




# Technical Writing and Presentation

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Thursday 18th May, 2017

## Proudly created by

Except for the figures created by Matlab[1], this thesis has been created by *open source software* (OSS) packages. Special thanks go to the numerous generous developers behind the following projects:

**GNU project** free software, mass collaboration project aiming to give users freedom

**LaTeX** document markup language

**TeX Live** cross-platform LaTeX distribution

**MiKTeX** LaTeX distribution for Windows

**LyX** cross-platform LaTeX-based document preparation system

**Beamer** LaTeX class for creating presentation slides and handouts

**Inkscape** cross-platform vector graphics editor

**TeX Text** Inkscape plugin for creating and editing LaTeX formulae

**Other** great projects I failed to mention ...

## Other software packages

Other software packages that greatly helped me during this research include:

**Areca** cross-platform incremental backup package

**pdfcrop** a tool for removing white margins of a pdf file; indispensable for exported Matlab figures

**GoldenDict** cross-platform feature-rich dictionary lookup program

[1] For your information, NumPy + SciPi + Matplotlib + Spyder offer very competitive alternative to Matlab. For Windows, all these packages and more are distributed by *Python(x,y)*.

# Table of Contents

# 1 Open Source Software (OSS)

- It is a software whose source code is published and made available to the public, enabling anyone to copy, modify and redistribute the source code without paying royalties or fees.
- It is very often developed in a public/collaborative manner through community cooperation
  - These communities are composed of individual programmers as well as very large companies
  - Many of the individuals programmers who start an open source project usually end up as large companies with open source programs

1

### Notable Open Source Projects

#### Application Software

- 7-Zip
- Blender
- Eclipse
- GIMP
- Inkscape
- Firefox
- Chromium
- Thunderbird
- NASA World Wind
- OpenOffice.org
- LibreOffice
- PrestaShop

#### Programming Languages

- Perl
- PHP
- Python
- Ruby

#### Operating Systems

- Android
- FreeBSD
- Linux
- OpenIndiana
- ReactOS
- Haiku

#### Server Software

- Apache
- Drupal
- MediaWiki
- MongoDB
- Moodle
- WordPress
- TYPO3

2

### Useful Links

- Introduction to Open Source Software (in Arabic) (http://ojuba.org/wiki/%D9%85%D9%82%D8%AF%D9%85%D8%A9_%D9%81%D9%8A_%D8%A7%D9%84%D8%A8%D8%B1%D9%85%D8%AC%D9%8A%D8%A7%D8%AA_%D8%A7%D9%84%D8%AD%D8%B1%D8%A9)
- Open source is the backbone for Startups (http://www.findbestopensource.com/article-detail/open-source-startups)

- How to contribute to open source (http://www.findbestopensource.com/article-detail/contribute-to-opensource)
- en.opensuse.org/portal:How_to_participate
- How to learn from open source projects (http://www.findbestopensource.com/article-detail/learn_from_open-source)
- How to make money from Open Source (http://www.findbestopensource.com/article-detail/make_money_opensource)
- Arabic websites
  - http://www.linuxac.org
  - http://itwadi.com
  - http://www.ojuba.org/
- Imagine Publishing
  - Linux User&Developer magazine (www.linuxuser.co.uk/)
  - Linux Tips, Tricks, Apps & Hacks (https://www.imagineshop.co.uk/bookazines.html)
  - Linux & Open Source Genius Guide (https://www.imagineshop.co.uk/bookazines.html)

## 1.1 OSS Alternatives

**Clone vs Non-clone Alternative**

- Clone software always follows the original software, hence clone is
  - always lagging
  - usually inferior
- In conclusion, often you won't be satisfied

*Examples*

- MS-Word vs Libre-office-Writer vs Abi-Word vs Calligra-Words vs Lyx
- Matlab vs Scilab vs GNU-Octave vs SciPython-MatPlotLib

