

---

# nbsphinx

Release 0.8.4

Matthias Geier

2021-04-29

## Contents

<b>1</b>	<b>Installation</b>	<b>4</b>
1.1	nbsphinx Packages	4
1.2	nbsphinx Prerequisites	5
1.2.1	Python	5
1.2.2	Sphinx	5
1.2.3	pip	5
1.2.4	pandoc	5
1.2.5	Pygments Lexer for Syntax Highlighting	6
1.2.6	Jupyter Kernel	6
<b>2</b>	<b>Usage</b>	<b>7</b>
2.1	Sphinx Setup	7
2.1.1	Sphinx Configuration Values	7
2.1.1.1	exclude_patterns	8
2.1.1.2	extensions	8
2.1.1.3	html_css_files	8
2.1.1.4	html_sourcelink_suffix	8
2.1.1.5	latex_additional_files	9
2.1.1.6	mathjax3_config	9
2.1.1.7	pygments_style	9
2.1.1.8	suppress_warnings	9
2.1.2	nbsphinx Configuration Values	10
2.1.2.1	nbsphinx_allow_errors	10
2.1.2.2	nbsphinx_codecell_lexer	10
2.1.2.3	nbsphinx_custom_formats	10
2.1.2.4	nbsphinx_epilog	10
2.1.2.5	nbsphinx_execute	10
2.1.2.6	nbsphinx_execute_arguments	10
2.1.2.7	nbsphinx_input_prompt	11
2.1.2.8	nbsphinx_kernel_name	11
2.1.2.9	nbsphinx_output_prompt	11
2.1.2.10	nbsphinx_prolog	11
2.1.2.11	nbsphinx_prompt_width	11
2.1.2.12	nbsphinx_requirejs_options	11
2.1.2.13	nbsphinx_requirejs_path	11
2.1.2.14	nbsphinx_responsive_width	12
2.1.2.15	nbsphinx_thumbnails	12
2.1.2.16	nbsphinx_timeout	12

2.1.2.17	nbsphinx_widgets_options	12
2.1.2.18	nbsphinx_widgets_path	12
2.2	Running Sphinx	12
2.3	Watching for Changes with sphinx-autobuild	13
2.4	Automatic Creation of HTML and PDF output on readthedocs.org	14
2.4.1	Using requirements.txt	14
2.4.2	Using conda	15
2.5	HTML Themes	15
2.5.1	Sphinx's Built-In Themes	16
2.5.2	3rd-Party Themes	16
2.6	Using Notebooks with Git	18
<b>3</b>	<b>Markdown Cells</b>	<b>18</b>
3.1	Equations	19
3.1.1	Automatic Equation Numbering	20
3.1.2	Manual Equation Numbering	21
3.2	Citations	21
3.2.1	Footnote citations	21
3.3	Code	22
3.4	Tables	22
3.5	Images	22
3.5.1	Using the HTML <img> tag	23
3.5.2	SVG support for LaTeX	23
3.6	Cell Attachments	24
3.7	HTML Elements (HTML only)	24
3.8	Info/Warning Boxes	25
3.9	Links to Other Notebooks	26
3.10	Links to *.rst Files (and Other Sphinx Source Files)	27
3.11	Links to Local Files	27
3.12	Links to Domain Objects	27
<b>4</b>	<b>Code Cells</b>	<b>28</b>
4.1	Code, Output, Streams	28
4.2	Cell Magics	29
4.3	Special Display Formats	29
4.3.1	Local Image Files	29
4.3.2	Image URLs	30
4.3.3	Math	30
4.3.4	Plots	31
4.3.5	Pandas Dataframes	33
4.3.6	YouTube Videos	34
4.3.7	Interactive Widgets (HTML only)	35
4.3.7.1	Troubleshooting	36
4.3.8	Arbitrary JavaScript Output (HTML only)	37
4.3.9	Unsupported Output Types	37
4.4	ANSI Colors	37
<b>5</b>	<b>Raw Cells</b>	<b>39</b>
5.1	Usage	39
5.2	Available Raw Cell Formats	40
5.2.1	None	40
5.2.2	reST	40
5.2.3	Markdown	40
5.2.4	HTML	40
5.2.5	LaTeX	40
5.2.6	Python	40

<b>6</b>	<b>Hidden Cells</b>	<b>40</b>
<b>7</b>	<b>Controlling Notebook Execution</b>	<b>41</b>
7.1	Pre-Executing Notebooks	41
7.1.1	Long-Running Cells	41
7.1.2	Rare Libraries	42
7.1.3	Exceptions	42
7.1.4	Client-specific Outputs	42
7.1.5	Interactive Input	43
7.2	Explicitly Dis-/Enabling Notebook Execution	43
7.3	Ignoring Errors	43
7.4	Ignoring Errors on a Per-Cell Basis	45
7.5	Configuring the Kernels	45
7.5.1	Kernel Name	45
7.5.2	Kernel Arguments	46
7.5.3	Environment Variables	46
7.6	Cell Execution Timeout	47
<b>8</b>	<b>Prolog and Epilog</b>	<b>47</b>
8.1	Examples	48
<b>9</b>	<b>Custom Notebook Formats</b>	<b>49</b>
9.1	Example: JupyterText	49
<b>10</b>	<b>Notebooks in Sub-Directories</b>	<b>50</b>
10.1	A Sub-Section	51
<b>11</b>	<b>Creating Thumbnail Galleries</b>	<b>51</b>
11.1	Using a Cell Tag to Select a Thumbnail	52
11.2	Using Cell Metadata to Select a Thumbnail	53
11.3	Choosing from Multiple Outputs	54
11.4	A Notebook without Thumbnail	55
11.5	Specifying Thumbnails in <code>conf.py</code>	55
<b>12</b>	<b>Using <code>toctree</code> In A Notebook</b>	<b>56</b>
12.1	Yet Another Notebook	57
<b>13</b>	<b>Custom CSS</b>	<b>57</b>
13.1	For All Pages	57
13.2	For All RST files	58
13.3	For All Notebooks	58
13.4	For a Single Notebook	58
<b>14</b>	<b>Normal reStructuredText Files</b>	<b>59</b>
14.1	Links to Notebooks (and Other Sphinx Source Files)	59
14.2	Links to Notebooks, Ye Olde Way	60
14.3	Sphinx Directives for Info/Warning Boxes	60
14.4	Domain Objects	61
14.5	References	61
14.5.1	Citations	61
14.5.2	Footnote citations	62
14.6	Thumbnail Galleries	62
14.6.1	Dummy Notebook 1 for Gallery	63
14.6.2	Dummy Notebook 2 for Gallery	63
<b>15</b>	<b>External Links</b>	<b>63</b>

<b>16 Contributing</b>	<b>66</b>
16.1 Development Installation . . . . .	66
16.2 Building the Documentation . . . . .	67
16.3 Testing . . . . .	67
<b>17 Version History</b>	<b>67</b>
<b>References</b>	<b>72</b>

---

nbsphinx is a [Sphinx](#)<sup>1</sup> extension that provides a source parser for \*.ipynb files. Custom Sphinx directives are used to show [Jupyter Notebook](#)<sup>2</sup> code cells (and of course their results) in both HTML and LaTeX output. Un-evaluated notebooks – i.e. notebooks without stored output cells – will be automatically executed during the Sphinx build process.

**Quick Start:**

1. Install nbsphinx
2. Edit your `conf.py` and add 'nbsphinx' to extensions.
3. Edit your `index.rst` and add the names of your \*.ipynb files to the toctree.
4. Run Sphinx!

