LaTeX

Tutorial - Part I

Ellie Stathopoulou

April 2017

NTUA PH[O]TO
GRAMMETRY

Section 1

Introduction

Introduction

What is LaTeX? (1/3)

LaTeX is a typesetting system for scientific documents.

latex-project.org

Introduction

What is LaTeX? (2/3)

LaTeX is very useful for medium and large documents!

Introduction

What is LaTeX? (3/3)

LaTeX is free software!

Introduction

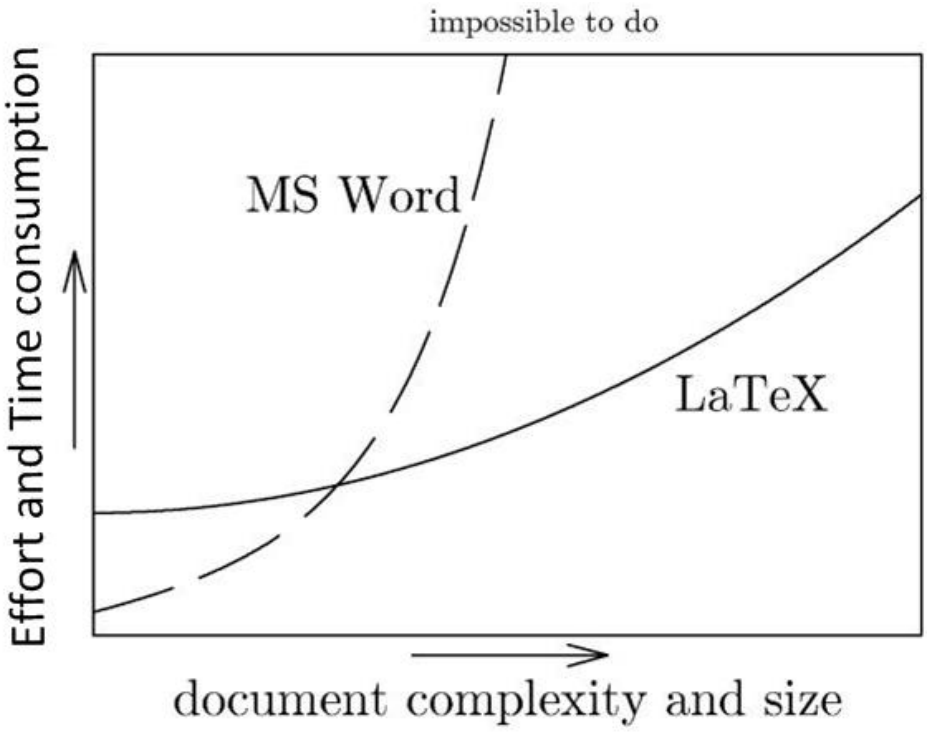
What is not LaTeX?

LaTeX is **not** a word processor!

WYSIWYM vs. WYSIWYG

Introduction

Why to use LaTeX? (1/2)



Introduction

Why to use LaTeX? (2/2)

Pros:

- Separation between context and style
- High quality output
- Easy to include math formulas
- Small output file size (.pdf)
- Free
- Platform independent

Cons:

- Difficulties
- Occasional bugs ...

LaTeX classes

Default:

- Article
- Book
- Report
- Letter
- Memoir
- Beamer ...

Customized

- KOMA
- moderncv ...

