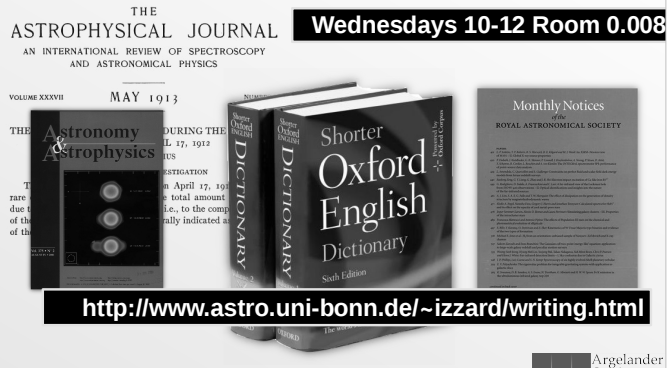
Scientific Writing 6951



Wednesdays 10-12 Room 0.008

http://www.astro.uni-bonn.de/~izzard/writing.html

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Today: Software Tools

- Writing tools
  - WYSIWYG
  - WYSIWYM
- Graphics tools
  - Plotting
  - Diagrams
  - Images
- Web content
- Presentations

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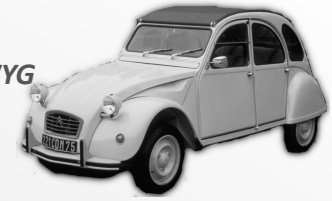
What you see is...

- … what you get. ***WYSIWYG***



- … what you mean. ***WYSIWYM***

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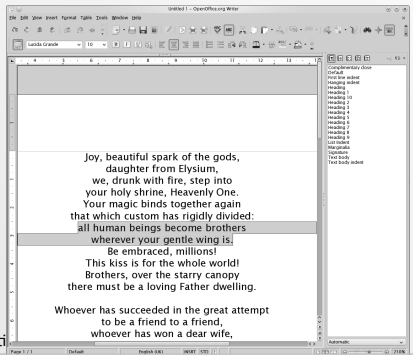
WYSIWYG

…what you see is what you get.

- e.g. Libre/OpenOffice ***Write***, M$ ***Word***



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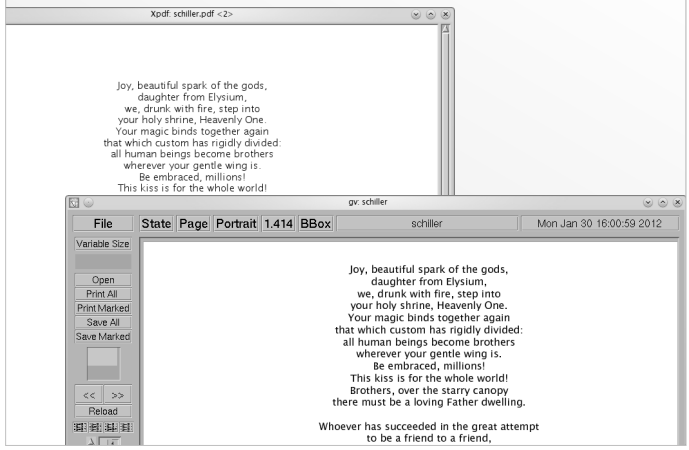
WYSIWYG

… what you see is what you get.

- **Pros**
  - Complete package (templates, graphics, add-ons, spell/grammar check)
  - Easy to use : saves time
  - Often required for e.g. grant applications :(
- **Cons**
  - WYSI ***not quite*** WYG! e.g. multiformat/print
  - Inefficient? (bloated)
  - Journal-compatible? Equations?
  - Expensive? (proprietary software)

Output issues



Proprietary Formats (e.g. doc)

- Always changing!
  - **doc 2000** vs **doc 1997** vs **docx** vs ... etc.
- Compatibility issues

> Following reverse engineering … by ***Sun*** and ***OpenOffice.org***, *Microsoft* released a ***.DOC*** format specification under the ***Microsoft Open Specification Promise***. However, this specification does not describe all of the features used by (the) ***DOC*** format and reverse engineering remains necessary.
> https://en.wikipedia.org/wiki/DOC_(computing)

