Using Python and Latexslides to Make Slides

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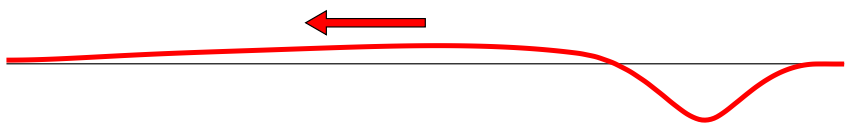
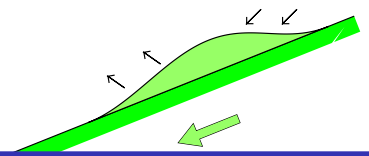
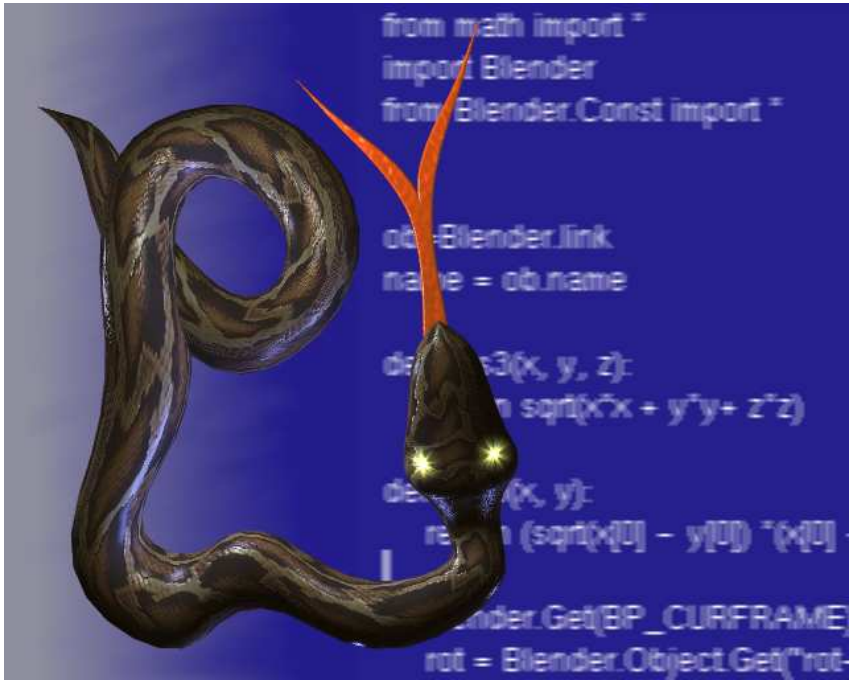




List of Topics

1. Intro to Latexslides
   - Plain Text Slides
   - Figures
   - Computer Code
2. More information



Do you use LaTeX for writing slides?

Continue studying these slides if your answer to at least one of the following questions is 'yes':

1. Are you using prosper for writing slides?
2. Have you not yet discovered latex-beamer?
3. Would you like your slide collection to be independent of what is the currently most popular LaTeX slide package?
4. Would you like to write less LaTeX source code when you create presentations?
5. Would like to get more flexibility than what plain ASCII files with LaTeX source provide?

List of Topics

What is Latexslides?

- A Python module
- You write slides as Python code, i.e., as function calls
- The function calls are translated to LaTeX
- Changes are easier to perform in the Python code than in the corresponding LaTeX code – that is the main purpose of Latexslides
- From the Python code you can automatically generate prosper or beamer LaTeX code and HTML

List of Topics

First example: simple bullet lists

Here is how we wrote the previous slide:

```
BulletSlide('What is Latexslides?',
['A Python module',
 'You write slides as Python code, i.e., as function calls',
 r'The function calls are translated to \LaTeX',
 'Changes are easier to perform in the Python code than '
 r'in the corresponding \LaTeX~code -- that is the main '
 'purpose of Latexslides',
 'From the Python code you can automatically generate '
 r'prosper or beamer \LaTeX~code and HTML'],)
```

Explanations:

- The first argument is the title of the slide
- Bullet lists are simply Python lists of (raw) strings

A general slide is defined by using `Slide`

```
Slide(title='title', content=[
    Text(r'some plain text'),
    BulletList([r'item1',
                r'item2',
                r'item3',
               ],),
    Code(r'some code'),],)
```

- Use raw strings if the text has LaTeX commands with backslash (always using raw strings is a good habit!)
- The `title=` and `content=` keywords can be omitted if they are the first two arguments given to Slide or one of its subclasses.