Section 2

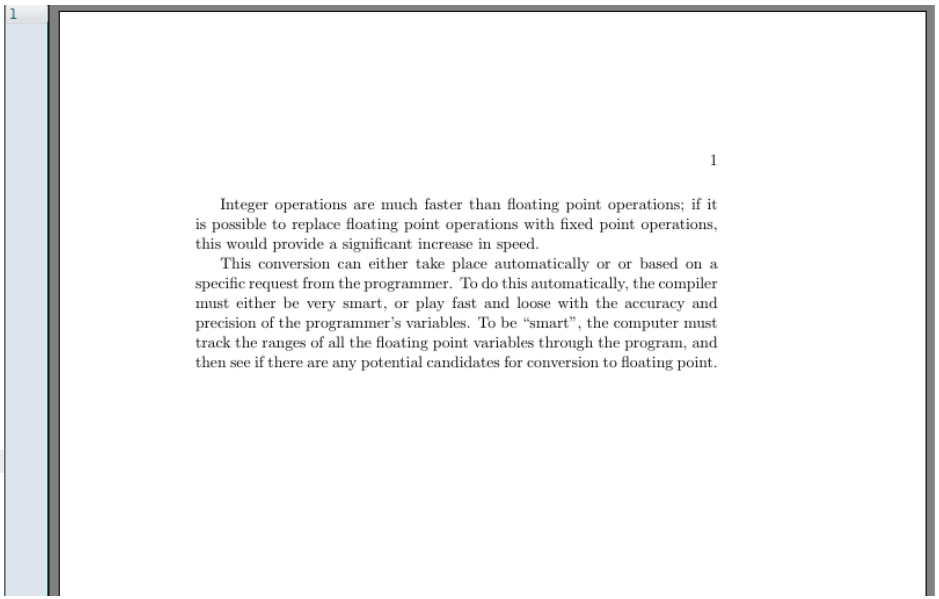
Document Creation

LaTeX Basic Structure

- Preamble
- Main Body
- Bibliography

LaTeX example

```
\documentclass[a4paper,11pt,twoside]{book}

\usepackage[ngerman, english]{babel}
\usepackage{hyperref}

\begin{document}


Integer operations are much faster than floating point operations; if it is
possible to replace floating point operations with fixed point operations,
this would provide a significant increase in speed.

This conversion can either take place automatically or or based on a
specific request from the programmer.  To do this automatically, the
compiler must either be very smart, or play fast and loose with the
accuracy
and precision of the programmer's variables.  To be ``smart'', the computer
must track the ranges of all the floating point variables through the
program, and then see if there are any potential candidates for conversion
to floating point.


\end{document}
```



1

Integer operations are much faster than floating point operations; if it is possible to replace floating point operations with fixed point operations, this would provide a significant increase in speed.

This conversion can either take place automatically or or based on a specific request from the programmer. To do this automatically, the compiler must either be very smart, or play fast and loose with the accuracy and precision of the programmer's variables. To be "smart", the computer must track the ranges of all the floating point variables through the program, and then see if there are any potential candidates for conversion to floating point.

Preamble

Everything before main body!
Affects entire document!

Includes:

- Document Class Definition

```
\documentclass{article}
```

- Print page size

```
\documentclass[a4paper,11pt,twoside]{book}
```

- Packages and Setups

```
\usepackage{graphicx}
\usepackage{hyperref}
\hypersetup{colorlinks,urlcolor=blue}
```

Main Body

Contents

- Table of Contents

  `\tableofcontents`

- List of Figures

  `\listoffigures`

- List of Tables

  `\listoftables`

Contents

Main Body

Sectioning

- Sections

```
\section{This is the first section}
```

- Subsections

```
\subsection{This is the first subsection}
```

- Subsubsections

```
\subsubsection{This is the first sub-subsection}
```

1 This is the first section

1.1 This is the first subsection

1.1.1 This is the first sub-subsection

Integer operations are much faster than floating point operations; if it is possible to replace floating point operations with fixed point operations, this would provide a significant increase in speed.

This conversion can either take place automatically or or based on a specific request from the programmer. To do this automatically, the compiler must either be very smart, or play fast and loose with the accuracy and precision of the programmer's variables. To be "smart", the computer must track the ranges of all the floating point variables through the program, and then see if there are any potential candidates for conversion to floating point.

Main Body

Figures

- In preamble

```
\usepackage{graphicx}
```

- In the main body

```
\begin{figure}[hbt!]
\centering
\includegraphics[scale=0.55]{./Figures/Linux.jpg
\caption{Penguin}
\label{fig:PenguinImage}
\end{figure}
```

- Within the text you should reference

```
see ~\ref{fig:PenguinImage}
```

1 This is the first section

The development of Linux (see 1) is one of the most prominent examples of free and open-source software collaboration. The underlying source code may be used, modified, and distributedcommercially or non-commerciallyby anyone under licenses such as the GNU General Public License. Typically, Linux is packaged in a form known as Linux distribution, for both desktop and server use. Some popular mainstream Linux distributions include Debian, Ubuntu, Linux Mint, Fedora, openSUSE, Arch Linux, and the commercial Red Hat Enterprise Linux and SUSE Linux Enterprise Server. Linux distributions include the Linux kernel, supporting utilities and libraries and usually a large amount of application software to fulfill the distribution's intended use.

