A Look at some Recent TeX Fonts

Michael Sharpe

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This document examines a number of more recent additions to TeX's font repertoire, focussing on LaTeX packages exclusively, and, for the most part, on text fonts, though I will make some biased suggestions about suitable math packages to accompany them.

For each font package, there is a single page describing the package, important options and macros, and the features (figure choices, SMC and so on) available in the package.

The font packages (and Common Names) described on the following pages are:

SERIFED TEXT FONTS:

fbb (Bembo)

garamondx (Garamond)

newpx (Palatino)

kpfonts (Palatino-like)

newtx (Times)

stix (Times)

libertine

Baskervaldx (Baskerville)

XCharter (Charter)

heuristica (Utopia)

gentium (Gentium-tug)

TYPEWRITER FONTS:

inconsolata

zlmtt (Typewriter fonts from Latin Modern)

newtxtt (Typewriter fonts from `txfonts`)

Package name: fbb (Free Bembo)

Derived from: Cardo by David Perry (not available on CTAN)

Weights and shapes: {m, b}, {n, it}. (Cardo had no BoldItalic.)

Features:

- full set of f-ligatures—Cardo f-ligatures were modified;
- SMALL CAPS in all weights and shapes—Cardo had SMC only in Regular;
- lining figures, both proportionally spaced (option `lining`) and tabular (options `lining, tabular`);
- taboldstyle figures 0123456789 (options `oldstyle, tabular`);
- proportional oldstyle figures 0123456789 (option `oldstyle`);
- superior figures ⁰¹²³⁴⁵⁶⁷⁸⁹ in all weights and shapes. With the sups option, these will be used for footnote markers;
- full set of `textcomp` glyphs;
- \textcircled macro: Eg, \textcircled{A} gives Ⓐ. (Must load `textcomp` with `full` option.)
- tall ascenders, overarching f, calligraphic appearance.

Typical invocation:

```
\usepackage[full]{textcomp} % to get the right copyright, etc.
\usepackage{fbb} % osf for text, lining for math
\usepackage[scaled=.95]{cabin}
\usepackage[varqu,varl]{inconsolata}% typewriter
\usepackage[libertine,bigdelims,vvarbb]{newtxmath}
\usepackage[cal=boondoxo]{mathalfa}% less slanted than STIX
\usepackage[T1]{fontenc}
\useosf
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as \mathrm{d} and \mathrm{e}, and in fonts derived from mtpro2 or newtxmath, the latter is entered as \uppi.)

Simplest form of the *Central Limit Theorem*: *Let $X_1, X_2, \cdots$ be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathscr{F}, \mathbb{P})$. Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \leq y\right) \to \mathfrak{N}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E} f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t) \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: `garamondx`.

Derived from: URW Garamond No 8 (package `garamond` on CTAN, not TEXLive.)

Weights and shapes: {m, b}, {n, it}. (Bold weight is in fact medium-bold.)

Features:

- full set of f-ligatures—original had only `f_i` and `f_l`;
- SMALL CAPS in all weights and shapes;
- superior figures 0123456789—with the `sups` option, these will be used for footnote markers[1];
- taboldstyle figures 0123456789 or 0123456789;
- swash Q glyph activated by `\swashQ`: Q
- full set of `textcomp` glyphs;
- `\textcircled` macro: Eg, `\textcircled{A}` gives Ⓐ. (Must load `textcomp` with `full` option.)

Typical invocation:

```
\usepackage[full]{textcomp}
\usepackage[sups,osf,scaled=.96]{garamondx} % osf (or osfI) for text, not math
\usepackage[scaled=.95]{cabin} % sans serif
\usepackage[varqu,varl]{inconsolata} % sans serif typewriter
\usepackage[garamondx,bigdelims,vvarbb]{newtxmath} % bb from STIX
\usepackage[cal=boondoxo]{mathalfa} % mathcal
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as `\mathrm{d}` and `\mathrm{e}`, and in fonts derived from `mtpro2` or `newtxmath`, the latter is entered as `\uppi`.)

Simplest form of the *Central Limit Theorem*: *Let X_1, X_2, $\cdots$ be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathscr{F}, \mathbb{P})$. Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \leq y\right) \to \mathfrak{R}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E}f\left(S_n / \sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t) \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

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[1] For example

Package name: `newpxtext` (Palatino)

Derived from: TeX Gyre Pagella

Weights and shapes: {m, b}, {n, it}.