- **Word** (from 2007) now uses the Open Office XML format by default

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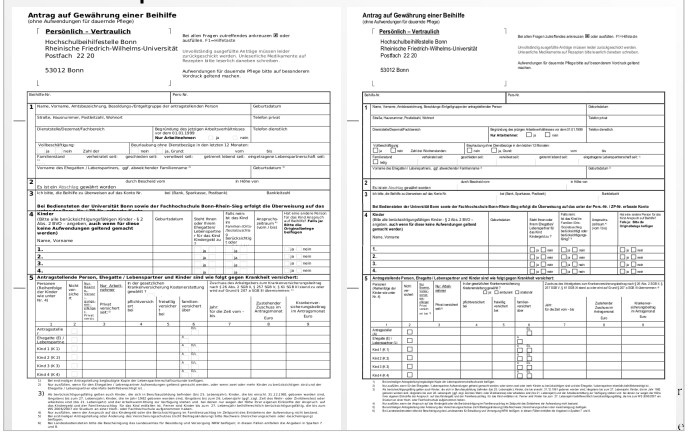
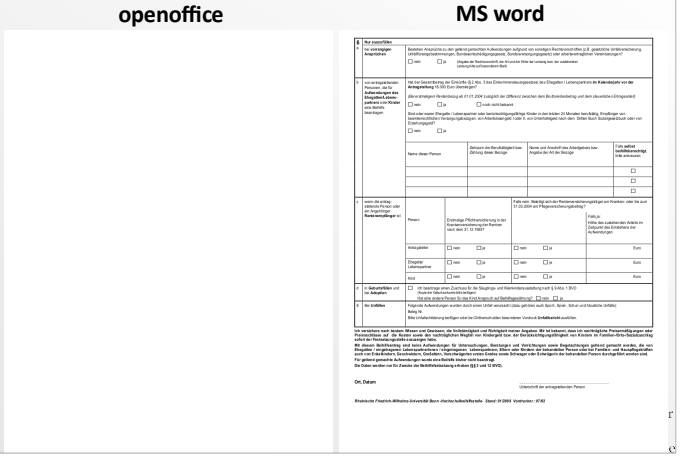
Compatibility issues

openoffice **MS word**



Compatibility issues

openoffice **MS word**



WYSIWYM

...what you see is what you mean.

- Separation of presentation and content:
  - Focus on document contents
  - Looks taken care of for you – don't worry!
- e.g. **LaTeX** & its **editors**

$\LaTeX\ 2_\varepsilon$

LaTeX

- Document **markup** language

  Text annotated with instructions e.g.

```
\begin{document}
Joy, beautiful spark of the gods,
daughter from \textcolor{red}{Elysium},
\textbf{we}, drunk with fire, step into
your holy shrine, \emph{Heavenly One}.
```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LaTeX

- Document **markup** language

  After processing:

Joy, beautiful spark of the gods,
daughter from Elysium,
we, drunk with fire, step into
your holy shrine, *Heavenly One*.

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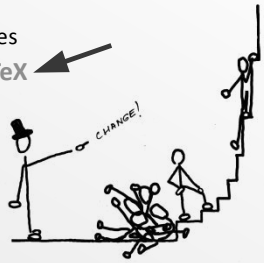
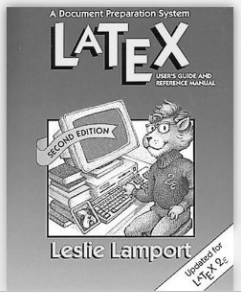
LaTeX

- Advantages
  - Great for scientific work (e.g. equations)
  - Embed graphics, tables etc.
  - Many add-on packages/templates
  - **Astronomy journals use LaTeX**
  - Open format (text file)
  - Export ps/pdf/dvi/html
- Disadvantages
  - Have to **learn** the commands
  - Continuously *compiling* to **ps/dvi/pdf**



LaTeX help

- http://www.latex-project.org/
- https://en.wikibooks.org/wiki/LaTeX
- Lamport's book
  http://www.amazon.com/LaTeX-Document-Preparation-System-2nd/dp/0201529831



BibTeX

- Citation system for LaTeX, use with Natbib
- Keep your citations in one file, download directly from ADS, cite in LaTeX

```
{1994sse..book.....K,
   author = {{Kippenhahn}, R. and {Weigert}, A.},
   title = "{Stellar Structure and Evolution}",
   publisher = {Springer-Verlag},
   year = 1994
}
```

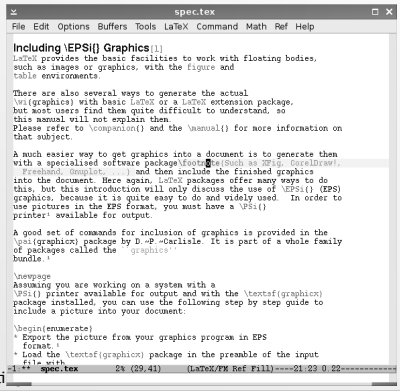
I read \citet{1994sse..book.....K} ten times.

I read Kippenhahn and Weigert (1994) ten times.

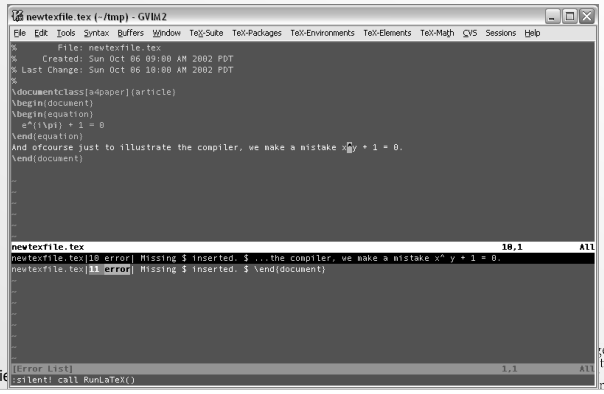
- Bibliography management systems:
  - http://www.zotero.org/
  - http://bibdesk.sourceforge.net/