**Online documentation (and example of use):** <http://nbsphinx.readthedocs.io/>

**Source code repository (and issue tracker):** <https://github.com/spatialaudio/nbsphinx/>

**License:** MIT – see the file LICENSE for details.

All content shown below – except for the sections *Normal reStructuredText Files* (page 59), *Contributing* (page 66) and *Version History* (page 67) – was generated from Jupyter notebooks.

The following section was generated from `doc/installation.ipynb` .....

## 1 Installation

Note that some packages may be out of date. You can always get the newest nbsphinx release from [PyPI](#)<sup>3</sup> (using `pip`). If you want to try the latest development version, have a look at the section *Contributing* (page 66).

### 1.1 nbsphinx Packages



If you are using the `conda` package manager (e.g. with [Anaconda](#)<sup>5</sup> for Linux/macOS/Windows), you can install nbsphinx from the `conda-forge`<sup>6</sup> channel:

```
conda install -c conda-forge nbsphinx
```

<sup>1</sup> <https://www.sphinx-doc.org/>  
<sup>2</sup> <https://jupyter.org/>  
<sup>3</sup> <https://pypi.org/project/nbsphinx>  
<sup>4</sup> <https://anaconda.org/conda-forge/nbsphinx>  
<sup>5</sup> <https://www.anaconda.com/products/individual#Downloads>  
<sup>6</sup> <https://conda-forge.org/>

pypi package 0.8.4 <sup>7</sup>

You can of course also install `nbsphinx` with `pip`, Python's own package manager:

```
python3 -m pip install nbsphinx
```

Depending on your Python installation, you may have to use `python` instead of `python3`. If you have installed the module already, you can use the `--upgrade` flag to get the newest release.

## 1.2 `nbsphinx` Prerequisites

Some of the aforementioned packages will install some of these prerequisites automatically, some of the things may be already installed on your computer anyway.

### 1.2.1 Python

Of course you'll need Python, because both Sphinx and `nbsphinx` are implemented in Python. There are many ways to get Python. If you don't know which one is best for you, you can try [Anaconda](#)<sup>8</sup>.

### 1.2.2 Sphinx

You'll need [Sphinx](#)<sup>9</sup> as well, because `nbsphinx` is just a Sphinx extension and doesn't do anything on its own.

If you use `conda`, you can get [Sphinx from the conda-forge channel](#)<sup>10</sup>:

```
conda install -c conda-forge sphinx
```

Alternatively, you can install it with `pip` (see below):

```
python3 -m pip install Sphinx
```

### 1.2.3 `pip`

Recent versions of Python already come with `pip` pre-installed. If you don't have it, you can [install it manually](#)<sup>11</sup>.

### 1.2.4 `pandoc`

The stand-alone program [pandoc](#)<sup>12</sup> is used to convert Markdown content to something Sphinx can understand. You have to install this program separately, ideally with your package manager. If you are using `conda`, you can install [pandoc from the conda-forge channel](#)<sup>13</sup>:

```
conda install -c conda-forge pandoc
```

---

<sup>7</sup> <https://pypi.org/project/nbsphinx>

<sup>8</sup> <https://www.anaconda.com/products/individual#Downloads>

<sup>9</sup> <https://www.sphinx-doc.org/>

<sup>10</sup> <https://anaconda.org/conda-forge/sphinx>

<sup>11</sup> <https://pip.pypa.io/en/latest/installing/>

<sup>12</sup> <https://pandoc.org/>

<sup>13</sup> <https://anaconda.org/conda-forge/pandoc>

If that doesn't work out for you, have a look at [pandoc's installation instructions](#)<sup>14</sup>.

---

#### Note

The use of `pandoc` in `nbsphinx` is temporary, but will likely stay that way for a long time, see [issue #36](#)<sup>15</sup>.

---

### 1.2.5 Pygments Lexer for Syntax Highlighting

To get proper syntax highlighting in code cells, you'll need an appropriate *Pygments lexer*. This of course depends on the programming language of your Jupyter notebooks (more specifically, the `pygments_lexer` metadata of your notebooks).

For example, if you use Python in your notebooks, you'll have to have the IPython package installed, e.g. with

```
conda install -c conda-forge ipython
```

or

```
python3 -m pip install IPython
```

---

#### Note

If you are using Anaconda with the default channel and syntax highlighting in code cells doesn't seem to work, you can try to install IPython from the `conda-forge` channel or directly with `pip`, or as a work-around, add `'IPython.sphinxext.ipython_console_highlighting'` to extensions in your `conf.py`.

For details, see [Anaconda issue #1430](#)<sup>16</sup> and [nbsphinx issue #24](#)<sup>17</sup>.

---

### 1.2.6 Jupyter Kernel

If you want to execute your notebooks during the Sphinx build process (see [Controlling Notebook Execution](#) (page 41)), you need an appropriate [Jupyter kernel](#)<sup>18</sup> installed.

For example, if you use Python, you should install the `ipykernel` package, e.g. with

```
conda install -c conda-forge ipykernel
```

or

```
python3 -m pip install ipykernel
```

---

If you created your notebooks yourself with Jupyter, it's very likely that you have the right kernel installed already.

---

#### Note

<sup>14</sup> <https://pandoc.org/installing.html>

<sup>15</sup> <https://github.com/spatialaudio/nbsphinx/issues/36>

<sup>16</sup> <https://github.com/ContinuumIO/anaconda-issues/issues/1430>

<sup>17</sup> <https://github.com/spatialaudio/nbsphinx/issues/24>

<sup>18</sup> <https://jupyter.readthedocs.io/en/latest/projects/kernels.html>

If your *automatic builds* (page 14) on <https://readthedocs.org> are failing due to an error like the one below, add `ipykernel` to `docs/requirements.txt` or `doc/environment.yml` to resolve.

```
jupyter_client.kernelspec.nosuchkernel: no such kernel named python3
..... doc/installation.ipynb ends here.
```

The following section was generated from `doc/usage.ipynb` .....

## 2 Usage

### 2.1 Sphinx Setup

In the directory with your notebook files, run this command (assuming you have [Sphinx](#)<sup>19</sup> and `nbsphinx` installed already):

```
python3 -m sphinx.cmd.quickstart
```

Answer the questions that appear on the screen. In case of doubt, just press the `<Return>` key repeatedly to take the default values.

After that, there will be a few brand-new files in the current directory. You'll have to make a few changes to the file named `conf.py`. You should make sure that the `extensions` setting at least contains `'nbsphinx'` (but you might want to add other useful extensions as well):

```
extensions = [
    'nbsphinx',
]
```

For an example, see this project's [conf.py](#) file.

Once your `conf.py` is in place, edit the file named `index.rst` and add the file names of your notebooks (without the `.ipynb` extension) to the `toctree`<sup>20</sup> directive. For an example, see this project's `doc/index.rst` file.

Alternatively, you can delete the file `index.rst` and replace it with your own notebook called `index.ipynb` which will serve as main page. In this case you can create the main *toctree* (page 56) in `index.ipynb`.

#### 2.1.1 Sphinx Configuration Values

All configuration values are described in the [Sphinx documentation](#)<sup>21</sup>, here we mention only the ones which may be relevant in combination with `nbsphinx`.

---

<sup>19</sup> <https://www.sphinx-doc.org/>

<sup>20</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/directives.html#directive-toctree>

<sup>21</sup> <http://www.sphinx-doc.org/en/master/usage/configuration.html>

### 2.1.1.1 `exclude_patterns`

Sphinx builds all potential source files (reST files, Jupyter notebooks, ...) that are in the source directory (including any sub-directories), whether you want to use them or not. If you want certain source files not to be built, specify them in `exclude_patterns`<sup>22</sup>. For example, you might want to ignore source files in your build directory:

```
exclude_patterns = ['_build']
```

Note that the directory `.ipynb_checkpoints` is automatically added to `exclude_patterns` by `nbsphinx`.

