A	73/113	A	A	414	611	−11	D
PerpetuaStd	Adobe	A	R	76/129	A	A	353	573	−12	P
VeljovicStd	Adobe	2		77/110/150/204			452	626	−12	B
TiepoloStd	Adobe	2		77/111/148			469	614	−9	B
GoudyStd	Adobe	2	R	79/123/152/243	A		418	704	−7	J
LegacySerifStd	Adobe	2		79/105/141/183			422	635	−12	B
DanteMTStd	Adobe	A	R	80/104/124	A	A	404	596	−9	I
FairfieldStd	Adobe	2	R	80/111/150/201	A	A	418	678	−9	
WeissStd	Adobe	2		82/108			407	694	−8	B
BemboStd	Adobe	A	R	82/111/140/168	A	A	396	622	−11.5	D
HiroshigeStd	Adobe	2		82/113/148/193			504	692	−9	B
BellMTStd	Adobe	A	R	84/105/137		A	410	644	−16	C
MeridienLTStd	Adobe	2		85/114/150			460	634	−12	B
MinionPro	Adobe	A	A	85/116/134	A	A	437	650	−12	
JensonPro	Adobe	A	A	86/113/127	A	A	388	649	−8	D
LeawoodStd	Adobe	2		86/134/183/207			554	709	−12	B
MinsterStd	Adobe	2		87/121/167/228			456	722	−10	B
Berling	Adobe	2		88/126			447	709	−12	B
GalliardStd	Adobe	2		88/132			442	680	−14	B
MeliorLTStd	Adobe	2		90/148			465	692	−12	B
StempelGaramond	Adobe	2	R	91/134	A		429	698	−16	R
SouvenirStd	Adobe	2		92/148/183/239			473	732	−10	B
CaslonPro	Adobe	A	R	93/127/150	A	A	420	711	−22	Q
StoneInformalStd	Adobe	2		96/140/212			500	700	−12	B
StoneSerifStd	Adobe	2		97/140/211			500	700	−12	B
TrumpMediaeval	Adobe	2	R	98/146	A		477	698	−12	
SabonLTStd	Adobe	2	R	99/128	A		442	698	−12	Q
UtopiaStd	Adobe	A	RB	99/141/164/224	A	A	461	653	−13	S
NewCaledoniaLTStd	Adobe	2	RB	100/129/169/220	A		422	664	−12	A
JansonText	Adobe	2	R	100/157	A		440	711	−15	A
LucidaOT	TUG	A	RB	104/150	A		530	723	−11.25	N
NewBaskervilleStd	Adobe	2	RB	105/152	A	A	427	660	−16	A, T
NewAsterLTStd	Adobe	2		111/138/178/228			464	692	−16	B
TiffanyStd	Adobe	2		114/149/295			449	715	−13	B

Notes on free fonts

1. High contrast (ratio of widest stems to narrowest).
2. Scale down about 5%.
3. Extension of Computer Modern.
4. Extension of URW version of Bookman.
5. Extension of URW version of Palatino.
6. Extension of the URW version of New Century Schoolbook. This is the font to use for briefs to the SCOTUS. The package fouriernc pairs it with fourier math, should you wish to improve your case with mathematical arguments.
7. Extension of URW version of Times.
8. Extension of Bitstream Charter.
9. Extension of original Utopia, donated to TUG by Adobe. Can use expert fonts, if available (not free), for OsF and real small caps. (Venturis is another option.)
10. Text and math fonts included.
11. Not on CTAN, download from `sil.org`. Lacks kerning tables.
12. Fake small caps.
13. Oldstyle figures available, but no option to designate them as the default text figures.
14. Can use newtxmath as math package.
15. Similar to Baskerville. Lack of small caps and OsF is a drawback to serious LaTeX use. Math and tabular usage is problematic because no tabular figures are provided.
16. Based on Utopia, but not as heavy. Full-featured. Can use fourier for math.
17. Antykwa Toruńska text and math. Singular appearance (see samples).
18. Resolves to Pagella, with added figures.
19. Can use newpxmath as math package.
20. Designs based originally on Palatino, but much modified to have a unique appearance.
21. Uses a variant of the mathdesign math fonts.
22. By default, uses txfonts for math.
23. The name is misleading as the Roman glyphs are based on URW's version of Palatino, which is an old-style, not a Didone. Uses pxfonts for math.
24. By default, uses CM for math.
25. Lacks Latin script small caps and OsF, but seems unsurpassed for coverage of Cyrillic and Eastern European character sets.
26. This carries the promise of becoming a remarkable font family, though currently only regular weights of upright and italic are available. It offers both small caps and "petite caps", the latter having an x-height equal to the x-height of the font, and a greater selection of figure style than most commercial fonts.
27. Unlike most Baskerville renditions, this has low contrast, and the italic is quite heavy. No fixed width or old style figures, nor small caps.
28. No fixed width or old style figures, nor small caps.

Notes on commercial fonts

A. High contrast (ratio of widest stems to narrowest).
B. No oldstyle figures or small caps.
C. No oldstyle figures.
D. Scale up by about 6%.
E. Too decorative for scientific text?
F. Slab serif, very geometric. Maybe for slides?
G. Limited small caps. Scale up 10–15%. Fine-looking font.
H. Slab serif. Slides?
I. Limited small caps. Scale up 7%.
J. Goudy Oldstyle.
K. Small x-height — elegant, but hard on older eyes.
L. Update of Utopia, even denser.
M. Slab serif with character.
N. Scale down about 8%. Includes math fonts.
O. Upper case italic not slanted.
P. Scale up by 15–18%.
Q. High italic angle — beautiful but less readable.
R. Glyphs very similar to garamondx but more widely spaced.
S. More extensive than Utopia in Fourier.
T. This text font is the basis for fonts used by the SMF (*Société Mathématique de France*) for its journals, the mathematical fonts deriving from Adobe Mathematical Pi and a private release by Yannis Haralambous. See [2].

