

Introduction to Scientific Typesetting

Lesson 14: Fonts

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Fonts can be either monospaced or proportionally spaced. Notice the difference:

mmmmiiii

monospaced

mmmmiiii

proportionally spaced

- You will use proportionally spaced fonts most of the time.
- Monospace fonts have their uses, such as typing computer code.

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Another way to classify fonts: the presence/absence of *serifs*.

serif: tiny strokes at the extremities of character shapes

- Serifed fonts generally used for long texts; thought to be more readable;
- Sans serif fonts occasionally used for titles/presentations.

To see the difference, open the first example file (`.tex`).

Build and view.

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Ways to refer to a font family:

- **shape** — upright, *italic*, *slanted*; variant: SMALL CAPS;
- **weight and width**
 - weight* — light, medium, bold
 - width* — condensed, medium, extended
- **size** — measured in pt, 72.29 per inch
 - familiar L^AT_EX size commands

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Font Encoding often deals with the ability to type in a foreign language. Here are the two most common encodings.

- OT1 — this is the standard, the encoding for the default font in \LaTeX
- T1 — more modern encoding, what we will use most frequently

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There are two main ways to change the *main font* or *normal font* of the document.

- **Commands** — such as `\textbf{}`; good for changing the appearance of small portions of text; cannot have paragraph breaks in this command
- **Declarations** — such as `\bfseries`; changes document from this point forward (until end of current group of braces or environment)
 - also available: `\begin{bfseries}`

We covered the list of commands and declarations earlier in the course.

\LaTeX keeps three font families loaded so you can refer to them easily: serifed font, sans serif font, typewriter font.

\LaTeX 's defaults:

- `serifed` — Computer Modern Roman
- `sans serif` — Computer Modern Sans
- `typewriter` — Computer Modern Typewriter

Two of the shapes available in \LaTeX are italics and slanted type, called by `\textit{}` and `\textsl{}`. To see the difference, look at the second section of the first example file. (Uncomment the second section of the `.tex` file; build and view.)

- There are two different shapes for the letters in these two fonts.
 - Slanted letters are usually just upright letters rotated a bit.
 - Italicized letters are different altogether.

- Slanted letters are usually just for sans serif font, but Computer Modern Roman contains both.

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There are a number of commands to change the look of a small group of letters in math.

Command	Appearance
<code>\mathcal</code>	\mathcal{A}
<code>\mathrm</code>	$\max_{i < n}$
<code>\mathbf</code>	$c \cdot \mathbf{v}$
<code>\mathsf</code>	G_1^2
<code>\mathtt</code>	$W(a)$
<code>\mathnormal</code>	abc
<code>\mathit</code>	abc

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There is one other way to change a math formula entirely. Use the command `\mathversion{bold}`. (`\mathversion{normal}` is default.)

Notice the difference:

$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$

$$\sum_{i=1}^n \mathbf{i} = \frac{\mathbf{n(n+1)}}{2}$$

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Computer Modern fonts were the ones that Donald Knuth originally designed. They are the standard fonts on every \LaTeX system.

Included:

Computer Modern

Computer Modern Fibonacci

Computer Modern Funny Roman

Computer Modern Dunhill

Documentation for fonts I posted:

- A short PDF I threw together: `font-doc.pdf`
- Longer PDF documentation which comes with \LaTeX :
`using-fonts.pdf`

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For most of the rest of these fonts, you should have the line
`\usepackage [T1] {fontenc}`
in your preamble.

The Latin Modern fonts are an effort to consolidate the Computer Modern fonts into one seamless package. Work is ongoing, but you can use them now by placing this in your preamble:

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

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There are 10 fonts that are built into Ghostscript (our PS interpreter) and every postscript printer. With all of the variations, this gives about 35 fonts that are available.

See `font-doc.pdf`, Table 1.

The way to use these fonts is (for example):
`\usepackage{bookman}` in the preamble.

Notice that only two of these (plus the default) have support for a math language.

There is a fundamental difference between postscript and non-postscript fonts!

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Open the second example file (`.tex`); build and view.

There is also a list of sample text for several fonts together on pages 3–4 of `font-doc.pdf`.

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There is a very useful command allowing you to change fonts mid-document:

```
\usefont{enc}{fam}{ser}{shp}
```

- `enc` — the font encoding; usually T1;
- `fam` — the font family; see Tables 3 and 4 on `font-doc.pdf`;
- `ser` — the font series;
- `shp` — the font shape;

Go back to the previous example file and uncomment the second section. Build and view.

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For Postscript fonts, you can set the size whenever you wish.

The command is `\fontsize{size}{leading}`. (I think this has to be paired with a `\usefont` command.)

The *leading* is (roughly) the amount of space between lines of text.

Font	Size	Leading
Times	10	12
Palatino	10	11.5
New Cent.	10	12.5
Bookman	10	12
Helvetica	10	13
Avant Garde	9	13
Courier	10	12
Zapf Chanc.	10	12
Utopia	10	12.5
Charter	10	12.4

Suggested size and leading
for standard postscript
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Uncomment the third section of our previous example file.

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Two things.

1. Packages like `helvet` or `avant` change the default sans serif typeface but do not change the default document font. In order to use this sans serif font as the new default for your document, place this in the preamble:

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

Take a look at the third example file (`.tex`).

2. Use commands like `\usefont` and `\fontsize` sparingly. One good place to use them is in titles. Changing the font or its size frequently is not visually pleasing.

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Here is a list of the fonts that have math support. All of these are packages that would be loaded in the preamble.

1. `mathptmx` — Times Roman in math and text;
2. `mathpazo` — Palatino in math and text ;
3. `ccfonts` — Concrete fonts in math and text;
 - ▶ default size/leading is 10/13;
4. `cmbright` — Computer Modern Bright fonts;
 - ▶ recommend use of T1 option with `fontenc`;

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5. `txfonts` — version of Times Roman in math and text; more symbols available than in `mathptmx`; rare spacing problems in formulas; recommend use of T1 option with `fontenc`;
6. `pxfonts` — version of Palatino in math and text; rare spacing problems in formulas; recommend use of T1 option with `fontenc`;
7. `fourier` — based on Utopia
8. `kpfonts` — not drastically different from Computer Modern; symbols differ more

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Let's practice!

Open the fourth example file (`.pdf`) and reproduce it.