Effective Scientific Word
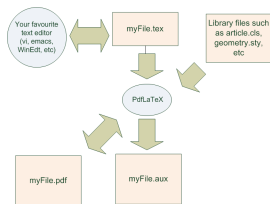## and LaTeX too

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2010 July 16

LaTeX

LaTeX is a textual typesetting language.

You write a textual description of how your document should look and a LaTeX compiler (e.g., PDFTeX) will produce a nicely typeset document.

LaTeX

LaTeX is good for math, but a bit cryptic

> \documentclass[12pt]{article}
> \begin{document} This is a simple \LaTeX\ document.
> \begin{eqnarray*}
> && \int_0^R 4 x \pi \sqrt{R^2-x^2}\,dx
> \\   &=& \frac{4}{3} \pi R^3
> \end{eqnarray*}\end{document}

This typesets as

This is a simple LaTeX document.

$$\int_0^R 4x\pi\sqrt{R^2 - x^2}\,dx$$
$$= \frac{4}{3}\pi R^3$$

LaTeX

Separates document information from style information.

Is very good at cross references.

Is very good at bibliographies.

Is very good at mathematical typesetting.

Can be used for presentations (like this one), articles, books, etc.

Scientific Workplace

Provides structural editing of LaTeX documents.

- ▶ It is hard to produce erroneous LaTeX with SW

Provides a visual representation that is suggestive of the typeset document.

- ▶ What you see is (almost) what you get

Scientific workplace example

Tags
Section/Body tags (Alt-2)

SWP applies "Section/Body tags" to paragraphs
E.g. a section heading would have a "Section" (F11) tag applied
to the paragraph.
Run of the mill paragraphs should be tagged as "Body Text" (F3)
There is a "drop down box" of Section/Body tags on the "Tag"
toolbar.

Tags
Item tags (Alt-1)

Each paragraph is associated with a stack of "Item tags".

- ▶ E.g. this paragraph has [Bullet List Item tag (F8)] as its stack
    1. And this one has [Bullet List Item tag (F8),Numbered List Item tag (F7)] as its stack
- ▶ Use F2 to Remove the top of the stack.

Tags

Text tags (Alt-3)

Each character is associated with a set of text tags.

- ▶ This is normal (empty set) (F4)
- ▶ **This is bold (F5)**
- ▶ **This is bold and emphasized (F5,F6)**

Tags
Customizing tags.

Use the Tag menu to change the appearance of tags in SW (not in the typeset document)

Use the Tag menu to customize the function keys. E.g. I use Shift-F6 for Italic.

Math
Math mode

Math is either "displayed" or "in-line"

Displayed math: Cntl-D

Add/remove an equation number to/from a display: Tab

In-line math: Cntl-M

Back to text: Cntl-T

Toggle math/text: Insert key

Tip. Use Tools/User Setup/Math so that two spaces enters math mode and one space exits math mode.

Math

Math shortcuts

You can use the various math tool bars to enter math, but it is good to know some shortcuts.

- ▶ Subscript: Cntl-↓
- ▶ Superscript: Cntl-↑
- ▶ Use spacebar to exit sub- or superscript.
- ▶ Bracket pairs. Cntl-(, Cntl-[, Cntl-{ Cntl-\, Cntl-|
- ▶ Spaces: Thin (Cntl-,), Thick (Cntl-Shift-Spacebar)
- ▶ Other spaces at Insert/Spacing/Horizontal Spaces...
- ▶ Greek letters: Cntl-G. E.g. Cntl-G p gives π and Cntl-G P gives Π

Math

Automatic substitution

In math mode (and only in math mode), certain letter sequences convert to symbols. E.g. xpnd converts to expand.

You can program your own substitutions. Using Tools / Automatic Substitutions.

Here are some of mine:

- qa expands to $\wedge$
- qo expands to $\vee$
- qqa expands to $\forall$
- qqe expands to $\exists$
- rrr expands to $\rightarrow$

This can save a lot of time.

Math

Tricks

Double click on a letter or symbol to put on an accent $\breve{a} \overset{\smile}{\rightarrow} \hat{b}$
Matrices (Insert/Matrix) can be used for a lot of things, as can bracket pairs

$$for(s, i) = \left\{ \begin{array}{ll} skip & \text{if } i = 0 \\ s; for(s, i-1) & \text{if } i > 0 \end{array} \right.$$

Math

Pitfalls

In LaTeX, the math italic typeface is NOT SUITABLE for forming words. Consider

$$for(s, i) = \left\{ \begin{array}{ll} skip & if\ i = 0 \\ s; for(s, i-1) & if\ i > 0 \end{array} \right.$$

vs.

$$for(s, i) = \left\{ \begin{array}{ll} skip & \text{if } i = 0 \\ s; for(s, i-1) & \text{if } i > 0 \end{array} \right.$$

Graphics and Tables

Import Picture

If you use another program to create a graphics file, use File / Import Picture to import it.

For papers you want to make the image float.