Some personal opinions

Fonts without small caps in at least the upright shapes are severely lacking, as are those without a full set of common f-ligatures in each style. I think oldstyle figures make a real difference to the appearance of a document and should be available as the default text figures. These stylistic principles have a bearing on the assertions below.

The number and quality of the text fonts in the "free" category is much improved since Stephen Hartke's survey [3] of 2006, with LinLibertine perhaps the most notable example. As is apparent from the

above list of properties of existing commercial fonts, many have languished for years without improvement and lack some combination of amenities which I now consider essential.

Of the free fonts, I am most partial to LinLibertine, garamondx and mathpazo/newpx. LinLibertine and newpxtext (which is based on a slight modification of TeX Gyre Pagella) have the quantitative edge when scored by criteria (A′–E′), but I prefer the overall appearance of garamondx, even though I wish it were more generously spaced, in the manner of StempelGaramond. Mathpazo and newpx come with built-in math support, and matching math support for LinLibertine and garamondx are available as options to newtxmath. Garamondx may also be used with the mathdesign package using the garamond option.

Among the commercial fonts, there are some first-rate contenders. LucidaOT has the benefit of a math font designed from ground up to accompany the text font, and all at a very reasonable price. The "Pro" font families in the list comprise some of Adobe's most impressive offerings, some of them surely as close to technical perfection as font families can be. Those that are the most interesting to me — BriosoPro, WarnockPro, MaiolaPro — may lack the gravitas required of academic research papers and books, and GaramondPremierPro may now be so overused as to appear old hat. I find UtopiaStd and KeplerStd too plain and too cramped for comfortable reading. My favorites among the rest come down to BemboStd, CentaurMTStd and DanteMTStd which, despite their slight technical inadequacies, possess, so to speak, real character. There is much to be thankful for with the Adobe fonts that are not simply licensed from others. Unlike most foundries, their fonts have licenses that allow modifications.

Math fonts that are well-matched to the Adobe fonts are not so easy to find. There is now a homogeneity of design in the newer Adobe fonts that renders many of them poor contenders for mathematical use because the italic v is almost indistinguishable from Greek \nu, requiring a substantial work-around.

The MinionPro package on CTAN provides a math package based on MnSymbol that is a good match to MinionPro, but which has some problematic features: (a) the symbols are on the small and light side — indeed, some are borrowed from Computer Modern; (b) math italic v and Greek small letter \nu are indistinguishable; (c) the scale is not adjustable; (d) the package is so cleverly constructed as to be quite difficult to modify.

A number of Adobe text fonts may be adapted to the newtxmath package, with some amount of labor and skill required. The minion option to newtxmath provides one example of what can be done — the math italic and Greek symbols are taken from MinionPro text but other symbols are from newtxmath, the end result being a little heavier than MinionPro math. NewBaskervilleStd adapts well to newtxmath, but has some deficiencies: it lacks a full set of f-ligatures and has small caps only in upright shapes. Baskervald is not a good substitute for NewBaskervilleStd, having much heavier italics that don't match newtxmath well, among its other issues. It may be that Baskerville is the new black, in a manner of speaking. The recently issued (and very expensive) Baskerville 10 Pro has made quite a splash — for example, it is now the Metropolitan Opera's official font, replacing Garamond.

References

[1] Horn, Berthold. "Where Are the Math Fonts?" *TUGboat* **14**:3 (1993), pp. 282–284.

[2] Haralambous, Yannis. "Une police mathématique pour la Société Mathématique de France: le SMF Baskerville". Cahiers GUTenberg **32** — actes du congrès GUT'99, Lyon, mai 1999.

[3] Hartke, Stephen G. "A Survey of Free Math Fonts for TEX and LATEX". The PracTEX Journal 2006 No. 1, pp. 1–26.

Appendix — Some font samples

Further, more extensive, samples are available at
`http://math.ucsd.edu/~msharpe/ffsamples.pdf`

```
\usepackage[math]{anttor}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{baskervald}
\usepackage[lite]{mtpro2}% free
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{gtamacbaskerville}
\pdfmapfile{+gtamacfonts.map}
\usepackage[lite]{mtpro2}% free
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage[scaled=.84]{librebaskerville}
\usepackage[lite]{mtpro2}% free
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
%Computer Modern
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{fourier}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{fourier,venturis}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{fouriernc}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{gfsartemisia}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{gfsbodoni}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{gfsdidot}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{kmath,kerkis}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \operatorname{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{kpfonts}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{libertine}
\usepackage[libertine]{newtxmath}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage[sc]{mathpazo}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{newpxtext,newpxmath}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{newtxtext,newtxmath}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage[lining]{ebgaramond}
\usepackage[garamondx]{newtxmath}
```

Roman text, Small Caps, *Italics*, (no bold variants), followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage{garamondx}
\usepackage[garamondx]{newtxmath}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage[garamond]{mathdesign}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage[utopia]{mathdesign}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

```
\usepackage[charter]{mathdesign}
```

Roman text, Small Caps, *Italics*, **Bold roman** and ***Bold Italic***, followed by some display math:

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-t^2/2}\,dt = \frac{1 + \mathrm{erf}\left(\frac{x}{\sqrt{2}}\right)}{2}$$

◇ Michael Sharpe
Math Dept, UCSD
La Jolla, CA 92093-0112
USA
msharpe (at) ucsd (dot) edu
http://math.ucsd.edu/~msharpe/