A LaTeX textour

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/usr/local/src/our/word/tutorials/textour

ABSTRACT

This is is a sample of a report, written in LaTeX with included interactive figures. To compile and print this document: `\texpr -s -bib textour`

INTRODUCTION

This sample paper should help people start using LaTeX or can be used as a quick reference. This example paper can be found in /usr/local/src/our/word/tutorials/textour; the file name is textour.tex. If you are running X-windows, type `cake`; if you want a hardcopy, type `cake hard`.

STARTING LaTeX

You can immediately try using LaTeX. Using the original manuscript of this paper together with the literal printout by `lpr` as an example, you should be able to write a report in LaTeX immediately. You should also look at "sep_standards.tex" and "latex_intro.tex" in the same directory. The references (Knuth, 1984) and (Lamport, 1986) are places to look if you run into problems not covered here.

Running LaTeX

Prepare your text with `vi` in a file called, say, `report`. Then do

```
texpr -s report
```

If you are using the "`\ref`" macro for cross-referencing, do

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```
texpr -s -2 report
```

instead. If you are using the bibliographic databases referencing related literature, do

```
texpr -s -bib report
```

instead. Type `texpr` to see all your options.

EXAMPLES

Equations

Here are some equations:

$$\sin\psi = \frac{2h}{vt} \tag{1}$$

$$\frac{h^2}{t^2}k_y^2 + \omega_s^2 = \omega^2 \tag{2}$$

$$\frac{\partial U}{\partial z} = \{ \sqrt{\frac{1}{v^2} - [\frac{\partial t}{\partial g}]^2} + \sqrt{\frac{1}{v^2} - [\frac{\partial t}{\partial s}]^2} \} \frac{\partial U}{\partial t} \tag{3}$$

$$z_{wr} = \sqrt{\gamma^2(x^2+z^2) - x^2}$$

$$R(x,z) = \sum_{\omega} \frac{U(x,z,\omega)}{D(x,z,\omega)}$$

$$\int_0^\infty \mathrm{roman\ text\ in\ math}^{\mathrm{squared}} dx \tag{4}$$

Here is a matrix:

$$A = \begin{pmatrix} a_{11} & a_{12} & \ldots & a_{n1} \\ a_{21} & a_{22} & \ldots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \ldots & a_{mn} \end{pmatrix} \tag{5}$$

and here is an integral:

$$\int_0^x \int_0^y dF(u,v) = 0. \tag{6}$$

You should let LaTeX number equations and figures for you. Label each equation or figure you might want to refer to with a name using the `\label` macro. To refer to it, use the `\ref` macro and LaTeX will translate the internal name into the correct number. For example, "equation 5 is the matrix example and equation 6 is the integral example".

Recommended Macros:

For equation, figure and program references within the text, there are the following commands `\EQN` , `\FIG` and `\PROG` (or `\GPROG`). Instead of using `\ref` it is of great advantage to use those macros, since it allows identical names for figures as well as programs or equations which go with the figure. For composite documents the chaptername is tagged to the label by a unique separator-symbol. Equation (1) and (2) were labelled using `\EQNLABEL` and are referenced using `\EQN`. Figures that are included using `\activeplot` should be referenced by `\FIG`, like figure 2 and 1. In the same way programs that are included with `\progblock` or `\gprogblock` should be referenced by using `\PROG` and `\GRPOG`, like `progfig()` (page 7).

Merging graphics with text

Figures are floating objects. It is possible to merge text and graphics, thus reducing, and hopefully eliminating, cut and paste. In addition to just include figures into the text body, it is now possible to make documents interactive (see also (Karrenbach and Nichols, 1990)). The reader of your document typically displays the document on a computer screen. He is the able to move the mouse into boxes, which appear in your document. Pressing mouse buttons in such a box causes a command to be executed. If you look at the next figure you will see a boxed label appearing after the figure caption. This box is for interaction. The name appearing in the box is the figure name.

Figures 1, 2, 3 and 4 are examples for how to use the interactive plot command.

Quite often you have figures which are not stored together with the TeXdocument, for this reason, you can define a directory from which the figure is included. In your document you specify the directory by

```
\def\figdir{/usr/local/src/our/word/tutorials/textour}
```

If you want you can specify a separate directory for each figure, although this might be rarely the case.

Sometimes you might want to have some figures active while you prohibit interacivity for others. You can specify this explicitly for each figure by `\interactive` or by `\notinteractive`.

The plot command requires that you specify four arguments, namely: filename, size, cake directory and caption.