The available objects on a slide are `Text`, `Code` and `BulletList`

About the appearance of the three slide elements

Text, code and bullets can be typeset as shadowed blocks by using TextBlock, CodeBlock and BulletBlock instead of Text, Code and BulletList

- Note that this text is not a block since we used
  `BulletList`
  instead of `BulletBlock`

Each block may have a title!

The title is enabled by the argument

```
heading='Each block may ...'
```

Note that

```
Code("...")
```

can be used within the other objects

Blocks and slides

If only a single block is used on a slide, subclasses of `Slide` can be used, providing a simpler syntax:

- `BulletSlide`
- `TextSlide`
- `RawSlide`

These only have the following keywords:

- `title`
- `text/bullets`
- `block_heading`

`RawSlide` simply takes the raw LaTeX code for a slide such that old code can be reused (see the code for the first slide)

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How to dim blocks and bullet points

- Want to dim the blocks (as in the previous slide)? Just add an argument

```
dim='blocks'
```

- Want bullet items to pop up one by one? Just add an argument

```
dim='progressive'
```

- Want one bullet visible and the other dimmed? Just add

```
dim='single' #dim=False (default) turns off dimming
```

  Note that subbullets appear at the same time:

- Want the previous effect but with all bullets appearing at the end? Just add

```
dim='single_then_all'
```

- This is much easier than editing the underlying LaTeX code!

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Why? plain LaTeX is so easy...

- Latexslides turns the talk into living data structures
- With the data structures, you can easily generate Prosper, Beamer, HTML or write your own format output
- Some of us experimented with the idea for fun, now we're regularly using it – it's simply more convenient
- Latexslides talks can make use of future fancy LaTeX slide packages
- You can tweak the resulting LaTeX file if you want
- Talks are composed as lists of slide objects – you can import slide objects from previous talks and compose new collections
- Figures are definitely easier with Latexslides

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List of Topics

Handling figures is really easy

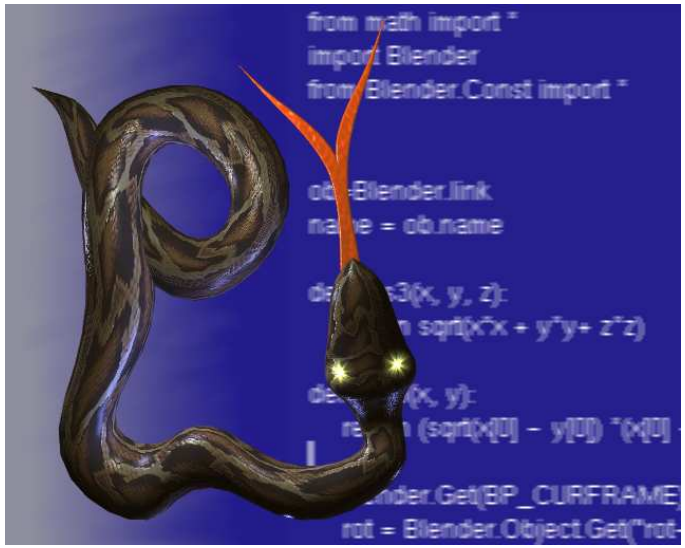
- Putting figures in LaTeX slides is not that easy, especially not if you want them to the left or right of the figure and move them around later
- Here is what you do with Latexslides, just add

```
figure='figs/python1.ps',    # filename
figure_pos='e',              # east ('e'), west ('w'),
                             # north ('n'), south ('e')
figure_fraction_width=0.5,
left_column_width=0.6   # => 0.4 fraction width for figure
```