Features:

- full set of f-ligatures;

- Sᴍᴀʟʟ Cᴀᴘꜱ in all weights and shapes;

- monospaced lining figures 0123456789;

- taboldstyle (monospaced) figures 0123456789—option osf makes these the default text figures, while using lining figures for math; (the TeXGyrePagella package doesn't seem to have an option for this;)

- superior figures ⁰¹²³⁴⁵⁶⁷⁸⁹. Unless you use the option `defaultsups`, these will be used for footnote markers;

Typical invocation:

```
\usepackage[full]{textcomp}
\usepackage[osf]{newpxtext} % osf for text, not math
\usepackage{cabin} % sans serif
\usepackage[varqu,varl]{inconsolata} % sans serif typewriter
\usepackage[bigdelims,vvarbb]{newpxmath} % bb from STIX
\usepackage[cal=boondoxo]{mathalfa} % mathcal
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as \mathrm{d} and \mathrm{e}, and in fonts derived from mtpro2 or newtxmath, the latter is entered as \uppi.)

Simplest form of the *Central Limit Theorem*: *Let X_1, X_2, $\cdots$ be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathscr{F}, \mathbb{P})$. Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \leq y\right) \to \mathfrak{R}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}}\,\mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t)\frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}}\,\mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: `kpfonts` (Palatino–like)

Derived from: URW Palatino (loosely)

Weights and shapes: {l, m, b}, {n, it}.

Features:

- full set of f-ligatures;
- SMALL CAPS in all weights and shapes;
- monospaced lining figures 0123456789;
- taboldstyle (monospaced) figures 0123456789—option `oldstylenums` makes these the default text figures, while using lining figures for math.

Typical invocation:

```
\usepackage[oldstylenums]{kpfonts}
\usepackage[cal=boondoxo]{mathalfa} % mathcal
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as `\mathrm{d}` and `\mathrm{e}`, and in `kpfonts`, the latter is entered as `\piup`.)

Simplest form of the *Central Limit Theorem*: *Let X_1, $X_2, \cdots$ be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathscr{F}, \mathbb{P})$. Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \leq y\right) \to \Omega(y) :- \int_{-\infty}^{y} \frac{e^{-t^2/2}}{\sqrt{2\pi}}\, dt \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n :- \sum_1^n X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t)\frac{e^{-t^2/2}}{\sqrt{2\pi}}\, dt \quad \text{as } n \to \infty, \text{ for every } f \in b\mathscr{C}(\mathbb{R}).$$

Package name: `newtxtext` (Times)

Derived from: txfonts, TeX Gyre Termes

Weights and shapes: {m, b}, {n, it}.

Features:

- full set of f-ligatures;

- SMALL CAPS in all weights and shapes;

- monospaced lining figures 0123456789;

- taboldstyle (monospaced) figures 0123456789—option `osf` makes these the default text figures, while using lining figures for math; (the TeXGyreTermes package doesn't seem to have an option for this;)

- superior figures ⁰¹²³⁴⁵⁶⁷⁸⁹. Unless you use the option `defaultsups`, these will be used for footnote markers;

Typical invocation:

```
\usepackage[full]{textcomp}
\usepackage[osf]{newtxtext} % osf for text, not math
\usepackage{cabin} % sans serif
\usepackage[varqu,varl]{inconsolata} % sans serif typewriter
\usepackage[bigdelims,vvarbb]{newtxmath} % bb from STIX
\usepackage[cal=boondoxo]{mathalfa} % mathcal
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as `\mathrm{d}` and `\mathrm{e}`, and in fonts derived from `mtpro2` or `newtxmath`, the latter is entered as `\uppi`.)

Simplest form of the *Central Limit Theorem*: *Let* X_1, $X_2, \cdots$ *be a sequence of iid random variables with mean* 0 *and variance* 1 *on a probability space* $(\Omega, \mathcal{F}, \mathbb{P})$. *Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \leq y\right) \to \mathfrak{N}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}}\, \mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t)\frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}}\, \mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: `stix` (STIX)

Derived from: Times

Weights and shapes: {m, b}, {n, it}.

Features:

- full set of f-ligatures;

- No SMALL CAPS—better to use another Times package for text;

- monospaced lining figures 0123456789;

- taboldstyle (monospaced) figures 0123456789 are available only through `textcomp` commands;

- vast number of math glyphs available, but not all are accessible using LaTeX.

Typical invocation:

```
\usepackage[lcgreekalpha]{stix} %[notext], and load another package for text?
\usepackage{textcomp}
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as `\mathrm{d}` and `\mathrm{e}`, and in fonts derived from STIX, the latter is entered as `\mathrm{\pi}`, which works only if you set the option `lcgreekalpha`, which makes lower case Greek letters respond to alphabet changes such as `\mathrm` and `\mathbf`.)

