LaTeX workshop for advanced users... or at least not beginners!

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What for?

These slides were used for a CIRMMT training workshop on LaTeX, on january 20, 2008.

They are provide as is, with no warranty.

Feel free to share them.

You may contact the author in case of broken link, however no hotline nor answer is warrantied.

General outline

Outline of Part I: To begin with

Outline of Part II: Installing, editing and running LaTeX

Outline of Part III: LaTeX features

Outline of Part IV: Technical scientific communication

Outline of Part V: LaTeX and other tools

Part I: To begin with

Introduction

Learning LaTeX seems more difficult that other softwares, as:

- open software with many contributors and packages
- open/distributed documentation: good books & tutorials, maybe too much?
- no academic program to teach LaTeX
  http://www.tug.org/pracjourn/2007-4/blaga/, Blaga, Practex 2007-04

Are you late by a few packages since you started using LaTeX?

Learning a LaTeX package a day keeps the doctor away!

If you need it, someone already did it!

Knowing where and how to find the information will help you to avoid re-inventing the wheel.

Pre-requisite

I guess that:

- you already know 25–75% of those materials
- different 25–75% for each
- you come to get the other 75–25%!

Prerequisites: you have...

- installed a distribution of LaTeX on your machine
- installed a text editor for LaTeX
- used both to write a document with LaTeX (report, paper)

Even better: you were at Mark Zadel's LaTeX tutorial for beginners:
https://132.206.14.8:443/wiki/index.php/LaTeX_Tutorial_Nov_2007

Fast-forward history of LaTeX

Where does it comes from?

http://www.latex-project.org/

Several 'compilers' and version of LaTeX:

1. TeX: 1977 (Donald Knuth)
2. LaTeX 2.09: 1992 (Leslie Lamport)
3. LaTeX 2_ε: since 1994 (team effort)

And then???

- LaTeX 3: soon? http://www.latex-project.org/latex3.html
- ConTeXt, eTeX, pdfTeX, pdfLaTeX, XeTeX, etc.

My use of LaTeX

I started using LaTeX in 1994
during an engineering internship (particle physics lab)
with very poor skills :-)
I learned a lot using LaTeX since:

- 3 internship reports, 12 project reports, 5 technical reports
- 6 abstracts, 12 conference papers, 3 journal papers, 2 thesis, 21 beamer presentations (talks + teaching)
- paper style for the CIM'05 conference
- a personal JNMR LaTeX style (quite awful)
- DAFx'06 proceedings
- 'confproc' package, for conference proceedings

Useful links: docs and FAQs

Some useful links to start with, when looking for answers to specific problems:

- LaTeX mailing list, http://email.esm.psu.edu/pipermail/macosx-tex/
- LaTeX project documentation, http://www.latex-project.org/
- Hypertext Help with LaTeX, http://ipagwww.med.yale.edu/latex/latex2e-html/ among others
- LaTeX wikibook, http://en.wikibooks.org/wiki/LaTeX
- A Guide to LaTeX, http://www.astro.rug.nl/~kuijken/latex.html, 1994
- Scott Pakin, visual FAQ, http://www.ctan.org/tex-archive/info/visualFAQ/visualFAQ.pdf
- United Kingdom List of TeX Frequently Asked Questions on the Web, http://www.tex.ac.uk/cgi-bin/texfaq2html
- R. W. Kaye, Learning LaTeX† web course, http://web.mat.bham.ac.uk/R.W.Kaye/latex/

Selective bibliography: books

Reference books on LaTeX:


Tobias Oetiker, The (Not So) Short Introduction to LaTeX, http://www.ctan.org/tex-archive/info/lshort/, in 20 languages


Leslie Lamport, LaTeX: A document preparation system, User's guide and reference manual, 2nd edition, 1994, ISBN 0-201-52983-1


Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle, Chris Rowley, The LaTeX Companion, 2nd Edition, 2004, ISBN 0-201-36299-6


Michel Goossens, Frank Mittelbach, Sebastian Rahtz, Denis Roegel, Herbert Voss, The LaTeX Graphics Companion, 2nd edition, 2007, ISBN 978-0-321-50892-8


Peter Flynn A beginner's introduction to typesetting with LaTeX 2005„ http://www.ctan.org/tex-archive/info/beginlatex/beginlatex-3.6.pdf

This document's color & formatting code

What is the color code used in these slides?

It is recommended to limit to 3 or 4 the number of colors used.
However, to allow a quick navigate in the slides after the workshop, I used 5 colors + some text formatting:

- `LaTeX code`
  `and longer portions of LaTeX code`
  `that do not fit inside a line of text`
  as well as the result LaTeX provides
- `commands`, `environments`
- **package names** (bold sf)
- `scripts in Unix, Perl, etc.`
- example file names, other file names
- http://www.ctan.org for URLs

Part II: Installing, editing and running LaTeX

Watt You Sea is Watt you Gait

Are word processors good for you?

Extreme citation (Allin Cottrell):

- "the word processor is a stupid and grossly inefficient tool for preparing text for communication with others"
- "This program (or set of programs) will in effect do for us, for free and in a few seconds or fractions of a second, the job that traditional typesetters did for Shakespeare, Jane Austen, Sir Walter Scott and all the rest."

http://www.ecn.wfu.edu/~cottrell/wp.html

Watt You Sea is Watt you Gait

The Evils of WYSIWIG

Allin Cottrell again:

- The author is distracted from the proper business of composing text, in favor of making typographical choices in relation to which she may have no expertise ("fiddling with fonts and margins" [instead of] content).
- The typesetting algorithm employed by WYSIWYG word processor sacrifices quality to the speed required for the [(re)]setting of the user's input in real time. The final product is greatly inferior to that of a real typesetting program.
- The user of a word processor is under a strong temptation to lose sight of the logical structure of the text and to conflate this with superficial typographical elements.

I would add:

- first write the text, and
- only at the end, take care of the layout details.

How does it @#$?% works?

Basics

- clear input/output separation $\Longrightarrow$ not a WYSIWYG
  .tex $\longleftrightarrow$ .dvi,.ps,.pdf
  arguable: the preview we get (.dvi) is perfectly identical to the result (.ps)
  (Peter Flynn, http://www.tug.org/pracjourn/2005-1/flynn/)
  $\Longrightarrow$ not a realtime WYSIWYG :-)
- exceptions: some realtime WYSIWYM/W (mean/want) exist:
  LyX (cross-platform), BaKoMa TeX (Windows), Scientific Author (MikTeX) and Scientific WorkPlace/Word ($ MacKichan)
  Pb: LyX writes LaTeX as MS Word writes HTML (*i.e.* adding lots of extra 'useless' formatting commands)
- flow: .tex $\longrightarrow$ .ps,.pdf
  1. type a command: `tex filename.tex` or `latex filename.tex`
  2. the `tex`/`latex` program compiles filename.tex
  3. an output file is generated (if no compilation error)

How does it @#$?% works?

Old school (`tex/latex`)

.tex $\longrightarrow$ .dvi $\longrightarrow$ .ps

- .tex: input text file with LaTeX commands
- .dvi: device independent file (preview formatted text)
- .ps: PostScript, Adobe Inc.
  - concepts: 1976
  - Level 1: 1984
  - Level 2: 1991 (faster, image decompression *e.g.* .jpg, font composites)
  - 3: 1997 (better color handling & new filters)
    $\Longrightarrow$ replaced existing proprietary color electronic prepress systems!

How does it @#$?% works?

PDF school (`pdftex/pdflatex`)

.tex ⟶ .pdf

- .tex: input text file with LaTeX commands
- .pdf: Portable Document Format, Adobe Inc. (1993)
  represents 2D documents with device & display resolution-independent fixed layout document format
  i.e. includes text, fonts, images, 2D vector graphics (*e.g.* .eps)

Remarks:

- possibility to convert: .ps ⟶ .pdf
  but this may loose internal links **hyperref**
  also, lower graphical quality on the web (font selection by the compiler)
- when typing `latex` in a MacOsX terminal, you are using `pdftex`!

Some LaTeX related softwares

Distributions

- main distributions: software sections of the TeX User Groups (TUG), http://www.tug.org/
- TeX software publicly available through a set of servers, Comprehensive TeX Archive Network (CTAN)
- Unix (incl. MacOsX, Linux), Windows:
  - TeX Live / TUG: comprehensive cross-platform TeX system
  - teTeX († May 2006): easy install with Fink
- MacOsX easy install:
  - TeX Live: MacTeX, http://www.tug.org/mactex/
  - teTeX: I-installer († Jan 01, 2007)
- Windows:
  - aternative distr.: MikTeX, http://www.miktex.org/
    easy install: ProTeXt, http://www.tug.org/protext/
    cannot share trees with TeX Live

Some LaTeX related softwares

TeX Editors

- old (and good) school: vim, emacs
- new (and lazy?) school:
  - cross-platform: TexMaker (Linux / Windows / MacOsX)
    - 1 window with subwindows (.tex file, file structure, log)
    - call to an external application for PDF view
  - Windows: WinEdt
  - MacOsX:
    - TeXshop (shareware, many templates, 'find all' fct, compile form sub-files),
    - TexMate (run log, ability to collapse/expand environments)

Some LaTeX related softwares

Viewers

- DVI: xdvi, xdivk, kdvi
- PS: (k)ghostview, gv, ggv, Preview (converts to PDF)
- PDF: Adobe Reader (was Acrobat Reader), xpdf, ggv, kdf, evince, Preview
- viewers for your web browser (other than Adobe/Acrobat Reader):
  - Mozilla:
  - Safari: PDF with ShubertIt at http://www.schubert-it.de/pluginpdf/
- focus on pdfLaTeX: internal links / sounds / videos only properly rendered with Adobe Reader

Some LaTeX related softwares

Miscellaneous

- bibliography editors:
  - bibdesk (MacOsX) at http://bibdesk.sourceforge.net/
  - jabRef, crossplatform at http://jabref.sourceforge.net/
- Endnote: can import/export LaTeX
- test equations: LaTeX Equation Editor (MacOsX)
- WYSIWYM for tables: TeXtable (MacOsX)

How can I add styles/classes/packages?

How do I add new packages? ie: building packages from .ins, the location to store packages in the unix directory structure, adding to the tex path, using texhash, etc.

- to build a package from the .ins installer, run `latex filename.ins`
- before adding a style/class/package to your distribution:
  - check that it is not already installed!
    e.g., run LaTeX on a document file using this style/class!
  - try it locally, to be sure it does what you want (and is not incompatible with other packages you use)

TDS

- TeX Directory Structure standard http://www.tug.org/tds/tds.html
- TDS at root: Unix distributions place this structure either in `/usr/local/share`, `/usr/local`, `/usr/local/lib`, and `/opt`

How can I add styles/classes/packages?