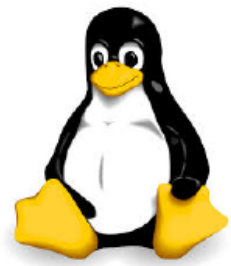


Figure 1: Penguin

A distribution oriented toward desktop use will typically include X11, Wayland or Mir as the windowing system, and an accompanying desktop environment such as GNOME or the KDE Software Compilation. Some such distributions may include a less resource intensive desktop such as LXDE or Xfce, for use on older or less powerful computers. A distribution intended to run as a server may omit all graphical environments from the standard install, and instead include other software to set up and operate a solution stack such as LAMP. Because Linux is freely redistributable, anyone may create a distribution for any intended use.

Main Body

Tables

- In the main body

```
\begin{table}[hbt!]
  \centering
  \begin{tabular}{ |c | c | c| }
        \hline
         1 & 2 & 3 \\
         \hline
         4 & 5 & 6 \\
        \hline
         7 & 8 & 9 \\
         \hline
    \end{tabular}
  \caption{Random Numbers}
  \label{tab:randomNumbers}
\end{table}
```

- Within the text you should reference

```
see ~\ref{tab:randomNumbers}
```

1 This is the first section

The development of Linux (see [1]) is one of the most prominent examples of free and open-source software collaboration. The underlying source code may be used, modified, and distributedcommercially or non-commerciallyby anyone under licenses such as the GNU General Public License. Typically, Linux is packaged in a form known as Linux distribution, for both desktop and server use. Some popular mainstream Linux distributions include Debian, Ubuntu, Linux Mint, Fedora, openSUSE, Arch Linux, and the commercial Red Hat Enterprise Linux and SUSE Linux Enterprise Server. Linux distributions include the Linux kernel, supporting utilities and libraries and usually a large amount of application software to fulfill the distribution's intended use.

1	2	3
4	5	6
7	8	9

Table 1: Random Numbers

A distribution oriented toward desktop use will typically include X11, Wayland or Mir as the windowing system, and an accompanying desktop environment such as GNOME or the KDE Software Compilation. Some such distributions may include a less resource intensive desktop such as LXDE or Xfce, for use on older or less powerful computers. A distribution intended to run as a server may omit all graphical environments from the standard install, and instead include other software to set up and operate a solution stack such as LAMP. Because Linux is freely redistributable, anyone may create a distribution for any intended use.

Main Body

Formulas General

- In preamble

```
\usepackage{amsmath}
```

- In the main body

```
\begin{equation}
\label{eq:map2}
l'=F\:x
\end{equation}
```

- Within the text you should reference

```
see ~\ref{eq:map2}
```

- For inline formulas we use

```
$(\det F=0)$
```

1 This is the first section

The development of Linux (see 1) is one of the most prominent examples of free and open-source software collaboration. The underlying source code may be used, modified, and distributedcommercially or non-commerciallyby anyone under licenses such as the GNU General Public License. Typically, Linux is packaged in a form known as Linux distribution, for both desktop and server use. Some popular mainstream Linux distributions include Debian, Ubuntu, Linux Mint, Fedora, openSUSE, Arch Linux, and the commercial Red Hat Enterprise Linux and SUSE Linux Enterprise Server ($\det F = 0$). Linux distributions include the Linux kernel, supporting utilities and libraries and usually a large amount of application software to fulfill the distribution's intended use.

$$l' = F\,x \tag{1}$$

A distribution oriented toward desktop use will typically include X11, Wayland or Mir as the windowing system, and an accompanying desktop environment such as GNOME or the KDE Software Compilation. Some such distributions may include a less resource intensive desktop such as LXDE or Xfce, for use on older or less powerful computers. A distribution intended to run as a server may omit all graphical environments from the standard install, and instead include other software to set up and operate a solution stack such as LAMP. Because Linux is freely redistributable, anyone may create a distribution for any intended use.