**Useful Links**

- http://www.findbestopensource.com/
- Cool list of Linux programs (http://www.dedoimedo.com/computers/new-cool-list-linux.html)

## 1.2 Learning New Software Packages

**Try/Explore/Read** about capabilities of the new software package

**Find** good examples

**Short** course/training/tutorial/user-guide

**Test** your knowledge through a real project

**Use** a book/manual/reference

***If you find expert who is willing to answer your questions;***

- you are lucky
- don't waste the chance

6

# 2 Technical Writing

## 2.1 Introduction to LaTeX

**Word Processors**

Usually there are two categories of word processing software packages

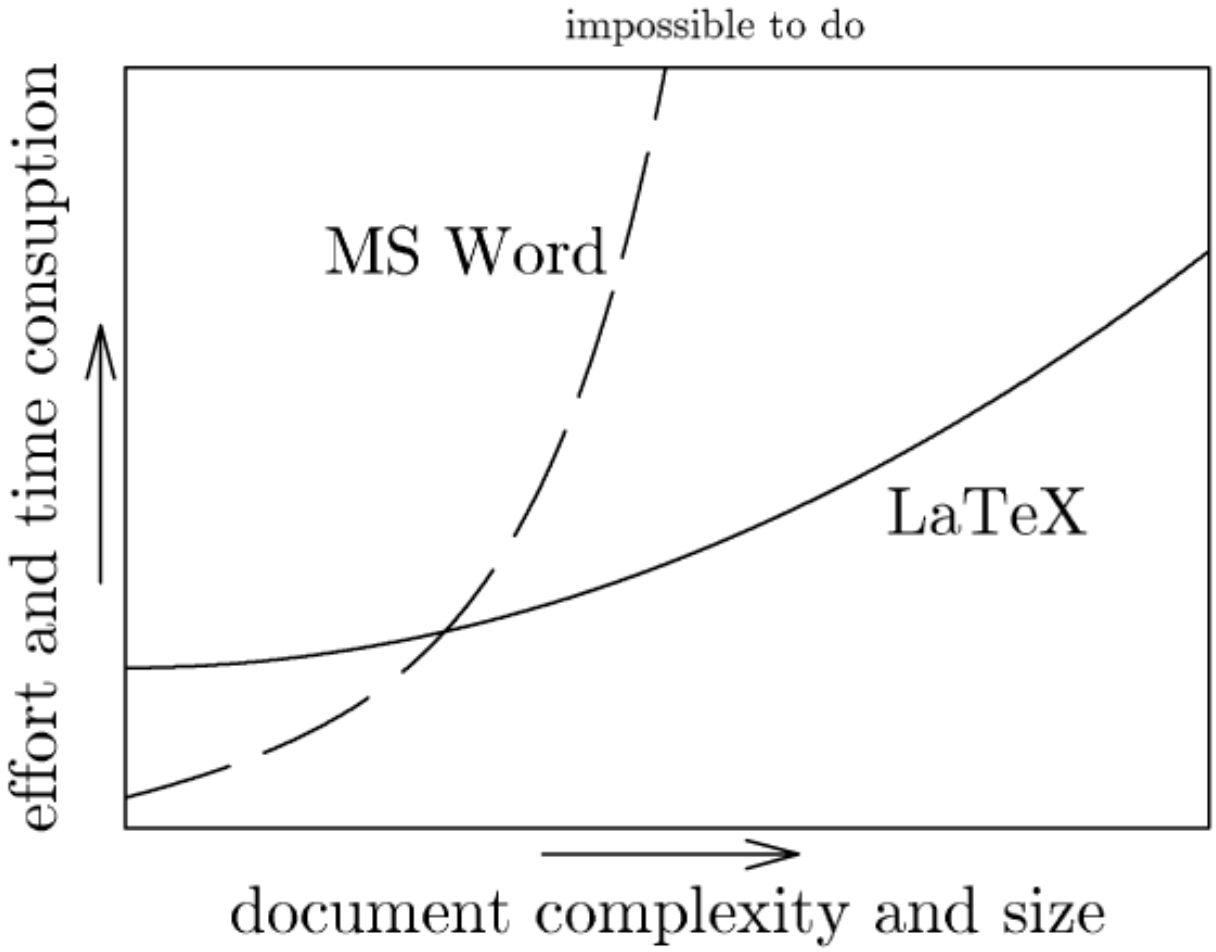
- What You See Is What You Get (WYSIWYG)
- What You See Is What You Mean (WYSIWYM)

