Useful Software/Tricks You Should Know

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Gatsby Tea Talk

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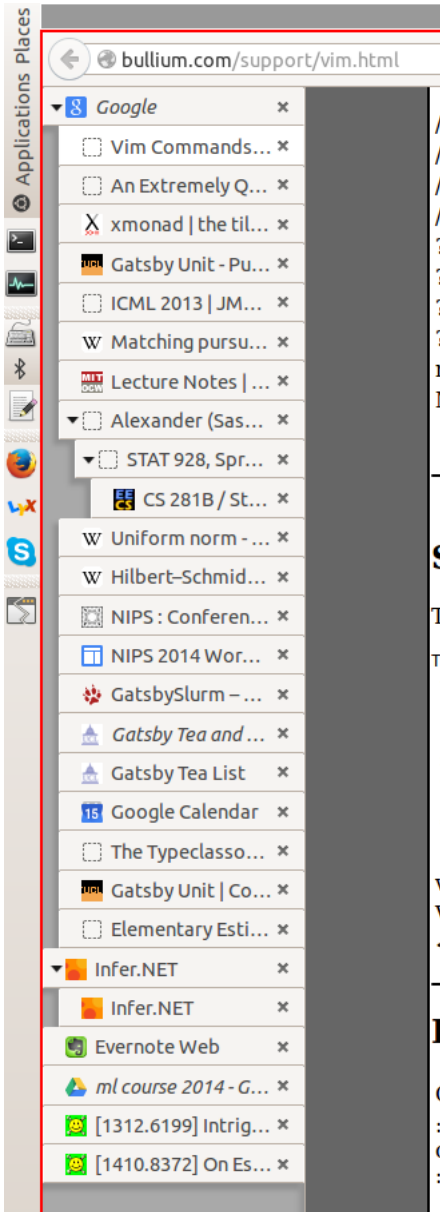
Gmail tricks

- Filter messages like these
- Labeling
- Priority inbox
- Advanced search
  (https://support.google.com/mail/answer/7190?hl=en)
  - from:someone@example.com
  - filename:pdf (has a PDF as an attachment)
  - label:ml-news

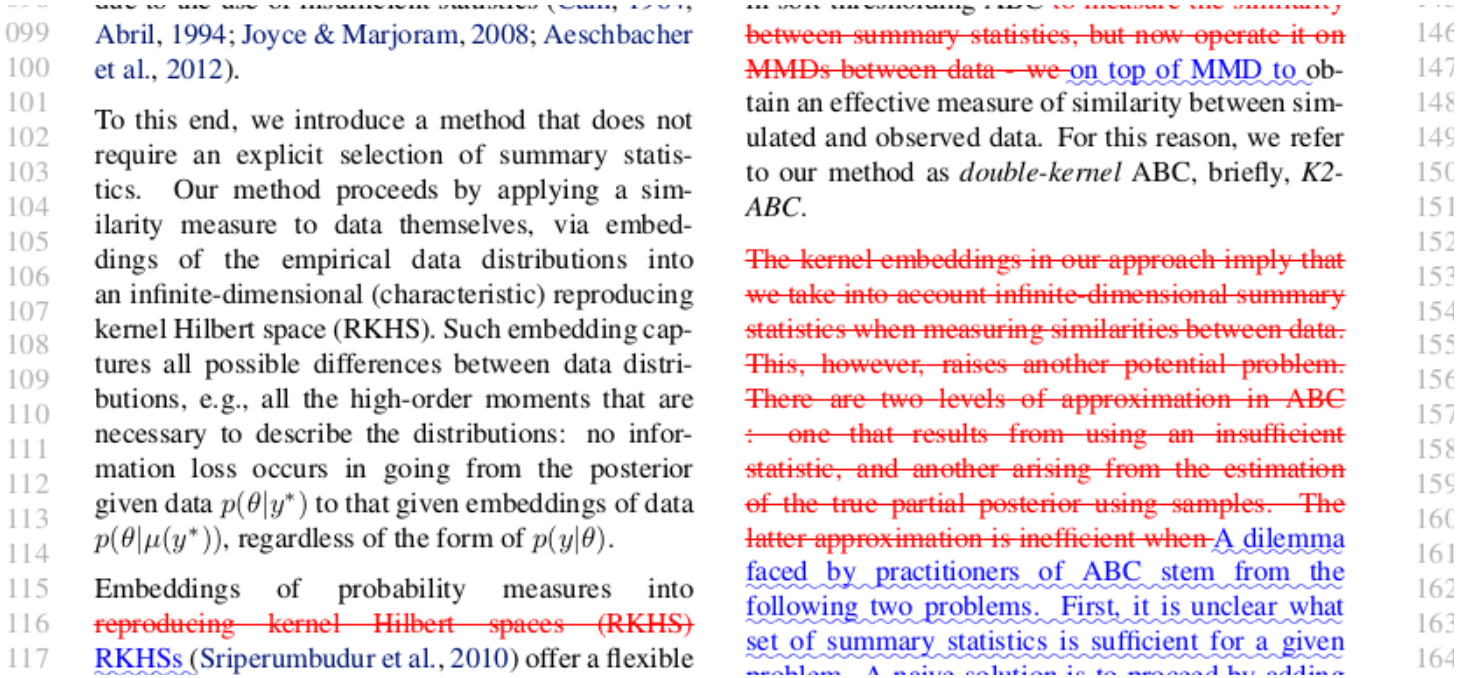
Firefox Plugin: Tree Style Tab



- **Tree Style Tab**
- Useful when you open too many tabs
- Display tabs vertically
- Many similar plugins for Chrome.

latexdiff

- See the difference of two latex files **in pdf**.
  - latexdiff old.tex new.tex > diff.tex
  - Compile diff.tex
- Addition. Deletion.