Main Body

Formulas Matrices

- Same as before, but

```
\begin{equation}
T=
\begin{bmatrix}
\dfrac {\sqrt{2}}{d} & 0 & -\dfrac {\sqrt{2}}{d}
0 & \dfrac {\sqrt{2}}{d} & -\dfrac {\sqrt{2}}{d}
0 & 0 & 1
\end{bmatrix}
\label{eq:TranslationMatrix}
\end{equation}
```

1 This is the first section

The development of Linux (see 1) is one of the most prominent examples of free and open-source software collaboration. The underlying source code may be used, modified, and distributedcommercially or non-commerciallyby anyone under licenses such as the GNU General Public License. Typically, Linux is packaged in a form known as Linux distribution, for both desktop and server use. Some popular mainstream Linux distributions include Debian, Ubuntu, Linux Mint, Fedora, openSUSE, Arch Linux, and the commercial Red Hat Enterprise Linux and SUSE Linux Enterprise Server ($\det F = 0$) . Linux distributions include the Linux kernel, supporting utilities and libraries and usually a large amount of application software to fulfill the distribution's intended use.

$$T = \begin{bmatrix} \frac{\sqrt{2}}{d} & 0 & -\frac{\sqrt{2}}{d}x_c \\ 0 & \frac{\sqrt{2}}{d} & -\frac{\sqrt{2}}{d}y_c \\ 0 & 0 & 1 \end{bmatrix} \tag{1}$$

Main Body

Itemize

- In the main body

```
\begin{itemize}
\item Ubuntu.
\item openSUSE.
\item Debian
\end{itemize}
```

- Or

```
\begin{enumerate}
\item Ubuntu.
\item openSUSE.
\item Debian
\end{enumerate}
```

1 This is the first section

- Ubuntu.
- openSUSE.
- Debian

Or:

1. Ubuntu.
2. openSUSE.
3. Debian

Section 3

Bibliography

BibTeX Database

- Additional software (e.g. JabRef)
- Database creation
- File should be compiled in both BibTeX and pdfLaTeX

BibTeX Entry .bib

```
@InProceedings{Hartley92,
  Title                    = {Estimation of {R}elative {C}amera {P}ositions for {U}ncalibrated {C}ameras},
  Author                   = {Hartley, R.},
  Booktitle                = {Proceedings of the Second European Conference on Computer Vision},
  Year                     = {1992},

  Address                  = {London, UK, UK},
  Pages                    = {579--587},
  Publisher                = {Springer-Verlag},
  Series                   = {ECCV '92},

  Acmid                    = {648678},
  ISBN                     = {3-540-55426-2},
  Numpages                 = {9},
  Url                      = {http://dl.acm.org/citation.cfm?id=645305.648678}
}
```

Citation

- In preamble

```
\bibliographystyle{plain}
```

- Within the text – "key" label

```
\cite{Hartley92}
```

- At the end of the document we call the database

```
\bibliography{test}
```

1 This is the first section

The development of Linux (see [1]) is one of the most prominent examples of free and open-source software collaboration. The underlying source code may be used, modified, and distributedcommercially or non-commerciallyby anyone under licenses such as the GNU General Public License. Typically, Linux is packaged in a form known as Linux distribution, for both desktop and server use. Some popular mainstream Linux distributions include Debian, Ubuntu, Linux Mint, Fedora, openSUSE, Arch Linux, and the commercial Red Hat Enterprise Linux and SUSE Linux Enterprise Server ($\det F = 0$). Linux distributions include the Linux kernel, supporting utilities and libraries and usually a large amount of application software to fulfill the distribution's intended use [1].

$$T = \begin{bmatrix} \frac{\sqrt{2}}{d} & 0 & -\frac{\sqrt{2}}{d}x_c \\ 0 & \frac{\sqrt{2}}{d} & -\frac{\sqrt{2}}{d}y_c \\ 0 & 0 & 1 \end{bmatrix} \tag{1}$$

References

[1] R. Hartley. Estimation of Relative Camera Positions for Uncalibrated Cameras. In *Proceedings of the Second European Conference on Computer Vision*, ECCV '92, pages 579–587, London, UK, UK, 1992. Springer-Verlag.