| WYSIWYG | WYSIWYM |
|---|---|
| Microsoft Word<br>AbiWord<br>LibreOffice Writer<br>Calligra Words | LaTeX |

**Roughly,** you can compare LaTeX to Word as you compare Matlab to Excel

7

**LaTeX vs Microsoft Word**




### LaTeX

**LaTeX** is a document markup language.

- Simply you can think of it as similar to HTML[2]
- In order to create a document in LaTeX, a **.tex** file must be created using some **text editor**
- The **.tex** file is then **compiled** to produce the document
- LaTeX can generate several document formats including "pdf"

### LaTeX is Free

**Although** being free is an advantage, but it is a drawback at the same time

- Slow download server
- No clean official documentation
- Several alternatives to do the same thing

[2](HyperText Markup Language)

**However;** LaTeX is very mature and widely used by professional/enterprise publishers

- Also it has a big user community
  - when you encounter a problem, google it. Most likely you will find others had encountered it and found a solution

10

**LaTeX Editors**

- To write C/C++ code, any text editor can be used. But using a good IDE can greatly ease your job.
- LaTeX is similar. Any text editor is ok, but a dedicated LaTeX editor is strongly recommended.
- A dedicated LaTeX editor
  - can highlight and auto complete LaTeX keywords
  - has several LaTeX templates for several types of documents
  - facilitates compiling and debugging
  - ...

11

**Some LaTeX Editors**

**Kile;** works on Linux, but can also work on Windows (my favorite)

**Texmaker;** cross-platform

**and** many others

12

**Keep Concentrating**

Due to its WYSIWYM nature, I feel more concentrating while using **LaTeX** as compared to **Ms-Word**.

13

## 2.2 LyX

**LyX** is a front-end to LaTeX

- You can think of the LyX-LaTeX relationship as similar to the Visual Studio-C++ compiler relationship
- Unlike LaTeX, LyX comes with tidy and very good manuals
- Also it has a big community, i.e.,
  - it is mature enough
  - when you encounter a problem, google it. Most likely you will find others had encountered it and found a solution

14

**Keep your concentration**

Due to its WYSIWYM nature, I feel very concentrating while using **LyX** as compared to **Ms-Word**.

**Lets Learn LyX**

**Help menu** includes very good manuals. The manuals themselves are LyX documents. So they are essentially very good LyX examples.

**lyx\examples** folder contains wide variety of very good examples

**Explore** menus and toolbars

**Test drive LyX** to recreate the attached final exam

## 2.3 Presentations

**Beamer**

**Beamer** is a LaTeX class for creating **professional** presentation slides

**Beamer template** is a built in template in LyX provides to enable easily building presentations in LyX

**Beamer manual** explain creating Beamer presentations in plain LaTex and LyX as well

Check this; http://www.hartwork.org/beamer-theme-matrix/

**Presentation Handouts**

**Beamer-Article** class is also available. It renders the slides on standard sized paper (like A4 or letter), with frame titles used as paragraph titles, no special slide layout/colors and keeps the sectioning.

- Beamer article class is suitable for creating lecture handouts (article)
- You can have a single source file for the slides and its handouts
- You can still control the source file so that the **slides** and the **article** are different.