Abril, 1994; Joyce & Marjoram, 2008; Aeschbacher et al., 2012).

To this end, we introduce a method that does not require an explicit selection of summary statistics. Our method proceeds by applying a similarity measure to data themselves, via embeddings of the empirical data distributions into an infinite-dimensional (characteristic) reproducing kernel Hilbert space (RKHS). Such embedding captures all possible differences between data distributions, e.g., all the high-order moments that are necessary to describe the distributions: no information loss occurs in going from the posterior given data $p(\theta|y^*)$ to that given embeddings of data $p(\theta|\mu(y^*))$, regardless of the form of $p(y|\theta)$.

Embeddings of probability measures into ~~reproducing kernel Hilbert spaces (RKHS)~~ RKHSs (Sriperumbudur et al., 2010) offer a flexible

~~between summary statistics, but now operate it on MMDs between data - we~~ on top of MMD to obtain an effective measure of similarity between simulated and observed data. For this reason, we refer to our method as *double-kernel* ABC, briefly, *K2-ABC*.

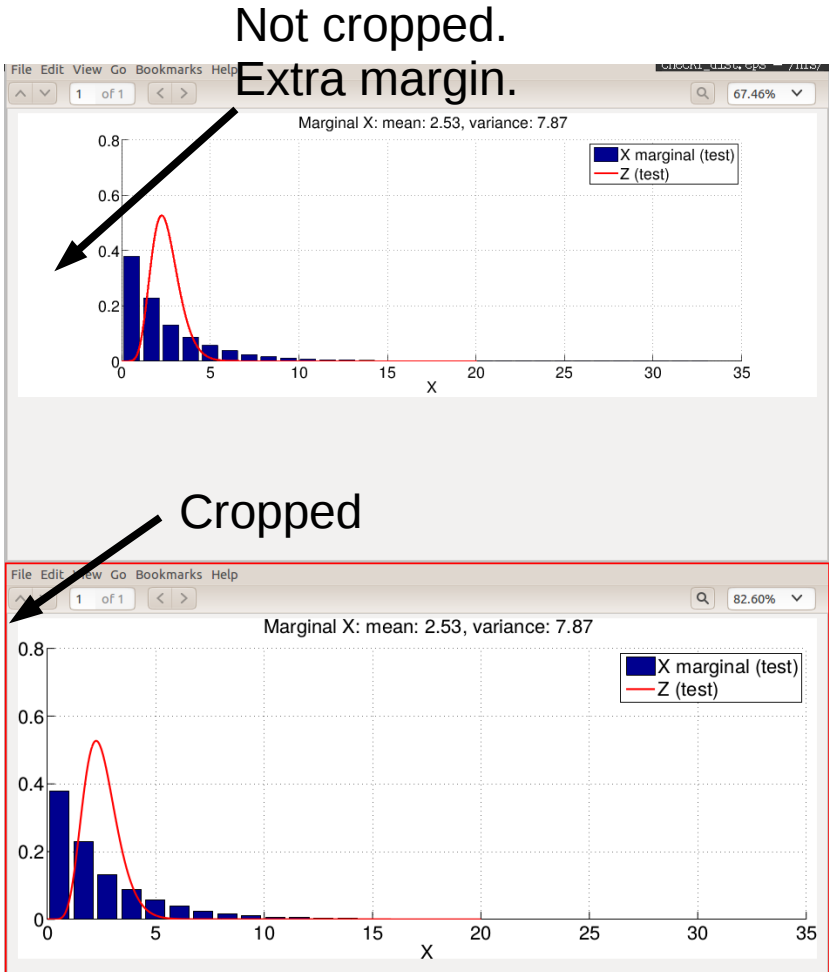
~~The kernel embeddings in our approach imply that we take into account infinite-dimensional summary statistics when measuring similarities between data. This, however, raises another potential problem. There are two levels of approximation in ABC : one that results from using an insufficient statistic, and another arising from the estimation of the true partial posterior using samples. The latter approximation is inefficient when~~ A dilemma faced by practitioners of ABC stem from the following two problems. First, it is unclear what set of summary statistics is sufficient for a given

screen / byobu / tmux

- Text-based terminal multiplexer
- Shortcut reference
- Cheatsheet
- https://gist.github.com/henrik/1967800
- Detachable. Still run after logging off.
- Can attach the same screen back after logging in.
- Useful for remote log in.