LaTeX editors

- LaTeX in **emacs** e.g. *AcuTeX*



LaTeX editors



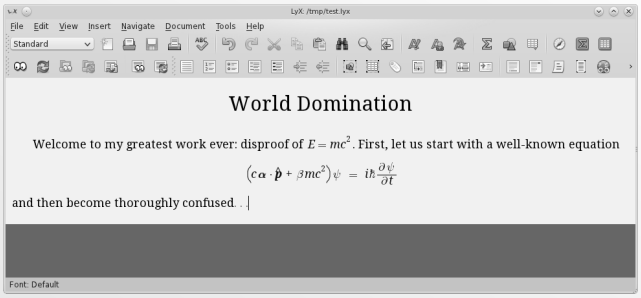
LaTeX editors

- There exist hybrid ***WYSIWYM*** editors for LaTeX e.g.
- LyX ← My favourite!
- TeXShop
- Texmaker
- .... + many more
- See e.g. https://en.wikipedia.org/wiki/Comparison_of_TeX_editors
- LaTeX in Libre/Openoffice
  - TeXMaths http://roland65.free.fr/texmaths/
  - OOOLatex (now defunct?) http://ooolatex.sourceforge.net/
- http://docs.latexlab.org/

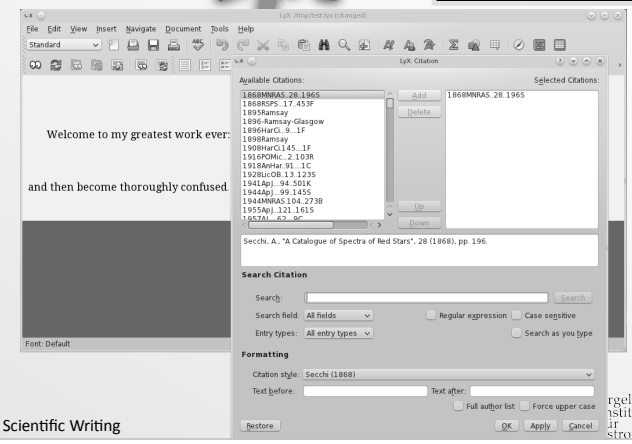
www.lyx.org

- Document **processor**
- Graphical interface to **LaTeX**
- Little effort on your part (just write!)
- Equation editor
- Graphics, tables
- Output to **PDF**, postscript, LaTeX, text, HTML, RTF (>doc), Opendocument (ODF), DVI etc.
- Many extras: spell check, thesaurus, bibliography etc.
- ***A&A*** text class comes as standard! **:)**