- You can also use the Beamer-Article class within LyX

**Keep your concentration**

Due to its WYSIWYM nature, I feel very very very concentrating while using **LyX-Beamer** as compared to **Ms-Power Point**.

**Lets Learn Beamer**

**Attached samples** are a very good variety of presentations

**Explore** the styles list

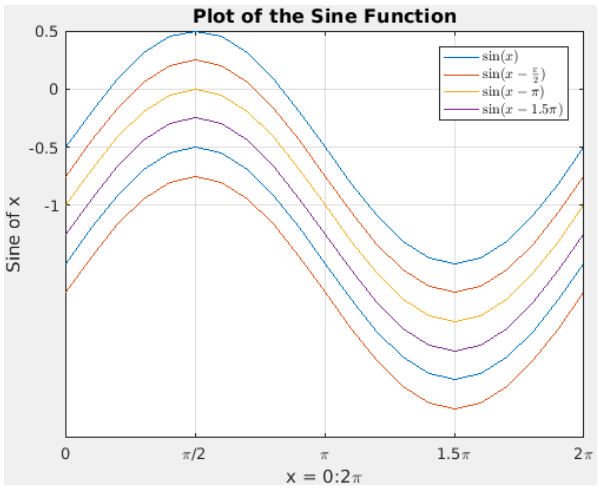
**Test drive Beamer** to create this presentation

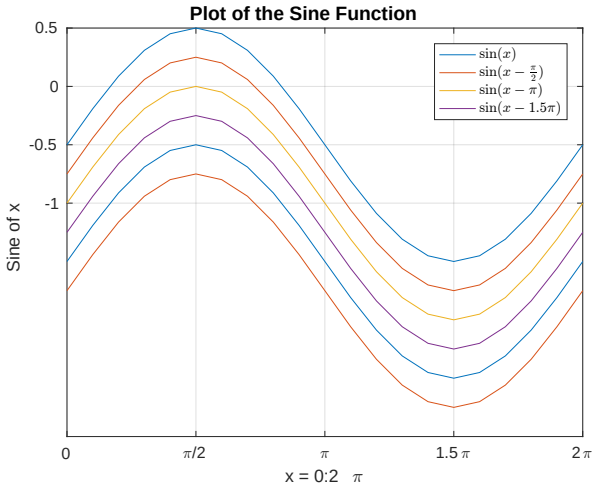
**Create** the handouts of this presentation

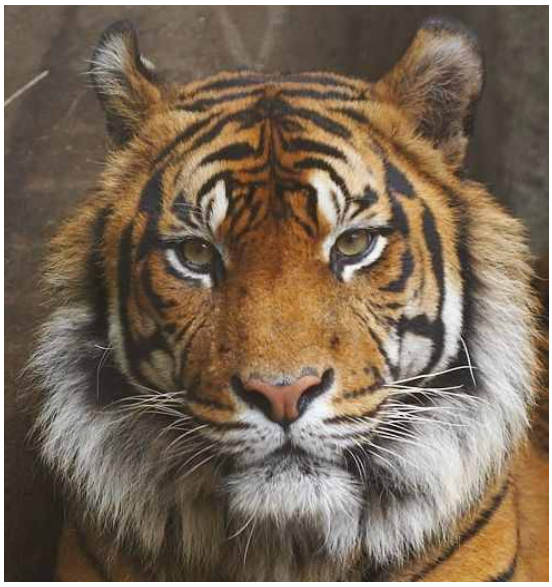
**Beamer manual** includes all the details you need to know