EPS Crop Script

- EPS figures usually have extra margin.
- Script
  - Remove extra margin from all EPS files in current directory.
  - For each Plot.eps, produce
    - Plot-crop.eps
    - Plot-crop.pdf



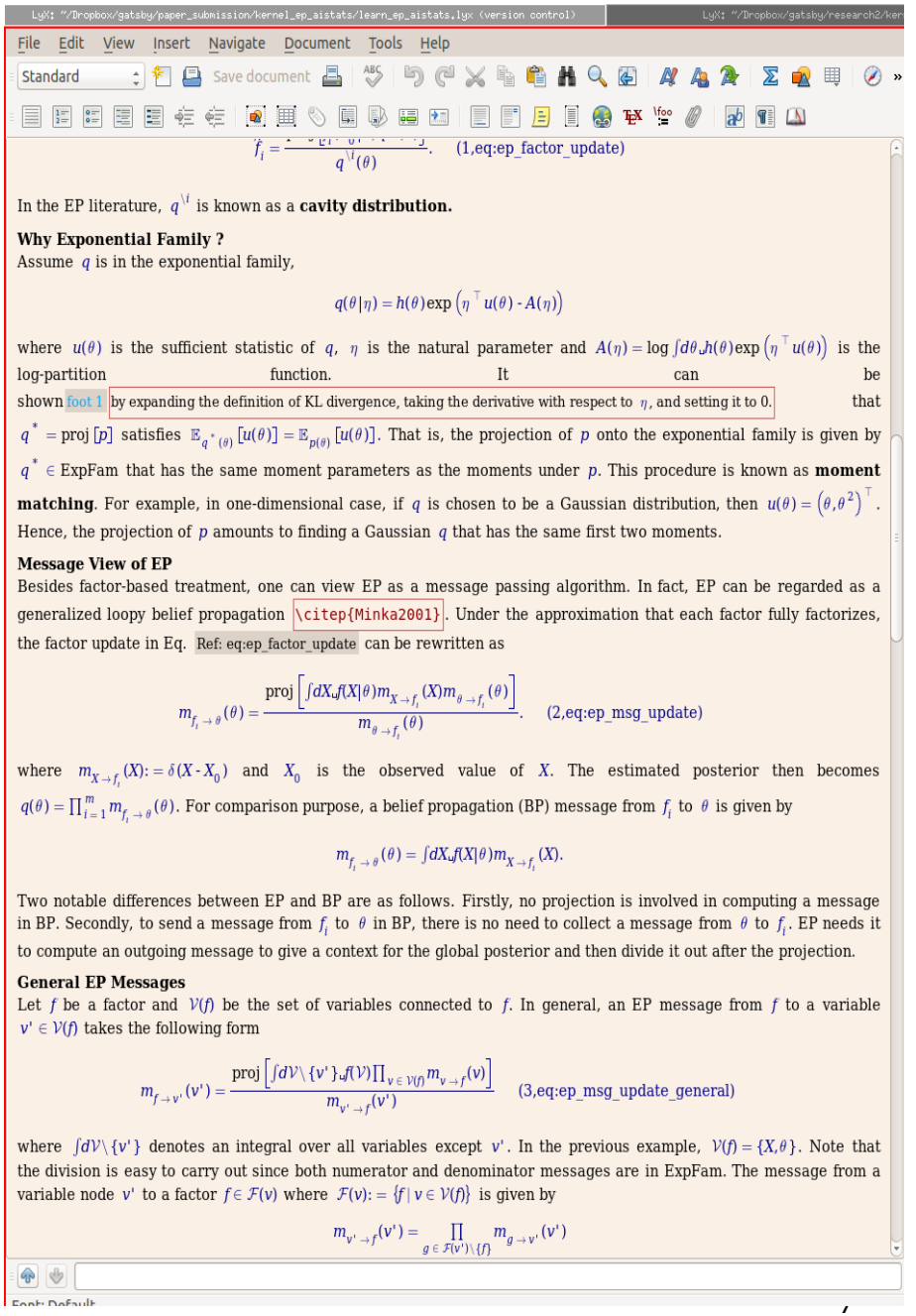

```
$ cat processeps.sh

#!/bin/bash
```

```
for f in $(find $(pwd) -maxdepth 1 -type f -name "*.eps" -not -name "*-crop.eps")
do
     ps2pdf -dEPSCrop $f
     pdfcrop $(basename $f ".eps")“.pdf“
     pdftops -eps $(basename $f ".eps")"-crop.pdf" $(basename $f ".eps")"-crop.eps"
done
```