Simplest form of the *Central Limit Theorem*: *Let X_1, X_2, $\cdots$ be a sequence of iid random variables with mean* 0 *and variance* 1 *on a probability space* $(\Omega, \mathscr{F}, \mathbb{P})$. *Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \le y\right) \to \mathfrak{N}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_{1}^{n} X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t)\frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: `libertine` (LinuxLibertine)

Derived from: Original work, based on nineteenth century book faces

Weights and shapes: {m, sb, b}, {n, it}. (Uses `z` internally in place of `sb`.)

Features:

- loads Biolinum as sans serif, Libertine Mono as `tt`, the latter being very wide (6.7% wider than `courier`) and based on Libertine glyph shapes;

- full set of f-ligatures;

- Small Caps in all weights and shapes;

- lining figures, both tabular 0123456789 and proportional 0123456789;

- oldstyle figures, both tabular 0123456789 and proportional 0123456789;

- superior figures ⁰¹²³⁴⁵⁶⁷⁸⁹; to use them for footnote markers, call the `superiors` package, as below;

Typical invocation:

```
\usepackage{textcomp}
\usepackage[sb]{libertine}
\usepackage[varqu,varl]{inconsolata}% sans serif typewriter
\usepackage[libertine,bigdelims,vvarbb]{newtxmath} % bb from STIX
\usepackage[cal=boondoxo]{mathalfa} % mathcal
\useosf % osf for text, not math
\usepackage[supstfm=libertinesups,%
  supscaled=1.2,%
  raised=-.13em]{superiors}
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as \mathrm{d} and \mathrm{e}, and in fonts derived from `mtpro2` or `newtxmath`, the latter is entered as \uppi.)

Simplest form of the *Central Limit Theorem*: *Let $X_1, X_2, \cdots$ be a sequence of iid random variables with mean* 0 *and variance* 1 *on a probability space* $(\Omega, \mathscr{F}, \mathbb{P})$. *Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \leq y\right) \to \mathfrak{N}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E} f\left(S_n / \sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t) \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: Baskervaldx (Baskerville)

Derived from: Baskervald

Weights and shapes: {m, b}, {n, it}.

Features:

- full set of f-ligatures;

- SMALL CAPS in all weights and shapes;

- lining figures, both tabular 0123456789 and proportional 0123456789;

- oldstyle figures, both tabular 0123456789 and proportional 0123456789—options osf with one of tabular, proportional selects the default text figures, while using tabular lining figures for math;

- superior figures ^{0123456789}. The option sups forces their use as footnote markers;

Typical invocation:

```
\usepackage[full]{textcomp}
\usepackage[osf,sups]{Baskervaldx} % osf for text, not math
\usepackage{cabin} % sans serif
\usepackage[varqu,varl]{inconsolata} % sans serif typewriter
\usepackage[baskervaldx,bigdelims,vvarbb]{newtxmath} % bb from STIX
\usepackage[cal=boondoxo]{mathalfa} % mathcal
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as \mathrm{d} and \mathrm{e}, and in fonts derived from mtpro2 or newtxmath, the latter is entered as \uppi.)

**Simplest form of the *Central Limit Theorem*: *Let X_1, $X_2, \cdots$ be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathscr{F}, \mathbb{P})$. Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \le y\right) \to \mathfrak{N}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t) \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: XCharter (Charter)

Derived from: Bitstream Charter (free version)

Weights and shapes: {m, b}, {n, it}.

Features:

- full set of f-ligatures;
- SMALL CAPS in all weights and shapes;
- tabular lining figures 0123456789;
- proportional oldstyle figures with two choices for 'one': 0123456789 and 0123456789—options osf and osfI set the default figure style in text accordingly;
- superior figures ⁰¹²³⁴⁵⁶⁷⁸⁹. The option sups forces their use as footnote markers;
- very plain but very readable, even at small sizes and lower resolutions.