- Select the image.
- Menu Edit / Properties ... (Cntl-F5)
- On Layout, select Floating, Here, Top, Bottom.
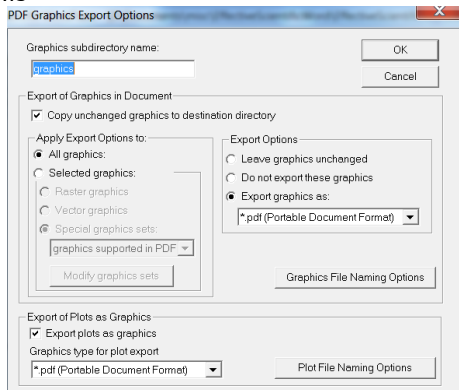- On Labelling, give it a Caption and a Key.

Figure: A rotation by 45 degrees

- To insert a reference to the figure in the text.
  - Insert / Typeset Object / Cross Reference and use the key.
  - For example, see Fig. 1

Graphics and Tables

Scientific word will convert files from other formats to PDF

▶ Use menu Typeset / User Settings ... / PDF Graphics
  Settings.
▶ Set it like this

Graphics and Tables

Tables

Use Insert / Table to insert a table.

Select a whole row or column

- ▶ Use delete key to delete the row or column
- ▶ Use Edit / Insert Row or Edit / Insert Column to insert a new row or column
- ▶ Use Edit / Properties to change justification or lines.
- ▶ You can fix the width of a column, but then you can't edit it any more.
  - ▶ So save this for last
- ▶ Tables don't float and don't have captions
- ▶ For that you must drop down to LaTeX and use the table environment.
- ▶ Later we will see a "fragment" that is useful for floating tables.

Dropping down to LaTeX
Inserting Raw LaTeX

Do this as a last resort.

- Insert / Typeset Object / TeX Field ...
- Check Encapsulated
- Give it a name.
- Enter your LaTeX.
- Use Lamport's book to learn more about LaTeX.

Dropping down to LaTeX
Changing the Preamble

The preamble is all the commands between \documentclass and \begin{document}.

Use Typeset / Preamble to change it.

For example you can define new LaTeX macros in the preamble.

Fragments

Fragments are saved bits of code

Use File / Import Fragment or the Fragment Drop Down List (Alt-4)

For example try the Table (4x3, floating) fragment.

You can select any portion of a paragraph and save it as a fragment for later use.

- ▶ Select what you want to save
- ▶ File / Save Fragment
- ▶ Give it an easy to remember name

Classes and packages

In LaTeX the overall look of document is determined by its "class"
In Scientific Word, you select the class when you create the
document.

- ▶ For example File / New ... / Standard Latex / Standard
  LaTeX Article selects the "article" class
- ▶ whereas File / New ... / Other Documents / Slides - Beamer
  selects the "beamer" class.

Use Typeset / Optional and Packages ... to select the class
options.

Classes and packages

Use Typeset / Optional and Packages ... to select packages.

Front Matter

Front matter is things like the title, author information, date, abstract
To edit the front matter use Typeset / Front Matter ...
Several item tags are for use only in the Front Matter.

Cross references

In LaTeX anything that is automatically numbered can be given a symbolic name (key). Sections, subsections, figures, tables, math displays, theorems, definitions, etc.

- ▶ For sections, theorems, definitions, etc., use Insert / Marker to set the key.
- ▶ For displayed math
    - ▶ use the tab key to number the display,
    - ▶ double click on the [#] to set the key.
- ▶ For figures, use the Labelling tab of the properties dialog.

To insert a reference, use Insert / Typeset Object / Cross Reference ...

Odds and ends

Footnotes: Insert / Note...
Margin notes: Insert / Note ...
Horizontal spacing: Insert / Spacing / Horizontal Space...
Vertical spacing: Insert / Spacing / Vertical Space...

Character entry in text mode

- "Double quotation marks": Press ' or ' twice. (Never use the " key.)
- 'Single quotation marks' and apostrophes: Press: ' or ' once.
- En-dash, e.g. 1872–1970: Press – twice.
- Em-dash —used for parenthetical remarks: Press – 3-times.
- Discretionary hyphens: Insert/Spacing/Break... (TeX will not hyphenate words that contain non-letters. E.g. for "k-colouring", you might add discretionary hyphens after the l and r.)
- Accented letters: Double click on the letter.

Spaces and such

Insert / Horizontal Space... or double click on a space

- A "regular space" after a '.', '!', or '?' will be set extra wide,
- so, after a '.' that does not end a sentence, use a "Required Space" or "Non-breaking Space":
  - Mr. Smith — Non-breaking space, as the name is short.
  - Fig. 1 and Table 2 — Non-breaking spaces.
  - 10 μm — Non-breaking space.
  - Prof. Venkatesan — Required space, as the name is long.
- Use "Thick Space" and "Negative Thin Space" for math mode only.
- Use "Regular", "Required" and "Non-breaking" space for text mode only.
- Use "No Indent" at the start of a paragraph that should not be indented. (LaTeX already knows not to indent the first paragraph of a chapter or section.)