### 2.1.1.2 `extensions`

This is the only required value. You have to add `'nbsphinx'` to the list of `extensions`<sup>23</sup>, otherwise it won't work.

Other interesting extensions are:

- `'sphinx.ext.mathjax'` (Sphinx loads this by default) for *math formulas* (page 19)
- `'sphinxcontrib.bibtex'` for *bibliographic references* (page 61)
- `'sphinxcontrib.rsvgconverter'` for *SVG->PDF conversion in LaTeX output* (page 23)
- `'sphinx_copybutton'` for adding “copy to clipboard” buttons<sup>24</sup> to all text/code boxes
- `'sphinx_gallery.load_style'` to load CSS styles for *thumbnail galleries* (page 51)

### 2.1.1.3 `html_css_files`

See *Custom CSS* (page 57) and `html_css_files`<sup>25</sup>.

### 2.1.1.4 `html_sourcelink_suffix`

By default, a `.txt` suffix is added to source files. This is only relevant if the chosen HTML theme supports source links and if `html_show_sourcelink`<sup>26</sup> is `True`.

Jupyter notebooks with the suffix `.ipynb.txt` are normally not very useful, so if you want to avoid the additional suffix, set `html_sourcelink_suffix`<sup>27</sup> to the empty string:

```
html_sourcelink_suffix = ''
```

<sup>22</sup> [http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-exclude\\_patterns](http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-exclude_patterns)

<sup>23</sup> <http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-extensions>

<sup>24</sup> <https://sphinx-copybutton.readthedocs.io/>

<sup>25</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_css\\_files](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_css_files)

<sup>26</sup> [http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_show\\_sourcelink](http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_show_sourcelink)

<sup>27</sup> [http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_sourcelink\\_suffix](http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_sourcelink_suffix)



### 2.1.1.5 latex\_additional\_files

`latex_additional_files`<sup>28</sup> can be useful if you are using BibTeX files, see *References* (page 61).

### 2.1.1.6 mathjax3\_config

The configuration value `mathjax3_config`<sup>29</sup> can be useful to enable *Automatic Equation Numbering* (page 20).

For Sphinx versions below 4.0.0, which used MathJax version 2, the relevant configuration value was called `mathjax_config`.

### 2.1.1.7 pygments\_style

Use `pygments_style`<sup>30</sup> to change the color/font theme that's used for syntax highlighting in source code.

This affects both *code cells* (page 28) and *code blocks in Markdown cells* (page 22) (unless overwritten by the `html_theme`<sup>31</sup>).

### 2.1.1.8 suppress\_warnings

Warnings can be really helpful to detect small mistakes, and you should consider invoking Sphinx with the `-W`<sup>32</sup> option, which turns warnings into errors. However, warnings can also be annoying, especially if you are fully aware of the “problem”, but you simply don't care about it for some reason. In this case, you can use `suppress_warnings`<sup>33</sup> to silence specific types of warnings.

If you want to suppress all warnings from `nbsphinx`, use this:

```
suppress_warnings = [  
    'nbsphinx',  
]
```

You can also be more specific:

```
suppress_warnings = [  
    'nbsphinx.localfile',  
    'nbsphinx.gallery',  
    'nbsphinx.thumbnail',  
    'nbsphinx.notebooktitle',  
    'nbsphinx.ipywidgets',  
]
```

<sup>28</sup> [http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-latex\\_additional\\_files](http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-latex_additional_files)

<sup>29</sup> [https://www.sphinx-doc.org/en/master/usage/extensions/math.html#confval-mathjax3\\_config](https://www.sphinx-doc.org/en/master/usage/extensions/math.html#confval-mathjax3_config)

<sup>30</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-pygments\\_style](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-pygments_style)

<sup>31</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_theme](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_theme)

<sup>32</sup> <https://www.sphinx-doc.org/en/master/man/sphinx-build.html#cmdoption-sphinx-build-W>

<sup>33</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-suppress\\_warnings](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-suppress_warnings)

## 2.1.2 nbsphinx Configuration Values

### 2.1.2.1 nbsphinx\_allow\_errors

If `True`, the build process is continued even if an exception occurs.

See *Ignoring Errors* (page 43).

### 2.1.2.2 nbsphinx\_codecell\_lexer

Default Pygments lexer for syntax highlighting in code cells. If available, this information is taken from the notebook metadata instead.

### 2.1.2.3 nbsphinx\_custom\_formats

See *Custom Notebook Formats* (page 49).

### 2.1.2.4 nbsphinx\_epilog

See *Prolog and Epilog* (page 47).

### 2.1.2.5 nbsphinx\_execute

Whether to execute notebooks before conversion or not. Possible values: `'always'`, `'never'`, `'auto'` (default).

See *Explicitly Dis-/Enabling Notebook Execution* (page 43).

### 2.1.2.6 nbsphinx\_execute\_arguments

Kernel arguments used when executing notebooks.

If you *use Matplotlib for plots* (page 31), this setting is recommended:

```
nbsphinx_execute_arguments = [  
    "--InlineBackend.figure_formats={'svg', 'pdf'}",  
    "--InlineBackend.rc=figure.dpi=96",  
]
```

If you don't use LaTeX/PDF output, you can drop the `'pdf'` figure format.

See *Configuring the Kernels* (page 46).

### 2.1.2.7 nbsphinx\_input\_prompt

Input prompt for code cells. %s is replaced by the execution count.

To get a prompt similar to the Classic Notebook, use

```
nbsphinx_input_prompt = 'In [%s]:'
```

### 2.1.2.8 nbsphinx\_kernel\_name

Use a different kernel than stored in the notebook metadata, e.g.:

```
nbsphinx_kernel_name = 'python3'
```

See *Configuring the Kernels* (page 45).

### 2.1.2.9 nbsphinx\_output\_prompt

Output prompt for code cells. %s is replaced by the execution count.

To get a prompt similar to the Classic Notebook, use

```
nbsphinx_output_prompt = 'Out [%s]:'
```

### 2.1.2.10 nbsphinx\_prolog

See *Prolog and Epilog* (page 47).

### 2.1.2.11 nbsphinx\_prompt\_width

Width of input/output prompts (HTML only).

If a prompt is wider than that, it protrudes into the left margin.

Any CSS length can be specified.

### 2.1.2.12 nbsphinx\_requirejs\_options

Options for loading RequireJS. See *nbsphinx\_requirejs\_path* (page 11).

### 2.1.2.13 nbsphinx\_requirejs\_path

URL or local path to override the default URL for RequireJS<sup>34</sup>.

If you use a local file, it should be located in a directory listed in *html\_static\_path*<sup>35</sup>.

Set to empty string to disable loading RequireJS.

<sup>34</sup> <https://requirejs.org/>

<sup>35</sup> [http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_static\\_path](http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_static_path)

#### 2.1.2.14 `nbsphinx_responsive_width`

If the browser window is narrower than this, input/output prompts are on separate lines (HTML only).

Any CSS length can be specified.

#### 2.1.2.15 `nbsphinx_thumbnails`

A dictionary mapping from a document name (i.e. source file without suffix but with subdirectories) – optionally containing wildcards – to a thumbnail path to be used in a *thumbnail gallery* (page 51).

See *Specifying Thumbnails* (page 55).

#### 2.1.2.16 `nbsphinx_timeout`

Controls when a cell will time out. The timeout is given in seconds. Given `-1`, cells will never time out, which is also the default.

See *Cell Execution Timeout* (page 47).