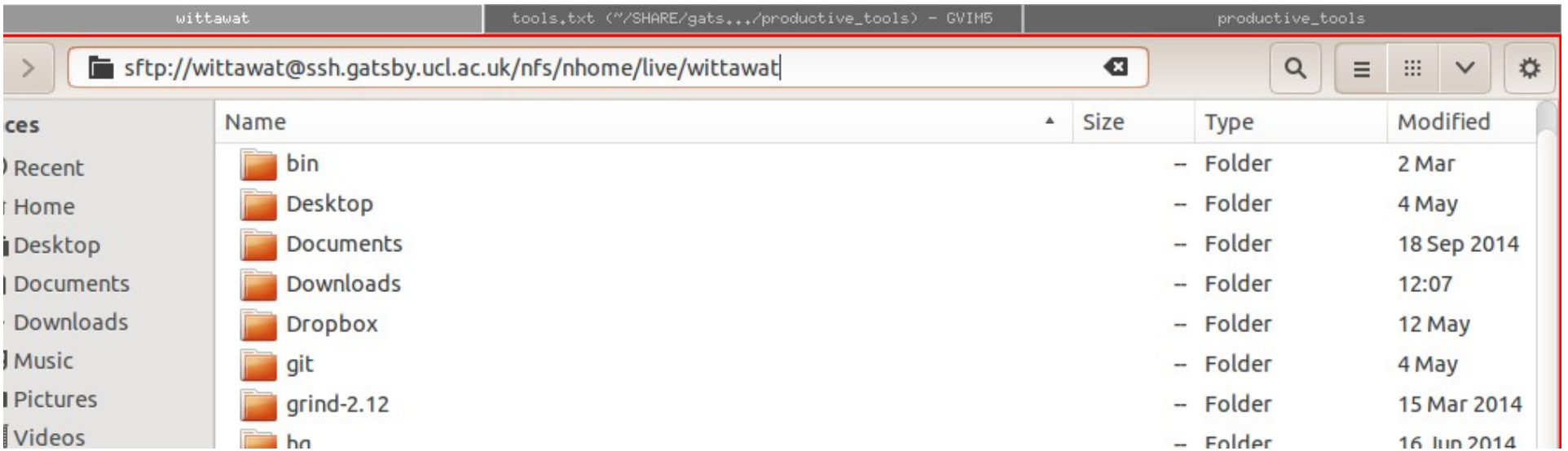
Lyx

- Latex-backed document processor with graphical interface.
- Can be exported to Latex.
- Fast for typing equations.
- Work with Latex template e.g., NIPS template.



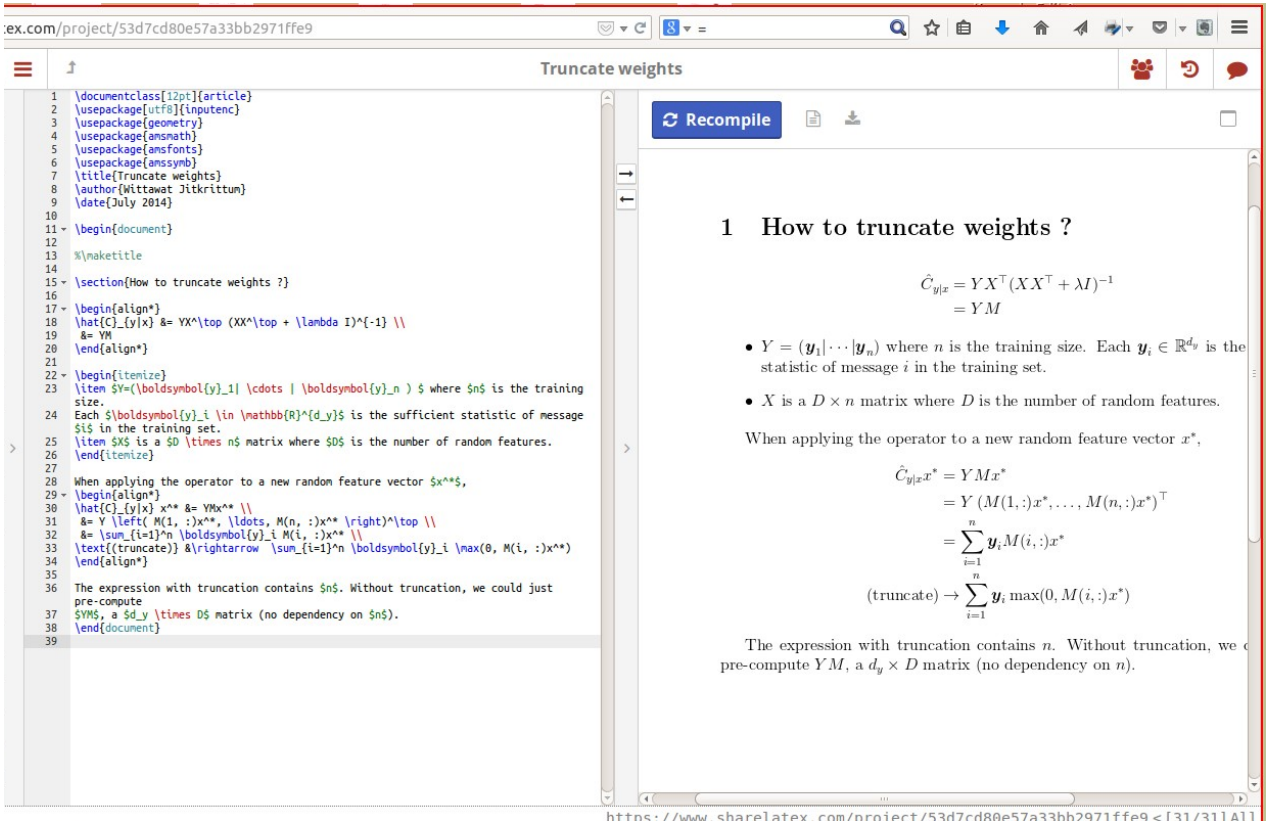
sftp + nautilus in Linux

- sftp = SSH File Transfer Protocal
- Nautilus supports sftp.
- Can browse remote files with Nautilus GUI.
- sftp://username@ssh.gatsby.ucl.ac.uk/some/path/