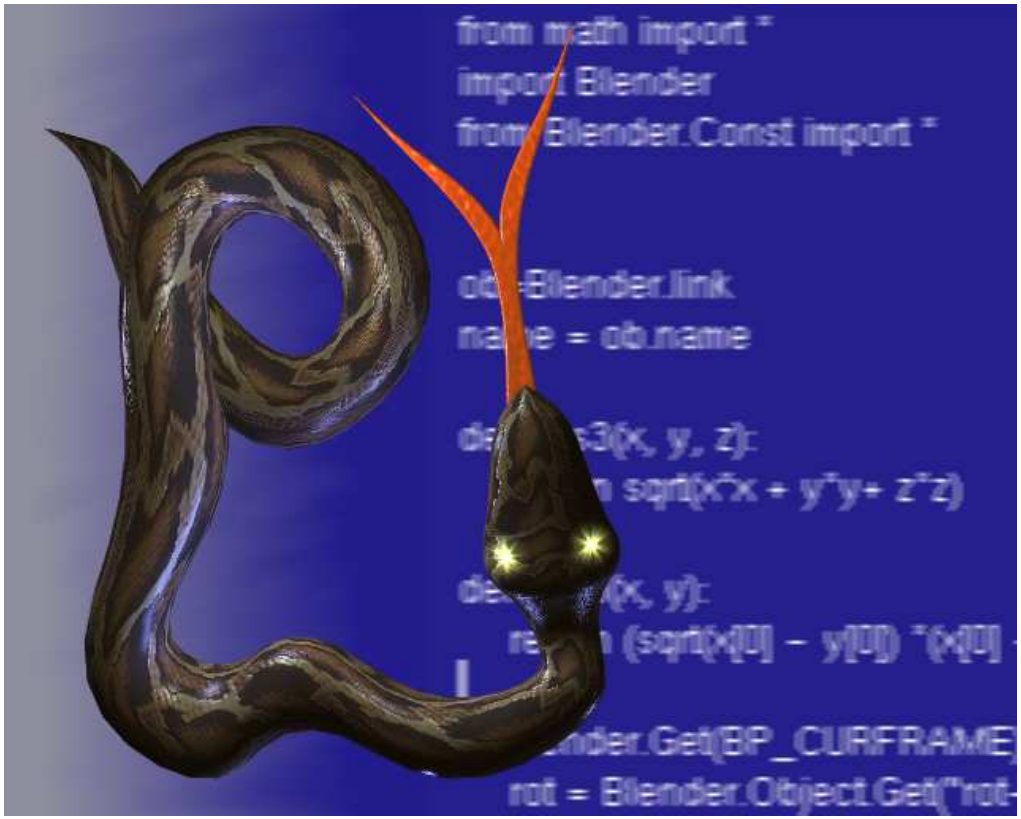
See next slides for an example

Slide with a figure

- Bullets to the west
- Figure to the east
- Easy to change: `'e'` $\rightarrow$ `'w'`
- ...and then text is to the right

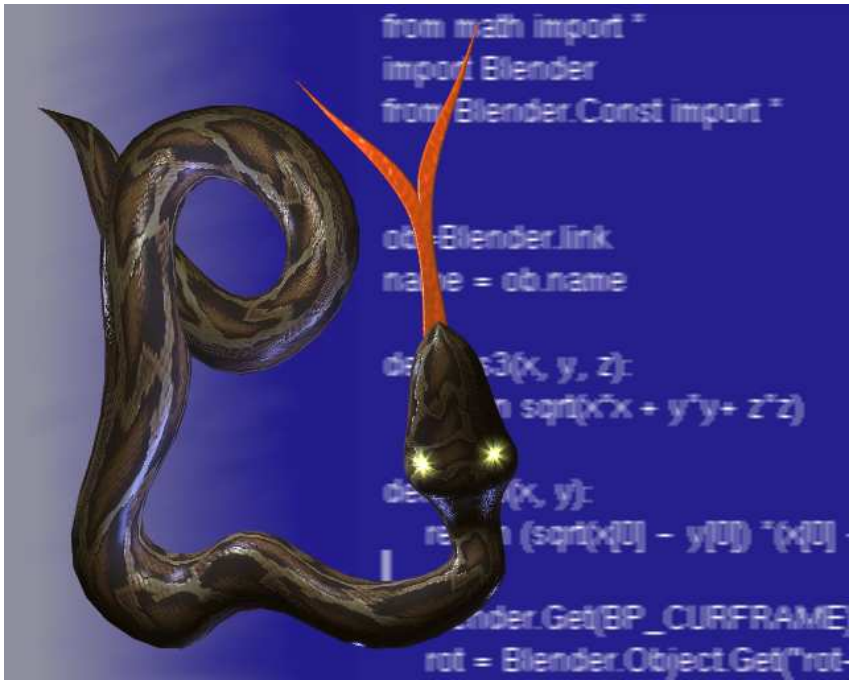


Slide with a figure



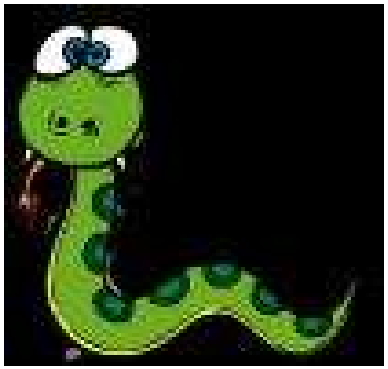
- Bullets to the east
- Figure to the west
- Easy to change: `'w'` $\rightarrow$ `'n'`
- ...and then text below the figure