```
\activeplot{name}{height=,width=}{cakedirectory}{caption}
```

The first argument is the file name without extension and it will be the label for that figure, additionally it appears in the box after the caption. The second argument specifies size information and is a very flexible option. You can specify either height, or width, or height and width. If you do not specify anything, it will use the bounding box information from the postscript figure. This is especially useful, when including figures generated by `idraw`. The third argument is a directory in which a cakefile resides. Whenever a mouse button is hit in the boxed label of a figure, the command: `cake figurename.idoc` is executed in that directory. The fourth argument is the figure caption. Let's look a some examples. The next four figures show in their captions how they are specified in the document.

Figure missing !

Figure 1: This figure is specified in the document by `\activeplot {comb} {height=1.5in} {\cakedir} {caption...}` . comb [NR]

The figure name is **comb**. The height is given explicitly, and the figure is scaled isotropically to be of the right size. In case you hit the mouse button in the boxed label, the command `cake comb.idoc` is executed in the directory defined in `\cakedir`. Let's try another variation of the command.

Figure missing !

Figure 2: This figure is specified in the document by `\activeplot {reswait} {width=6.0in} {.} {This caption.}` . reswait [NR]

For figure 2, the figure name is **reswait**. The width is given explicitly, and the figure is scaled isotropically to be of the right size. In case you hit the mouse button in the boxed label, the command `cake reswait.idoc` is executed in the current directory. Let's try yet another variation of the command.

For figure 3, the figure name is **reRE**. The height and width is given explicitly, so that the figure is scaled anisotropically. As you see, it can look strange! In case you

Figure missing !

Figure 3: This figure is specified in the document by `\activeplot {reRE} {height=1.5in,width=2.0in} {\cakedir} {This caption.}` . reRE [NR]

hit the mouse button in the boxed label, the command `cake reRE.idoc` is executed in the directory defined in `\cakedir`.

The same arguments are taken by the companion command `\sideplot`, which positions the figure side by side to the caption. For figure 4, the figure name is

Figure 4: This figure is specified in the document by `\activesideplot {sideplot1} {2.2in} {.} {This caption.}` . sideplot1 [NR]

sideplot1. The size parameter is only a number. In such a case it is assumed to be the height. In case you hit the mouse button in the boxed label, the command `cake sideplot1.idoc` is executed in the current directory.

As a last example, we have side plot which is not interactive, you will notice that nothing happens when you hit the mouse button in the boxed label.

Figure 5: This figure is specified in the document by `\activesideplot {mbest} {2.2in} {.} {This caption.}` . mbest [NR]

Tables

An example table:

Table Example		
migration	$\omega \rightarrow k_z$	$k_y^2 + k - z^2 \cos^2 \psi = 4\omega^2/v^2$
zero-offset diffraction	$k_z \rightarrow \omega_0$	$k_y^2 + k_z^2 = 4\omega_0^2/v^2$
DMO+NMO	$\omega \rightarrow \omega_0$	$\frac{1}{4}v^2 k_y^2 \sin^2 \psi + \omega_0^2 \cos^2 \psi = \omega^2$
radial DMO	$\omega \rightarrow \omega_s$	$\frac{1}{4}v^2 k_y^2 \sin^2 \psi + \omega_s^2 = \omega^2$
radial NMO	$\omega_s \rightarrow \omega_0$	$\omega_0 \cos \psi = \omega_s$

Program listings

Programs may be included in the body of text.