TDS:

- `tex` for TeX files
- `fonts` for font-related files
- `metafont` for Metafont files which are not fonts
- `metapost` for MetaPost files
- `bibtex` for BibTeX files
- `scripts` for platform-independent executables
- `doc` for user documentation
- `source` for sources (including both traditional program sources and LaTeX .dtx sources)

How can I add styles/classes/packages?

http://support.math.arizona.edu/tex/accountpackages.php

4 options to make use of other people's TeX/LaTeX macros:

1. manually copy/paste relevant TeX/LaTeX code in your source files
   $\Longrightarrow$ ok for 1 or 2 commands
2. place macro file(s) and your source file in a same directory
   $\Longrightarrow$ 164,567 copies of the same file in your account?
3. ask computer support staff to install the macro package system-wide
   $\Longrightarrow$ Darryl?
4. place the macro file(s) in a special inputs directory inside your account, and tell TeX/LaTeX to look for it there

when including a file, need to search for it in your TeX/LaTeX Input Path
use `kpsepath tex` to see this path's current value

How can I add styles/classes/packages?

http://support.math.arizona.edu/tex/accountpackages.php

For Unix/MacOsX/Linux:

1. add a directory to the path (name and path control):
   - in `.bashrc`, add `declare -x TEXINPUTS=.:$HOME/TeX/inputs:`
   - create the TeX and TeX/inputs directories
2. use a directory already mentioned in your path (faster):
   - use `kpsepath tex` to examine your current path
   - should include `!!$HOME/texmf/tex///`
     !! = special index to speed up the search
     // = search the entire subtree under there
   - Rmk: `texmf/tex`, $\neq$ `ex/texmf`
   - create the relevant subdirectories
     e.g. `mkdir texmf` and `mkdir texmf/tex`
   - in `texmf/tex`, create as many subdirectories as needed
   - build index file with `sudo texhash` after each addition

Understanding the run log

run = compilation

- terminal (and frontends such as TexMaker, Texshop, etc): complete log all possible information, interactive when errors (type `h` to get the help one the current error, or return to try going on)
- Textmate:
  - processes the log, displays condensed information
  - Pros: fast, colors, show the essential, click/go to errors, no-interruption run
  - Cons: $$$, no way to get the help after each error

Understanding the run log

During a run:

- TeX (& others) version:

```
This is pdfTeXk, Version 3.141592-1.40.3 (Web2C 7.5.6)
Babel <v3.8h> and hyphenation patterns for english, usenglishmax, dumylang, noh
```

- main file and compiler

```
        (./LaTeX_tutorial.tex
LaTeX2e <2005/12/01>
```

- document class & packages:

```
(/usr/local/texlive/2007/texmf-dist/tex/latex/beamer/beamer.cls
(/usr/local/texlive/2007/texmf-dist/tex/latex/beamer/beamerbasercs.sty)
```

  Rmk: use of () around each loaded file

- each package can provide specific information:

```
Document Class: beamer 2005/10/23 cvs version 3.06 A class for typesetting pres
entations (rcs-revision 1.67)
```

Understanding the run log

- list of base and local packages

```
(/usr/local/texlive/2007/texmf-dist/tex/latex/graphics/graphicx.sty)
(/usr/local/texlive/2007/texmf-dist/tex/latex/hyperref/hyperref.sty)
```

  Note that each package can also provide warnings:

```
Package hyperref Warning: Option `pdfpagelabels' is turned off
(hyperref)                because \thepage is undefined.
```

- loading of local style file

```
(./Vstyle.tex)
```

- loading .aux file:

```
 (./LaTeX_tutorial.aux)
```

- including figure:

```
<use images/CIRMMT_Logo2005BlackHi_2.pdf>
Note:  warning about PDF version of inserted figure:

pdfTeX warning: /usr/texbin/pdflatex (file ./images/CIRMMT_Logo2005BlackHi_2.pd
f): PDF inclusion: found PDF version <1.5>, but at most version <1.4> allowed
```

Understanding the run log

- including several text files:

```
(./texts/LaTeX_tutorial_part1.tex)
(./texts/LaTeX_tutorial_part2.tex )
```

- indicating page numbers:

```
(./texts/LaTeX_tutorial_part4.tex [40] [41] [42] <use images/typo.png> [43]}
```

- writing .aux file for next time:

```
 (./LaTeX_tutorial.aux)
```

- warning about cross references (it means: recompile!!!)

```
LaTeX Warning: Label(s) may have changed. Rerun to get cross-references right.
```

- being very impolite (dealing with fonts):

```
 ){/usr/local/texlive/2007/texmf-dist/fonts/enc/dvips/base/8r.enc}</usr/local/t
exlive/2007/texmf-dist/fonts/type1/bluesky/cm/cmmi10.pfb></usr/local/texlive/20
07/texmf-dist/fonts/type1/bluesky/cm/cmss10.pfb></usr/local/texlive/2007/texmf-
dist/fonts/type1/bluesky/cm/cmsy10.pfb></usr/local/texlive/2007/texmf-dist/font
s/type1/urw/courier/ucrr8a.pfb>
```

A few tricks about run error

- information about the output document

```
Output written on LaTeX_tutorial.pdf (73 pages, 621907 bytes).
```

- log file (this file):

```
Transcript written on LaTeX_tutorial.log.
```

- if you get many errors, correct what you can, and erase the .aux files before recompiling: some errors may result from invalid data of the previous unlucky run
- type `h` to get help about the error, test your sense of humour:

```
Sorry, I already gave what help I could...
Maybe you should try asking a human?
An error might have occurred before I noticed any problems.
``If all else fails, read the instructions.''
```

- an error message always indicate a line number + a copy of the code with problems, with a line break where the problem occurs:

```
! Undefined control sequence.
l.2     \framesbtitle
                     {\myurl{http://noodle.med.yale.edu/latex/latex2e-html/l...
```

Rmk: line number for the given .tex file (name given above in the log). In Beamer, a number may be relative to the current frame .vrb

Part III: LaTeX features

Using existing LaTeX commands

How are commands defined?

A LaTeX command is made of:

1. a command name, *i.e.* `\` +
   (a) a string of letters (*e.g.* `setlength` for setting a length), or
   (b) a single non-letter (*e.g.* `;` for spacing: `\;`)
2. optional arguments in square brackets `[]`
3. required arguments in braces `{}`, *e.g.*

Example

```
\section[A short title]{A very long and boring title}
```

NB: LaTeX is case sensitive
all commands are in lower case (unless specified otherwise)

TeX / LaTeX commands

What are the differences?

- when writting packages, TeX (low-level) commands may be overwritten by one of the packages you load, and behave differently than expected
- conversely, LaTeX (macro) commands are more robust and reliable

For instance

use `\newcommand` (LaTeX) instead of `\def` (TeX)

Moving arguments

What are moving arguments?

args that may be “moved" to other places in the document

Examples

- args of sectioning cmds may be moved to the TOC
- arguments of `\caption` commands
- terminal input and output, `\typeout` and `\typein`
- commands that produce page headings
- the `letter` environment
- the `\thanks` command
- an `@` expression in the `array` or `tabular` environment

Solution

precede fragile cmds in moving args by a `\protect`

NB: it only applies to the immediately following command

Fragile and robust commands

2 types of commands:

- robust commands
- fragile commands: need special care if they are part of a moving argument

Some robust commands

- `$ ... $`
- commands which change Type face or Type style are robust (in general)
- length commands (should not be preceded by a `\protect` cmd)
- argument to `\addtocounter` or `\setcounter` command (no `\protect`)

Fragile and robust commands

Some fragile commands

- All commands that have an optional argument
- Environments delimited by `\begin`, `\end`
- Display math environment delimited by `\[ ... \]`
- Math environment `\( ... \)`
- Line breaks, `\\`
- `\item` commands
- `\footnote` commands

Defining new commands: newcommand

How to define new commands?

use \newcommand + cmd name + the cmd itlsef

```
\newcommand{\kek}{a command}
```

What can I use commands for?

- text always formatted in the same way, such as LaTeX
- variable (a name, a date, a software name, etc)

Remarks:

- the cmd must not exist prior to its definition
- the curly braces are not compulsory:

```
\newcommand\kek{a command}
```

Defining new commands: newcommand

Remarks:

- space management: you need to add a space after the cmd call in order to indicate where the command finishes, except it if is followed by a punctation mark (`.,;!?`) a curly brace (`{` or `}`) or parenthesis `(,)`:

```
\kek without comma; \kek, with comma; \kek{} with curly braces
```

  a commandwithout comma; a command, with comma; a command with curly braces

- a command can be used inside another command:

```
\newcommand\bli{bla bla}
\newcommand\bla{\bli}
\bla{}
\renewcommand\bla{bli bli}
\bla{}
```

  provides bla bla bli bli

- more flexible alternative in Python: newcommand.py by Scott Pakin: http://tug.ctan.org/tex-archive/support/newcommand

New commands with arguments

How to define new commands with arguments?

A new cmd with arguments has

1. a command name = `\` + a string of letters
   e.g. `\setlength` for setting a length
2. a number of arguments between square brakets `[N]`
3. a command between braces `{}`, *e.g.*

```
\newcommand{\cmdname}[N]{command itself}
```

What can it be used for?

identical processing of similar items to provide coherent layout/formatting

How to use it?

- argument inserted by its number `i` and the `#` symbol
  e.g. `\newcommand{\name}[2]{\textsc{#2 #1}}`
- args are curly-braces separated: *e.g.*
  `his name is \name{Doe}{John}`
  provides: his name is JOHN DOE

Redefining commands: renewcommand

When to use renewcommand?

The command must already exist prior to be used

Example

```
Today is \today,
\renewcommand\today{September 75, 832}
yesterday was \today.
```

Today is February 4, 2008, yesterday was September 75, 832.

Redefining commands: renewcommand

How to use renewcommand?

- it can be (re)defined as you want
- you can even change the number of arguments
- Rmk: be careful not to redefine a LaTeX internal that is used by other portions of code (especially if you change the number of arguments)

Example

```
\newcommand{\test}[1]{command number #1}
\test{10} becomes
\renewcommand{\test}{an equation:
  $\int_{-\infty}^{+\infty} x(t) dt$}
\test{}
```

command number 10 becomes an equation: $\int_{-\infty}^{+\infty} x(t)dt$

Definition

What is en environment?

- a portion of text with `begin` + `end` delimiters
- used with the following syntax:

```
\begin{environmentname}
  bla bla
\end{environmentname}
```

- *e.g.* lists of items, floats (tables, figures), equations

Lists

4 types of lists:

- itemize
- enumerate
- description
- list

Lists: itemize

A simple example:

```
\begin{itemize}
  \item 20th letter of the alphabet
  \item 21st letter of the alphabet
\end{itemize}
```

provides:

- 20th letter of the alphabet
- 21st letter of the alphabet

Lists: itemize

Changing itemize's style

- locally changing bullet style: using `\item[]`

```
\begin{itemize}
  \item[$-$] 20th letter of the alphabet
  \item[$\eighthnote$] 21st letter of the alphabet
\end{itemize}
```

provides

– 20th letter of the alphabet
♪ 21st letter of the alphabet

- globally changing bullet style: using

```
\renewcommand{\labelitemi}{\textbullet}
```

Lists: enumerate

Enumerate = list with numbers

```
\begin{enumerate}
  \item 20th letter of the alphabet
    \begin{enumerate}
      \item 22nd letter of the alphabet
      \item 23rd letter of the alphabet
    \end{enumerate}
  \item 21st letter of the alphabet
\end{enumerate}
```

1. 20th letter of the alphabet
    1. 22nd letter of the alphabet
    2. 23rd letter of the alphabet
2. 21st letter of the alphabet

Lists: enumerate

Changing enumerate lists' formatting:

```
\renewcommand{\labelenumi}{\Alph{enumi}}
\renewcommand{\labelenumii}{\alph{enumii}}
\begin{enumerate}
  \item 20th letter of the alphabet
    \begin{enumerate}
      \item 22nd letter of the alphabet
      \item 23rd letter of the alphabet
    \end{enumerate}
  \item 21st letter of the alphabet
\end{enumerate}
```

Rmk: does not work in Beamer, so see lists_enumerate.tex

Lists: description

Simple example:

```
\begin{description}
    \item[tea] 20th letter of the alphabet
    \item[you] 21st letter of the alphabet
\end{description}
```

tea 20th letter of the alphabet

you 21st letter of the alphabet

Lists

Define a new list

http://noodle.med.yale.edu/latex/latex2e-html/ltx-260.html or
http://web.mit.edu/vogt/www/latex/ltx-260.html

New lists can be defined as:

```
\newcounter{Lcount}
\begin{list}{Item-\Roman{Lcount}}
  {\usecounter{Lcount}
  \setlength{\rightmargin}{\leftmargin}}
    \item 20th letter of the alphabet
    \item 21st letter of the alphabet
\end{list}
```

Item-I 20th letter of the alphabet

Item-II 21st letter of the alphabet

Lists: spacing commands

- `\topsep`: amount of extra vertical space at top of list
- `\partopsep`: extra length at top if environment is preceded by a blank line (it should be a rubber length)
- `\itemsep`: amount of extra vertical space between items
- `\parsep`: amount of vertical space between paragraphs within an item
- `\leftmargin` ≥ 0: list to environment's left margins horizontal distance
- `\rightmargin` ≥ 0: list to environment's right margins horiz. distance
- `\listparindent`: amount of extra space for paragraph indent after the first in an item
- `\itemindent`: indentation of first line of an item
  - `\labelsep`: separation between end of the box containing the label and the text of the first line of an item
    - `\labelwidth`: normal width of the box containing the label; if the actual label is bigger, the natural width is used, extending into the space for the first line of the item's text
- `\makelabel{label}`: generates the label printed by `\item`

Example of use: `\setlength{\itemsep}{-0.3em}`

Floats

What are floats?