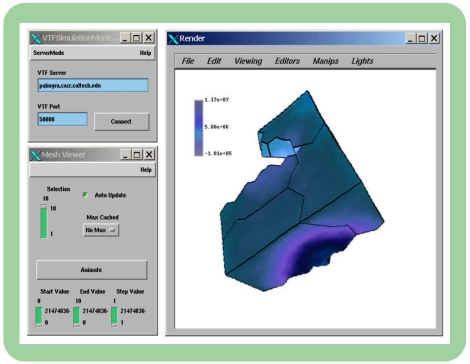
Slide with a figure



- Bullets to the south
- Figure to the north
- Easy to change: `'n'` $\rightarrow$ `'s'`
- ...and then text is above the figure

Several figures in one slide





- You simply provide a tuple (or list) of figure file names and a tuple of fraction widths
- Example:

```
figure=('figs/python2.ps','figs/python3.ps'),
figure_fraction_width=(0.45,0.55),
figure_pos='n',
```

List of Topics

Code objects take care of verbatim text

- Want to include computer code or some other verbatim text?

```
bullets=[r'Here is an example:' +
Code("""
def mypyfunc(somearg):
    for i in somearg:
        p = process(i)
        if p in mylist:
            return p
        else:
            return None
""")
```

- Code objects are wrapped in fancyvrb "Verbatim" environments

Result of using Code objects

Here is the result of the constructions on the previous slide:

- Here is an example:

```
def mypyfunc(somearg):
    for i in somearg:
        p = process(i)
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            return None
```

Code objects can also use ptex2tex enviroments

- Can set `Code.ptex2tex_envir = "pycod"` (for instance), which then applies to all Code objects
- Can alternatively provide `ptex2tex_envir` argument to Code constructor:

```
bullets=[r'Here is an example:' +
Code("""
def mypyfunc(somearg):
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""", ptex2tex_envir='pycod')
```

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- Here `pycod` corresponds to `Python_ANS`
- Note that the slides should be written to a file with extension `.p.tex`
- Note that ptex2tex must be installed and used

Code objects take care of verbatim text

- Can also just insert ptex2tex environment delimiters in the code:

```
# Recall to use raw strings because of \b...!!
bullets=[r'Here is an example:'  + Code(r"""
\bpycod
def mypyfunc(somearg):
    for i in somearg:
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\epycod
""")
```

- Any `ptex2tex_envir` argument will overrule `pycod` here

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```
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...
Slide(...
bullets=[r'Here is an example:' +
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```

- This code style requires pygmentize to be installed and LaTeX to be invoked by `latex -shell-escape`
- Here `cod` corresponds to `Minted_Python`

List of Topics

Adding sections and subsections

- Adding a section is just like adding a slide:

```
sec = Section('Long title', 'Short title')
```

  The short title is optional, and will be used if there is not enough room for the long title
- SubSection works the same way, but a Section needs to be defined prior to a SubSection
- Slide objects are automatically a part of the current section or subsection
- If no sections are defined, all slides will be part of the main talk

You can turn off the header and footer

- Want to navigate in your talk? Click in the header!
- Sometimes the navigation header and the author/title in the footer is disturbing
- Turn header/footer decoration off for all slides:

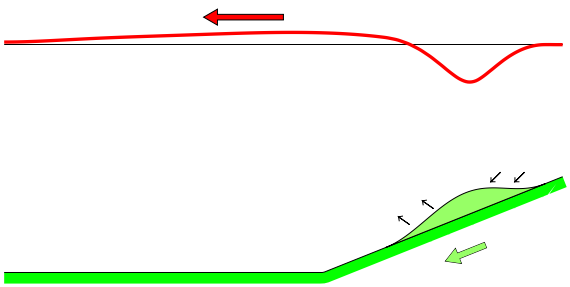
```
header_footer = False
```

There is support for mapping slides

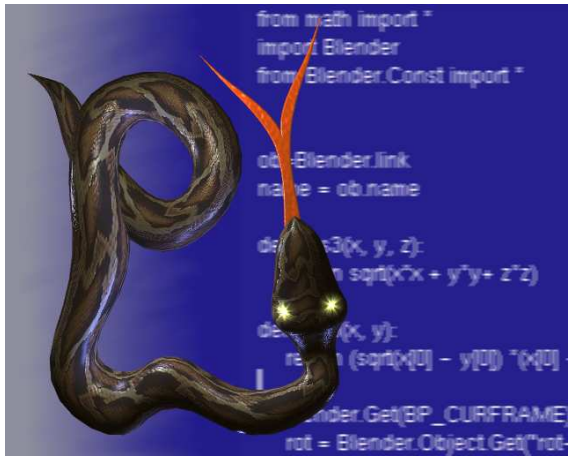
Michael Alley-style mapping slides can be created, using `MappingSlide` and a list of heading-figure pairs (optionally heading-figure-width triples, where width denotes the relative width of the figure). Here is an example:

```
mapping_slide2 = \
MappingSlide([('Wave motion', 'figs/wave-dueto-slide.ps'),
              ('Some Python', 'figs/python1.ps'),
              ])
```

See the next slide for the result (the headings are placed to the right of the figures, and the figure-heading pairs appear diagonally on the slide).