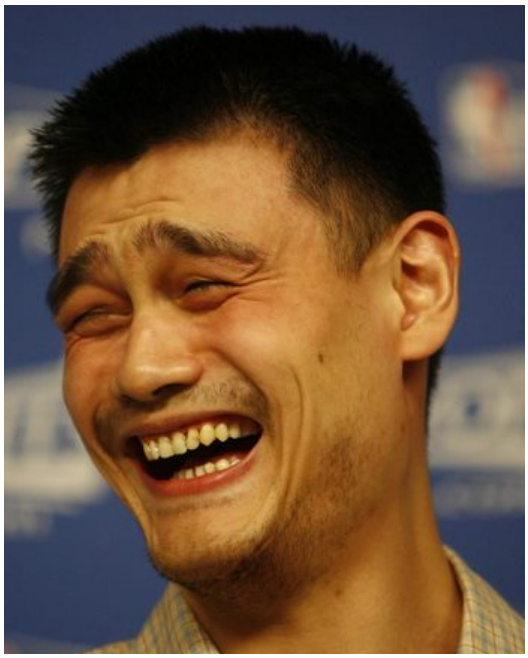
# 3 Vector Graphics using Inkscape

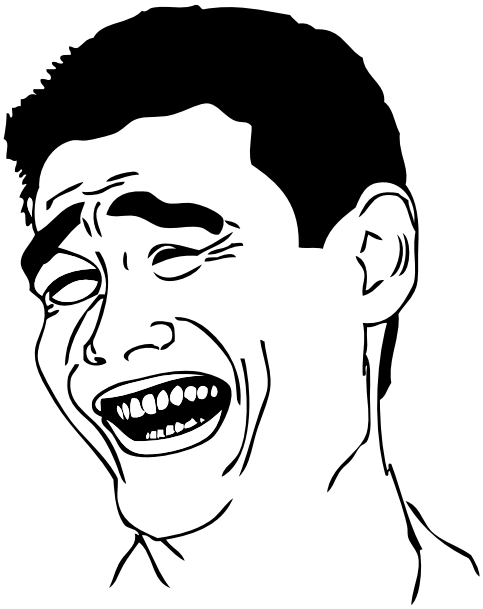
## Raster vs Vector Graphics







21

## Graphics Formats

| Raster | | Vector | |
|---|---|---|---|
| .bmp | Uncompressed | .pdf | Compressed |
| .png | Loose-less compression | .eps | |
| .jpg | Lossy compression | .emf | compatible with Ms Office |
| | | .svg | |
| ⋮ | | ⋮ | |

22

## Vector Graphics Editors

- Adobe Illustrator (*de facto* standard; bloated)
- Corel Draw (bloated)
- Inkscape (light, free, cross-platform and popular; my favorite)
- LibreOffice Draw
- …