Section 4

How To

How to Install (1/4)

What do we need

- MikTeX / TeX Live / MacTeX
- Text Editors (Texmaker, TeXstudio ...)

How to Install(2/4)

MikTeX - MacTeX - TeX Live

- http://miktex.org/download
- https://tug.org/mactex/
- https://www.tug.org/texlive/

How to Install (3/4)

TeXMaker - TeXstudio

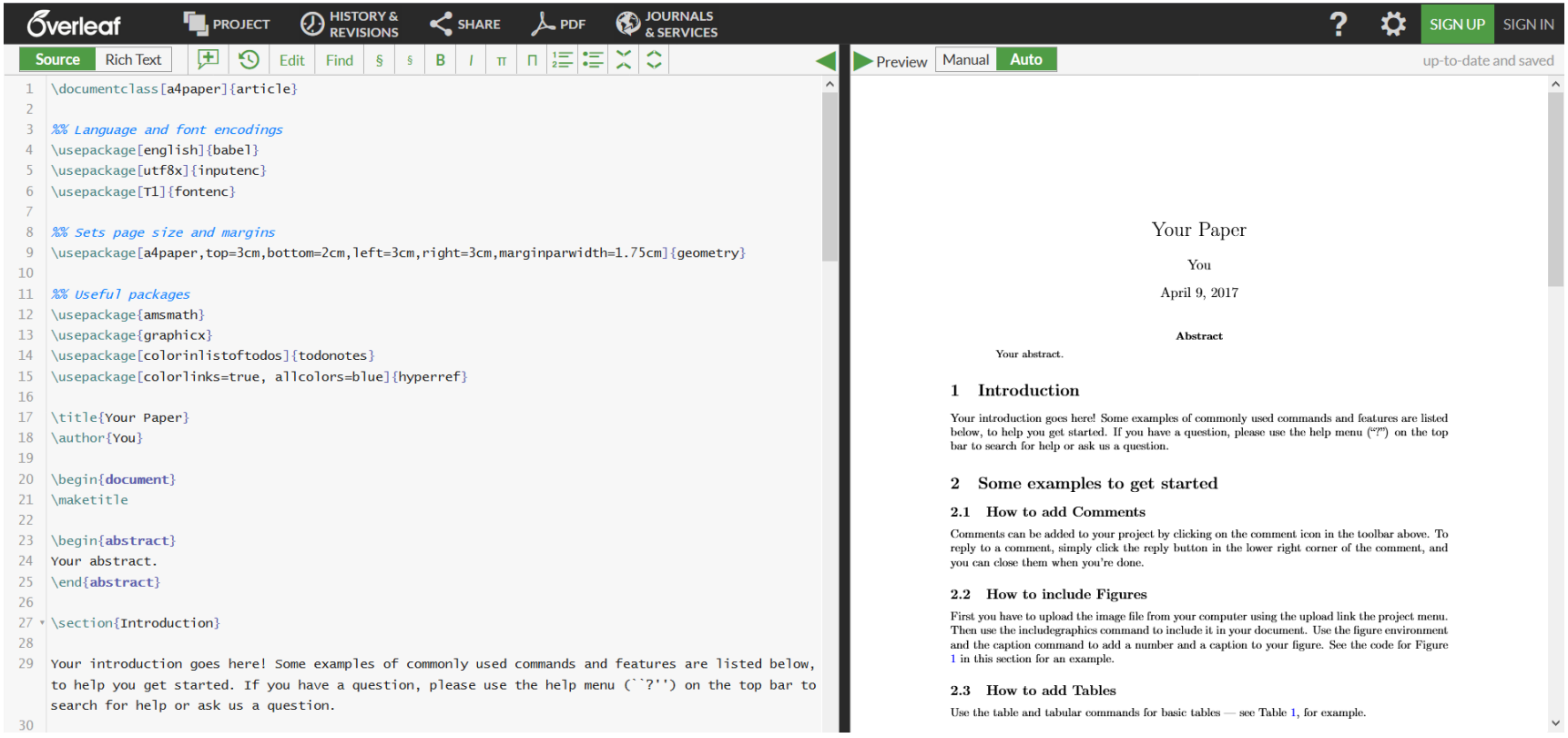
- http://www.xm1math.net/texmaker/download.html
- http://texstudio.sourceforge.net/