sharelatex.com

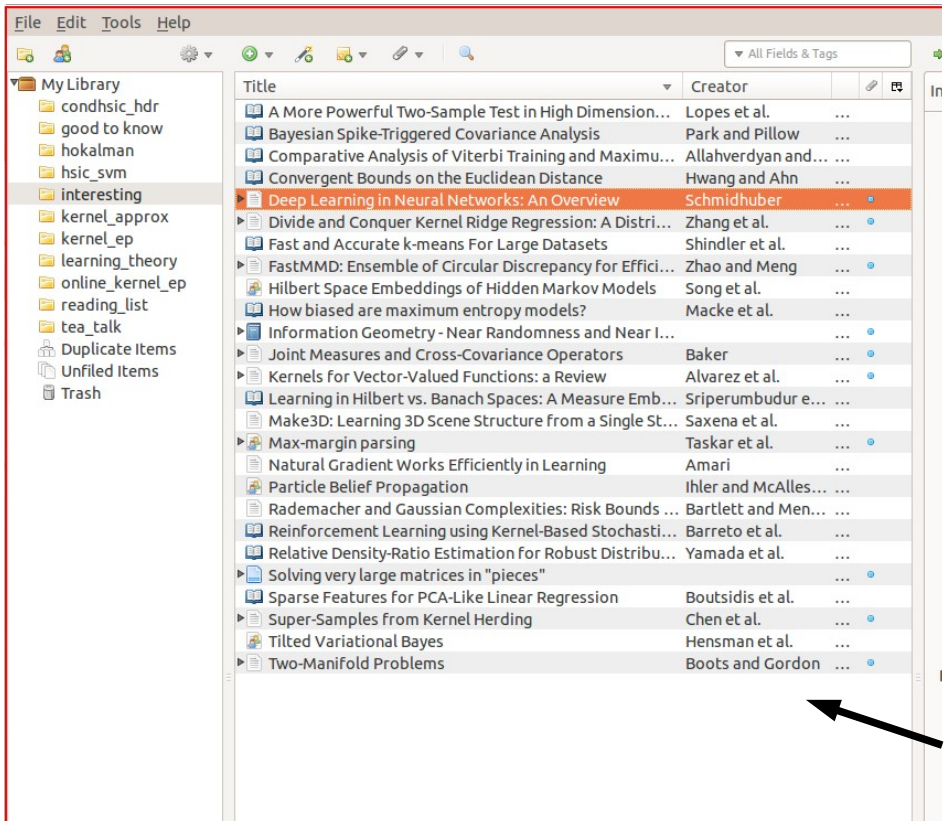
- Free online realtime collaborative Latex editor.
- Just share URL.



- Viewers do not need to register.
- If made public, anyone can edit.

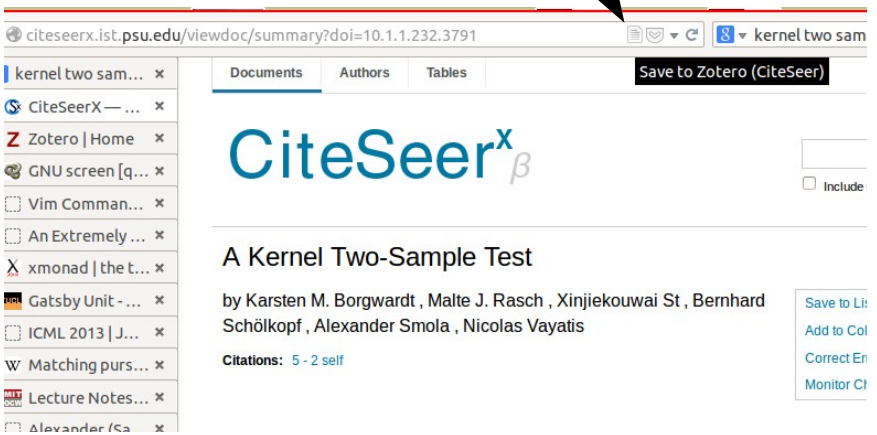
Zotero + Zotero Firefox Plugin

- Bibliography management tool. Need to register at zotero.org
- All information stored online.
- Ability to export to .bib file.
- Zotero Firefox plugin