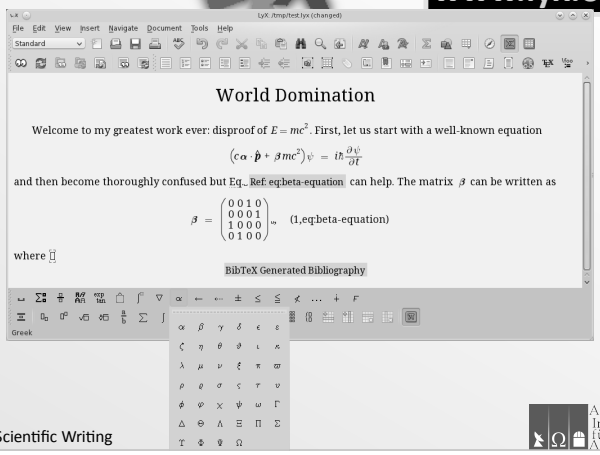
www.lyx.org



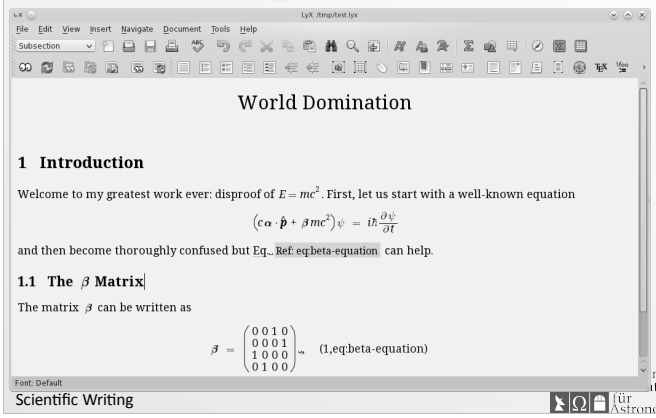
www.lyx.org



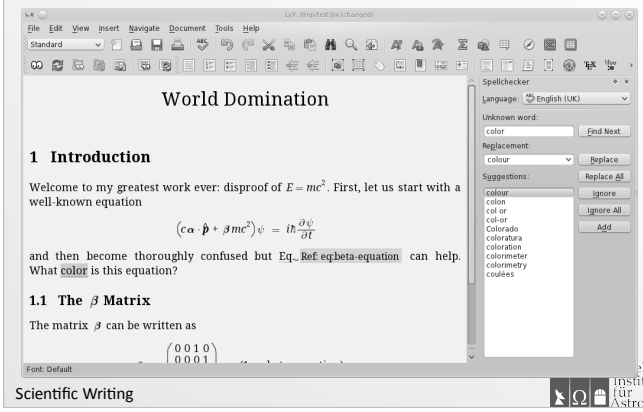
www.lyx.org



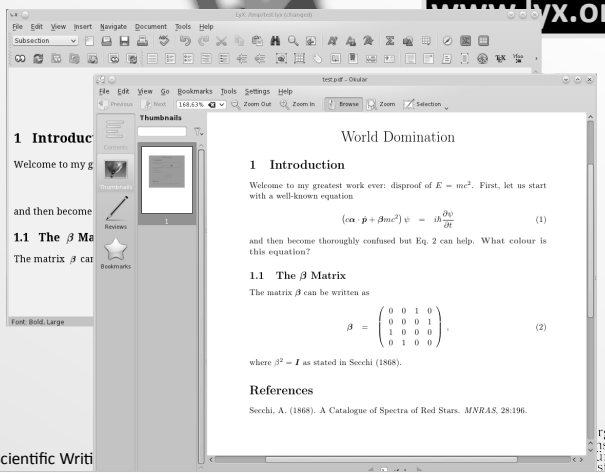
www.lyx.org



www.lyx.org



www.lyx.org



Graphics

- Data-plotting tools
- Vector graphics
- (Bitmap) Graphic editors

Data Plotting

- There are many plotting packages e.g.
  - Micro$oft Excel
  - IDL
  - Supermongo
  - PGPlot
  - Gnuplot
  - Python (SciPy)
- **Many cost money!**
- Demo **Gnuplot** (which is free)

Gnuplot

http://www.gnuplot.info/

- Command-line/scripted plotting program
- Cross-platform, open source, **free**!
- 2D, 3D plots
- Output PNG, PS, JPEG, PDF, bitmap, SVG …
- Interactive window (pan/zoom etc.)

Version 4.6 in Ubuntu 14, or

`/vol/software/software/tools/gnuplot`

Version 5.0 is the latest version, expect this in the next Ubuntu.

Gnuplot

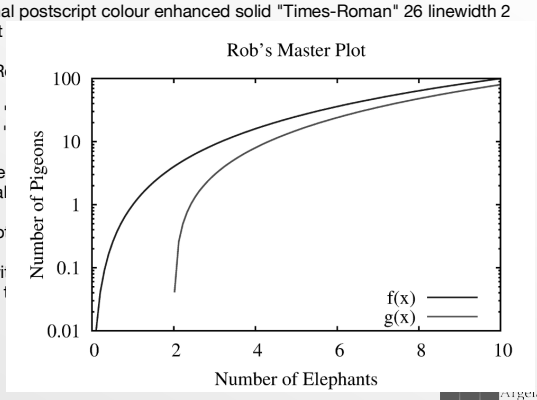
http://www.gnuplot.info/

```
set terminal postscript colour enhanced solid "Times-Roman" 26 linewidth 2
set output "master.ps"

set title "Rob's Master Plot"

set xlabel "Number of Elephants"
set ylabel "Number of Pigeons" offset 3

set xrange[0:10]
set logscale y

set key bottom right

plot x*x with lines linewidth 2 linetype 3 title "f(x)", x*x-2*x with lines linewidth 2
linetype 1 title "g(x)"
```


Gnuplot

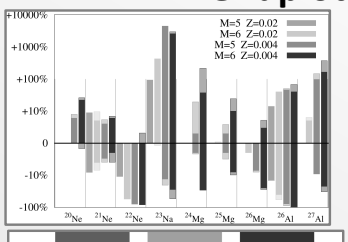
http://www.gnuplot.info/

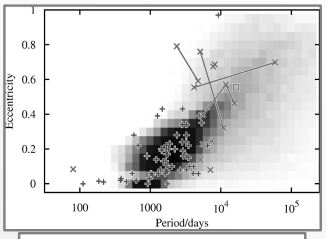
```
set terminal postscript colour enhanced solid "Times-Roman" 26 linewidth 2
set output
set title "R
set xlabel "
set ylabel "
set xrange
set logscal
set key bo
plot x*x wi
linetype 1 t
```