23

## Inkscape

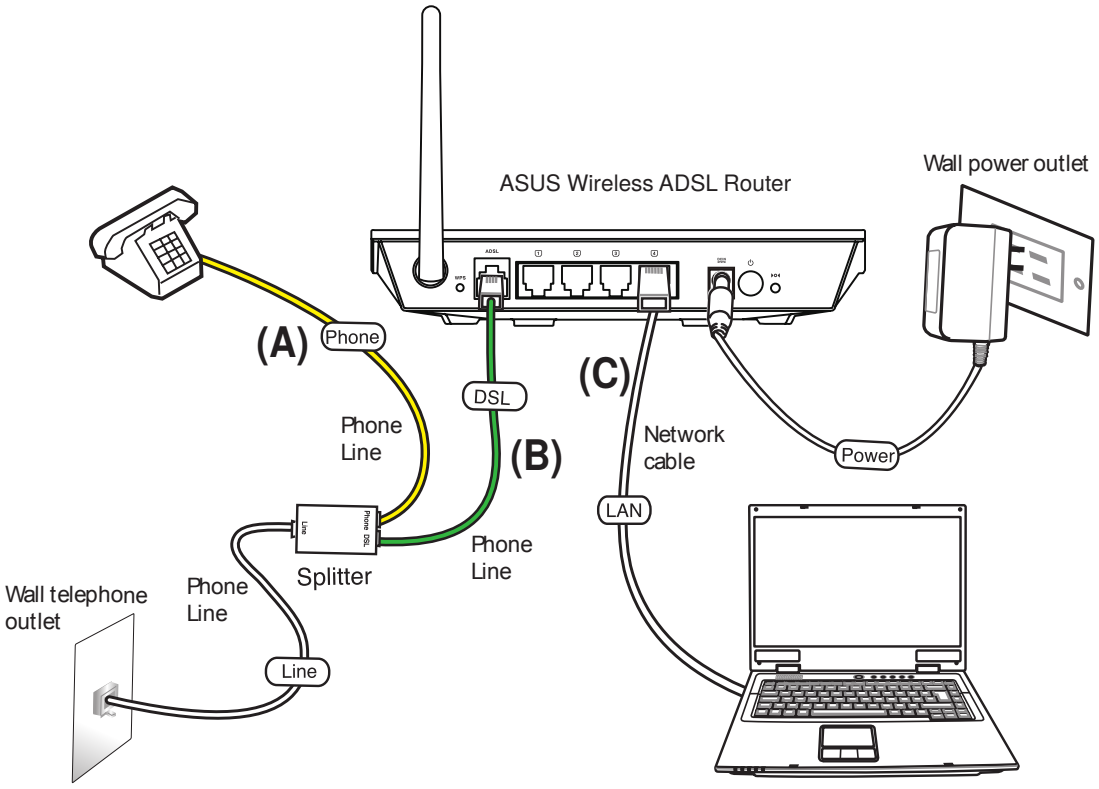
- Free
- Open source
- Cross platform
- Has a big community, i.e.,
  - it is mature enough
  - when you encounter a problem, google it. Most likely you will find others had encountered it and found a solution

- Much much powerful than MS-Word or MS-Power point sketching capabilities
- Has several plugins that greatly expand its capabilities

### Inkscape Capabilities

- Inkscape is based on brazier curves
  - Defines a curve using four information, **start**, **end**, **start tangent** and **end tangent**
- Additionally, you can draw and edit:
  - straight lines
  - circles/arcs/ellipses
  - text
  - LaTeX formulas
  - function curves
  - ...

### Import Graphics from pdf

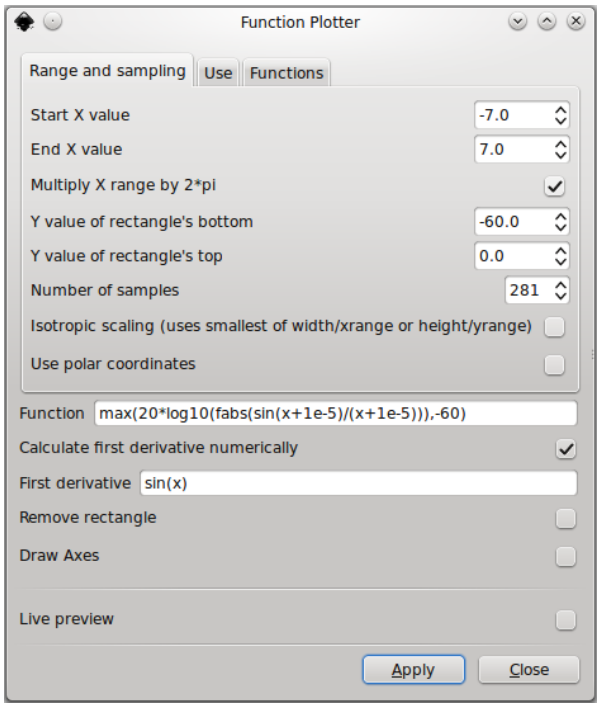


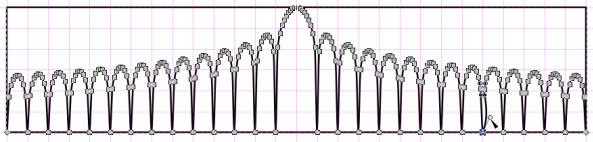

- You can import vector graphics from pdf files, and even edit them

## 3.1 Interesting Plug-ins

### Function Plotter

- It is a built in plugins
- It uses brazier curves, same as Inkscape
- It calculates the function derivative and use it to adjust the curve slope
  - It produces very smooth curves using much less points than Matlab
  - You can still adjust/correct the curve manually