#### 2.1.2.17 `nbsphinx_widgets_options`

Options for loading Jupyter widgets resources. See *nbsphinx\_widgets\_path* (page 12).

#### 2.1.2.18 `nbsphinx_widgets_path`

URL or local path to override the default URL for Jupyter widgets resources. See *Interactive Widgets (HTML only)* (page 35).

If you use a local file, it should be located in a directory listed in `html_static_path`<sup>36</sup>.

For loading the widgets resources, RequireJS is needed, see *nbsphinx\_requirejs\_path* (page 11).

If `nbsphinx_widgets_path` is not specified, widgets resources are only loaded if at least one notebook actually uses widgets. If you are loading the relevant JavaScript code by some other means already, you can set this option to the empty string to avoid loading it a second time.

## 2.2 Running Sphinx

To create the HTML pages, use this command:

```
python3 -m sphinx <source-dir> <build-dir>
```

If you have many notebooks, you can do a parallel build by using the `-j` option:

```
python3 -m sphinx <source-dir> <build-dir> -j<number-of-processes>
```

For example, if your source files are in the current directory and you have 4 CPU cores, you can run this:

```
python3 -m sphinx . _build -j4
```

<sup>36</sup> [http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_static\\_path](http://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_static_path)

Afterwards, you can find the main HTML file in `_build/index.html`.

Subsequent builds will be faster, because only those source files which have changed will be re-built. To force re-building all source files, use the `-E` option.

---

#### Note

By default, notebooks will be executed during the Sphinx build process only if they do not have any output cells stored. See *Controlling Notebook Execution* (page 41).

---

To create LaTeX output, use:

```
python3 -m sphinx <source-dir> <build-dir> -b latex
```

If you don't know how to create a PDF file from the LaTeX output, you should have a look at [Latexmk](#)<sup>37</sup> (see also [this tutorial](#)<sup>38</sup>).

Sphinx can automatically check if the links you are using are still valid. Just invoke it like this:

```
python3 -m sphinx <source-dir> <build-dir> -b linkcheck
```

## 2.3 Watching for Changes with `sphinx-autobuild`

If you think it's tedious to run the Sphinx build command again and again while you make changes to your notebooks, you'll be happy to hear that there is a way to avoid that: `sphinx-autobuild`<sup>39</sup>!

It can be installed with

```
python3 -m pip install sphinx-autobuild
```

You can start auto-building your files with

```
python3 -m sphinx_autobuild <source-dir> <build-dir>
```

This will start a local webserver which will serve the generated HTML pages at <http://localhost:8000/>. Whenever you save changes in one of your notebooks, the appropriate HTML page(s) will be re-built and when finished, your browser view will be refreshed automatically. Neat!

You can also abuse this to auto-build the LaTeX output:

```
python3 -m sphinx_autobuild <source-dir> <build-dir> -b latex
```

However, to auto-build the final PDF file as well, you'll need an additional tool. Again, you can use `latexmk` for this (see *above* (page 12)). Change to the build directory and run

```
latexmk -pdf -pvc
```

If your PDF viewer isn't opened because of LaTeX build errors, you can use the command line flag `-f` to *force* creating a PDF file.

---

<sup>37</sup> <http://personal.psu.edu/jcc8//software/latexmk-jcc/>

<sup>38</sup> <https://mg.readthedocs.io/latexmk.html>

<sup>39</sup> <https://pypi.org/project/sphinx-autobuild>

## 2.4 Automatic Creation of HTML and PDF output on readthedocs.org

There are two different methods, both of which are described below.

In both cases, you'll first have to create an account on <https://readthedocs.org/> and connect your GitLab/Github/Bitbucket/... account. Instead of connecting, you can also manually add any publicly available Git/Subversion/Mercurial/Bazaar/... repository.

After doing the steps described below, you only have to "push" to your repository, and the HTML pages and the PDF file of your stuff are automatically created on readthedocs.org. Awesome!

You can even have different versions of your stuff, just use Git tags and branches and select in the [readthedocs.org settings](#)<sup>40</sup> which of those should be created.

---

### Note

If you want to execute notebooks (see *Controlling Notebook Execution* (page 41)), you'll need to install the appropriate Jupyter kernel. In the examples below, the IPython kernel is installed from the packet `ipykernel`.

---

#### 2.4.1 Using `requirements.txt`

1. Create a file named `.readthedocs.yml` in the main directory of your repository with the following contents:

```
version: 2
formats: all
python:
  version: 3
  install:
    - requirements: doc/requirements.txt
  system_packages: true
```

For further options see <https://docs.readthedocs.io/en/latest/config-file/>.

2. Create a file named `doc/requirements.txt` (or whatever you chose in the previous step) containing the required pip packages:

```
ipykernel
nbsphinx
```

You can also install directly from Github et al., using a specific branch/tag/commit, e.g.

```
git+https://github.com/spatialaudio/nbsphinx.git@master
```

---

<sup>40</sup> <https://readthedocs.org/dashboard/>

## 2.4.2 Using conda

1. Create a file named `.readthedocs.yml` in the main directory of your repository with the following contents:

```
version: 2
formats: all
conda:
  environment: doc/environment.yml
```

For further options see <https://docs.readthedocs.io/en/latest/config-file/>.

2. Create a file named `doc/environment.yml` (or whatever you chose in the previous step) describing a `conda environment`<sup>41</sup> like this:

```
channels:
  - conda-forge
dependencies:
  - python>=3
  - pandoc
  - ipykernel
  - pip
  - pip:
    - nbsphinx
```

It is up to you if you want to install `nbsphinx` with `conda` or with `pip` (but note that the `conda` package might be outdated). And you can of course add further `conda` and `pip` packages. You can also install packages directly from Github et al., using a specific branch/tag/commit, e.g.

```
- pip:
  - git+https://github.com/spatialaudio/nbsphinx.git@master
```

---

### Note

The specification of the `conda-forge` channel is recommended because it tends to have more recent package versions than the default channel.

---

## 2.5 HTML Themes

The `nbsphinx` extension does *not* provide its own theme, you can use any of the available themes or create a custom one<sup>42</sup>, if you feel like it.

The following (incomplete) list of themes contains up to three links for each theme:

1. The documentation (or the official sample page) of this theme (if available; see also the [documentation of the built-in Sphinx themes](#)<sup>43</sup>)
2. How the `nbsphinx` documentation looks when using this theme
3. How to enable this theme using either `requirements.txt` or `readthedocs.yml` and theme-specific settings (in some cases)

---

<sup>41</sup> <https://docs.conda.io/projects/conda/en/latest/user-guide/tasks/manage-environments.html>

<sup>42</sup> <https://www.sphinx-doc.org/en/master/development/theming.html#creating-themes>

<sup>43</sup> <https://www.sphinx-doc.org/en/master/usage/theming.html#builtin-themes>

### 2.5.1 Sphinx's Built-In Themes

- agogo: [example](#)<sup>44</sup>, [usage](#)<sup>45</sup>
- alabaster<sup>46</sup>: [example](#)<sup>47</sup>, [usage](#)<sup>48</sup>
- bizstyle: [example](#)<sup>49</sup>, [usage](#)<sup>50</sup>
- classic: [example](#)<sup>51</sup>, [usage](#)<sup>52</sup>
- haiku: [example](#)<sup>53</sup>, [usage](#)<sup>54</sup>
- nature: [example](#)<sup>55</sup>, [usage](#)<sup>56</sup>
- pyramid: [example](#)<sup>57</sup>, [usage](#)<sup>58</sup>
- scrolls: [example](#)<sup>59</sup>, [usage](#)<sup>60</sup>
- sphinxdoc: [example](#)<sup>61</sup>, [usage](#)<sup>62</sup>
- traditional: [example](#)<sup>63</sup>, [usage](#)<sup>64</sup>