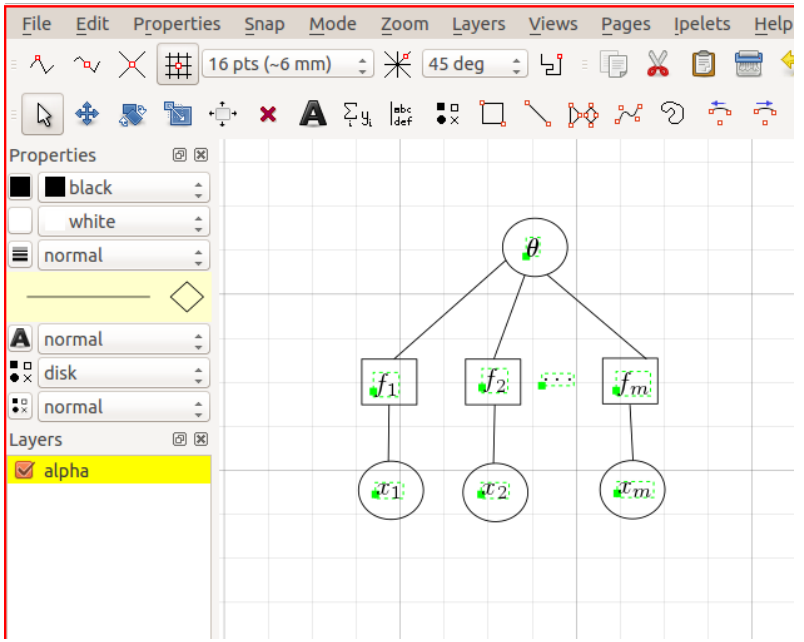
Zotero Linux client

'Save to Zotero'
In Firefox



ipe

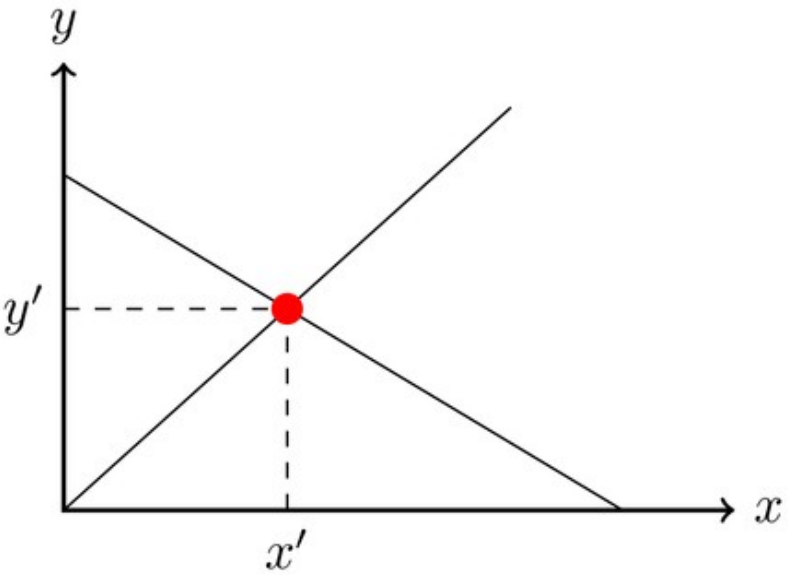
- Drawing editor for creating figures in PDF or EPS.
- Support Latex.



- Alternative to tex-based Tikz (for high precision figures).
- Tikz script is embedded in Latex file. Compile to generate a figure.

Tikz

```
\documentclass{article}
\usepackage{tikz}
\begin{document}
\begin{tikzpicture}[scale=1.5]
   % Draw axes
   \draw [<->,thick] (0,2) node (yaxis) [above] {$y$}
      |- (3,0) node (xaxis) [right] {$x$};
   % Draw two intersecting lines
   \draw (0,0) coordinate (a_1) -- (2,1.8) coordinate (a_2);
   \draw (0,1.5) coordinate (b_1) -- (2.5,0) coordinate (b_2);
   % Calculate the intersection of the lines a_1 -- a_2 and b_1 -- b_2
   % and store the coordinate in c.
   \coordinate (c) at (intersection of a_1--a_2 and b_1--b_2);
   % Draw lines indicating intersection with y and x axis. Here we use
   % the perpendicular coordinate system
   \draw[dashed] (yaxis |- c) node[left] {$y'$}
      -| (xaxis -| c) node[below] {$x'$};
   % Draw a dot to indicate intersection point
   \fill[red] (c) circle (2pt);
\end{tikzpicture}
\end{document}
```



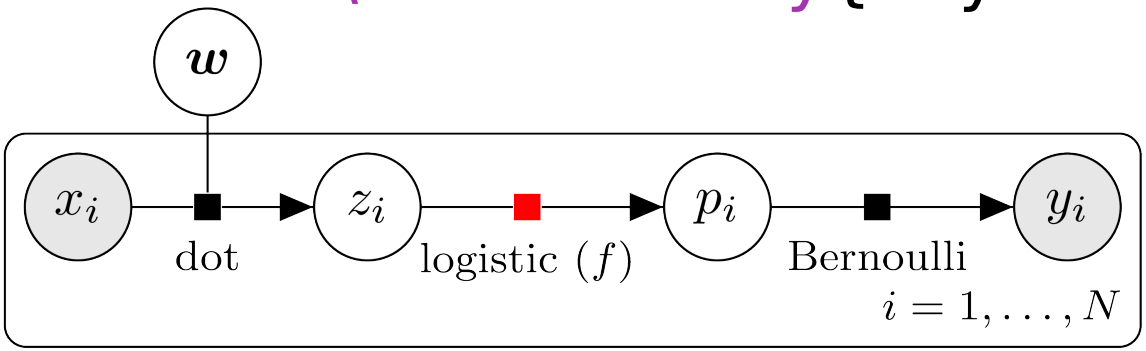
Tikz-bayesnet

```
\begin{tikzpicture}
 \node[obs] (x) {$x_i$};
 \bayesfactor[right= of x] {dot} {below:dot} {} {};
 \node[latent, above = 5mm of dot] (w)
    {$\boldsymbol{w}$};
 \node[latent, right = 6mm of dot] (z) {$z_i$};
 \bayesfactor[right= 6mm of z, color=red]
    {logistic} {below:logistic} {} {};
 \node[latent, right = 6mm of logistic] (p) {$p_i$};
 \bayesfactor[right = 6mm of p] {bern}
   {below:Bernoulli} {} {};
 \node[obs, right = 6mm of bern]  (y)   {$y_i$}; %
 \edge[-] {dot} {x} ;
 \edge[-] {w} {dot};
 \edge[-] {dot} {z} ;
 \edge[-] {z} {logistic} ;
 \edge[-] {logistic} {p};
 \edge[-] {p} {y} ;

 \plate {sample} { %
   (x)  (z) (p) (y)
 } {$i=1, \ldots, N$} ;
\end{tikzpicture}
```