Typical invocation:

```
\usepackage[full]{textcomp}
\usepackage[osf,sups,scaled=.97]{XCharter} % osf for text, not math
\usepackage{cabin} % sans serif
\usepackage[varqu,varl]{inconsolata} % sans serif typewriter
\usepackage[libertine,bigdelims,vvarbb,scaled=1.03]{newtxmath} % bb from STIX
\usepackage[cal=boondoxo]{mathalfa} % mathcal
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as \mathrm{d} and \mathrm{e}, and in fonts derived from mtpro2 or newtxmath, the latter is entered as \uppi.)

Simplest form of the *Central Limit Theorem*: *Let X_1, X_2, $\cdots$ be a sequence of iid random variables with mean* 0 *and variance* 1 *on a probability space* $(\Omega, \mathscr{F}, \mathbb{P})$. *Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \leq y\right) \to \mathfrak{N}(y) \coloneqq \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n \coloneqq \sum_1^n X_k$,

$$\mathbb{E}f\left(S_n / \sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t) \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: `heuristica` (Utopia)

Derived from: Utopia (free version)

Weights and shapes: {m, b}, {n, it}.

Features:

- full set of f-ligatures;
- SMALL CAPS in regular weight, upright shape only;
- monospaced lining figures 0123456789;
- taboldstyle (monospaced) figures 0123456789—option osf makes these the default text figures, while using lining figures for math;
- superior figures ⁰¹²³⁴⁵⁶⁷⁸⁹. The option sups will force footnote markers to use them;
- Option `space` (default value 1.2) multiplies `fontdimen2` by that factor, making for a less cramped appearance.

Typical invocation:

```
\usepackage{textcomp}
\usepackage[osf,scaled=.95]{heuristica} % osf for text, not math
\usepackage{cabin} % sans serif
\usepackage[varqu,varl]{inconsolata} % sans serif typewriter
\usepackage[utopia,bigdelims,vvarbb]{newtxmath} % bb from STIX
\usepackage[cal=boondoxo]{mathalfa} % mathcal
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as \mathrm{d} and \mathrm{e}, and in fonts derived from mtpro2 or newtxmath, the latter is entered as \uppi.)

Simplest form of the *Central Limit Theorem*: *Let $X_1, X_2, \cdots$ be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathscr{F}, \mathbb{P})$. Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \le y\right) \to \mathfrak{N}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}}\,\mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_{1}^{n} X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t)\frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}}\,\mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: `gentium` (Gentium-tug)

Derived from: Original font design

Weights and shapes: {m, b}, {n, it}.

Features:

- many encodings available, supporting a wide variety of languages/scripts;
- full set of f-ligatures in Roman scripts;
- SMALL CAPS in Regular and Italic, not in Bold weights;
- only text figure choice is monospaced lining figures 0123456789;
- superior and inferior figures, but no LaTeX support;
- after scaling down 5%, `gentium`'s size and italic angle are close enough to Libertine's that it works tolerably well with the `libertine` option to `newtxmath` as math accompaniment.

Typical invocation:

```
\usepackage[scaled=.95]{gentium}
\usepackage{textcomp}
\usepackage[T1]{fontenc}
\usepackage{cabin}
\usepackage[varqu,varl]{inconsolata}
\usepackage{amsmath,amsthm}
\usepackage[libertine,bigdelims,vvarbb]{newtxmath}
\usepackage[cal=boondoxo]{mathalfa}
```

Example using this preamble:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as `\mathrm{d}` and `\mathrm{e}`, and in fonts derived from `mtpro2` and `newtxmath`, the latter is entered as `\uppi`.)

Simplest form of the *Central Limit Theorem*: *Let* $X_1, X_2, \cdots$ *be a sequence of iid random variables with mean* 0 *and variance* 1 *on a probability space* $(\Omega, \mathscr{F}, \mathbb{P})$. *Then*

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \le y\right) \to \mathfrak{N}(y) := \int_{-\infty}^{y} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t) \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}} \, \mathrm{d}t \quad \text{as } n \to \infty, \text{for every } f \in \mathrm{b}\mathscr{C}(\mathbb{R}).$$

Package name: `inconsolata/zi4`.

Derived from: Raph Levien's `inconsolata` TrueType fonts, reminiscent of Consolas.

Weights and shapes: {m, b}, {n}.

Features:

- available encodings are `OT1`, `LY1`, `T1`, `TS1`, `QX1`;

- the default zero in `inconsolata` is now slashed—the unslashed zero may be specified with the option `var0`;

- for those who find the default lower-case L(l) a bit too close to the numeral 1, there is an option `varl` which substitutes a more distinctive shape for all glyphs related to lower-case L;

- the default double quote have a small slant—use the `varqu` option for upright quotes;

- the package loads `upquote` by default, but provides an option `noupquote` to override it.

Typical invocation:

```
\usepackage[varqu,varl]{inconsolata} % sans serif typewriter
```

Example using this preamble: (with \texttt)

```
Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum
ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu
libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque.
Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis
egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna
fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien
est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices
bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla.
Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu,
accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.
```

```
0123456789
0123456789
```

Package name: `zlmtt` (Latin Modern Typewriter)

Derived from: `Computer Modern Typewriter (cmtt)`

Weights and shapes: {l, lc, m, b}, {n, it}. (Bold is only 20% thicker than medium. Not all combinations are available.)

