

L^AT_EX Experiments

AeAeA

January 23, 2020

1 TeX distributions

1.1 MacTeX

The best for Mac.

```
$ brew cask install mactex
```

1.2 Visual Studio Code LaTeX Workshop Extension

LaTeX Workshop is an extension for Visual Studio Code, aiming to provide core features for LaTeX typesetting with Visual Studio Code.

- <https://github.com/James-Yu/LaTeX-Workshop>
- <https://github.com/James-Yu/LaTeX-Workshop/wiki/Compile>

Build LaTeX file by calling the command **Build LaTeX project** from the Command Palette or from the TeX badge. This command is bound to **Cmd+Ctrl+b**

You can change VS Code settings by opening Settings tab:

Cmd+, -> Extensions -> LaTeX

or, alternatively, by directly editing settings.json file:

`~/Library/Application\ Support/Code/User/settings.json`

Recommended settings for LaTeX Workshop:

```
{
  "latex-workshop.view.pdf.viewer": "tab",
  "latex-workshop.latex.outDir": "%DIR%/texout",
  "latex-workshop.latex.autoBuild.run": "never",
  "latex-workshop.latex.autoClean.run": "onBuilt"
}
```

1.3 MiKTeX

Not for Mac. Old MiKTeX installation:

`/usr/local/bin/`

`/Applications/MiKTeX\ Console.app/`

1.4 TinyTeX

TinyTeX - a lightweight, cross-platform, portable, and easy-to-maintain L^AT_EX distribution based on TeX Live.

Currently TinyTeX works best for R users. Installing and maintaining TinyTeX is easy for R users, since the R package `tinytex` has provided wrapper functions.

For other (non-R) users:

- See TinyTeX docs [here](#).
- In the directory
`~/Library/TinyTeX/texmf-dist/tex/latex/`
you can find all L^AT_EX packages installed for TinyTeX.
- If you compile a LaTeX document and run into an error message like this:
`! LaTeX Error: File 'times.sty' not found.`
It basically indicates a missing LaTeX package.
Use the command `tlmgr search` to find the name of the missing package:

```
$ tlmgr search --global --file "/times.sty"
psnfss: texmf-dist/tex/latex/psnfss/times.sty
```


In this case, the missing package is `psnfss`, and we can install a package via `tlmgr install`, e.g.,

```
$ tlmgr install psnfss
```


If you still see error messages that you don't understand, you may need to update everything:

```
$ tlmgr update --self --all
$ tlmgr path add
$ fmtutil-sys --all
```
- To uninstall TinyTeX use command line:

```
$ tlmgr path remove
$ rm -r "~/Library/TinyTeX"
```

2 Epigraph

In doing what we ought we deserve no praise, because it is our duty.

— Saint Augustine

2.1 Online docs

TeXdoc Online is TeX and LaTeX documentation lookup system.

2.2 verbatim

Text enclosed inside

```
\begin{verbatim} ... \end{verbatim}
```

environment is printed directly
and all `\LaTeX{}` commands are ignored.

Text enclosed inside `\begin{verbatim*}` environment
is printed directly
and all `\LaTeX{}` commands are ignored,
and white spaces are emphasized with a special symbol.

Use `\verb+<inline verbatim text>+` like this:
The `\ldots` command produces ...

2.3 listings: Source code printing

- listings package documentation
- https://www.overleaf.com/learn/latex/Code_listing

2.3.1 minimal setup

Example of using the `\begin{lstlisting}[language=Python]` environment
from the `\usepackage{listings}` package to highlight Python code:

```
import numpy as np

def incmatrix(genl1, genl2):
    m = len(genl1)
    n = len(genl2)
    M = None #to become the incidence matrix
    VT = np.zeros((n*m, 1), int) #dummy variable

    #compute the bitwise xor matrix
    M1 = bitxormatrix(genl1)
    M2 = np.triu(bitxormatrix(genl2), 1)

    for i in range(m-1):
        for j in range(i+1, m):
            [r, c] = np.where(M2 == M1[i, j])
            for k in range(len(r)):
                VT[(i)*n + r[k]] = 1;
                VT[(i)*n + c[k]] = 1;
                VT[(j)*n + r[k]] = 1;
                VT[(j)*n + c[k]] = 1;

            if M is None:
```

```

        M = np.copy(VT)
    else:
        M = np.concatenate((M, VT), 1)

    VT = np.zeros((n*m,1), int)

    return M

```

2.3.2 with code styles and colours

You need `\usepackage{xcolor}` package for the code colouring.