Floats = objects that can be moved
(if needed, for typesetting reasons)

For instance:

- figures,
- tables,
- algorithms

Floats: is there any way to control them?

Andrew T. Young, http://mintaka.sdsu.edu/GF/bibliog/latex/floats.html

The problem

- frustrating features: insistence on moving floats to unexpected locations
- due to "an extremely stupid choice of defaults for the float mechanism"
- defaults are not hard-wired but set by the values of various parameters in the `\documentclass` startup file used by LaTeX

A solution

- change those defaults in the document's preamble
- combine with the `[htp]` option "to override another set of ill-chosen defaults"

$\Longrightarrow$ this should usually put figures and tables where you could reasonably expect them to appear

See examples on figures with float_normal_settings.tex and float_better_settings.tex

Floats: is there any way to control them?

Andrew T. Young, http://mintaka.sdsu.edu/GF/bibliog/latex/floats.html

More in-depth explanation of the problem:

- too many floats to fit on 1 page?
  $\Longrightarrow$ LaTeX pushes them on to the next page, and the next;
- eventually, floats may end up at the end of the document
- with the `[p]` option provided to individual floats, they may be pushed together onto a "float page" that has no text (defaults are still stingy about the amount of space taken up)
- 1 too big to go anywhere float migrates to the end of the document
- rule: all figures must appear in sequential order (similar rule for tables)
  $\Longrightarrow$ a single offender sweeps away everything that should follow it

Floats: is there any way to control them?

Andrew T. Young, http://mintaka.sdsu.edu/GF/bibliog/latex/floats.html

Example for overriding the defaults

```
% General parameters, for ALL pages:
\renewcommand{\topfraction}{0.9} % max fraction of floats at top
\renewcommand{\bottomfraction}{0.8} % max fraction of floats at bottom
% Parameters for TEXT pages (not float pages):
\setcounter{topnumber}{2}
\setcounter{bottomnumber}{2}
\setcounter{totalnumber}{4} % 2 may work better
\setcounter{dbltopnumber}{2} % for 2-column pages
\renewcommand{\dbltopfraction}{0.9} % fit big float above 2-col. text
\renewcommand{\textfraction}{0.07} % allow minimal text w. figs
% Parameters for FLOAT pages (not text pages):
\renewcommand{\floatpagefraction}{0.7} % require fuller float pages
% N.B.: floatpagefraction MUST be less than topfraction !!
\renewcommand{\dblfloatpagefraction}{0.7} % require fuller float pages
% remember to use [htp] or [htpb] for placement
```

Tables: formatting columns

- `@{}` suppresses leading/trailing space
- place some functions in the `{}`
  - spacing: `\,`, `\;`, `\ `, `\quad`, `\vspace*{1cm}`
  - formatting: `:`, `\|`
- change font size locally/globally

How can I change the font size for a whole table (without having to explicitly changing it for each element)?

use a font size command BEFORE the table (this works for formatting italic/bold/small capitals too)

Tables: multiple columns/rows and colors

- multiple columns = basic functionality

  `\multicolumn{nb}{fmt}{Contents}`

  for `nb` columns with `fmt` format and containing `Contents`
- multiple rows requires the **multirow** package, see table_multirow.tex
- colors: see table_multirow.tex too!

Tables: an example

Example with local/global font size change and multiple columns and rows

```
{\footnotesize\begin{table}[htbp]
   \centering
   \begin{tabular}{@{~~~} lcr @{\$}} \hline
      \multicolumn{2}{c}{\textbf{Item}} \\ \hline
      {\Large Animal}      & Description & Price~/~ \\ \hline
      {\normalsize Gnat}   & per gram & 13.65 \\
                           & each     &  0.01 \\
      Emu                  & stuffed  & 33.33 \\
      {\tiny Gnu}          & stuffed  & 92.50 \\ \hline
   \end{tabular}
   \caption{Remember, \emph{never} use vertical lines in tables.}
   \label{tab:booktabs}
\end{table}}
```

Tables: an example

Example with local/global font size change and multiple columns and rows

Item		
Animal	Description	Price / $
Gnat	per gram	13.65$
	each	0.01$
Emu	stuffed	33.33$
Gnu	stuffed	92.50$

Table: Remember, *never* use vertical lines in tables.

Tables: cross-references

How can I refer to a table/figure?

Use cross-references, *i.e.* a label to which you can refer:

- identical label/reference functionality as for chapters, sections, tables, figures, equations
- define the label using: `\label{}`
- use the label using: `\ref{}`
- ID: use clear labels, *e.g.* `\label{fig:num}` for figures, `\label{tab:txt}` for tables, etc.

Never hard-core a ref!

- short-term: avoid number errors, let hyperref works for you
- long-term: can copy/paste to another document and be sure if some materials are missing

Tables: footnotes

http://www.tex.ac.uk/cgi-bin/texfaq2html?label=footintab

How can I add a footnote inside a table?

"The standard LaTeX `\footnote` command doesn't work in tables; the table traps the footnotes and they can't escape to the bottom of the page."

Solutions in a floating tabular

`\footnotemark{mymark}`

in the table (appropriately position the marker), and then put in a

`\footnotetext{This footnote is about...}`

once you've closed the tabular environment
NB: it gets messy if there's more than one footnote.

Tables: footnotes

Here is an example:

Item		
Animal[a]	Description	Price / $
Gnat	per gram	13.65$
	each	0.01$
Emu	stuffed	33.33$
Gnu	stuffed	92.50$

Table: Remember, *never* use vertical lines in tables.

[a] Lamina

See table_footnote.tex for an example.

Tables: footnotes

http://www.tex.ac.uk/cgi-bin/texfaq2html?label=footintab

Solutions if the tabular is not floating

- place table in a minipage
  $\Longrightarrow$ "ugliness of footnotes in a minipage with no extra effort"
- use **threeparttable** (intended for floating tables)
- use **tabularx** or **longtable**
  less efficient than standard `tabular`, but allow footnotes
- grab hold of footnote, and put your tabular environment inside a `savenotes` environment
- say `\makesavenoteenv{tabular}` in the document preamble

Tables: landscape format

"Tables in LaTeX 2ε: packages and methods", Lapo Filippo Mori, PracTeX 2007-01,
http://www.tug.org/pracjourn/2007-1/mori/mori.pdf

How do I turn the table in landscape format?

- with **graphicx** and the `rotatebox` cmd
- with **rotating** and the `rotate`, `turn`, `sidewaystable` environments
- with **lscape** (compatible with **longtable**)

Tables: multi-pages tables

http://www.tug.org/pracjourn/2007-1/mori/mori.pdf, "Tables in LaTeX 2_ε: packages and methods", Lapo Filippo Mori, PracTeX 2007-01

How to split a table over several pages?

Use one of the following package:

- **supertabular**
- **xtab**
- **longtable**
- **threeparttable**
- **tabularx**

All those packages have specific handling of captions, that can differ on the last page.

Figures with proportional fonts

How can I resize a figure?

To re-size a figure, set the :

- width: `width=0.5\linewidth`, or
- height: `height=0.5\linewidth`, or
- scale: `scale=0.5`

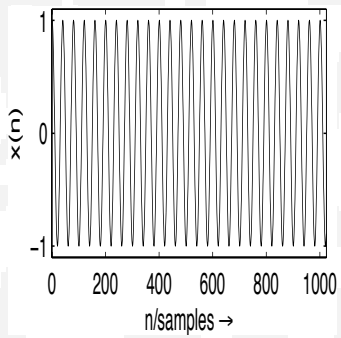
How can I preserve font shapes?

- never resize other than proportionally:
  - use `scale` alone, or
  - use either `width` or `height` but never both
- to change figure proportions, re-do the figure (outside of LaTeX) *e.g.* using `subplot(3,4,1)` in Matlab, instead of resizing a figure obtained using `subplot(3,2,1)`

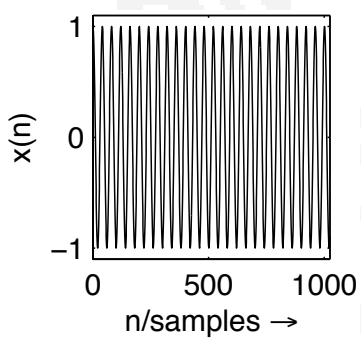
Figures with proportional fonts

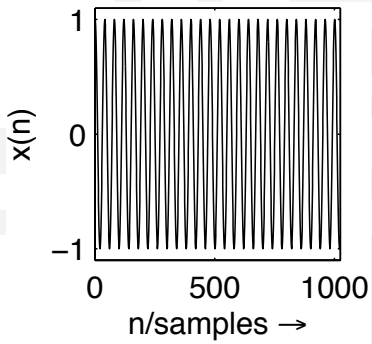
```
\begin{figure}[htb]
    \centering\includegraphics[width=0.7\linewidth,%
    height=0.7\linewidth]{\IMGPATH fft_ps2pdf_crop.pdf}
\end{figure}
```

provides:



when you need (width/scale):





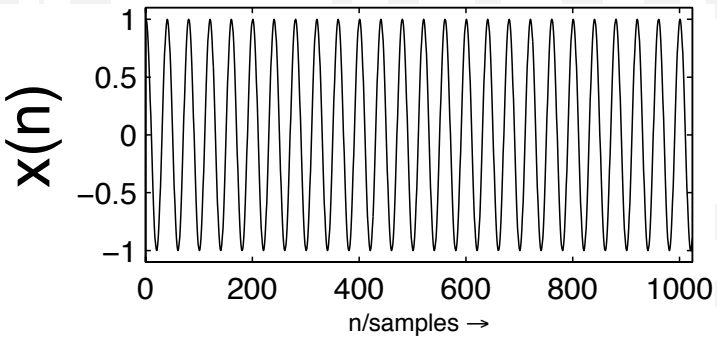
Look at the fonts of the left figure... that's waht you absolutely need to avoid in professional communications