Wave motion



Some Python

The look of the file header

```
from latexslides import *

# First set some module variables:
package = BeamerSlides
theme = 'blue2'
header_footer = True

# Add newcommands:
newcommands = r"""
\newcommand{\OBS}[1]{\marginpar{\scriptsize##1}}
"""
```

Can I change from Beamer to Prosper or HTML?

- Of course, this is trivial:

```
#package = BeamerSlides
package = ProsperSlides
package = HTMLSlides
```

- Prosper is fine (best?) for handouts
- Handouts for Beamer are made setting the keyword

```
handout=True
```

for colour prints and

```
colour=False
```

for b/w handouts

The titlepage

```
ifi = "Dept.~of Informatics, University of Oslo"
math = "Dept.~of Mathematics, University of Oslo"
simula = "Simula Research Laboratory"

hpl = 'Hans Petter Langtangen'
ilmarw = 'Ilmar M. Wilbers'

slides = BeamerSlides(
         title='Using Python and Latexslides to Make Slides',
         author_and_inst=[(hpl, simula, ifi),
                          (ilmarw, simula, math)],
         date='March 2008',
         titlepage_figure='figs/wave-dueto-slide.ps',
         # Figure to the south of the title:
         titlepage_figure_pos='s',
         titlepage_figure_fraction_width=0.5,
         # Used if titlepage_figure_pos is 'e':
         #titlepage_left_column_width=1.0,
         toc_heading='List of Topics',
         toc_figure='figs/python1.ps',
         toc_figure_fraction_width=1,
         toc_left_column_width=0.5,
         newcommands=newcommands)
```

Emacs commands

- The authors have found the following Emacs shortcuts very helpful:
  - Alt + up-arrow:

```
(global-set-key [ (meta up)] " = Slide('',
content=[BulletBlock(bullets=[
    '','")
```

  - Alt + down-arrow:

```
(global-set-key [ (meta down)] "
]),   # end bullets and BulletBlock
],    # end contents
)")
```

- These should be included in the `.emacs` file in your home directory
- This example is for the opening and closing of a BulletBlock, but illustrate how Emacs shortcuts can be used

Slide Objects 1

- You may save each slide in a Slide object (recommended!!)

```
slides = BeamerSlides(...)
motivation2 = \
Slide('Motivation Cont.',
      [BulletBlock([...], ...), ...]
```

- A list of all slide objects in a file can be generated with the following executable:

```
extract_slidenames mytalk.py
```

- The generated list can be included at the bottom of your file

Slide Objects 2

- Talks can be composed of lists of slide objects

```
slides = BeamerSlides(...)
collection = [header, title, sec1, intro1, test,
              sec2, plainloop]
# Can make some slides invisible:
for s in intro1, plainloop: s.hidden = True
# Or perhaps more elegant:
collection = [header, title, sec1, intro1.hide,
              test, sec2, plainloop.hide]

slides.add_slides(collection)
# Write slides to file:
f = open('exampletalk.tex', 'w')
f.write(slides.get_latex())
# Or the simplest, which will output the
# necessary latex commands as well:
slides.write(filename)
```

- In this way you can reuse old slides in new contexts without cut and paste, i.e., you can have a single source for each slide (important for large slide collections!)

How to Compile the Talk

- You write your talk as Python code in a plain text file, say `mytalk.py`
- The next step is to generate LaTeX code:

```
unix> python mytalk.py
```

- The latex commands you need to run will be the output if the `write` function is used

How to write mathematics

Use triple-quoted raw strings and just write the plain LaTeX code

Latexslide source:

```
TextBlock(heading='Latexslide source:',
          text=r"""Here is an equation
\[ ax^2 + bx + c = 0\]
that is easy to solve.
""")
```

Result:

Here is an equation

$$ax^2 + bx + c = 0$$

that is easy to solve.

Learning Latexslides

- Have a look at the source code for this presentation, it can be found in the file `exampletalk.py`. Going through the presentation and the source code simultaneously should get you started.

- When running

  ```
  unix> latexslides mytalk.py
  ```

  the file `mytalk.py` is created. This file contains the basics and will help you get started on a new talk.