### 2.5.2 3rd-Party Themes

- basicstrap<sup>65</sup>: [example](#)<sup>66</sup>, [usage](#)<sup>67</sup>
- better<sup>68</sup>: [example](#)<sup>69</sup>, [usage](#)<sup>70</sup>
- bootstrap<sup>71</sup>: [example](#)<sup>72</sup>, [usage](#)<sup>73</sup>
- bootstrap-astropy<sup>74</sup>: [example](#)<sup>75</sup>, [usage](#)<sup>76</sup>
- cloud/redcloud/greencloud<sup>77</sup>: [example](#)<sup>78</sup>, [usage](#)<sup>79</sup>

---

<sup>44</sup> <https://nbsphinx.readthedocs.io/en/agogo-theme/>

<sup>45</sup> <https://github.com/spatialaudio/nbsphinx/compare/agogo-theme%5E...agogo-theme>

<sup>46</sup> <https://alabaster.readthedocs.io/>

<sup>47</sup> <https://nbsphinx.readthedocs.io/en/alabaster-theme/>

<sup>48</sup> <https://github.com/spatialaudio/nbsphinx/compare/alabaster-theme%5E...alabaster-theme>

<sup>49</sup> <https://nbsphinx.readthedocs.io/en/bizstyle-theme/>

<sup>50</sup> <https://github.com/spatialaudio/nbsphinx/compare/bizstyle-theme%5E...bizstyle-theme>

<sup>51</sup> <https://nbsphinx.readthedocs.io/en/classic-theme/>

<sup>52</sup> <https://github.com/spatialaudio/nbsphinx/compare/classic-theme%5E...classic-theme>

<sup>53</sup> <https://nbsphinx.readthedocs.io/en/haiku-theme/>

<sup>54</sup> <https://github.com/spatialaudio/nbsphinx/compare/haiku-theme%5E...haiku-theme>

<sup>55</sup> <https://nbsphinx.readthedocs.io/en/nature-theme/>

<sup>56</sup> <https://github.com/spatialaudio/nbsphinx/compare/nature-theme%5E...nature-theme>

<sup>57</sup> <https://nbsphinx.readthedocs.io/en/pyramid-theme/>

<sup>58</sup> <https://github.com/spatialaudio/nbsphinx/compare/pyramid-theme%5E...pyramid-theme>

<sup>59</sup> <https://nbsphinx.readthedocs.io/en/scrolls-theme/>

<sup>60</sup> <https://github.com/spatialaudio/nbsphinx/compare/scrolls-theme%5E...scrolls-theme>

<sup>61</sup> <https://nbsphinx.readthedocs.io/en/sphinxdoc-theme/>

<sup>62</sup> <https://github.com/spatialaudio/nbsphinx/compare/sphinxdoc-theme%5E...sphinxdoc-theme>

<sup>63</sup> <https://nbsphinx.readthedocs.io/en/traditional-theme/>

<sup>64</sup> <https://github.com/spatialaudio/nbsphinx/compare/traditional-theme%5E...traditional-theme>

<sup>65</sup> <https://pythonhosted.org/sphinxjp/themes/basicstrap/>

<sup>66</sup> <https://nbsphinx.readthedocs.io/en/basicstrap-theme/>

<sup>67</sup> <https://github.com/spatialaudio/nbsphinx/compare/basicstrap-theme%5E...basicstrap-theme>

<sup>68</sup> <https://sphinx-better-theme.readthedocs.io/>

<sup>69</sup> <https://nbsphinx.readthedocs.io/en/better-theme/>

<sup>70</sup> <https://github.com/spatialaudio/nbsphinx/compare/better-theme%5E...better-theme>

<sup>71</sup> <https://sphinx-bootstrap-theme.readthedocs.io/>

<sup>72</sup> <https://nbsphinx.readthedocs.io/en/bootstrap-theme/>

<sup>73</sup> <https://github.com/spatialaudio/nbsphinx/compare/bootstrap-theme%5E...bootstrap-theme>

<sup>74</sup> <https://github.com/astropy/astropy-sphinx-theme>

<sup>75</sup> <https://nbsphinx.readthedocs.io/en/astropy-theme/>

<sup>76</sup> <https://github.com/spatialaudio/nbsphinx/compare/astropy-theme%5E...astropy-theme>

<sup>77</sup> <https://cloud-sptheme.readthedocs.io/>

<sup>78</sup> <https://nbsphinx.readthedocs.io/en/cloud-theme/>

<sup>79</sup> <https://github.com/spatialaudio/nbsphinx/compare/cloud-theme%5E...cloud-theme>



- `dask_sphinx_theme`<sup>80</sup>: example<sup>81</sup>, usage<sup>82</sup>
- `furo`<sup>83</sup>: example<sup>84</sup>, usage<sup>85</sup>
- `guzzle_sphinx_theme`<sup>86</sup>: example<sup>87</sup>, usage<sup>88</sup>
- `insipid`<sup>89</sup>: example<sup>90</sup>, usage<sup>91</sup>
- `jupyter`<sup>92</sup>: example<sup>93</sup>, usage<sup>94</sup>
- `maisie_sphinx_theme`<sup>95</sup>: example<sup>96</sup>, usage<sup>97</sup>
- `pangeo`<sup>98</sup>: example<sup>99</sup>, usage<sup>100</sup>
- `pydata_sphinx_theme`<sup>101</sup>: example<sup>102</sup>, usage<sup>103</sup>
- `pytorch_sphinx_theme`<sup>104</sup>: example<sup>105</sup>, usage<sup>106</sup>
- `sizzle`<sup>107</sup>: example<sup>108</sup>, usage<sup>109</sup>
- `sphinx_book_theme`<sup>110</sup>: example<sup>111</sup>, usage<sup>112</sup>
- `sphinx_holoviz_theme`<sup>113</sup>: example<sup>114</sup>, usage<sup>115</sup>
- `sphinx_material`<sup>116</sup>: example<sup>117</sup>, usage<sup>118</sup>
- `sphinx_py3doc_enhanced_theme`<sup>119</sup>: example<sup>120</sup>, usage<sup>121</sup>

---

<sup>80</sup> <https://github.com/dask/dask-sphinx-theme>

<sup>81</sup> <https://nbsphinx.readthedocs.io/en/dask-theme/>

<sup>82</sup> <https://github.com/spatialaudio/nbsphinx/compare/dask-theme%5E...dask-theme>

<sup>83</sup> <https://github.com/pradyunsg/furo>

<sup>84</sup> <https://nbsphinx.readthedocs.io/en/furo-theme/>

<sup>85</sup> <https://github.com/spatialaudio/nbsphinx/compare/furo-theme%5E...furo-theme>

<sup>86</sup> [https://github.com/guzzle/guzzle\\_sphinx\\_theme](https://github.com/guzzle/guzzle_sphinx_theme)

<sup>87</sup> <https://nbsphinx.readthedocs.io/en/guzzle-theme/>

<sup>88</sup> <https://github.com/spatialaudio/nbsphinx/compare/guzzle-theme%5E...guzzle-theme>

<sup>89</sup> <https://github.com/mgeier/insipid-sphinx-theme/>

<sup>90</sup> <https://nbsphinx.readthedocs.io/en/insipid-theme/>

<sup>91</sup> <https://github.com/spatialaudio/nbsphinx/compare/insipid-theme%5E...insipid-theme>

<sup>92</sup> <https://github.com/jupyter/jupyter-sphinx-theme/>

<sup>93</sup> <https://nbsphinx.readthedocs.io/en/jupyter-theme/>

<sup>94</sup> <https://github.com/spatialaudio/nbsphinx/compare/jupyter-theme%5E...jupyter-theme>