Figures and text font size

if using Matlab, you can either:

- set the font size by hand:

```
set(get(gca, 'YLabel'), 'Fontsize', 20)
set(get(gca, 'XLabel'), 'Fontsize', 4)
```

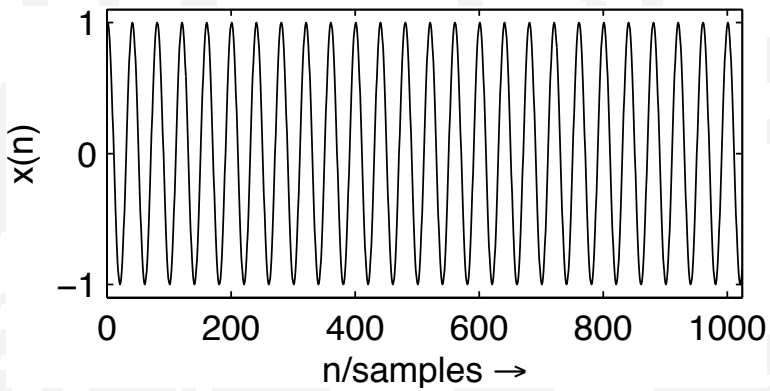


Figures and text font size

if using Matlab, you can either:

- set the font size by hand, or
- use the `subplot()` function to draw smaller subfigures (and respectively get bigger text font size)

```
subplot(3,2,1)   % proportionally bigger fonts
plot(x(1:N), 'k')
```



Also, do not forget to use clear legends & labels:
e.g. in Matlab: `xlabel('n/samples \rightarrow')`

Figures

Rotate figures

You can either specify the angle:

```
\begin{figure}[htb]
  \centering\includegraphics[width=0.45\linewidth,%
    angle=60]{\IMGPATH fft_ps2pdf_crop.pdf}
  \end{figure}
```

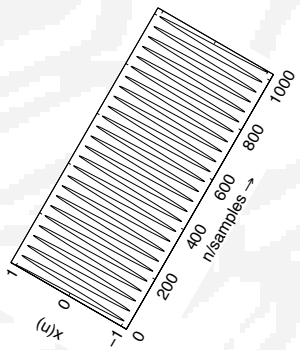


Figure: *The caption is here.*

or use the **rotate** package (for text, figures, tabulars)

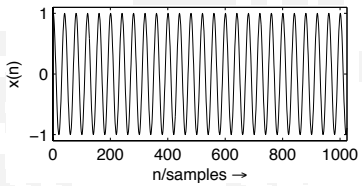


Figure: *The caption is here.*

more in figures_rotate.tex

Rmk: it does not work in **Beamer**...

Figures

Several sub-figures

How to arrange pictures into a matrix, and have each picture centered?

Depending on the caption management, use either:

- the `minipage` environment (no sub-captions)
- the **subfig** package (was **subfigure**)

How to ensure figures are centered, and corresponding captions left-justified?

Use **subfig** to costumize the layout (position) and formatting (fonts, styles) of (sub)captions

See a bit more in figures_sidebyside.tex, and a lot more in **subfig**'s doc at http://www.ctan.org/tex-archive/macros/latex/contrib/subfig/

Figures

On-the-fly postscript to PDF conversion

On-the-fly conversion possible with Obedierk's **epstopdf** at
ftp://ctan.cms.math.ca/tex-archive/macros/latex/contrib/oberdiek/epstopdf.pdf
(see an example in file figures_epstopdf.tex).
NB:

- use the **graphicx** package with the **pdftex** option
- do it only once, at it slows down the LaTeX run a lot
  (comment it out as soon as you all your new figures are converted)
- you can include your graphics without extension

Equations

Hoping you already know the differences between:

- `$x$`: provides x which is in the middle of the text
- numbered and single line formula with: `\begin/end{equation}`

$$x = a + b \tag{1}$$

- `$$x$$`: un-numbered formula on a separate line
  same as the un-numbered: `\begin/end{equation*}`
- array with `\begin{eqnarray}`)

$$\begin{aligned} x &= a + b \\ &= c + d + e + f \end{aligned} \tag{2}$$

- using `\nonumber`, you can remove the number

Equations

- using `\left\{ \right.` to close or split a formulae

$$y(t) = \begin{cases} \int_{-\infty}^{y} x(u)du & \text{if} \quad t<0 \\ \int_{t}^{+\infty} \sqrt{x(u)}du & \text{else} \end{cases} \tag{3}$$

obtained with:

```
\newcommand{\dudu}{du}
\begin{eqnarray}
  y(t) & = & \left\{\begin{array}{ll}
  \int_{-\infty}^{y} x(u) \dudu{} \quad \mathsf{if} \quad t<0\\
  \int_{t}^{+\infty} \sqrt{x(u)} \dudu{} \quad \mathsf{else}
  \end{array} \right.
  \end{eqnarray}
```

- Rmk 1: you can use commands in math mode too!
- Rmk 2: test your formulae into a separate editor (*e.g.* LaTeX equation editor / MacOsX)

Display algorithms

How can I print an algorithm, with line numbers and proper formatting?

Several ways for pseudo code:

- **algorithms** with `algorithmic` and `algorithm` (float wrapper)
  http://www.ctan.org/tex-archive/macros/latex/contrib/algorithms/algorithms.pdf
- **algorithmicx**: also allows Pascal code
  http://www.ctan.org/tex-archive/macros/latex/contrib/algorithmicx/algorithmicx.pdf
- **algorithm2e**: need to use **hyperef**† with option **naturalnames**
  http://www.ctan.org/tex-archive/macros/latex/contrib/algorithm2e/algorithm2e.pdf

Other solutions:

- **listings** source code printer, for real code (many languages)
  http://www.ctan.org/tex-archive/macros/latex/contrib/listings/listings.pdf
- **fancyvrb**: allows fancy verbatim that can print line numbers (and select a subset), and add colors/formatting (not automatically)
  http://www.ctan.org/tex-archive/macros/latex/contrib/fancyvrb/fancyverb.pdf

Existing lists

What lists can be automatically generated?

LaTeX provides without any effort the following lists of contents:

- table of contents (TOC), with the `\tableofcontents` command placed at the beginning of the document
- lists of figures (LOF), with the `\listoffigures` command
- lists of tables (LOT), with the `\listoftables` command
- index: requires a bit more work (see example)
- glossary: requires more work (see example)

An example is provided in lists_contents.tex.

Can I have a multi-column list?

Multi-column TOC, LOF and LOT are provided by the **multitoc** package (see lists_contents_multicol.tex).

TOC: use table of contents (etc) everywhere?

How can I add a table of contents in each chapter of my thesis?

Use the **minitoc** package!

It allows you to add:

- a mini table of contents,
- a list of figures, and
- a list of tables

to each chapter.
Indeed, they can be inserted:

- several times in the same chapter
- with various depth by resetting:

  ```
  \setcounter{minitocdepth}{2}
  ```

  provided that the maximum depth required in the document does not exceed the one in the preamble.

An example is provided in lists_minitoc.tex.

TOC including the other lists

How can I add lists into the table of contents?

Use the **tocbibind** package!

e.g. to add the TOC, the LOF, the LOT, the index and the bibliography section names into the TOC
NB: you need 2 LaTeX runs before noticing the changes in the TOC.
An example is provided in lists_contents.tex. If you comment (resp. uncomment) this package inclusion,

```
\usepackage{tocbibind}
```

you will notice changes in the TOC after 2 LaTeX runs:
TOC, LOF, LOT, index and bibliography are removed (resp. added);

TOC/LOF/LOT format

How can I control the layout of items in the table of contents?

Use the **tocloft** or the **titeltoc** package!

The tocloft package:

- "provides means of controlling the typographic design of the Table of Contents, List of Figures and List of Tables";
- "new kinds of 'List of . . .' can be defined"
- tested with **tocbibind**, **minitoc**, **ccaption**, **subfig**, **float**, **hyperref**
- helps to create new lists too

See an example in lists_contents.tex.

TOC/LOF/LOT format

The **titletoc** style from the **titelsec** package:

- **titelsec** “allows to change in a straightforward way the sectioning format of a document. It works with the standard classes and with many others, including the AMS ones”
- **titeltoc** “is a companion to the **titlesec** package and it handles toc entries. However, it’s an independent package and you can use it alone”
- similar philosophy: you have to learn just two new basic command and a couple of tools, no more

Example: what I used to build the **confproc** package

TOC: bibliography

Bibliography on TOC


Jean-Pierre F. Drucbert. The **minitoc** package. December 2000,
http://www.ctan.org/tex-archive/macros/latex/contrib/minitoc/minitoc.pdf, exists also in french at
http://www.ctan.org/tex-archive/macros/latex/contrib/minitoc/fminitoc.pdf


Javier Bezos. The **titlesec** and **titletoc** packages. June 2000,
http://www.ctex.org/documents/packages/layout/titlesec.pdf


Peter Wilson. The **tocbibind** package. May 2005,
http://www.ctan.org/tex-archive/macros/latex/contrib/tocbibind/tocbibindex.pdf


Peter Wilson. The **tocloft** package. September 2003,
http://www.ctan.org/tex-archive/macros/latex/contrib/tocloft/tocloft.pdf

Index

- In the preamble:
  - include the package:
    ```
    \usepackage{index}
    ```
  - generate the index:
    ```
    \makeindex
    ```
  - change the name of the index:
    ```
    \renewcommand\indexname{A short index}
    ```
- generate index entries in the text:
  ```
  a figure\index{figure} on a page\index{page}
  ```
- print the index at the end of the document:
  ```
  \printindex
  ```
- to generate the necessary .idx file, use this bash script:
  ```
  makeindex fname.ist
  ```

Index

Bibliography on indexes


David M. Jones. A new implementation of LaTeX's indexing commands. September 1995,
http://www.ctan.org/tex-archive/macros/latex/contrib/index/index.pdf


Leslie Lamport. Makeindex : An index processor for LaTeX. February 1987,
http://www.ctan.org/tex-archive/indexing/makeindex/doc/makeindex.pdf


Andreas Wettstein. The **authorindex** package. September 2002,
http://www.ctan.org/tex-archive/indexing/authorindex/authorindex.pdf

Glossary

- In the preamble:
  - include the package:
    ```
    \usepackage[hyper,style=long,border=plain,header=plain]{glossary}
    ```
  - generate the glossary:
    ```
    \makeglossary
    ```
  - change the name of the glossary:
    ```
    \renewcommand\glossaryname{A short glossary}
    ```
- generate glossary entries in the text:
  ```
  \glossary{name={Gnu}, description={check in a dictionary!}}
  ```
- print the glossary at the end of the document:
  ```
  \printglossary
  ```
- to generate the necessary .glo file, use this bash script:
  ```
  makeindex -s fname.ist -t fname.glg -o fname.gls fname.glo
  ```

Glossary

Bibliography on glossaries


Nicola L.C. Talbot. **glossary.sty** v 2.11: LaTeX 2ε package to assist generating glossaries. July 2006, http://www.ctan.org/tex-archive/macros/latex/contrib/glossary/glossary.pdf


R. L. Aurbach. User's guide to the GloTeX program. July 2006, http://www.ctan.org/tex-archive/indexing/glo+idxtex/glotex.pdf

Bibliography management

Bibliographies:

- can be directly placed in LaTeX with such code:

```
\begin{thebibliography}{}
  \bibitem{Lamport:1994:LaTeX}   Leslie Lamport,
    \newblock \LaTeX{}: A document preparation system,
      User's guide and reference manual,
    \newblock 2nd edition, 1994, ISBN 0-201-52983-1
\end{thebibliography}
```

  i.e. local management, with fixed format (bad)
  $\Longrightarrow$ used in these slides to provide several bibliographies
- are better managed with BibTeX, using an external .bib file:
  - cross-references using `\cite{}` (`\citep{}` and others in **natbib**).
  - use the following sequence: `latex, bibtex, latex, latex`

Why choosing to use a .bib file?