Features:

- many encodings available: T1, TS1, LY1, OT1, IL2, L7x, OT4, QX, T5;

- medium weight has a SMALL CAPS variant in upright shape only;

- each weight has a proportionally spaced variant (i.e., not monospaced) with fewer features (e.g., no lightcondensed variant), activated by option `proportional`, or simply `p`;

- each weight has an *italic style* in addition to the default upright style—this style is not simply a slanted version of the upright style except in the proportionally spaced variant;

- independently of the choices made for "medium" and "bold" in other font families, you may choose which weights will be chosen for Typewriter by specifying `light` (or just `l`) to make `\mdseries` render as `light`, `lightcondensed` or `lc` for `lightcondensed`, while `med` or `m` make `\bfseries` render using `medium`;

- the macros `\proptt` and `\monott` render their arguments using proportional and monospaced `tt`, no matter what options were specified for the package. The macro `\lctt` renders its argument as lightcondensed.

Typical invocation:

```
\usepackage[scaled=1.05]{zlmtt}% latin modern typewriter
```

Example using this preamble: (with `\textttt`)

```
Lorem ipsum dolor sit amet, consectetuer adipiscing elit.  Ut purus elit, vestibulum
ut, placerat ac, adipiscing vitae, felis.  Curabitur dictum gravida mauris.  Nam arcu
libero, nonummy eget, consectetuer id, vulputate a, magna.  Donec vehicula augue eu
neque.  Pellentesque habitant morbi tristique senectus et netus et malesuada fames
ac turpis egestas.  Mauris ut leo.  Cras viverra metus rhoncus sem.  Nulla et lectus
vestibulum urna fringilla ultrices.  Phasellus eu tellus sit amet tortor gravida placera
Integer sapien est, iaculis in, pretium quis, viverra ac, nunc.  Praesent eget sem
vel leo ultrices bibendum.  Aenean faucibus.  Morbi dolor nulla, malesuada eu, pulvinar
at, mollis ac, nulla.  Curabitur auctor semper nulla.  Donec varius orci eget risus.
Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam.  Duis eget orci sit
amet orci dignissim rutrum.
```

```
0123456789 (medium)
0123456789 (bold)
```

(With `\proptt`,)
Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

(With `\lctt`,)
A little bit of lightcondensed, which is not available in proportional mode.

Package name: `newtxtt` (Typewriter fonts from `txfonts`)

Derived from: Original design to match width of `cmtt`, but weight and height of Times.

Weights and shapes: {m, b}, {n, sl}.

Features:

- few encodings available: T1, TS1;

- four forms of 'zero' to choose from with option `zerostyle` one of `a`, `b`, `c`, `d`—the default is `a`, an unslashed 0, narrower than the capital letter O;

- Sᴍᴀʟʟ Cᴀᴘs variant in upright shapes only;

- variants are available (option `space`) which provide a limited form of text font, having the same monospaced glyphs, but permitting hyphenation and smaller (and variable) interword spacing—the macros `\ttzdefault`, `\ttzfamily`, `\ttz` behave like their monospace cousins, while `\nomono` changes the meanings of the `\tt` macros to their `\ttz` forms;

Typical invocation:

```
\usepackage[scaled=1.02]{newtxtt}% txfonts typewriter
```

Example using this preamble: (with `\textttt`)

```
Lorem ipsum dolor sit amet, consectetuer adipiscing elit.  Ut purus elit, vestibulum ut,
placerat ac, adipiscing vitae, felis.  Curabitur dictum gravida mauris.  Nam arcu libero,
nonummy eget, consectetuer id, vulputate a, magna.  Donec vehicula augue eu neque.  Pellente
habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.  Mauris
ut leo.  Cras viverra metus rhoncus sem.  Nulla et lectus vestibulum urna fringilla ultrices
Phasellus eu tellus sit amet tortor gravida placerat.  Integer sapien est, iaculis in,
pretium quis, viverra ac, nunc.  Praesent eget sem vel leo ultrices bibendum.  Aenean
faucibus.  Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla.  Curabitur
auctor semper nulla.  Donec varius orci eget risus.  Duis nibh mi, congue eu, accumsan
eleifend, sagittis quis, diam.  Duis eget orci sit amet orci dignissim rutrum.
```

```
0123456789 (medium)
0123456789 (bold)
```

(With `space` option,)
Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.