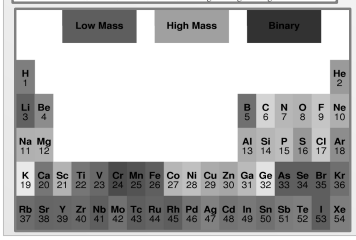


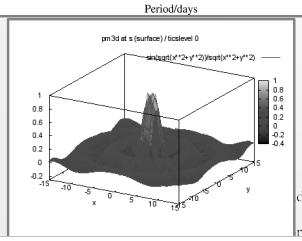
Gnuplot

http://www.gnuplot.info/









Vector Graphics

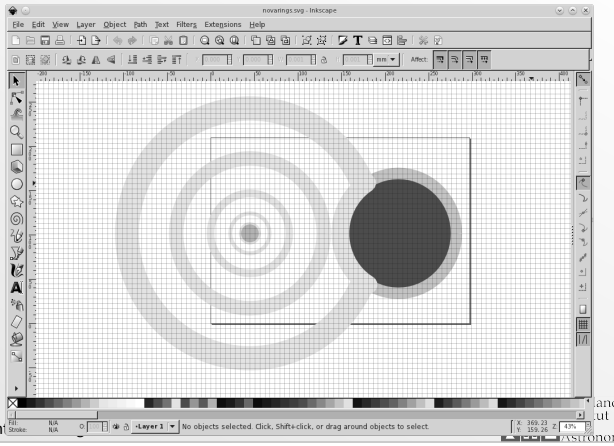
- e.g.
  - *Inkscape* http://inkscape.org/
  - *Xara Xtreme* http://www.xaraxtreme.org/
- SVG (*Scalable Vector Graphics*) files

  i.e. vector/line drawings
- Export to PNG/postscript for talks/web

.jpeg .gif .png

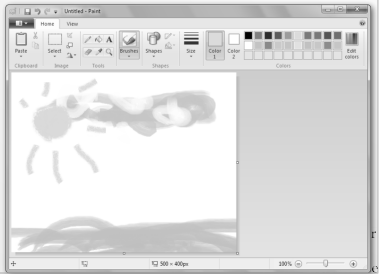
.svg

Vector Graphics



Bitmap graphics editing

- e.g. Adobe Photoshop (300 euros)
- GIMP (free!)
- Imagemagick: command line/scripts (e.g. `convert`)
  - Perl/python library
- Also:
  - Ghostscript
  - Microsoft paint



GIMP

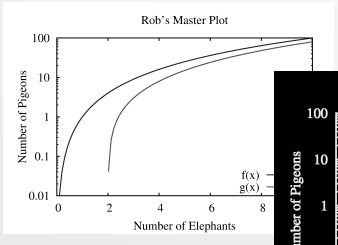
http://www.gimp.org

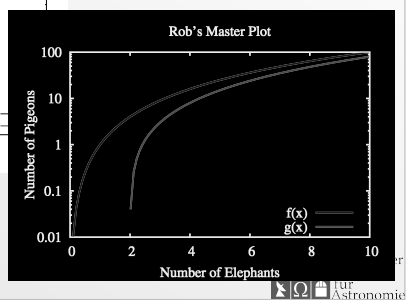
GNU Image Manipulation Program

- Cross-platform, **free**
- Image editing: filters, colours, transformations, etc.
- Many photo editing plugins
- Save as PNG, JPG, PS, PDF … you name it