$\Longrightarrow$ to use any bibliography style without editing your bibliography

- new **biblatex** package (beta): bib management directly in LaTeX = BibTeX for sorting only, http://www.ctan.org/tex-archive/macros/latex/exptl/biblatex/

Bibliography files

Why should I split my bibliography file into several?

For instance to clearly separate:

- strings, for common names of conferences, journals, editors (*e.g.* 2 files: abbreviated and long versions)
- bibliographic items, using the strings

NB: you can split even more:

- by topic
- by category: article, conference, books, etc.

Some tips about bibliographies:
http://www.math.uiuc.edu/~hildebr/tex/bibliographies.html

Bibliography header

How can I rename the bibliography header/title?

- one for the 'fixed names' in LaTeX
  (see a list at http://www.tex.ac.uk/cgi-bin/texfaq2html?label=fixnam).
- redefine the `\bibname` command:
  `\renewcommand{\bibname}{A nice bibliography}`
- if it does not exist, try renaming `\refname` instead:
  `\renewcommand{\refname}{The full bibliography}`
  e.g. **bibunits**
- examples in lists_contents.tex, bib_*.tex.

Bibliography styles

How to build a bibliography that preserves a given format?

Is that the right question?
First, check if it does not already exist, using lists of all existing bib styles:

- an example with many styles at
  http://amath.colorado.edu/documentation/LaTeX/reference/faq/bibstyles.pdf
- search the bst database: http://jo.irisson.free.fr/bstdatabase/help.html

You can also define your own bib style using the `latex makebst` script!
Trial and error + patience is then a good workflow.

Use bibliographies everywhere

Multiple bibliographies can be:

- non overlapping sets, from 1 file split into several (categories)
- overlapping sets: 1 item can appear in several bibs

How can I insert several bibliographies in one document?

Bad solution for normal documents (not Beamer): those slides provide several bibliographies by inserting formatted bib text.
Better solution: use one of the existing packages:

- **chapterbib**, see bib_chapterbib.tex + 3 included files
- **bibunits**, see bib_units.tex
- **multibib**, see bib_multibib.tex
- **bibtopics**, see bib_bibtopics.tex
- **multibbl**, *e.g.* to separate bibliographic items by language

Use bibliographies everywhere

- feature comparison in compare_multiple_bib.tex
- most of them have compatibility problems with **hyperref**
  $\Longrightarrow$ duplicated references (back-ref and cross-ref problems)
- most of them generate several sub-bibliography files $\Longrightarrow$ script to run BibTeX on all .aux files:

```
#!/bin/bash
for i in *.aux; do
  bibtex $i
done
```

Bibliography on bibliography

Bibliography on indexes


CTAN. BibTeX user guide, style hacking guide and tips and FAQ. November 2007, http://www.ctan.org/tex-archive/biblio/bibtex/contrib/doc/.


Nicolas Markey. Tame the BeaST: The B to X of BibTeX. November 2005, http://www.ctan.org/tex-archive/info/bibtex/tamethebeast/ttb_en.pdf.


David Young. Using BibTeX. May 15, 2002, http://wwwmaths.anu.edu.au/~chrisw/LaTeX/bibtex.pdf.


Ki-Joo Kim. A BibTeX guide via examples. April 6, 2004, http://www.geocities.com/kijoo2000/bibtex_guide.pdf.


Piet van Oostrum. Everything you always wanted to know about BibTeX... but were afraid to ask. Nov 13, 2003. slides: http://www.ntg.nl/bijeen/pdf-s.20031113/BibTeX-tutorial.pdf.

Document layout and formatting

Here are the elements this section deals with:

- change page layout
- see page layout
- header/footer
- section/chapter style
- hyphenation
- spacing
- breaks
- fonts

Changing the page layout

How can I change the general layout of the document?

2 ways to do so:

- simple and efficient: use the **geometry** package (Hideo Umeki), http://www.ctan.org/tex-archive/macros/latex/contrib/geometry/manual.pdf, *e.g.*

```
\usepackage[width=175mm,height=229mm,voffset=-10.22mm,top=36.68mm,%
  headsep=7.05mm,footskip=11.29mm,twoside,left=20.44mm]{geometry}
```

- do it yourself, *e.g.*

```
\setlength{\textwidth}{175truemm}
\setlength{\textheight}{229truemm}
\setlength{\voffset}{-28truept}
\setlength{\topmargin}{0truept}
\setlength{\headheight}{12truept}
\setlength{\headsep}{20truept}
\setlength{\footskip}{0truept}
\setlength{\oddsidemargin}{-4.95truemm}
\setlength{\evensidemargin}{-4.95truemm}
```

Seeing the page layout

How can I see the actual document/page layout?

Use the **layout** package together with the `\layout` command somewhere in the text body (before the 1st page?)

How can I see the table of contents layout?

Use **layouts**, and use:

```
\begin{figure}[htb]
  \setlayoutscale{0.8} \tocdiagram
  \caption{Table of Contents entry parameters}
  \label{fig:tocp}
\end{figure}
\begin{figure}[htb]
  \setlayoutscale{0.8} \currenttoc \tocdesign
  \caption{Typical Table of Contents entry for this document}
  \label{fig:thistoc}
\end{figure}
\clearsingleordoublepage
```

See an example in layouts.tex

Change header/footer layout

How can I add headers and footers?

Use the **fancyhdr** package!
Available at http://www.ctan.org/tex-archive/macros/latex/contrib/fancyhdr/

In the preamble:

- delete predefined values:

```
\fancyhf{}
```

- define left-header on even sides (LE), right-header on odd sides (RO):

```
\fancyhead[LE]{\leftmark\slshape\hfil}
\fancyhead[RO]{\hfil\slshape\rightmark}
```

- define center/right-footer on even/odd sides as the page number:

```
\fancyfoot[CE]{\thepage}
\fancyfoot[RO]{\thepage}
```

- set the line width for header and footer:

```
\renewcommand{\headrulewidth}{0.4pt}
\renewcommand{\footrulewidth}{0.4pt}
```

Change header/footer layout

- define marks for chapters and sections:

```
\renewcommand{\chaptermark}[1]{%
  \markboth{{\small \chaptername\ \thechapter.\ #1}}{}}
\renewcommand{\sectionmark}[1]{%
  \markright{\small \thesection\ #1}{}}
```

Some tricks:

- in the document's body, you may change any of those values
- the 1st page of a chapter has by default the `empty` style
- to define a page style:
  - globally: `\pagestyle{}`
  - locally: `\thispagestyle{}`
- to force adding headers: `\thispagestyle{fancy}`
- to force locally removing headers: `\thispagestyle{empty}`

See layout_document.tex for an example

Alternative: the **titlesec** package (see later)

Change the style of chapter/section titles

How can I change the style of chapter and section titles?

Use either **sectsty** + **fncychap**, or **titlesec**!

- **sectsty** at http://www.ctan.org/tex-archive/macros/latex/contrib/sectsty/sectsty.pdf
  - deals mainly with sections
  - to be included before **minitoc**
  - more friendly interface than standard LaTeX, does not affect the way it works
  - example in layout_sections_secsty.tex
- **fncychap** available at http://www.ctan.org/tex-archive/macros/latex/contrib/fncychap/fncychap.pdf
  - deals with chapters only $\Longrightarrow$ use it with **sectsty**
  - example in layout_chapter_fncychap.tex (also shows how to produce a dropped capital with **ydrop**)
- **titlesec** at http://www.ctan.org/tex-archive/macros/latex/contrib/titlesec/titlesec.pdf
  - replaces LaTeX macros related with sections: titles, headers and contents
  - provides new features unavailable in current LaTeX
  - very complete documentation + example in layout_sections_titlesec.tex
  - use it with **titletoc** instead of **fancyhdr**, **fncychap**, **sectsty** and **tocloft**

Right margin and hyphenation

How to remove words that appear in the right margin (even for justified text)?
How to enforce the limitation aspect of margins?

1. define how to hyphen words:
   - locally: indicate possible hyphenation places with `\-`,
     e.g. `pro\-ces\-sing` where you notice a problem in the .pdf
     Cons: may change as you add text; ok only for this instance of the word
   - globally: place in the preamble the list of words to hyphen, where ' -' indicates possible hyphenation places, *e.g.*

     ```
     \hyphenation{pro-ces-sing}
     ```

     Pros: more general!
2. change internal values

   ```
   \hyphenpenalty 10000 % disable LaTeX to split all words
   ```

   $\Longrightarrow$ you should avoid using this trick

Spacing

How do I change the spacing between lines?

Well, you should not do that: this is not your job, but the editor's job (book, journal or conference paper).
Try to:

- lower the line spacing with:

```
\renewcommand{\baselinestretch}{0.9}
```

  The layout_document.tex file provides examples.

- change title spacing with:

```
\titlespacing
```

- set the corresponding length (see the **layout**):

```
\setlength{\parskip}{0pt}
\setlength{\parsep}{0pt}
\setlength{\headsep}{0pt}
\setlength{\topskip}{0pt}
\setlength{\topmargin}{0pt}
\setlength{\topsep}{0pt}
\setlength{\partopsep}{0pt}
```

  The layout_sections_titlesec.tex file provides an example.

Adding breaks

How can I force a line break?

In fact, there are several breaks you can force:

- line: `\break` or `\linebreak`
- page: `\newpage`
- flush the floats: `\clearpage` (`\cleardoublepage` in 2-side documents)

See examples in layout_document.tex

Text formatting / fonts

from the LaTeX project "font guide" at http://www.latex-project.org/guides/fntguide.pdf

What are the common font attributes?

There are 5 font attributes:

- encoding: the order that characters appear in the font
- family, *e.g.* Adobe Times, Computer Modern Roman (Knuth)
- series: how heavy/expanded a font is (medium weight, narrow, bold extended)
- shape: form of the letters within a family (*e.g.* italic, oblique, upright/roman)
- size: by default in pt

Text formatting / fonts: font encoding

more at http://www-h.eng.cam.ac.uk/help/tpl/textprocessing/fonts.html

How do I change the font encoding?

- input encoding:

  ```
  \usepackage[applemac]{inputenc}
  ```

  for instance, to allow for accented entries on a Mac.
- (classical LaTeX) font encoding:

  ```
  \usepackage[T1]{fontenc}
  ```
- other defined fonts (*e.g.* Times that works in math):

  ```
  \usepackage{mathptmx}
  ```

Text formatting / fonts: fonts conversion

How to convert TrueType/OpenType/Type1 fonts to LaTeX form, especially if one want to use them with math?

Unfortunately, I have no answer to that question yet.
Some links that may help:

- font tutorials: http://www.tug.org/mactex/fonts/fonttutorial-current.html and http://tex.loria.fr/general/new/fntguide.html
- LaTeX font catalog: http://www.tug.dk/FontCatalogue/ http://www.tug.org/fonts/
- LaTeX math font catalog: http://ctan.tug.org/tex-archive/info/Free_Math_Font_Survey/survey.html
- XeTeX mailing list: http://tug.org/pipermail/xetex/ (XeTeX allows to use fonts under MacOsX)

Text formatting / fonts: font families

How many font families exist in LaTeX?