<sup>95</sup> <https://github.com/maisie-dev/maisie-sphinx-theme>

<sup>96</sup> <https://nbsphinx.readthedocs.io/en/maisie-theme/>

<sup>97</sup> <https://github.com/spatialaudio/nbsphinx/compare/maisie-theme%5E...maisie-theme>

<sup>98</sup> [https://github.com/pangeo-data/sphinx\\_pangeo\\_theme/](https://github.com/pangeo-data/sphinx_pangeo_theme/)

<sup>99</sup> <https://nbsphinx.readthedocs.io/en/pangeo-theme/>

<sup>100</sup> <https://github.com/spatialaudio/nbsphinx/compare/pangeo-theme%5E...pangeo-theme>

<sup>101</sup> <https://pydata-sphinx-theme.readthedocs.io/>

<sup>102</sup> <https://nbsphinx.readthedocs.io/en/pydata-theme/>

<sup>103</sup> <https://github.com/spatialaudio/nbsphinx/compare/pydata-theme%5E...pydata-theme>

<sup>104</sup> [https://github.com/shiftlab/pytorch\\_sphinx\\_theme](https://github.com/shiftlab/pytorch_sphinx_theme)

<sup>105</sup> <https://nbsphinx.readthedocs.io/en/pytorch-theme/>

<sup>106</sup> <https://github.com/spatialaudio/nbsphinx/compare/pytorch-theme%5E...pytorch-theme>

<sup>107</sup> [https://docs.red-dove.com/sphinx\\_sizzle\\_theme/](https://docs.red-dove.com/sphinx_sizzle_theme/)

<sup>108</sup> <https://nbsphinx.readthedocs.io/en/sizzle-theme/>

<sup>109</sup> <https://github.com/spatialaudio/nbsphinx/compare/sizzle-theme%5E...sizzle-theme>

<sup>110</sup> <https://sphinx-book-theme.readthedocs.io/>

<sup>111</sup> <https://nbsphinx.readthedocs.io/en/sphinx-book-theme/>

<sup>112</sup> <https://github.com/spatialaudio/nbsphinx/compare/sphinx-book-theme%5E...sphinx-book-theme>

<sup>113</sup> [https://github.com/pyviz-dev/sphinx\\_holoviz\\_theme](https://github.com/pyviz-dev/sphinx_holoviz_theme)

<sup>114</sup> <https://nbsphinx.readthedocs.io/en/holoviz-theme/>

<sup>115</sup> <https://github.com/spatialaudio/nbsphinx/compare/holoviz-theme%5E...holoviz-theme>

<sup>116</sup> <https://github.com/bashtage/sphinx-material>

<sup>117</sup> <https://nbsphinx.readthedocs.io/en/material-theme/>

<sup>118</sup> <https://github.com/spatialaudio/nbsphinx/compare/material-theme%5E...material-theme>

<sup>119</sup> <https://github.com/ionelmc/sphinx-py3doc-enhanced-theme>

<sup>120</sup> <https://nbsphinx.readthedocs.io/en/py3doc-enhanced-theme/>

<sup>121</sup> <https://github.com/spatialaudio/nbsphinx/compare/py3doc-enhanced-theme%5E...py3doc-enhanced-theme>

- sphinx\_rtd\_theme<sup>122</sup>: example<sup>123</sup>, usage<sup>124</sup>
- typlog<sup>125</sup>: example<sup>126</sup>, usage<sup>127</sup>

If you know of another Sphinx theme that should be included here, please open an issue on Github<sup>128</sup>. An overview of many more themes can be found at <https://sphinx-themes.org/>.

## 2.6 Using Notebooks with Git

Git<sup>129</sup> is extremely useful for managing source code and it can and should also be used for managing Jupyter notebooks. There is one caveat, however: Notebooks can contain output cells with rich media like images, plots, sounds, HTML, JavaScript and many other types of bulky machine-created content. This can make it hard to work with Git efficiently, because changes in those bulky contents can completely obscure the more interesting human-made changes in text and source code. Working with multiple collaborators on a notebook can become very tedious because of this.

It is therefore highly recommended that you remove all outputs from your notebooks before committing changes to a Git repository (except for the reasons mentioned in *Pre-Executing Notebooks* (page 41)).

If there are no output cells in a notebook, nbsphinx will by default execute the notebook, and the pages generated by Sphinx will therefore contain all the output cells. See *Controlling Notebook Execution* (page 41) for how this behavior can be customized.

In the Jupyter Notebook application, you can manually clear all outputs by selecting “Cell” → “All Output” → “Clear” from the menu. In JupyterLab, the menu items are “Edit” → “Clear All Outputs”.

There are several tools available to remove outputs from multiple files at once without having to open them separately. You can even include such a tool as “clean/smudge filters” into your Git workflow, which will strip the output cells automatically whenever a Git command is executed. For details, have a look at those links:

- <https://github.com/kynan/nbstripout>
- [https://github.com/toobaz/ipy nb\\_output\\_filter](https://github.com/toobaz/ipy nb_output_filter)
- <https://tillahoffmann.github.io/2017/04/17/versioning-jupyter-notebooks-with-git.html>
- <http://timestaley.co.uk/posts/making-git-and-jupyter-notebooks-play-nice/>
- <https://web.archive.org/web/20191003081426/https://pascalbugnion.net/blog/ipython-notebooks-and-git.html>
- <https://github.com/choldgraf/nbclean>
- <https://jamesfolberth.org/articles/2017/08/07/git-commit-hook-for-jupyter-notebooks/>
- <https://github.com/ResearchSoftwareActions/EnsureCleanNotebooksAction>

..... doc/usage.ipynb ends here.

The following section was generated from doc/markdown-cells.ipynb .....

## 3 Markdown Cells

We can use *emphasis*, **boldface**, preformatted text.

<sup>122</sup> [https://github.com/readthedocs/sphinx\\_rtd\\_theme](https://github.com/readthedocs/sphinx_rtd_theme)

<sup>123</sup> <https://nbsphinx.readthedocs.io/en/rtd-theme/>

<sup>124</sup> <https://github.com/spatialaudio/nbsphinx/compare/rtd-theme%5E...rtd-theme>

<sup>125</sup> <https://github.com/typlog/sphinx-typlog-theme>

<sup>126</sup> <https://nbsphinx.readthedocs.io/en/typlog-theme/>

<sup>127</sup> <https://github.com/spatialaudio/nbsphinx/compare/typlog-theme%5E...typlog-theme>

<sup>128</sup> <https://github.com/spatialaudio/nbsphinx/issues>

<sup>129</sup> <https://git-scm.com/>

It looks like strike-out text is not supported: [STRIKEOUT:strikethrough].

- Red
- Green
- Blue

- 
1. One
  2. Two
  3. Three

Arbitrary Unicode characters should be supported, e.g. ðö. Note, however, that this only works if your HTML browser and your LaTeX processor provide the appropriate fonts.

### 3.1 Equations

Inline equations like  $e^{i\pi} = -1$  can be created by putting a LaTeX expression between two dollar signs, like this: `\text{e}^{i\pi} = -1`.

---

Note

Avoid leading and trailing spaces around math expressions, otherwise errors like the following will occur when Sphinx is running:

```
ERROR: Unknown interpreted text role "raw-latex".
```

See also the [pandoc docs](#)<sup>130</sup>:

Anything between two \$ characters will be treated as TeX math. The opening \$ must have a non-space character immediately to its right, while the closing \$ must have a non-space character immediately to its left, and must not be followed immediately by a digit.