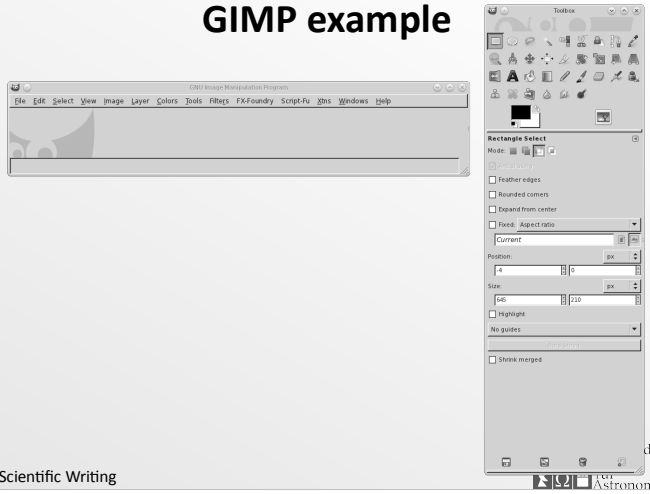
GIMP example

- From ***gnuplot*** postscript to dark-background presentation

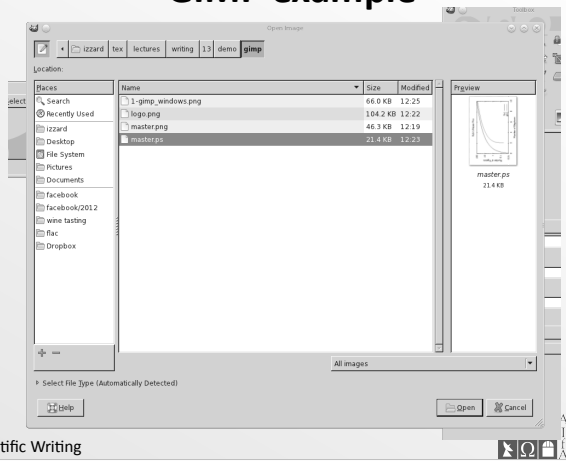




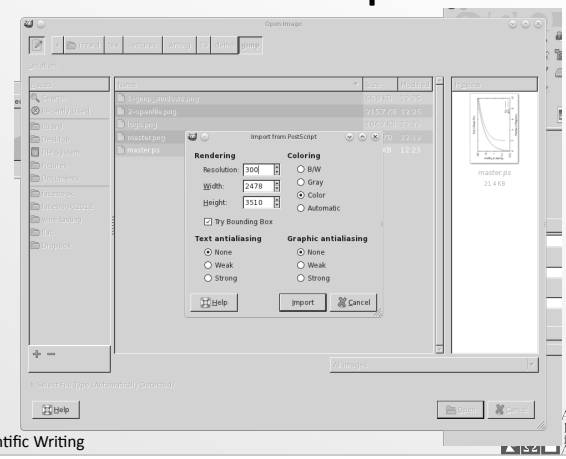
GIMP example



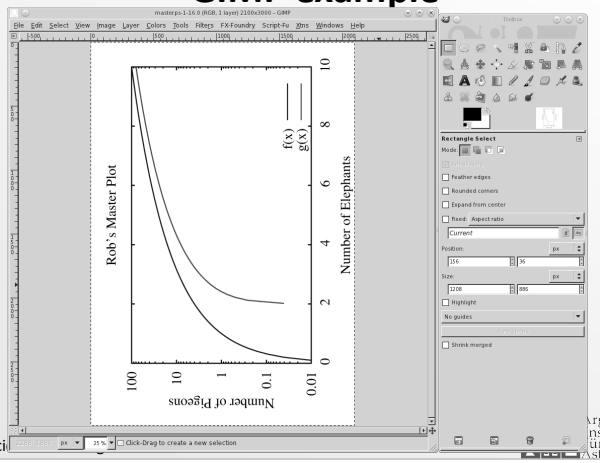
GIMP example



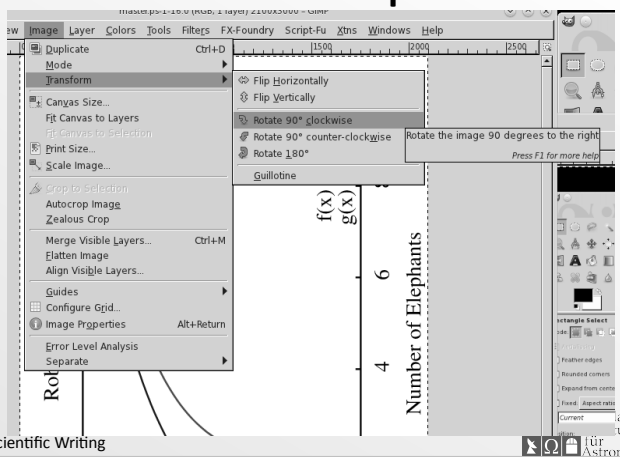
GIMP example



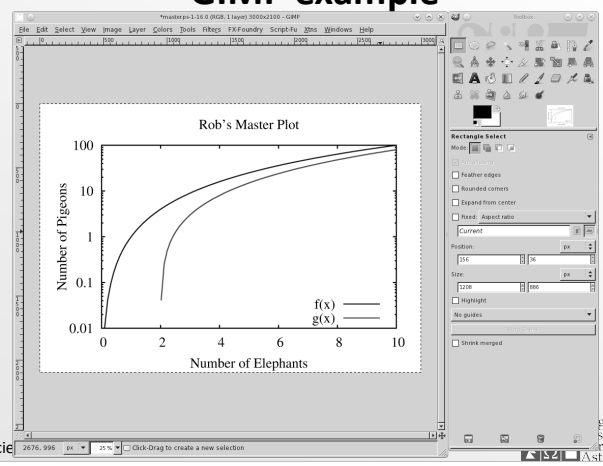
GIMP example



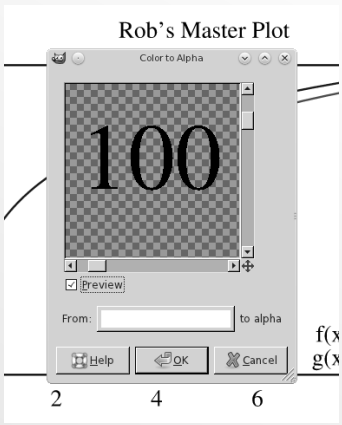