- Tikz library for drawing Bayesian networks.
- https://github.com/jluttine/tikz-bayesnet
- Good documentation, examples.
- Save tikzlibrarybayesnet.code.tex to the Latex source folder.

```
\usepackage{tikz}
\usetikzlibrary{bayesnet}
```



Graphviz

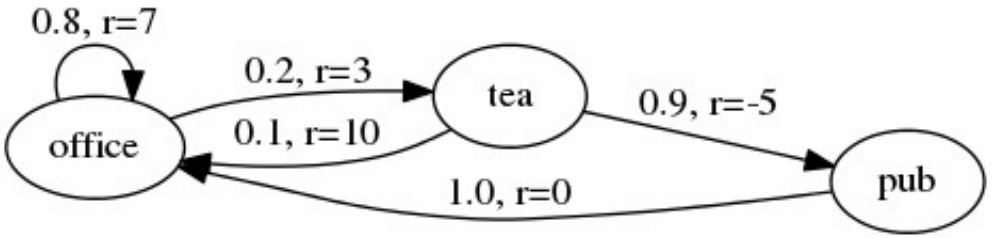
```
digraph mrp {
   rankdir=LR

   o [label="office"]
   s [label="tea"]
   h [label="pub"]

   o -> s [label="0.2, r=3"]
   o -> o [label="0.8, r=7"]
   s -> h [label="0.9, r=-5"]
   s -> o [label="0.1, r=10"]
   h -> o [label="1.0, r=0"]

}
```

- www.graphviz.org
- Generate graphs/diagrams from a “dot“ language source file.
- **dot -Tpng source.dot > target.png**
- Automatically arrange nodes and edges.



Vim / Gvim

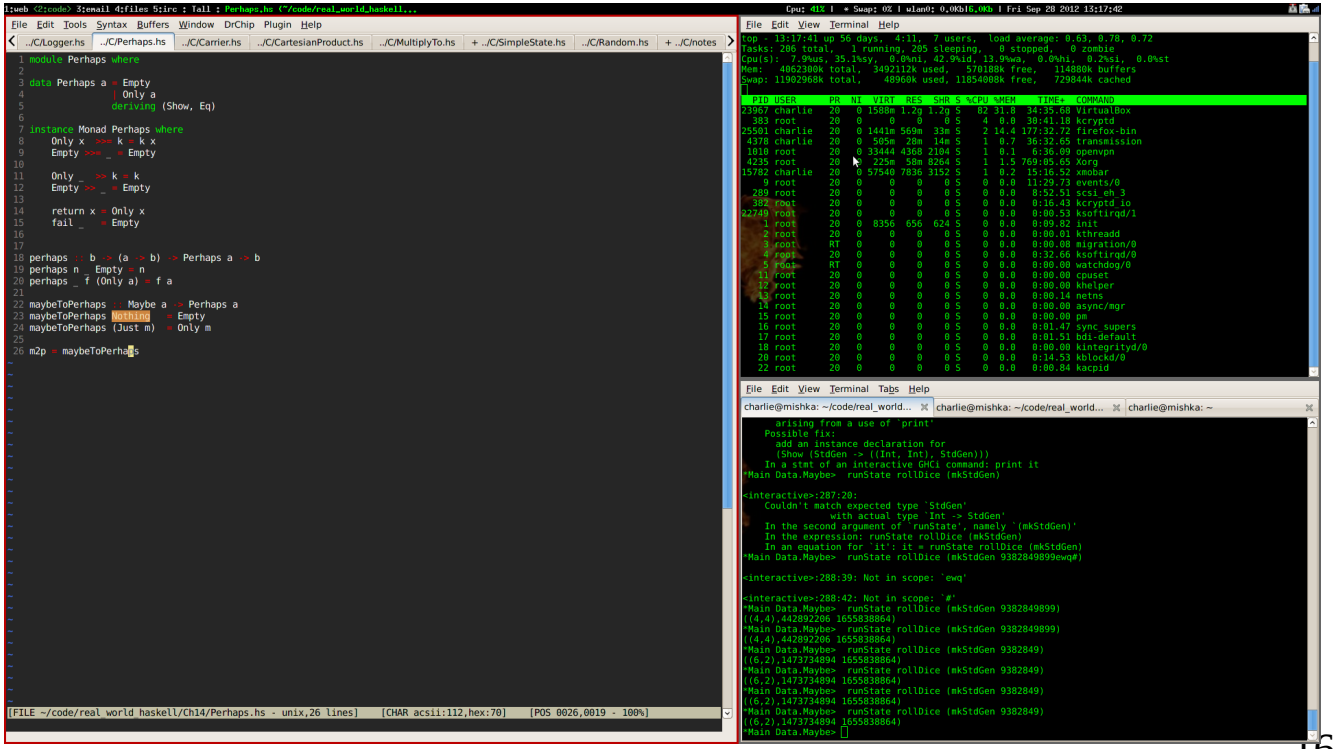
- Standard text editor on Linux. 30 years old.
- Tons of nifty keyboard shortcuts that can improve coding speed.
- Run `vimtutor` for a tutorial.
- Example commands:

command	description
w	Move one word
4w	Move 4 words
dw	Delete a word
dd	Delete line
dt)	Delete until)

command	description
A	Append line
yw	Yank (copy) a word
:%/target/replace/g	Replace “target“ with “replace“
.	Repeat last change
:20	Go to line 20

Xmonad

- Dynamically tiling window manager
- Written and configured in Haskell.
- Windows maximized by default.
- Resizing, moving, switching workspaces can be done without mouse.



Tikz Example

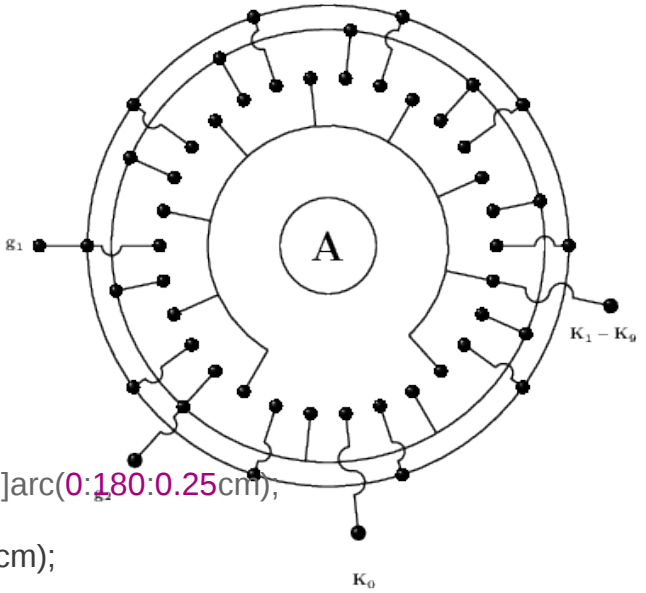
```
\begin{tikzpicture}[line width=1.1pt]
    \draw(0,0) circle(5cm);
    \draw(0,0) circle(1cm);
    \draw(0,0) node {\Huge$\mathbf{A}$};
    \draw(0,0) circle(4.5cm);
    \draw(-48:2.5) arc(-48:240:2.5cm);
    %% The outer nodes
    \foreach \x in {36,72,...,360}
        \shade[ball color=black](\x:5) circle(4pt);
    \foreach \nodes in {12,24,...,360}
        \shade[ball color=black](\nodes:3.5) circle(4pt);
    %%% The connecting nodes
    \foreach \angle in {-48,-12,...,240}
        \draw(\angle:2.5) --++(\angle:0.9cm);
    %%% outer interconnects
    \foreach \angle in {-24,12,...,306}
        \draw(\angle:3.6) --++(\angle:0.9cm);
    \foreach \y in {-24,12,...,240}
        \shade[ball color=black](\y:4.5cm) circle(4pt);
    %% outer most connections
    \foreach \angle in{-36,0,...,306}
        \draw(\angle:4.9cm) --(\angle:4.7cm)
[rotate=\angle]arc(0:180:0.20cm);
    \foreach \angle in{-36,0,...,306}
        \draw(\angle:4.3cm) --(\angle:3.6cm);
    %% Outer connects and leads
    \shade[ball color=black](276:6) circle(4pt);
    \draw(276:6)circle(4pt)--(276:5.2)[rotate=276]arc(0:180:0.25cm);
    \draw(276:7)node {$\mathbf{K_0}$};
    \draw(276:4.2)[rotate=276]arc(180:360:0.25cm);
    \draw(276:4.2)--(276:3.5);

    %% Exploitation of circular symmetry of the required figure

    {[rotate=72]
        \shade[ball color=black](276:6) circle(4pt);
        \draw(276:6)circle(4pt)--(276:5.2)
[rotate=276]arc(0:180:0.25cm);
        \draw(270:6)node {$\mathbf{K_1-K_9}$};
        \draw(276:4.2)[rotate=276]arc(180:360:0.25cm);%%%
        \draw(276:4.2)--(276:3.5);
    }

    {[rotate=-48]
        \shade[ball color=black](276:6) circle(4pt);
        \draw(276:6)circle(4pt)--(276:5.2)
[rotate=276]arc(0:180:0.20cm);
        \draw(276:7)node {$\mathbf{g_2}$};
        \draw(276:4.8)--(276:4.5);
    }

    \draw(180:5)--(180:6);
    \shade[ball color=black](180:6) circle(4pt);
    \draw(180:6.5)node{$\mathbf{g_1}$};
\end{tikzpicture}
```



Thank you