3 font families:

- roman: serif, with tails on the uprights `\textrm{text}`
- sans-serif: with no tails on the uprights `\textsf{text}`
- `monospace` (fixed-width or typewriter) `\texttt{text}`

Text formatting / fonts: font type styles

What are the type styles?

- *italic* using `\textit{}` (or `{\it ...}`)
- *slanted* using `\textsl{}` (or `{\sl ...}`)
- SMALL CAPITALS using `\textsc{}` (or `{\sc ...}`)
- **bold** using `\textbf{}` (or `{\bf ...}`)
- emphasis *in a given context*
  `\textit{\emph{emphasis} in a given context}`

NB: prefer `\textit{bla bla}` to `{\it bla bla}`, as *the first will do **that*** whereas *the second will do* **that**

```
\textit{the first will do \textbf{that}}}
{\it the second will do {\bf that}}
```

Text formatting / fonts: font type styles

Remark: this works with maths too!

Name	command	result
Roman	`\textrm{}`	text
	`\mathrm{}`	$a+b=c$
Sans serif	`\textsf{}`	text
	`\mathsf{}`	$a+b=c$
Italic	`\textit{}`	*text*
	`\mathit{}`	$a+b=c$
Bold	`\textbf{}`	**text**
	`\mathbf{}`	$\mathbf{a+b=c}$

Text formatting / fonts: font size

How can I define the font size?

- absolutely:

```
\huge huge > \Large Large > \large large >
\normalsize normal size > \small small >
\footnotesize footnotesize > \tiny tiny
```

will provide: huge > Large > large > normal size > small > footnotesize > tiny

- relatively, using **relsize.sty**:

```
{\relsize{+4} note} {\relsize{-4} that}
{\relsize{+3} this} {\relsize{-3} can} {\relsize{+2} however}
{\relsize{-2} be} {\relsize{+1} quite} {\relsize{-1} awful},
{\relsize{0} very awful!}
```

will provide: note that this can however be quite awful, very awful!

Symbols

How many symbols can I use in LaTeX?

- I have no idea :-)
- check the comprehensive LaTeX symbol list at CTAN:
  http://www.ctan.org/get/info/symbols/comprehensive/symbols-letter.pdf
- under MacOsX, use the 'Symbols' widget to find them (for LaTeX and html)
  http://vocaro.com/trevor/software/widgets/

Structure your document

Why should I structure my document?

Simply to make it clearer to read, correct, complement, etc.

Depending on:

- the document (*e.g.* long vs. short document),
- the context (*e.g.* need to be worked by parts), and
- your LaTeX skills ($\nearrow$ after the workshop)

you may consider:

- splitting your document into several files,
- writing a style,
- writing a class,
- writing a package.

$\Longrightarrow$ a clear organization of your whole 'production line' will help to generate good documents.

Split your document

After splitting a document into several files, include those files using:

- `\input{filename.tex}` directly insert the file content (for splitting a chapter, section, etc)
- `\include{filename.tex}` starts a new page before inserting content (for separating parts, chapters)

Good reasons to do so:

- short document: please be messy and forget this slide
- long/important document: please be organized

Trick

If using only `\include{}` commands, you can then select which one to include while preserving the TOC, etc, thanks to:

```
\includeonly{chapter1}
```

instead of commenting out the document insertion!

```
\include{chapter1}
```

Example: this document.

Write a package

How do I know if it is a class or a package?

- package = the commands could be used with any document class
- class = the commands **cannot** be used with any document class

To quickly create a package file, simply move all local commands and new environments into a new .sty file that you can use in you document using:

```
\usepackage{Vstyle}
```

$\Longrightarrow$ avoid dependencies: do not move command that depends on other packages, as they may not be loaded in the right order

Write a better package

How do I create a package?

1. move all commands in the .sty file (see Vstyle.sty)
2. indicate the package name, date and version

```
\NeedsTeXFormat{LaTeX2e}[2007/01/29]
\ProvidesPackage{Vstyle}[2007/01/29 provides tutorial cmds]
```

3. if needed, indicate some package dependencies:

```
\RequirePackage{fancyvrb}
```

4. define the package options (example from algorithm2e.sty):

```
\DeclareOption{algo2e}{%
  \renewcommand{\algocf@envname}{algorithm2e} }
```

5. default options are given last:

```
\ExecuteOptions{english,plain,resetcount,titlenotnumbered}
```

right before being processed

```
\ProcessOptions
```

6. the reminder of the file contains the definitions of all the commands

http://www.latex-project.org/guides/clsguide.pdf

Writing a class

What for?

- the commands **cannot** be used with any document class,
- need a document class that does not exist!

- first check if it does not already exist (*e.g.* 1 class + specific packages)!
- same technique as for a package!
- for more, read carefully:"LaTeX 2_ε for class and package writers", LaTeX3 project team, http://www.latex-project.org/guides/clsguide.pdf

Writing a full package

Writing a .dtx file = big chelem!

- it contains:
  - several files to be generated (.cls class or .sty package/style
  - the documentation (using **Docstrip** to manage with % signs, of maybe **docmfp** when using MetaPost and/or Metafonts)
  - a driver, *e.g.* to generate the doc, or the class, of the other files
  - other files to be generated (example, bibliography, etc.).
- when you are done, follow the guidelines for uploading TDS-packaged materials to CTAN at http://dante.ctan.org/tds-guidelines.html
- to use it:
  - run `latex` on mypackage.dtx
  - run `latex` on the installer file mypackage.ins (generates the other files from the .dtx file)
  - run `latex` on mypackage.dtx as many times as the compiler tells you that references may have changed

Bibliography on class/packages


LaTeX3 project team. LaTeX 2_ε for class and package writers. March 1999, http://www.latex-project.org/guides/clsguide.pdf.


Scott Pakin. How to Package Your LaTeX Package. November 2004, http://www.ctan.org/tex-archive/info/dtxtut/dtxtut.pdf


Frank Mittelbach, Denys Duchier, Johannes Braams, Marcin Wolinski, Mark Wooding. The DocStrip program. July 2007, http://tug.ctan.org/tex-archive/macros/latex/base/docstrip.dtx (run LaTeX onto it to generate the .pdf)


Peter Wilson. The **docmfp** package. March 2005, www.ctan.org/tex-archive/macros/latex/contrib/docmfp/docmfp.pdf


Nicola Talbot. **makedtx** v0.94b : a Perl script to help create a DTX file from source code. August 2007, http://www.ctan.org/tex-archive/support/makedtx/doc/makedtx.pdf.

Using pdfLaTeX to generate PDF documents

You may want to:

- have clickable (hyper) references
- synchronize the .pdf with the .tex
- include sounds and videos in the .pdf
- include .pdfs in your .pdf

More reading: “Using LaTeX to Create Quality PDF Documents for the World Wide Web”, The University of Akron, Mathematics and Computer Science, http://www.math.uakron.edu/~dpstory/latx2pdf.html
Also, add code for PDF files: http://www.geocities.com/kijoo2000/latex2pdf.pdf

The 'hyperref' package

- by default, all recent LaTeX editors may use the pdfLaTeX compiler to generate .pdf files
- **hyperref** is always placed last, as it redefines most of the internal cmds
- exceptions:
  - another package related to **hyperref**:
    e.g. **hypcap** for proper hyper-ref to float related to a caption

    ```
    \usepackage[figure,table]{hypcap}
    ```

    you may choose to correct only figures, tables, or both!
    (try in layout_document.tex)
  - a package for which the doc explicitly says to do so
- customization: **hyperref** has a huge list of options
  http://www.ctan.org/tex-archive/macros/latex/contrib/hyperref/doc/options.pdf

Package documentation at CTAN:
http://www.ctan.org/tex-archive/macros/latex/contrib/hyperref/doc/manual.pdf

The 'hyperref' package

What can **hyperref** do for me?

For you, nothing.
For your document, a lot :-) !

- add hyper-references:
  - clickable links to float references, citations, URLs
  - from the text body, the table of contents, the index, the glossay, the bibliography
- add back-references to the bibliography (see which pages 1 item is cited)
- define PDF metadata
- embed sounds, videos
- add PDF-specific items (buttons, notes, etc)

Good tutorial by Patrick Jöckel at http://www.p-joeckel.de/pdflatex/
See examples of use in layout_document.tex, layout_sections_secsty.tex, layout_sections_titlesec.tex, layout_chapter_fncychap.tex, lists_contents.tex, lists_contents_multicol.tex, lists_minitoc.tex, table_footnote.tex, and table_multirow.tex.

The 'pdfsync' package

OK, LaTeX is not a realtime WYSIWYG, but how can I quickly see where a portion of text fits into the .pdf?

Use **pdfsync**!

- simple way to synchronize your .tex and you PDF file
- for MacOsX, but migrating to **pdftex** (which means later available to all)
- Apple-clicking on a word in one shows the (almost) right place in the other, and vice-versa
- supported at various level by:
  - text editors: iTeXMac, iTeXMac2, TeXShop, AucTeX (at various level)
  - PDF viewers: iTeXMac, iTeXMac2, TeXShop, TeXniscope, PDFView
- doc at CTAN: http://www.ctan.org/tex-archive/macros/latex/contrib/pdfsync/
- tutorial at: http://itexmac.sourceforge.net/pdfsync.html
- "Will TeX ever be wysiwyg or the pdf synchronization story", Jérôme Laurent, Practex 2007 http://dw.tug.org/pracjourn/2007-3/laurens/

Inserting sounds and videos

Can I insert sounds and videos with LaTeX (and abandon Powerpoint/Keynote)?

Use either:

- the **multimedia** package at
  http://www.ctan.org/tex-archive/macros/latex/contrib/beamer/extensions/multimedia/,
  from **Beamer**, but not Beamer-specific
  - Pros: media not embedded by default (small files)
  - Cons: does only support PDF v1.5
    i.e. can only embed Apple Quicktime files, not Windows Media files
- the **movie15** package at
  http://www.ctan.org/tex-archive/macros/latex/contrib/movie15/doc/movie15.pdf
  - Pros: supports PDF v1.6
    i.e. embeds both Apple Quicktime and Windows Media files
  - Cons: media embedded by default (big files); doe snot load in Texshop

NB: media only play for PDF opened with **Adobe Reader** or **Acrobat**.