GIMP example



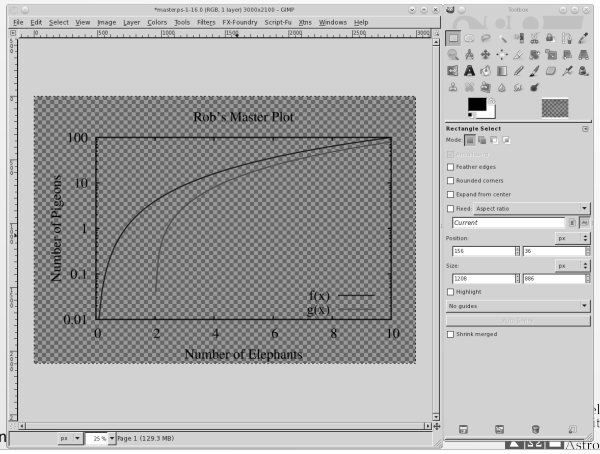
GIMP example



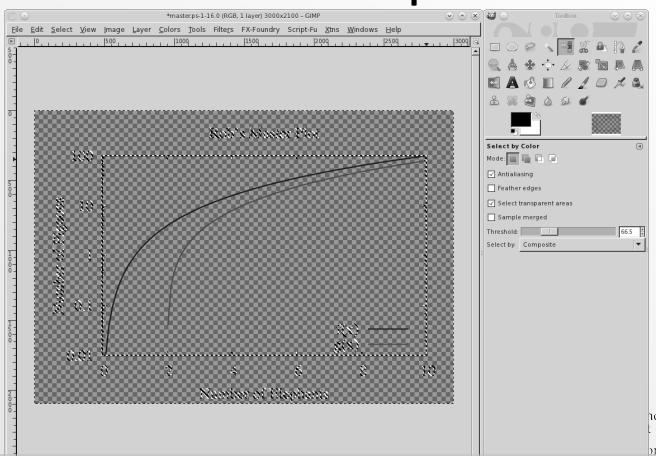
GIMP example



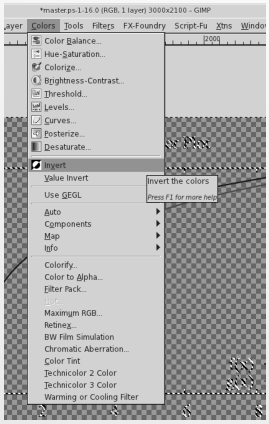
GIMP example



GIMP example



GIMP example



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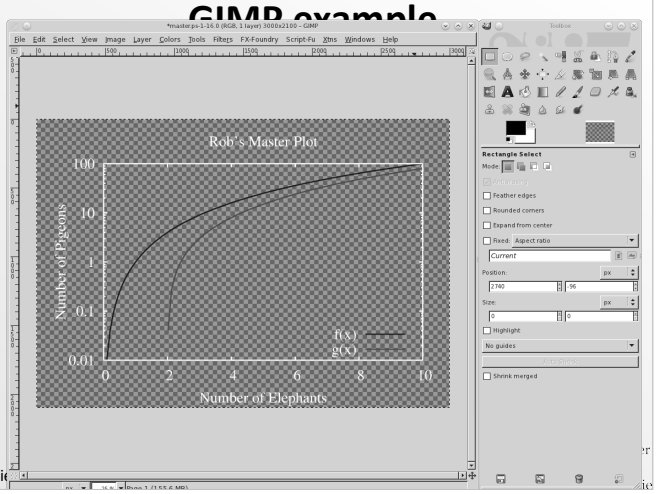
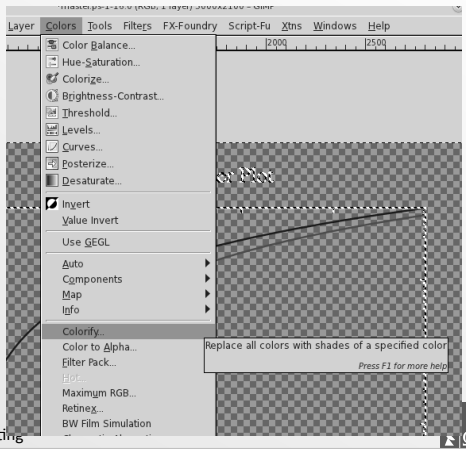
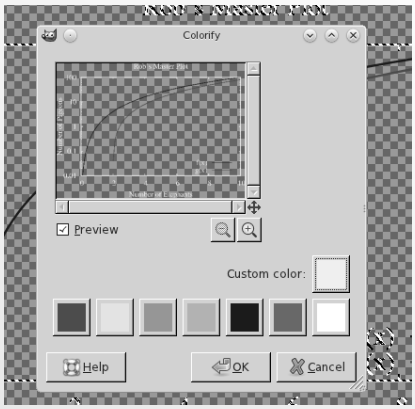


