

IN-CLASS WORK: LATEX & XFIG

The following steps walk you through **Latex**, which provides THE tool for writing scientific papers, especially when formulae and equations are involved. I will walk you through steps 1.-3. (For some of you this might be a reminder from junior lab.)

1. Sample File(s)

Copy

```
~kvollmay/classes.dir/phys338.dir/phys338_s2015.dir/papers.dir/template_phys338.tex
~kvollmay/classes.dir/phys338.dir/phys338_s2015.dir/papers.dir/samplefig1.eps
~kvollmay/classes.dir/phys338.dir/phys338_s2015.dir/papers.dir/samplefig2.eps
```

into your working directory. Have a *quick* look at `template_phys338.tex`.

2. Compile

The `template_phys338.tex` contains the “commands” and they need to be converted to something you can look at. Type (on the command line):

```
latex template_phys338.tex
```

Check with `ls` that the file `template_phys338.dvi` was created. You can look at the document with

```
xdvi template_phys338.dvi &
```

This opens a new window with the document as it will look when you print it. You do not have to redo this `xdvi` command each time when you change the tex-file and recompile the tex-file, instead this window will get updated whenever you recompile (i.e. whenever you use the `latex` command).

3. Make Printable File

Next we make out of the dvifile a file which you can print. Type

```
dvips template_phys338.dvi -o
```

(In case of wanting only a few pages of the document you may use

```
dvips -p1 -n1 template_phys338.dvi -o
```

where `-p1` specifies the starting page and `-n1` specifies how many pages you want to include in your psfile.) This creates `template_phys338.ps`. And you can print this psfile with

```
lpr -Pbert12-lp1 template_phys338.ps
```

To look at this psfile before you print it use `evince template_phys338.ps`¹

If you want instead a pdf-file, you may use `ps2pdf template_phys338.ps`

which creates `template_phys338.pdf` and you can look at the resulting pdf-file with `acroread template_phys338.pdf` or with `xpdf template_phys338.pdf`.

4. Title and Sections

Copy `template_phys338.tex` to a tex-file (with a different name) which you will use to write your paper. In this file change the title (search for `\title`). Use `xdvi` to look at the resulting document. Next change the sections (`\section`) and make more than one section by using the command multiple times.

Turn Page

¹Depending on the software of the computer you are using, you may use instead `ghostview template_phys338.ps` or `gv template_phys338.ps`

5. Formulae

Next look at the equations Eq.(1) and Eq.(2). Try modifying these equations to the equations for the model of your project. Check with your xdvi-viewer. See below where you can get more information.

6. References

Type in next at the end of the tex-file the references of your bibliography. Each reference starts with `\bibitem{}` where `{}` corresponds to the label for each reference.

Comment for advanced LaTeX:

There exists a more advanced bibliography-tool, "BibTeX", which automatically lists your references at the end of your paper in the order of occurrence in the main text of your paper. Furthermore the Bibliography is automatically in the right format (e.g. journal volume in boldface). And last but not least, WebofKnowledge has an icon "RefWorks" which allows you to get the bibtex-text for a specific paper. In case you would like to use BibTeX, copy

```
~kvollmay/classes.dir/capstone_s2015.dir/papers.dir/template_bibincl.tex
```

and also

```
~kvollmay/classes.dir/capstone_s2015.dir/papers.dir/template_bibincl.bib
```

In the header of `template_bibincl.tex` you find a quick description for how to use BibTeX and in the header of `template_bibincl.bib` is a description for how to use WebofKnowledge to save you the typing and search for the complete information about a paper.

Info: For more information please note on our webpage the link "Computer Tools (PHYS 310 Junior Lab)" and the links for "LaTeX Tutorials" (or just ask me).

The next steps will guide you through basic commands of the drawing tool `xfig`.

7. Xfig Intro

I will guide you through the following main commands:

- To get started: Type on the command line: `xfig &`
This will open a new window.
- drawing tools: background grid, circle, line, text, picture, grouping, scaling, copying, editing.
- To save an xfig session use `File → SaveAs` and give your xfig-file a name ending with `.fig`. You can get back to this session any time on the command line with `xfig filename.fig &` or within xfig with `File → Open`.
- To make an eps-file out of your figure use `File → Export`, make sure to choose "EPS (Encapsulated Postscript)" and choose the same filename but with the ending `.eps`. This eps-file can then be included in your latex file for the paper. (Later into the course I will also show you a variation of latex, latex beamer, which we will use to make talk-slides. You will be able to use the same eps-files for the paper and for the talk and therefore your work on the eps-files for your paper will be very handy for your talk preparation.)

Comment for Advanced xfig Users: In case you would like to use latex commands within xfig use the following steps: First copy

`~kvollmay/classes.dir/phys338.dir/phys338_s2015.dir/papers.dir/xfig2eps`
and

`~kvollmay/classes.dir/phys338.dir/phys338_s2015.dir/papers.dir/xfig2pdf`

then make both executable (these are perl-scripts)

`chmod u+x xfig2*`. These xfig2* files will be needed for step (3) below.

Instead of xfig use instead

(1) `xfig -specialtext -latexfonts -startlatexFont default`

(2) first save then export to "Combined PS/LaTeX (both parts)."

This creates two files: `filename.pstex` and `filename.pstex_t`. To then make an eps-file (which you can include in your paper) (3a) `xfig2eps filename`

or to make a pdf-file use

(3b) `xfig2pdf filename`

8. Figure(s) for Model Section

Work on the figure(s) which you will use for the model section and/or background section of your paper.