How to Install (4/4)

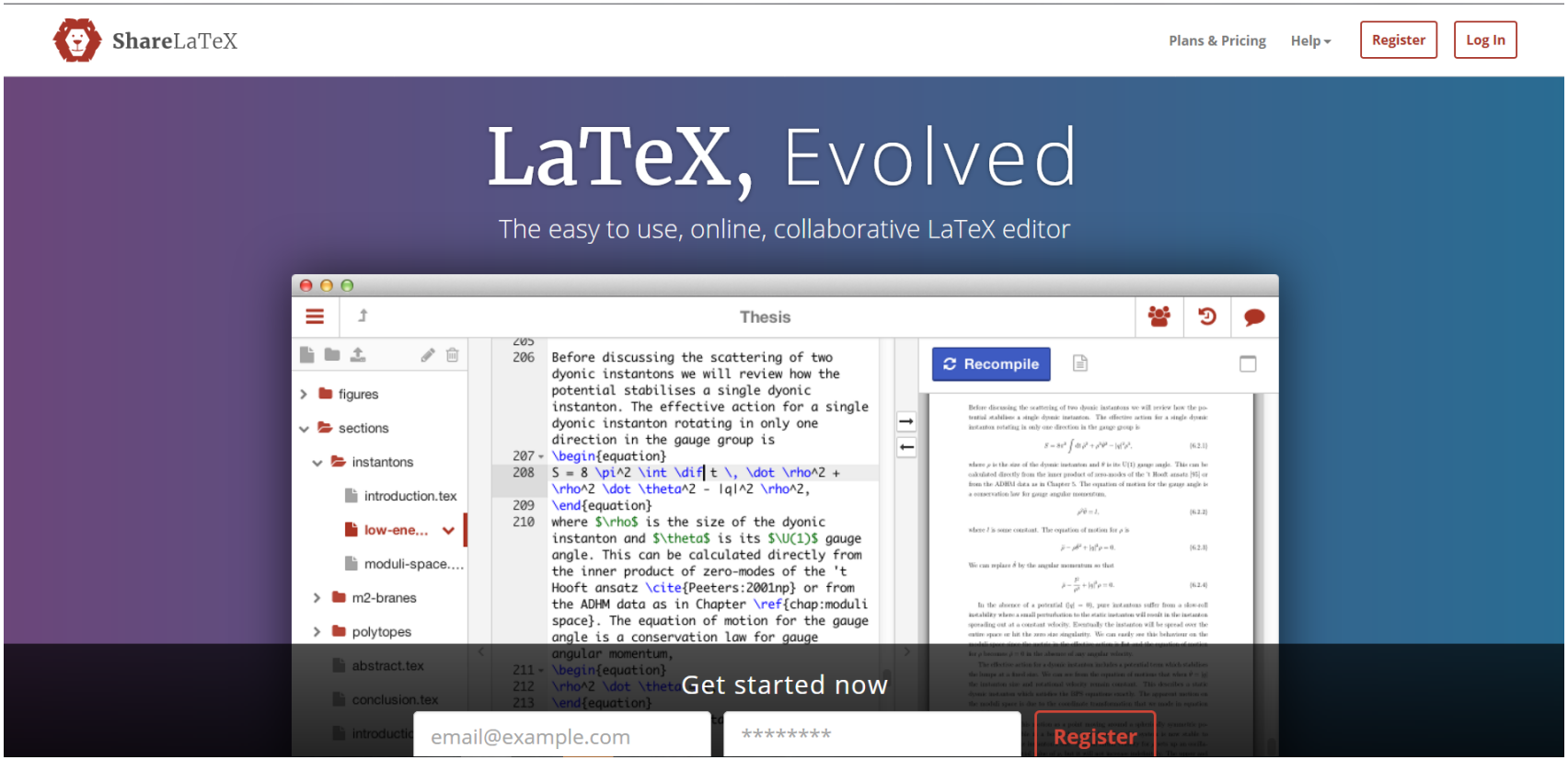
JabRef