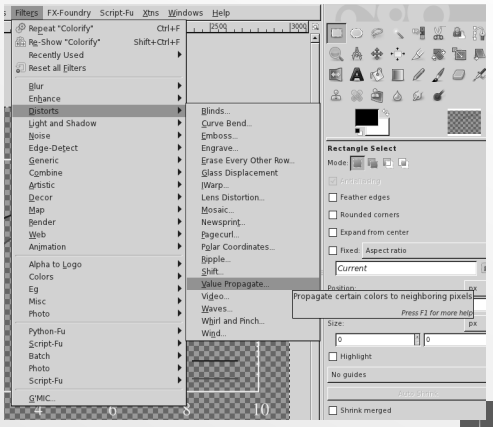
GIMP example



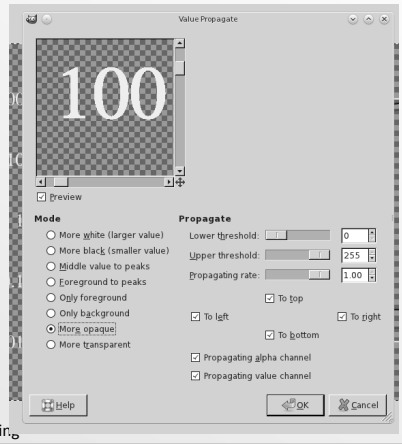
GIMP example

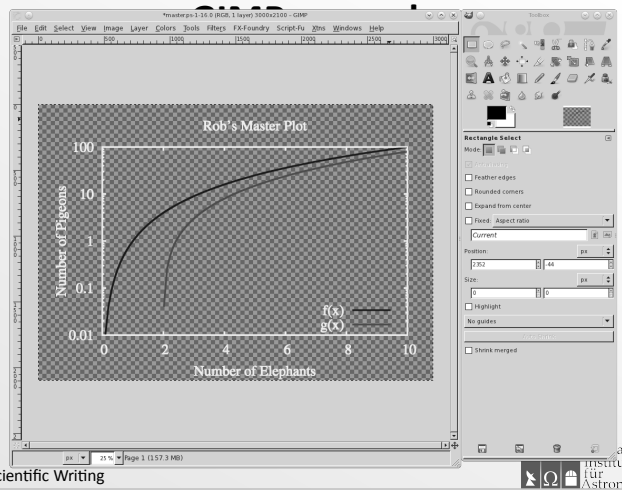


GIMP example

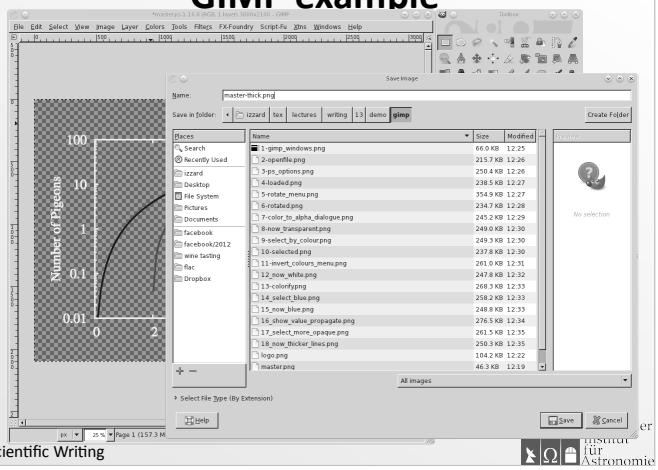


GIMP example

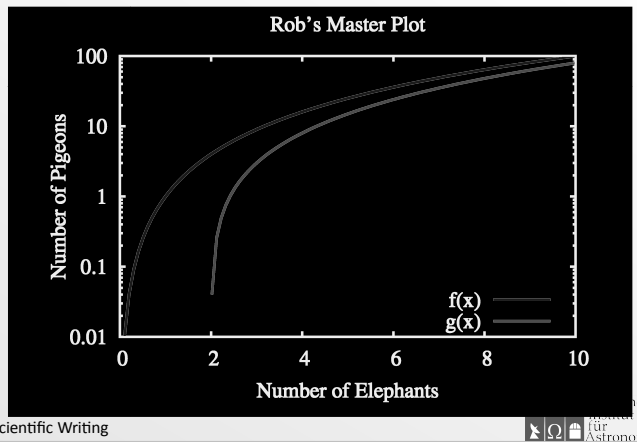




GIMP example



GIMP example

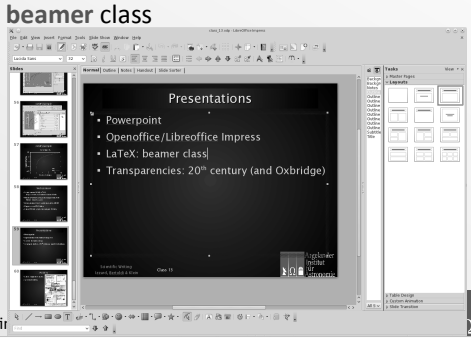


Web content

- Learn some basic **HTML/CSS : it's not difficult!** http://www.w3schools.com/html/
- Word/Ooffice/Apple software (etc.) can output huge **bloated HTML**: don't use it (unless you have to?)
- **Macs** output text as bitmap images (!!!) **ARGH**
- Papers on your website: use links to **PDF** files
- Latex2HTML? (LyX can output HTML)
- You can use **Typo3** on AIfA's website

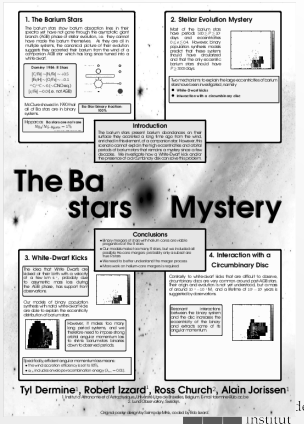
Presentations

- **Powerpoint**: classic *Micro$oft* bloatware
- Apple's *Keynote*
- Openoffice/Libreoffice **Impress** (free bloatware!)
- LaTeX: **beamer** class



Posters

- LaTeX *sciposter* class
- **Scribus**
- Read "Posters" chap. of ***Eloquent Science***
- **Walk around the *AIfA***: look at the posters
- What do you **like**?
- What is **terrible**? (there are some … :)



Nearly the end

- **Please fill in the questionnaire!**