Just like in floats (tables and figures), captions can be added to a listing for a more clear presentation. This caption can be later used in the list of Listings `\lstlistoflistings`.

```

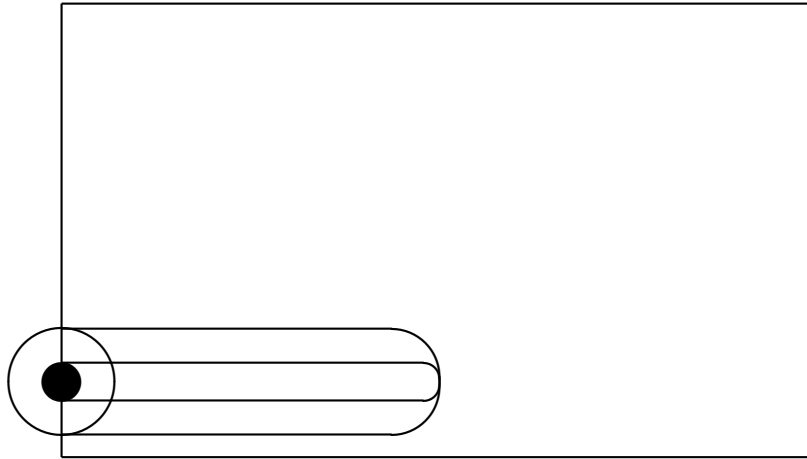
1 import numpy as np
2
3 def incmatrix(genl1,genl2):
4     m = len(genl1)
5     n = len(genl2)
6     M = None #to become the incidence matrix
7     VT = np.zeros((n*m,1), int) #dummy variable
8
9     #compute the bitwise xor matrix
10    M1 = bitxormatrix(genl1)
11    M2 = np.triu(bitxormatrix(genl2),1)
12
13    for i in range(m-1):
14        for j in range(i+1, m):
15            [r,c] = np.where(M2 == M1[i,j])
16            for k in range(len(r)):
17                VT[(i)*n + r[k]] = 1;
18                VT[(i)*n + c[k]] = 1;
19                VT[(j)*n + r[k]] = 1;
20                VT[(j)*n + c[k]] = 1;
21
22            if M is None:
23                M = np.copy(VT)
24            else:
25                M = np.concatenate((M, VT), 1)
26
27            VT = np.zeros((n*m,1), int)
28
29    return M

```

Listing 1: Python example

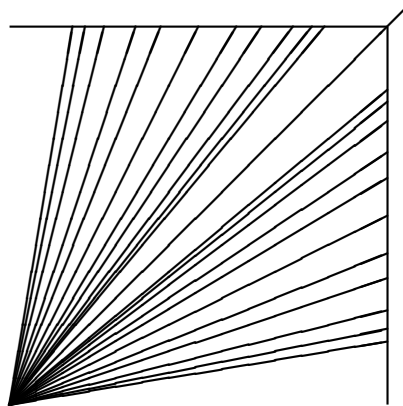
3 Picture environment

- <https://en.wikibooks.org/wiki/LaTeX/Picture>
- https://www.overleaf.com/learn/latex/Picture_environment



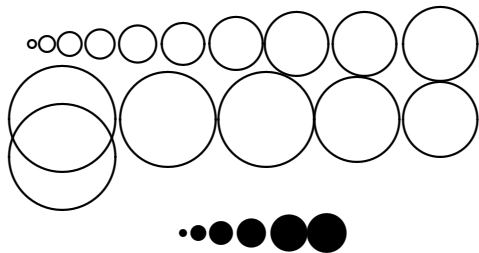
3.1 line

The components of the direction vector $(x1, y1)$ of the line segment `\line(x1,y1){length}` are restricted to the integers $(-6, -5, \dots, 5, 6)$ and they have to be coprime. The figure below illustrates all 25 possible slope values in the first quadrant.

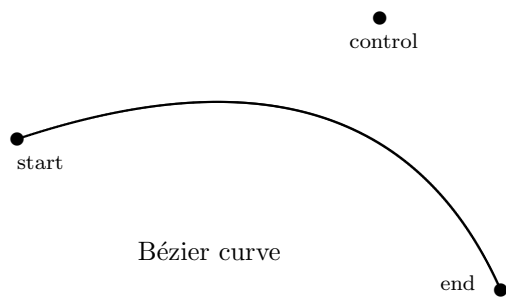
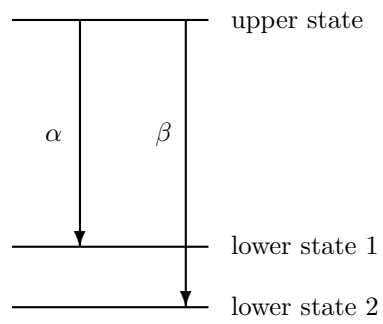
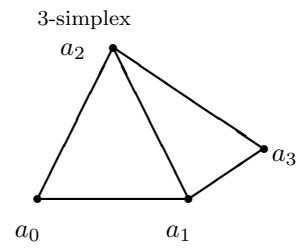


3.2 circle

The picture environment only admits diameters up to approximately 14mm, and even below this limit, not all diameters are possible.



3.3 vector and qbezier



Listings

1	Python example	4
---	--------------------------	---