---

Equations can also be displayed on their own line like this:

$$\int_{-\infty}^{\infty} f(x)\delta(x - x_0)dx = f(x_0). \quad (1)$$

This can be done by simply using one of the LaTeX math environments, like so:

```
\begin{equation}
\int\limits_{-\infty}^{\infty} f(x) \delta(x - x_0) dx = f(x_0)
\end{equation}
```

---

Note

For equations to be shown in HTML output, you have to specify a [math extension](#)<sup>131</sup> in your *extensions* (page 8) setting, e.g.:

---

<sup>130</sup> <https://pandoc.org/MANUAL.html#math>

<sup>131</sup> <https://www.sphinx-doc.org/en/master/usage/extensions/math.html>

```
extensions = [  
    'nbsphinx',  
    'sphinx.ext.mathjax',  
    # ... other useful extensions ...  
]
```

### 3.1.1 Automatic Equation Numbering

This is not automatically enabled in Jupyter notebooks, but you can install a notebook extension in order to enable equation numbering: <https://jupyter-contrib-nbextensions.readthedocs.io/en/latest/nbextensions/equation-numbering/readme.html>.

Automatic Equation Numbering is enabled on <https://nbviewer.jupyter.org/>, see e.g. the latest version of this very notebook at the link <https://nbviewer.jupyter.org/github/spatialaudio/nbsphinx/blob/master/doc/markdown-cells.ipynb#Automatic-Equation-Numbering>.

When using `nbsphinx`, you can use the following `mathjax3_config` setting in your `conf.py` file to enable automatic equation numbering in HTML output.

```
mathjax3_config = {  
    'tex': {'tags': 'ams', 'useLabelIds': True},  
}
```

This works for Sphinx version 4 (and higher), which uses MathJax version 3. For older Sphinx versions, the corresponding configuration looks like this:

```
mathjax_config = {  
    'TeX': {'equationNumbers': {'autoNumber': 'AMS', 'useLabelIds': True}},  
}
```

In LaTeX output, the equations are numbered by default.

You can use `\label{...}` to give a unique label to an equation:

$$\phi = \frac{1 + \sqrt{5}}{2} \tag{2}$$

```
\begin{equation}  
\phi = \frac{1 + \sqrt{5}}{2}  
\label{golden-mean}  
\end{equation}
```

If automatic equation numbering is enabled, you can later reference that equation using its label. You can use `\eqref{golden-mean}` for a reference with parentheses: (2), or `\ref{golden-mean}` for a reference without them: 2.

In HTML output, these equation references only work for equations within a single HTML page. In LaTeX output, equations from other notebooks can be referenced, e.g. (08.15).

### 3.1.2 Manual Equation Numbering

If you prefer to assign equation numbers (or some kind of names) manually, you can do so with `\tag{...}`:

$$a^2 + b^2 = c^2 \tag{99.4}$$

```
\begin{equation}
a^2 + b^2 = c^2
\tag{99.4}
\label{pythagoras}
\end{equation}
```

The above equation has the number 99.4.

## 3.2 Citations

According to [https://nbconvert.readthedocs.io/en/latest/latex\\_citations.html](https://nbconvert.readthedocs.io/en/latest/latex_citations.html), nbconvert supports citations using a special HTML-based syntax. nbsphinx supports the same syntax.

Example: `[[KRKP+16]]`.

```
<cite data-cite="kluver2016jupyter">Kluyver et al. (2016)</cite>
```

You don't actually have to use `<cite>`, any inline HTML tag can be used, e.g. `<strong>`: `[[PGH11]]`.

```
<strong data-cite="perez2011python">Python: An Ecosystem for Scientific Computing
→</strong>
```

You'll also have to define a list of references, see *the section about references* (page 61).

There is also a Notebook extension which may or may not be useful: <https://github.com/takluyver/cite2c>.

### 3.2.1 Footnote citations

Since version 2.0.0 of sphinxcontrib-bibtex, footnote citations<sup>132</sup> are possible. This generates footnotes for all foot-citations up to the point of the *bibliography directive* (page 62), which is typically placed at the end of the source file.

Depending on whether the documentation is rendered into HTML or into LaTeX/PDF, the citations are either placed into a bibliography as ordinary citations (HTML output) or placed into the footnotes of the citation's respective page (PDF).

Example:<sup>133</sup>.

```
<cite data-footcite="perez2011python">Pérez et al. (2011)</cite>
```

As footnote references are restricted to their own Jupyter notebook or other source file, a raw nbconvert cell of reST format (see *the section about raw cells* (page 39)) can be added to the notebook, containing the

```
.. footbibliography::
```

<sup>132</sup> <https://sphinxcontrib-bibtex.readthedocs.io/en/latest/usage.html#role-footcite>

<sup>133</sup> Fernando Pérez, Brian E. Granger, and John D. Hunter. Python: an ecosystem for scientific computing. *Computing in Science Engineering*, 13(2):13–21, 2011. doi:10.1109/MCSE.2010.119<sup>134</sup>.

<sup>134</sup> <https://doi.org/10.1109/MCSE.2010.119>

directive.

Alternatively, one can use the *nbsphinx epilog* (page 47) by setting it to, e.g.,

```
nbsphinx_epilog = r"""  
.. footbibliography::  
"""
```

### 3.3 Code

We can also write code with nice syntax highlighting:

```
print("Hello, world!")
```

### 3.4 Tables

A	B	A and B
False	False	False
True	False	False
False	True	False
True	True	True

### 3.5 Images



Local image:

```
![Jupyter notebook icon](images/notebook_icon.png)
```



Remote image:

```
![Python logo (remote)](https://www.python.org/static/img/python-logo-large.png)
```

### 3.5.1 Using the HTML `<img>` tag

The aforementioned Markdown syntax for including images doesn't allow specifying the image size.

If you want to control the size of the included image, you can use the HTML `<img>`<sup>135</sup> element with the `width` attribute like this:

```

```



In addition to the `src`, `alt`, `width` and `height` attributes, you can also use the `class` attribute, which is simply forwarded to the HTML output (and ignored in LaTeX output). All other attributes are ignored.

### 3.5.2 SVG support for LaTeX

LaTeX doesn't support SVG images, but there are Sphinx extensions that can be used for automatically converting SVG images for inclusion in LaTeX output.

Just include one of the following options in the list of *extensions* (page 8) in your `conf.py` file.

- `'sphinxcontrib.inkscapeconverter'` or `'sphinxcontrib.rsvgconverter'`: See <https://github.com/missinglinkelectronics/sphinxcontrib-svg2pdfconverter> for installation instructions.

The external programs `inkscape` or `rsvg-convert` (Debian/Ubuntu package `librsvg2-bin`; conda package `librsvg`) are needed, respectively.

- `'sphinx.ext.imgconverter'`: This is a built-in Sphinx extension, see <https://www.sphinx-doc.org/en/master/usage/extensions/imgconverter.html>.

This needs the external program `convert` from *ImageMagick*.

The disadvantage of this extension is that SVGs are converted to bitmap images.

If one of those extensions is installed, SVG images can be used even for LaTeX output:

<sup>135</sup> <https://www.w3.org/TR/html52/semantics-embedded-content.html#the-img-element>



```
! [Python logo] (images/python_logo.svg)
```

Remote SVG images can also be used (and will be shown in the LaTeX output):



```
! [Jupyter logo] (https://jupyter.org/assets/main-logo.svg)
```

### 3.6 Cell Attachments

Images can also be embedded in the notebook itself. Just drag an image file into the Markdown cell you are just editing or copy and paste some image data from an image editor/viewer.