Inserting sounds in Beamer

- with `movie` from **multimedia**, define the following command:

```
\newcommand{\mysound}[2]{\movie[showcontrols]%
  {\structure{#1}}{\SOUNDPATH #2}}
```

  and use it such as:

```
some \mysound{trumpet}{01-Trauermarsch.aif}
```

  you will then get some trumpet

- with `movie` from **movie15**, define the same command:

```
\newcommand{\mysound}[2]{\movie[showcontrols]%
  {\structure{#1}}{\SOUNDPATH #2}}
```

  as the `\movie`† command is on purpose defined with same syntax

Inserting videos in Beamer

- from the **multimedia** package, use the following command:

```
%\movie[width=5.6cm,height=2.5cm]{This text is visible.}%
\movie[width=5.6cm,height=2.5cm,poster]{This text is not visible.}%
  {\VIDEOPATH anim_AM_FM_SEM.mov}
```

This text is not visible.
See an example in test_media_multimedia.tex

- use **movie15** (non Beamer specific):

```
\begin{figure}[ht]
  \includemovie[poster,text=(Loading \VIDEOPATH anim_AM_FM_SEM.mov)]%
    {6cm}{6cm}{\VIDEOPATH anim_AM_FM_SEM.mov}
\end{figure}
```

See an example in test_media_movie15.tex

Inserting sounds and videos in reports, articles, etc

- use same packages and commands as for **Beamer**, or
- do it by hand using **hyperref** commands
  define a command:

```
\newcommand{\VideoFile}[4]
  {\label{#1}
  \pdfstringdef\videoName{#1}
  \pdfstringdef\imgName{#2}
  \vspace*{0.2cm}
  \mbox {\pdfimage width #3 height #4 {\IMGPATH \imgName}
  \hspace{-8.65cm}
  \pdfannot width #3 height #4
    {/Subtype /Movie
    /Movie << /F (\VIDEOPATH/\videoName) >> %/Border [10 10 0]
    /A << /ShowControls true /Volume 0.8 /Mode /Once /Rate 1 >>}}%
  \hspace{14.1cm}\vspace*{0.2cm}}
```

  and use it as:

```
\VideoFile{Trumpet_Vib_ff_Gb5_ana.mov}{TrumpetVibffGb5ana.png}%
  {8.4cm}{3.25cm}
```

  Cons: quite long code, more complex and and less efficient that already defined packages...

Include PDF documents using 'pdfpages'

How do I insert a PDf document into another PDF document?

Use LaTeX and the **pdfpages** package!
http://www.ctan.org/tex-archive/macros/latex/contrib/pdfpages/pdfpages.pdf

Easy to use:

```
\usepackage[options]{pdfpages}
```

with options:

- `{final` (default): inserts pages
- `draft`: does not insert pages
  prints a box and the filename instead (much faster)
- `enable-survey`: activates survey functionalities (experimental)

and call the

```
\includepdf[key=val]{filename}
```

with some of the many options to choose pages, change layout, add hyper-link or entries to the TOC, etc.

Part IV: Technical scientific communication

Basics about scientific and technical communication (STC)

Gary Burkhart:

> There is no scientific writer. Only scientific reader!

This is your responsibility to communicate clearly.
What might help:

- take the point of view of the reader
- observe how you read (quick and slow reading) a scientific paper
- use techniques for writing scientific and technical communication

Read “Guidelines for creating presentations”, chap. 1 sec. 5 (pp. 29–38) of the **Beamer** documentation at
http://www.ctan.org/tex-archive/macros/latex/contrib/beamer/doc/beameruserguide.pdf

Basic rules of STC (Gary Burkhart)

- what is your message (only 1 message / paper)?
- who are the readers/auditors?
- basic rules:
  - from know to unknown
  - put the action into the verb (no passive form)
  - avoid ambiguity about the agent (no pronouns, no passive forms)

  Agent (subject, known) $\longrightarrow$ action (verb) $\longrightarrow$ important point (object, inknown)

Organize the contents (Gary Burkhart)

- sentences:
  - be as accurate as possible
  - suppress useful words
  - avoid negative sentences (do not use non-positive sentences)
  - from known (beginning) to unknown (emphasis)
- paragraphs:
  - only 1 information per paragraph
  - the 1st sentence contains the information (important at the beginning)
  - next sentences explain, detail the information
- parts: made of paragraphs, from more to less important

Tell only 1 message (Gary Burkhart)

To cleary tell your message:

- define it clearly!
- 1 message per slide
- avoid titles such as: “the effect of...”, “the influence of ...”, “comparing ...”
- prefer “MoCap is move powerful than sushi chops”
- explicitly provide the objectives and key points

Use light slides (Gary Burkhart)

To ease the slides reading:

- 50% of empty space (too bad for me)
- 36 words maximum (6 lines of 6 words)
- sans serif font, with size: 36pt for title, 24 for text, 18 for numbers (not true in Beamer)
- activity gradient: video > picture > diagram > figure > table > words

Keeping the audience attention (Gary Burkhart)

To keep the audience attention

- silence after an important point (count 1, 2)
- transition sentence before going to next slide
- do not talk during the transition
- do not show what you are not talking about (hide)

Get organized for writing your paper

Remember: 1 paper = 1 idea only
Trick: “cartoon” (Udo Zölzer): write the story

- tell a story from your idea only
- compile the (smallest number of) tables, figs and equations that explain the idea
- add their legends
- add section/subsection titles
- you just have to fill in with your text!

Get organized for writing your paper

To prepare the text:

- flush-list with all ideas (as item lists only, no sentence)
- order ideas, hierarchily
- structure your document according to hierarchy (back to previous step as long as the structure is not ok)
- add figures, diagrams, tables, equations
- replace lists by sentences only when all previous steps are ok
- you're done

Other tricks:

- find Matlab way to always produce "final figures" each time you use it (no need to redo them, or re-do them all in the same way)
- Maltab can intepret some LaTeX commands

```
xlabel("f/Hz \rightarrow")
```

Multi-author paper writing

I love to track changes, especially writing a paper with colleagues. How can I do that in LaTeX?

Use either:

- **changes** at
  http://www.ctan.org/tex-archive/macros/latex/contrib/changes/changes_eng.pdf
- **trackchanges** at http://sourceforge.net/projects/trackchanges/

Generating best quality figures

It seems stupid to say, but...

always use good quality figures!

This means that:

- always use vectorial image formats (.ps, .eps, .pdf), especially for PDFs to be shared (thesis, journal/conference paper)
- if you have no choice, use the most adapted format (.jpg for shades/photos, .png for diagrams)
- big enough fonts for text & numbers (Matlab's `subplot()` fct helps)
- have clear legends and text

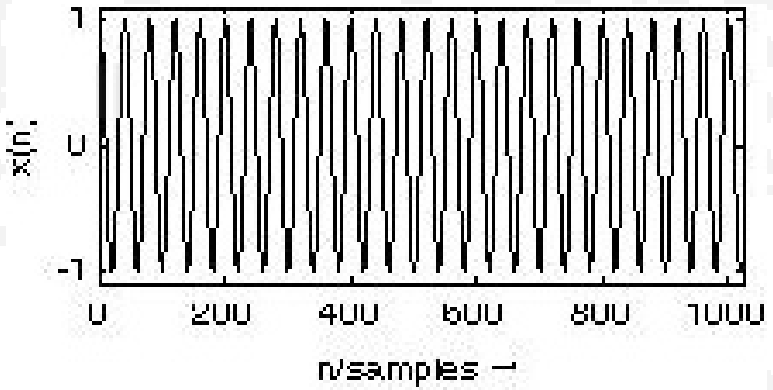
Keeping the audience attention (Gary Burkhart) with best quality

Let's consider a figure generated with this Matlab code:

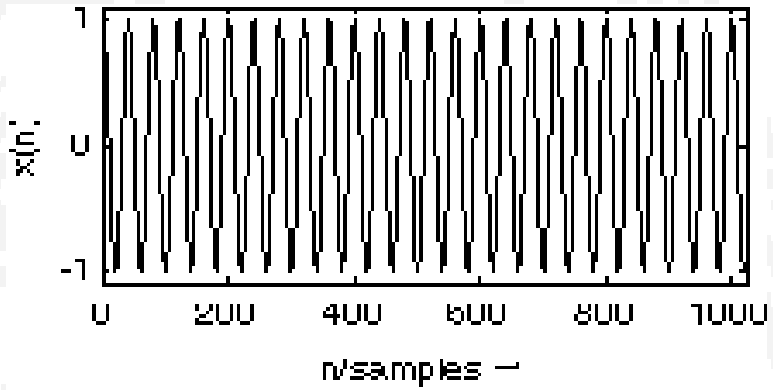
```
N = 1024;
t = (0:N-1);
SR = 2000;
x = zeros(N,1);
x(t+1) = cos(2*pi*50*t/SR);

figure(1)
subplot(3,2,1)    % proportionally bigger fonts
plot(x(1:N), 'k')
xlabel('n/samples \rightarrow')
ylabel('x(n)')
axis([0 N -1.1 1.1])
```

Generating best quality figures

First counter-example: exporting as .jpg a non-shaded figure:

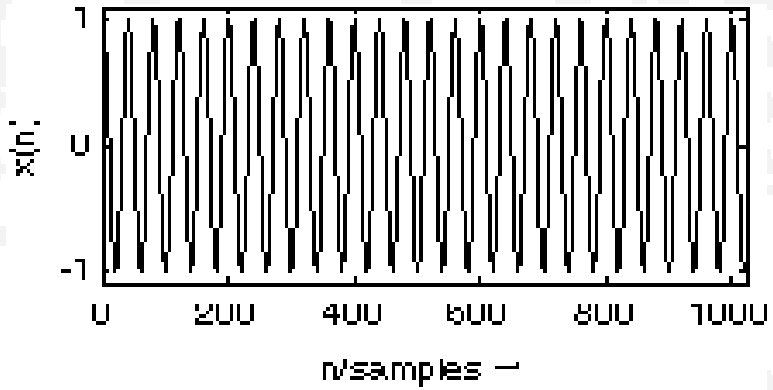


instead of using .png:

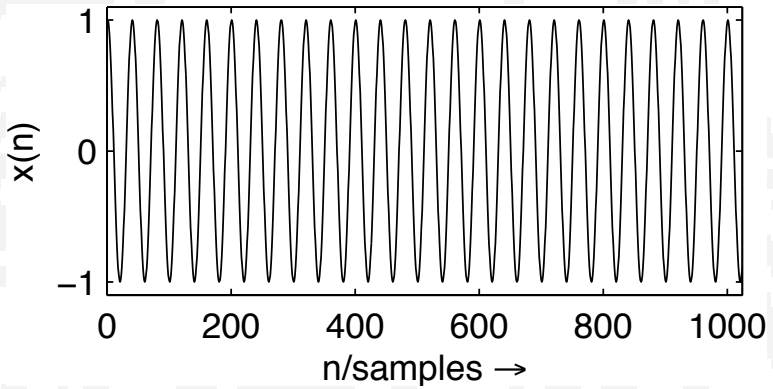


Generating best quality figures

Second counter-example: exporting as .png:

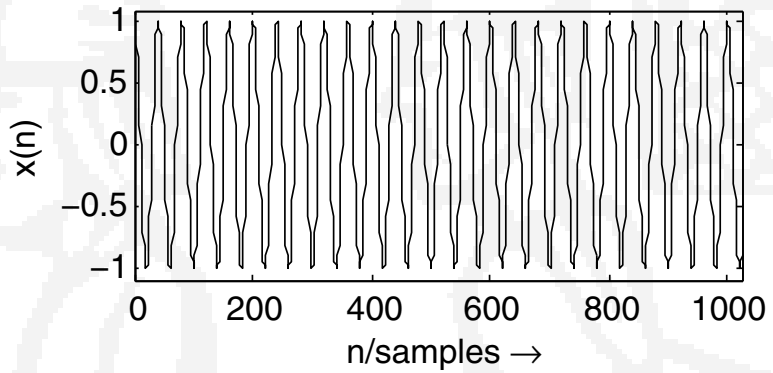


instead of using a vectorial format .ps (Matlab):

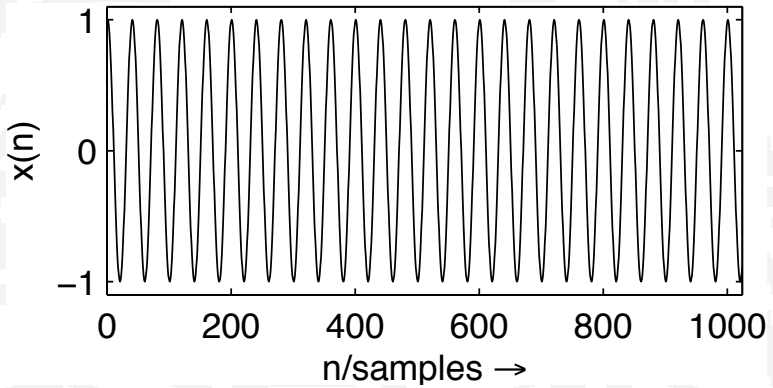


Generating best quality figures

Third counter-example: using a bad .pdf export (Matlab):



instead of `ps2pdf` (terminal):



Technical diagrams using MetaPost (Antoine Lefebvre)

What is **Metapost**?

