Publishing with LaTeX

Could your next report, white paper, article, book, paper, review, or essay benefit from using LaTeX? Do you need to be able to exchange documents with colleagues using other types of computer, without loss of formatting?

- ❑ Default styles give you immediate, automatic draft formatting for common types of document.
- ❑ Powerful automation features handle cross-references, bibliographic citations, tables of contents, indexes, and glossaries with ease.
- ❑ Automated formatting of formulae, designed by one of the world's leading computer scientists.
- ❑ Industry-standard Acrobat (PDF) and PostScript (PS) output.
- ❑ Available in Open Source and commercial versions.
- ❑ Strongly supported via the Internet, with user groups in many countries, and by business-level consultants and vendors.
- ❑ Huge range of fonts and languages supported, with floating and fixed accents, hyphenation, and language-based typographic rules.
- ❑ Journal and book style files available from leading publishers.
- ❑ Available on almost all platforms: PDAs, smartphones, and tablets; laptops and desktops; minicomputers, mainframes, and supercomputers.
- ❑ Completely portable between systems — document files are all plain Unicode and can be edited and processed on any supported platform.

Mathematics

Automated mathematical formatting uses a symbolic notation, regardless of complexity. Spacing and sizing is done to mathematicians' standards, so this:

```
E(n_{g+1}'|n_i',n_i'';\,1\le i\le g)=(N'-
N_g')\left[1-\left\{\left(1-\frac{c}
{cN'+N''}\right)^{n_g'd}\left(1-\frac{c}
{cN''+N'}\right)^{n_g''d}\right\}\right]
```

results in the equation below. Graphical LaTeX-based systems such as LyX and *Scientific Word* have built-in equation editors for constructing expressions with the mouse and menus.

Typefaces

Whether you're using Windows or Unix (including Apple Mac OS X and GNU/Linux systems), standard LaTeX works with any Type 1 outline (PostScript) or Type 3 bitmap (METAFONT). Using the XeLaTeX processor (included on the DVD), you can also use all your TrueType and OpenType fonts. This gives you access to tens of thousands of typefaces, both free and commercial.

The standard Adobe '35' core PostScript fonts (Times, Palatino, Century Schoolbook, Helvetica, Zapf Calligraphic. etc) are provided by default; with the mathematics fonts of Computer Modern, Euler, Concrete, and Times; and a range of decorative and specialist typefaces for technical, linguistic, and literary typesetting.

Non-Latin types include Japanese, Chinese, Devanagari, Urdu, Thai, Vietnamese, Coptic, Cyrillic, Greek, and many other languages and alphabets, including mixed bi-directional Arabic and Hebrew. Extensive user group coverage world-wide provides native-language support for non-Latin typesetting.

The fontmaking programs METAFONT and METAPOST come with all TeX systems for designing and implementing your own typefaces or special symbols.

The calculations of the underlying TeX formatting engine are very precise: it works internally in microunits smaller than the wavelength of visible light (≈53.6Å), resulting in great accuracy in positioning. LaTeX can use any mixture of Anglo-American, Didot, or Adobe points, or metric or imperial units.

$$E(n'_{g+1}|n'_i,n''_i;\,1\le i\le g)=(N'-N'_g)\left[1-\left\{\left(1-\frac{c}{cN'+N''}\right)^{n'_g d}\left(1-\frac{c}{cN''+N'}\right)^{n''_g d}\right\}\right] \qquad (10.57)$$

After Rapoport (in Bartholomew, D.J. *Stochastic Models for Social Processes*, 2nd. ed., John Wiley & Sons, 1973, p. 368.)

Tables

LaTeX's tables and figures follow the standard publishers' practice of 'floating', so if there is no room on the current page, they automatically float to the next. Automated crossreferencing means that tables and figures can be moved around the document and will always renumber themselves and all their references.

TABLE 6.2: CASES FOR WHICH THE QUANTILE AND KEMSLEY'S METHODS WERE IMPOSSIBLE, CLASSIFIED BY THE SIZE OF σ

σ	Method of quantiles		Kemsley's method		Total no. of samples available
	5%	10%	5%	10%	
0.2–0.4	[illegible]	[illegible]	[illegible]	[illegible]	20
0.5–0.7	[illegible]	[illegible]	[illegible]	[illegible]	22
0.8–1.0	—	1	2	15	23
All samples	2	2	4	23	65

After Aitchison, J. and J.A.C. Brown, *The Lognormal Distribution*, CUP, 1976, p. 62.

There are powerful tabular controls for both simple and complex designs, with fixed or auto-adjusting spacing which can be very precisely aligned to provide better visual appeal. Formal tables and Figures are automatically numbered, and can be captioned, labelled, crossreferenced, and included in a List of Tables and List of Figures.

Complex tabular matter can span pages and can be printed landscape while retaining the portrait orientation of the caption and pagenumber. Simple tabular matter can appear anywhere, without being a formal numbered table.