- http://jabref.sourceforge.net/

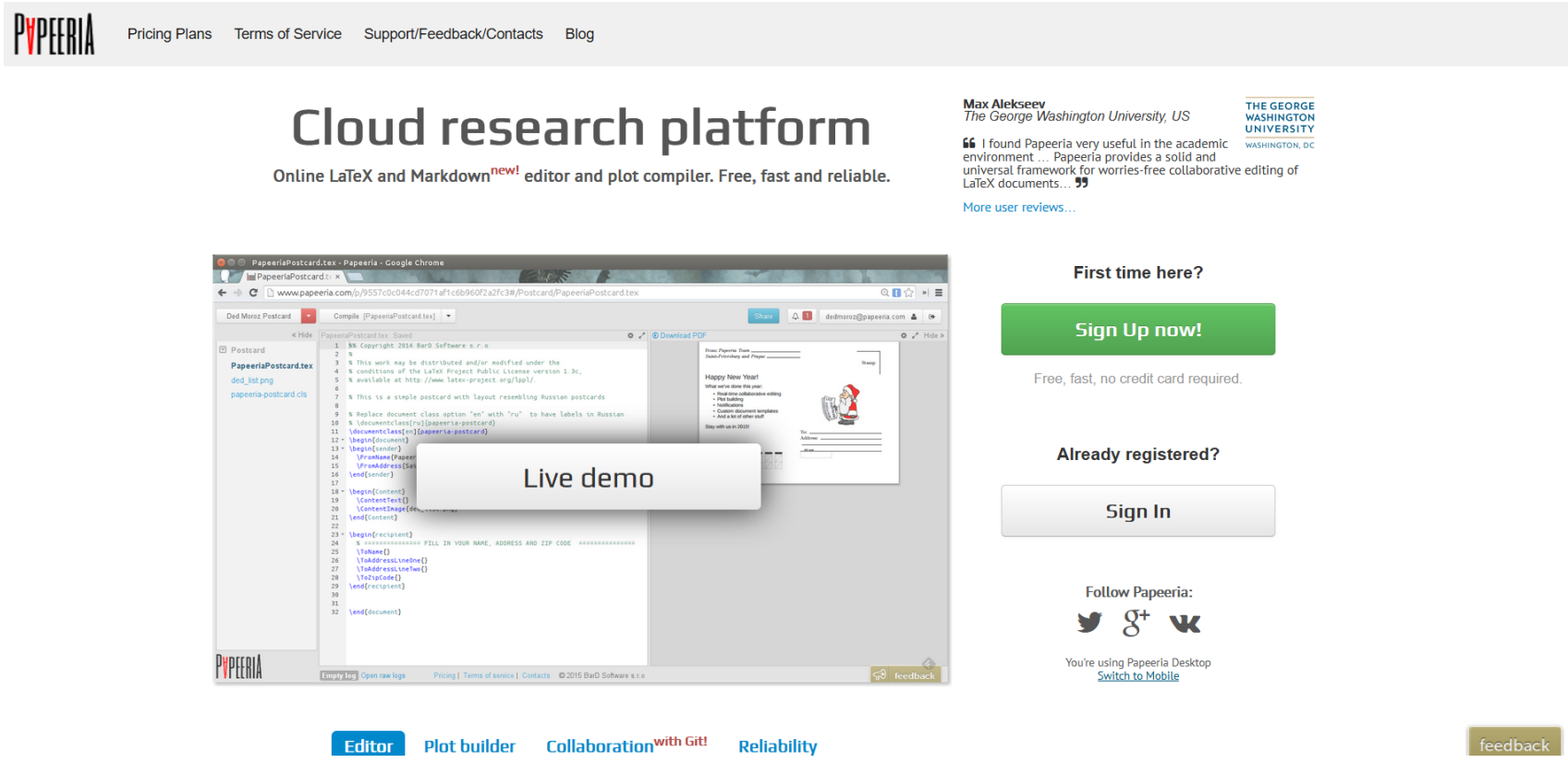
Online (1/3)