```
/*

 NAME
     cabs2 - squared modulus of a complex number

 SYNOPSIS
     float cabs2(a)
     complex a;

 DESCRIPTION
     Cabs2 returns the squared modulus, re**2 + im**2, of the
     complex number a.

 SEE ALSO
     seplib(9), cabs(9s), ccabs(9s)

 WHERE
```

```
      ./lib/libsepmath/cabs2.c

  */
  #include "Cmplxlib.h"

  float cabs2(x)
  complex x;
          {
          float i;
          i = x.re*x.re +x.im*x.im;
          return (i);
          }
```

Here is "cabs2.c", a program for calculating absolute values. This program was grabbed straight out of Seplib, so this listing should really be the exact source listing for the installed copy.

Finding references

SEP is an institution with a glorious past, so unless you are doing something completely new, you should dig up some references. The best way, is using the new bibliographic databases, which include not only SEP articles, but also SEG, EAEG, CSEG and conference proceedings. To find references you can use: `sepindex`, `bibindex` or the wide area information server `xwais`. To get some Yilmaz references in bibtex format, try `sepindex yilmaz` to search SEP reports, or `bibindex yilmaz SEP SEG` to search the reports and the Geophysics and SEG conference articles. For more information about other databases look at the selfdoc of both shells. If you use that method, the only thing to remember is the "citation-key". By typing `sepindex Active documents` we get the answer:

```
J.F. Claerbout@{Active documents and reproducible results}@Claerbout.sep.67.139
```

. The information retrieved is author, title and citation-key. To cite this article (Claerbout, 1990) in your paper just use the latex command `\cite{Claerbout.sep.67.139}`.

Finally when you want to list all references at the end of your paper, the only thing you have to put is: `\putbib[SEP]`. Here only the SEP index is looked up. If you have more than one database, use a comma seprated list like `\putbib[SEP,SEG,EAEG]`. You don't have to list anything else, every reference is inserted in the correct format. So you never have to worry about typos or style. You need to run `texpr` now with `-bib` flag, to pick up the references. For more information about the bibliographic databases look at the file `easybib.tex` which exists in this directory.

The older method of including references is **not recommended** any longer, it uses: `index` and `REF`. To get some decon references, try `index decon`. To get some Yilmaz references in LaTeXformat, try `index Yilmaz | REF` . After that you have to explicitly put the references like this:

```
\REF
\reference{Claerbout, J.F., 1990,
       Active documents and reproducible results, SEP--{\bf 67}, 139-144.
       }
```

Of course we can reference equation (A-1) or figure A-1 in the “appendix”.

REFERENCES

Claerbout, J. F., 1990, Active documents and reproducible results: SEP–**67**, 139–144.

Karrenbach, M., and Nichols, D., 1990, Progress towards the interactive book: SEP–**67**, 149–160.

Knuth, D. E., 1984, The TeX book: Addison-Wesley.

Lamport, L., 1986, LaTeX User's guide and reference manual: Addison-Wesley.

APPENDIX A

Here we put the mathematical stuff, like

$$(a+b)^2 = a^2 + 2ab + b^2 \tag{A - 1}$$

Of course we can reference equation (A-1) and note the “appendix” form of the equation number. This is the standard way, if you have only one appendix. Here the appendix is generated by using `\APP` We can have an arbitrary number of appendices, then you should use the `\APPENDIX{ }` command, which takes an argument like **A** or **II**.

Figure A-1: The figure number is labeled as an appendix. mbest2
[NR]

To be complete here is a figure again, Figure A-1. Note that the figure number is reset.

APPENDIX MXCVII.2

$$a+b = \sqrt{a^2 + 2ab + b^2} \tag{MXCVII.2-1}$$

Of course we can reference this also (1).

$$\$1.- = 100\,\text{cents} \tag{MXCVII.2 - 2}$$

Reference that fundamental equation (MXCVII.2-2), take the $\sqrt{}$ and divide by the number of working days and you get your 2 cents worth.