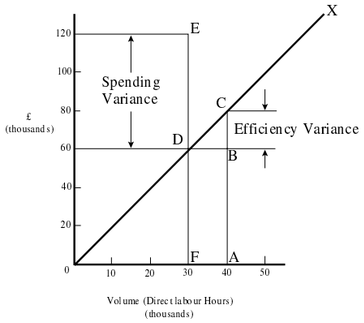
Crossreferences

The crossreferencing features let you name anything you want to refer to (table, figure, section, chapter, page, item, etc), and then use that name anywhere in the document. This lets each crossreference automatically update its location so that no matter how much you edit the text, the references remain correct. The same method is used for automated indexing, glossary, table of contents, list of figures, list of tables, and bibliographic references.

The BibTeX bibliographic database lets you store references separately from documents, and the BibLaTeX system extracts and automatically formats them to any of the standard styles, including numeric, in-text, footnotes, or endnotes.

Figures and illustrations

Figures can contain textual or graphical illustrations. Pictures can be included with scaling, rotation, and clipping, using industry standard PDF or EPS vector formats for diagrams, or PNG or JPG bitmaps for pictures.



After R.J. Bull, *Accounting in Business*, Butterworths, 2nd. ed., 1972, p. 191.

LaTeX also has its own CAD-like vector language for simple diagrams, and there are packages for typesetting music, electronic circuits, flowcharts, and other graphical notations.

Illustration from collection of Don Knuth (artist unknown)

I find LaTeX a powerful instrument for generating elaborate typographic layouts quickly and reliably. They are available for revision for years afterwards, without worries about software versions or compatibility. LaTeX is demanding in its requirements but it relieves me of any concern about the finished project.

Séamus Ó Direáin, Lexicographer

Documentation

Flynn, P. (2005). *Formatting information — a beginner's guide to LaTeX 2ε* (3.6 ed.). `http://www.ctan.org/tex-archive/info/beginlatex/`: Silmaril Consultants.

Goossens, M., & Rahtz, S. (1999). *The LaTeX Web companion*. Reading, MA: Addison-Wesley Longman. (With Eitan M. Gurari and Ross Moore and Robert S. Sutor.)

Goossens, M., Rahtz, S., & Mittelbach, F. (1997). *The LaTeX graphics companion*. Reading, MA: Addison-Wesley.

Knuth, D. (1986). *The TeXbook*. Reading, MA: Addison-Wesley.

Lamport, L. (1994). *LaTeX, a document preparation system* (2nd ed.). Reading, MA: Addison-Wesley.

Mittelbach, F., Goossens, M., Braams, J., Carlisle, D., & Rowley, C. (1994). *The LaTeX Companion* (2nd ed.). Reading, MA: Addison-Wesley.

Oetiker, T., Partl, H., Hyna, I., & Schlegl, E. (1999, Apr). *The (not so) short introduction to LaTeX 2ε* (Tech. Rep. No. 3.7). `http://www.ctan.org/`: Comprehensive TeX Archive Network.

Patashnik, O. (1988, Feb). *BIBTeXing* (Tech. Rep.). Portland, OR: TeX Users Group.

The book by Lamport is the user manual for LaTeX: make sure you get the second edition for LaTeX 2ε. The *Companion* is more advanced, but useful if you want to implement your own customised document designs. Knuth's original *TeXbook* is of interest mainly to computer scientists and typographic programmers who need to know the finest detail.

There are dozens of other books, ranging from the online introductions, *Formatting Information* and *The (not so) short introduction to LaTeX 2ε*, to the professional mathematician's *The Joy of TeX* and the typographer's *Digital Typography*.

Persistence and reliability

LaTeX was designed to be independent of any particular manufacturer, make, or model of computer or printer. Unlike some wordprocessor manufacturers' proprietary file formats, LaTeX uses plaintext (ASCII or Unicode) files which can be created and updated with any editor anywhere, and moved between different systems without danger of information loss or corruption.

The system has been carefully designed so that documents written years ago can still be typeset. Because the file format is stable, your investment in intellectual property cannot be damaged by vendors' arbitrary or planned obsolescence, or by changes in versions or formats.

LaTeX material originally produced for paper printing, no matter how long ago, can quickly and easily be made available for today's Web access. I have just recently had to provide a journal from 1987–1996 in a format available for the Web. The opening page was converted into HTML for quick scanning on the Web, while the complete articles, with all typesetting and font features (including Hebrew, phonetics, and Greek), were available for viewing in PDF just by re-running the LaTeX files.

The biggest advantage in publishing production is that similar coding of files means anyone can do any journal –- there is no need to learn new sets of commands for style variations. Changes in platforms have no effect on production as LaTeX is available for all main operating systems.

It is possible to separate the writing tasks (creation of text) from the design/layout issues (spacing, fonts, etc), which allows the author simply to identify types of elements (heading levels, foot/endnotes, citations, etc) without getting bogged down trying to remember the text shape and font selections for each element. *Christina Thiele*, CCS Publishing