- **Metapost** system: by John Hobby (copied from **Metafont**'s sources, D. Knuth)
- powerful picture-drawing language very much like that of **Metafont**
- outputs Encapsulated PostScript files (embedded in LaTeX)
- includes facilities for directly integrating TeX text and mathematics with the graphics
- PDFLaTeX cannot ordinarily handle PostScript graphics, the
- output of MetaPost regular and simple enough for PDFLaTeXto handle it (using code borrowed from ConTeXt)

How can I use it?

- you can write **Metapost** in any text editor
- can be generated by drawing programs, *e.g.* Xfig

Technical diagrams using MetaPost (Antoine Lefebvre)

Example with Xfig

how to use Xfig to create metapost files with text formatted with latex (especially useful for mathematical equations and symbols in figures)?

1. With Xfig, make you drawing and add text using latex formatting
2. edit text properties and add the flag “special’ flag (See XfigScreenshot.png)
3. export your drawing as metapost (metapostexample.mp)
4. run `mpost metaposexample.mp` (it creates metapostexample.0)
5. using metapostexample.tex
   - include metapostexample.0 in a LaTeX document
     this will process the LaTeX still unresolved command
   - run `latex metapostexample.tex` (it creates metapostexample.dvi)
6. convert the .dvi file to .eps: run `dvips -E -j -o metapostexample.eps metapostexample.dvi`
7. convert the .eps file to .pdf for inclusion in your pdfLaTeX documents: `epstopdf metapostexample.eps`

Other tools for technical diagrams

- PSTricks at http://www.ctan.org/tex-archive/graphics/pstricks/
  http://www.tug.org/applications/PSTricks/
- XY-pic at
  http://www.ctan.org/tex-archive/macros/generic/diagrams/xypic/xy/doc/xyguide.pdf

Counting the number of words

How can I count the number of words?

Good question...
Try one of the following:

- `detex` to remove commands, and count using `wc` (or Word)
- `spelltex`: removes commands and count words
- `texcount.pl`:
  - "Perl script for counting words in TeX and LaTeX documents. It parses the document, interpreting the text as text words, headers, formulae (mathematics) and floats/begin-end groups"
  - available for download at http://folk.uio.no/einarro/Comp/texwordcount.html
  - try it online: http://folk.uio.no/einarro/Services/texcount.html

Slides

Why making slides with LaTeX?

Why should I use LaTeX to produce my slides?

- free softwares
- LaTeX manages the layout for you
  (avoid the automatic font size changes of WYSIWYG softwares)
- allows for sound/video inclusion, generates a proper PDF, has pre-defined zoom, etc
- allows proper insertion of vectorial figures, tables and equations

What exists out there?

- **slides** class
- **seminar** package
- **Prosper** class
- **Beamer** class
- **FoilTeX** class
- **TexPower**

Beamer?

Why do you use **Beamer**?

- many styles, that easily change the slide formatting
- simple mechanism to include partial table of contents
- predefine set of colors for text formatting
- very complete documentation at
  http://www.ctan.org/tex-archive/macros/latex/contrib/beamer/doc/beameruserguide.pdf
- also some info at http://latex-beamer.sourceforge.net/

However, I found many some behavior while making those slides (maybe more things to learn)

Beamer basics

Check the source of those slide to see how to:

- insert figures
- define your table of contents
- split your talk in parts
- insert verbatim

Beamer and background images

Is it possible (in Beamer or otherwise) to specify the position of a piece of text or of an image with absolute (page-relative) coordinates? For example, for it to show up in the background behind some text?

Sure, use for instance:

```
\usebackgroundtemplate{%
  \includegraphics[width=1.4\linewidth]{\IMGPATH typo.png}}
```

NB: it can be re-define at any time, for example

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```
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```

NB: it can be re-define at any time, for example now!!!

Costumize the Beamer navigation bar

To remove the logo, and most of icons:

```
\usefoottemplate{}
\usenavigationsymbolstemplate{
    \hbox{\insertframenavigationsymbol}
    \hbox{\insertsectionnavigationsymbol}
}
```

Costumize the Beamer navigation bar

To bring back the logo, and most of icons:

```
\usenavigationsymbolstemplate{%
  \vbox{\hspace*{-1.5cm}
  \color{MyLightBlue}\hfill
  \hbox{\insertslidenavigationsymbol}
  \hbox{\insertframenavigationsymbol}
  \hbox{\insertsubsectionnavigationsymbol}
  \hbox{\insertsectionnavigationsymbol}
  \hbox{\insertdocnavigationsymbol}
  \includegraphics[width=0.3\linewidth]%
    {\IMGPATH CIRMMT_Logo2005BlackHi_TeX2}}}
```

Part V: LaTeX and other tools

Versioning Systems

What is a versioning system?

- systems to back up version of code
- any type of code (even LaTeX) as it is code-independent
- access to previous version, with tags/info you provide
- Subversion (SVN) at http://subversion.tigris.org/project_packages.html
- CVS at http://www.nongnu.org/cvs/

Why should I use one for editing LaTeX documents?

- for big documents
- for documents that take time to write (thesis)
- because you refuse to save your files under another name each time you make changes (176,586 different names?)

Scripting (UNIX)

Why should I think of scripting?

faster compilation (*e.g.* LaTeX, BibTeX, LaTeX, LaTeX)

When?

- not ok when debugging (the LaTeX compiler may interrupt at each error)
- ok for big document that is finished, when changing only 1 element (*e.g.* a figure, the caption style, the TOC layout, etc)

How?

- directly in some text editor (Texmaker)
- in the terminal

Even better: use a makefile!

Declare some variables:

```
#!/bin/sh
TEXFILE="example" # set user file name
LATEXPATH="/usr/texbin/" # for TexLive 2007 # distribution path
PDFLATEX=$LATEXPATH"pdflatex" # compiler path
BIBTEX=$LATEXPATH"bibtex"
MAKEINDEX=$LATEXPATH"makeindex"
```

Run LaTeX and others:

```
echo '*** PdfLaTeX: creating TOC (1/6) ***'
$PDFLATEX  $TEXFILE.tex
echo '*** Bibtex: generating the general biblio. (2/6) ***'
$BIBTEX $TEXFILE
echo '*** Makeindex: creating index (3/6) ***'
$MAKEINDEX -s indexstyle.ist $TEXFILE.idx
echo '*** PdfLaTeX: include index (4/6) ***'
$PDFLATEX $TEXFILE.tex
echo '*** PdfLaTeX: updating TOC & all back references (5/6) ***'
$PDFLATEX $TEXFILE.tex
echo '*** PdfLaTeX: final run (6/6) ***'
$PDFLATEX $TEXFILE.tex
```

Spell-checking

Some spell-checkers:

- Excalibur (MacOsX) at http://excalibur.sourceforge.net/
- MicroSpell (Windows) at http://www.microspell.com/
- for Vim: http://www.vim.org/scripts/script.php?script_id=499
- terminal: `ispell -t filename.tex` (LaTeX mode)
- terminal: Gnu `aspell` at http://aspell.net/

Templates

Where can I find templates? I need further examples...

Check in your LaTeX editor if it has templates!

- Texmaker: Wizard (6th item in toolbar)
- Texshop: templates of documents, environments, etc (right menu in any file editor)

Also, many templates online:

- Michael Stutz: http://dsl.org/comp/templates/
- Rob Rutten: http://www.astro.uu.nl/~rutten/rrtex/templates/.
- CTAN and packages' examples

plus the examples of this tutorial!

Sharewares for quick edit

Edit formulae

Quick equation editor:

- MacOsX:
  - Equation service at http://www.esm.psu.edu/mac-tex/EquationService/
  - Equation editor at http://evolve.lse.ac.uk/software/EquationEditor/
  - iTexMac at http://itexmac.sourceforge.net/
  - LaTeXIt at http://ktd.club.fr/programmation/latexit_en.php
- Windows:
  - WinEdt at http://www.winedt.com/
- Linux:
  - eqe at http://rlehy.free.fr/
- cross-platform: laeqed at http://www.thrysoee.dk/laeqed/
- online at http://test.izyba.com/equationeditor/equationeditor.php

Sharewares for quick edit

Edit tables

WYSIWYM table editors:

- TeXtable (MacOsX) at http://www.twistedtheorysoftware.com/textable/
- LaTable (Windows) at http://g32.org/latable/
- Tablas (Windows) at http://www.informatica.us.es/~calvo/latex_en.html
- Texmaker (cross-platform)
- WinEdt (TableDesigner) (Windows)
- OpenOffice 2.0.4 (cross-platform)

Convert Excel tables to LaTeX

How can I import an Excel table into LaTeX?

- with several steps:
  - export the Excel table as a .csv comma-separated file
  - import the .csv into LaTeX using **CSV2LaTeX**: http://brouits.free.fr/csv2latex/
- with Gnumeric (Linux):
  - import the Excel table
  - export it to LaTeX
- **maketable** (Windows) at
  http://www.ctan.org/tex-archive/support/maketable/?filename=support/maketable/
- tutorial with Xemacs at http://csdl.ics.hawaii.edu/FAQ/chart-ps.html
- Excel to LaTeX convertor in Ruby for MacOsX at
  http://tom.counsell.org/view/ExcelToLatexTableConvertor
- try the Excel2LaTeX macro at http://www.hha.dk/~skj/Xl2latex.xls

LaTeX to html

How can I generate .html code from my .tex code?

- `latex2html` at http://www.latex2html.org/
  Ask Julius: “Tools for publishing LaTeX documents on the Web”,
  http://ccrma.stanford.edu/~jos/webpub/
- `tth` at http://hutchinson.belmont.ma.us/tth/
- `ltoh` at http://www.ctan.org/tex-archive/support/ltoh/readme.pdf

LaTeX and Music

How can I write scores with LaTeX?

- MusixTeX: perfect TeX-powered score editor
  http://www.ctan.org/tex-archive/macros/musixtex/taupin/
  Cons: needs so many counters that used with other packages like **minitoc**, you get hundreds of error messages
- Lilypond (http://lilypond.org/): a score can be inserted in LaTeX, however need to be parsed and pre-process
  http://www.penguin-soft.com/penguin/man/1/lilypond-latex.html
  you still can edit in Lilypond, export as PDF, and insert PDF in LaTeX with **pdfpages**
- ABC: http://abcplus.sourceforge.net/, to be used with the LaTeX **abc** package at http://www.ctan.org/tex-archive/macros/latex/contrib/abc/

Conclusion

Want some more?

- spend more time using LaTeX
- read news groups:
  - comp.txt.tex at http://groups.google.com/group/comp.text.tex/topics
  - CTAN announcements: https://lists.dante.de/mailman/listinfo/ctan-ann
  - TeX on MacOsX list: http://tug.org/mailman/listinfo/macostex-archives