Overleaf
PROJECT
HISTORY & REVISIONS
SHARE
PDF
JOURNALS & SERVICES
SIGN UP
SIGN IN
Source
Rich Text
Edit
Find
Preview
Manual
Auto
up-to-date and saved
\documentclass[a4paper]{article}
%% Language and font encodings
\usepackage[english]{babel}
\usepackage[utf8x]{inputenc}
\usepackage[T1]{fontenc}
%% Sets page size and margins
\usepackage[a4paper,top=3cm,bottom=2cm,left=3cm,right=3cm,marginparwidth=1.75cm]{geometry}
%% Useful packages
\usepackage{amsmath}
\usepackage{graphicx}
\usepackage[colorinlistoftodos]{todonotes}
\usepackage[colorlinks=true, allcolors=blue]{hyperref}
\title{Your Paper}
\author{You}
\begin{document}
\maketitle
\begin{abstract}
Your abstract.
\end{abstract}
\section{Introduction}
Your introduction goes here! Some examples of commonly used commands and features are listed below, to help you get started. If you have a question, please use the help menu (``?'') on the top bar to search for help or ask us a question.
Your Paper
You
April 9, 2017
Abstract
Your abstract.
1 Introduction
Your introduction goes here! Some examples of commonly used commands and features are listed below, to help you get started. If you have a question, please use the help menu ("?") on the top bar to search for help or ask us a question.
2 Some examples to get started
2.1 How to add Comments
Comments can be added to your project by clicking on the comment icon in the toolbar above. To reply to a comment, simply click the reply button in the lower right corner of the comment, and you can close them when you're done.
2.2 How to include Figures
First you have to upload the image file from your computer using the upload link the project menu. Then use the includegraphics command to include it in your document. Use the figure environment and the caption command to add a number and a caption to your figure. See the code for Figure 1 in this section for an example.
2.3 How to add Tables
Use the table and tabular commands for basic tables — see Table 1, for example.

Online (2/3)


ShareLaTeX
Plans & Pricing
Help
Register
Log In
LaTeX, Evolved
The easy to use, online, collaborative LaTeX editor
Thesis
Recompile
figures
sections
instantons
introduction.tex
low-ene...
moduli-space....
m2-branes
polytopes
abstract.tex
conclusion.tex
Before discussing the scattering of two dyonic instantons we will review how the potential stabilises a single dyonic instanton. The effective action for a single dyonic instanton rotating in only one direction in the gauge group is
\begin{equation}
S = 8 \pi^2 \int \dif t \, \dot \rho^2 + \rho^2 \dot \theta^2 - |q|^2 \rho^2,
\end{equation}
where ρ is the size of the dyonic instanton and θ is its $U(1)$ gauge angle. This can be calculated directly from the inner product of zero-modes of the 't Hooft ansatz \cite{Peeters:2001np} or from the ADHM data as in Chapter \ref{chap:moduli space}. The equation of motion for the gauge angle is a conservation law for gauge angular momentum,
\begin{equation}
\rho^2 \dot \theta = l,
\end{equation}
Get started now
email@example.com
****
Register

Online (3/3)


PAPEERIA
Pricing Plans
Terms of Service
Support/Feedback/Contacts
Blog
Cloud research platform
Online LaTeX and Markdown new! editor and plot compiler. Free, fast and reliable.
Max Alekseev
The George Washington University, US
THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC
I found Papeeria very useful in the academic environment … Papeeria provides a solid and universal framework for worries-free collaborative editing of LaTeX documents…
More user reviews…
Live demo
First time here?
Sign Up now!
Free, fast, no credit card required.
Already registered?
Sign In
Follow Papeeria:
You're using Papeeria Desktop
Switch to Mobile
Editor
Plot builder
Collaboration with Git!
Reliability
feedback