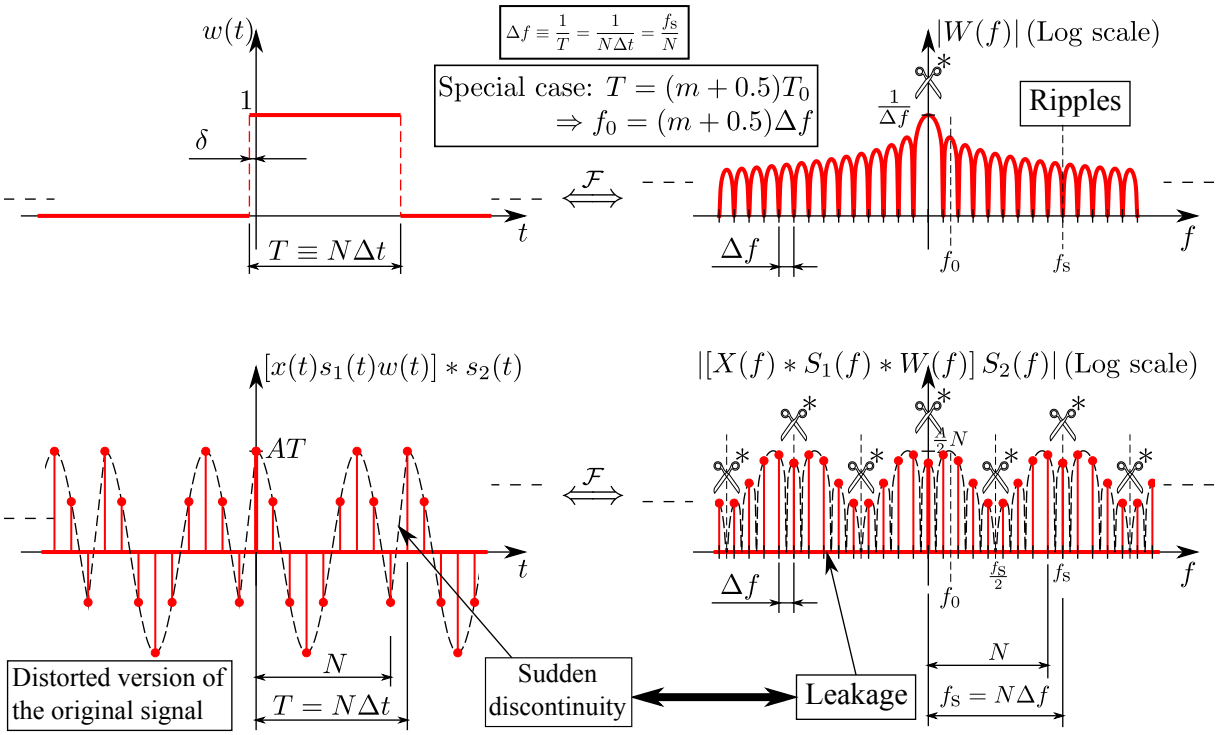


27

### TexText

It allows you to write/edit LaTeX formulas inside Inkscape




## 3.2 Learning Inkscape

- **Explore** menus and toolbars
- **Official manual** [Tavmjong Bah, Inkscape: Guide to a Vector Drawing Program, Pearson Education, 4th ed, 2011] is very good and detailed
  - Chapters 1 includes 10 examples
    - The first 3 examples are enough for a good start
  - Chapters 5 explains editing
    - Surf it fast
- **Help menu** includes tutorials, FAQ, ...
- http://inkscapetutorials.org/