The generated Markdown code will look just like a “normal” image link, except that it will have an `attachment:` prefix:

```
! [a stick figure] (attachment:stickfigure.png)
```



These are cell attachments:



In the Jupyter Notebook, there is a special “Attachments” cell toolbar which you can use to see all attachments of a cell and delete them, if needed.

### 3.7 HTML Elements (HTML only)

It is allowed to use plain HTML elements within Markdown cells. Those elements are passed through to the HTML output and are ignored for the LaTeX output. Below are a few examples.

HTML5 `audio`<sup>136</sup> elements can be created like this:

```
<audio src="https://example.org/audio.ogg" controls>alternative text</audio>
```

<sup>136</sup> <https://developer.mozilla.org/en-US/docs/Web/HTML/Element/audio>



Example:

The HTML audio element is not supported!

HTML5 `video`<sup>137</sup> elements can be created like this:

```
<video src="https://example.org/video.ogv" controls>alternative text</video>
```

Example:

The HTML video element is not supported!

The alternative text is shown in browsers that don't support those elements. The same text is also shown in Sphinx's LaTeX output.

---

**Note:** You can also use local files for the `<audio>` and `<video>` elements, but you have to create a link to the source file somewhere, because only then are the local files copied to the HTML output directory! You should do that anyway to make the audio/video file accessible to browsers that don't support the `<audio>` and `<video>` elements.

---

### 3.8 Info/Warning Boxes

Warning

This is an *experimental feature*! Its usage will probably change in the future or it might be removed completely!

Until there is an info/warning extension for Markdown/CommonMark (see [this issue](#)<sup>138</sup>), such boxes can be created by using HTML `<div>` elements like this:

```
<div class="alert alert-info">
```

Note

This is a note!

```
</div>
```

For this to work reliably, you should obey the following guidelines:

- The `class` attribute has to be either `"alert alert-info"` or `"alert alert-warning"`, other values will not be converted correctly.
- No further attributes are allowed.
- For compatibility with CommonMark, you should add an empty line between the `<div>` start tag and the beginning of the content.

Warning

While this works nicely with `nbsphinx`, JupyterLab and the Classic Jupyter Notebook, This doesn't work correctly in `nbconvert` and by extension on <https://nbviewer.jupyter.org/> and Github's notebook preview.

<sup>137</sup> <https://developer.mozilla.org/en-US/docs/Web/HTML/Element/video>

<sup>138</sup> <https://github.com/jupyter/notebook/issues/1292>

```
See https://github.com/jupyter/nbconvert/issues/1125.
```

Note

The text can contain further Markdown formatting. It is even possible to have nested boxes:

```
... but please don't overuse this!
```

### 3.9 Links to Other Notebooks

Relative links to local notebooks can be used: *a link to a notebook in a subdirectory* (page 50), a link to an orphan notebook (latter won't work in LaTeX output, because orphan pages are not included there).

This is how a link is created in Markdown:

```
[a link to a notebook in a subdirectory](subdir/a-notebook-in-a-subdir.ipynb)
```

Markdown also supports *reference-style* links: *a reference-style link* (page 50), *another version of the same link* (page 50).

These can be created with this syntax:

```
[a reference-style link] [mylink]  
[mylink]: subdir/a-notebook-in-a-subdir.ipynb
```

Links to sub-sections are also possible, e.g. *this subsection* (page 51).

This link was created with:

```
[this subsection](subdir/a-notebook-in-a-subdir.ipynb#A-Sub-Section)
```

You just have to remember to replace spaces with hyphens!

BTW, links to sections of the current notebook work, too, e.g. *beginning of this section* (page 26).

This can be done, as expected, like this:

```
[beginning of this section](#Links-to-Other-Notebooks)
```

It's also possible to create a *link to the beginning of the current page* (page ??), by simply using a # character:

```
[link to the beginning of the current page](#)
```

### 3.10 Links to \*.rst Files (and Other Sphinx Source Files)

Links to files whose extension is in the configuration value `source_suffix`<sup>139</sup>, will be converted to links to the generated HTML/LaTeX pages. Example: *A reStructuredText file* (page 59).

This was created with:

```
[A reStructuredText file](a-normal-rst-file.rst)
```

Links to sub-sections are also possible. Example: *Sphinx Directives* (page 60).

This was created with:

```
[Sphinx Directives](a-normal-rst-file.rst#sphinx-directives-for-info-warning-  
→boxes)
```

---

#### Note

Sphinx section anchors are different from Jupyter section anchors! To create a link to a subsection in an `.rst` file (or another non-notebook source file), you not only have to replace spaces with hyphens, but also slashes and some other characters. In case of doubt, just check the target HTML page generated by Sphinx.

---

### 3.11 Links to Local Files

Links to local files (other than Jupyter notebooks and other Sphinx source files) are also possible, e.g. *requirements.txt*.

This was simply created with:

```
[requirements.txt](requirements.txt)
```

The linked files are automatically copied to the HTML output directory. For LaTeX output, links are created, but the files are not copied to the target directory.

### 3.12 Links to Domain Objects

Links to *Sphinx domain objects*<sup>140</sup> (such as a Python class or JavaScript function) are also possible. For example: *example\_python\_function()* (page 61).

This was created with:

```
[example_python_function()](a-normal-rst-file.rst#example_python_function)
```

This is especially useful for use with the Sphinx *autodoc*<sup>141</sup> extension!

..... doc/markdown-cells.ipynb ends here.

---

<sup>139</sup> [https://www.sphinx-doc.org/en/master/config.html#confval-source\\_suffix](https://www.sphinx-doc.org/en/master/config.html#confval-source_suffix)

<sup>140</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/domains.html>

<sup>141</sup> <https://www.sphinx-doc.org/en/master/ext/autodoc.html>

The following section was generated from doc/code-cells.ipynb .....

## 4 Code Cells

### 4.1 Code, Output, Streams

An empty code cell:

```
[ ]:
```

Two empty lines:

```
[ ]:
```

Leading/trailing empty lines:

```
[1]:  
  
# 2 empty lines before, 1 after
```

A simple output:

```
[2]: 6 * 7  
[2]: 42
```

The standard output stream:

```
[3]: print('Hello, world!')  
Hello, world!
```

Normal output + standard output

```
[4]: print('Hello, world!')  
6 * 7  
Hello, world!  
[4]: 42
```

The standard error stream is highlighted and displayed just below the code cell. The standard output stream comes afterwards (with no special highlighting). Finally, the “normal” output is displayed.

```
[5]: import sys  
  
print("I'll appear on the standard error stream", file=sys.stderr)  
print("I'll appear on the standard output stream")  
"I'm the 'normal' output"  
I'll appear on the standard output stream  
I'll appear on the standard error stream  
[5]: "I'm the 'normal' output"
```

---

Note

Using the IPython kernel, the order is actually mixed up, see <https://github.com/ipython/ipykernel/issues/280>.

## 4.2 Cell Magics

IPython can handle code in other languages by means of [cell magics](#)<sup>142</sup>:

```
[6]: %%bash
for i in 1 2 3
do
    echo $i
done
```

```
1
2
3
```

## 4.3 Special Display Formats

See IPython example notebook<sup>143</sup>.

### 4.3.1 Local Image Files

```
[7]: from IPython.display import Image
i = Image(filename='images/notebook_icon.png')
i
```



```
[8]: display(i)
```



See also *SVG support for LaTeX* (page 23).

```
[9]: from IPython.display import SVG
SVG(filename='images/python_logo.svg')
```

<sup>142</sup> <https://ipython.readthedocs.io/en/stable/interactive/magics.html#cell-magics>

<sup>143</sup> <https://nbviewer.jupyter.org/github/ipython/ipython/blob/master/examples/IPython%20Kernel/Rich%20Output.ipynb>

[9]:



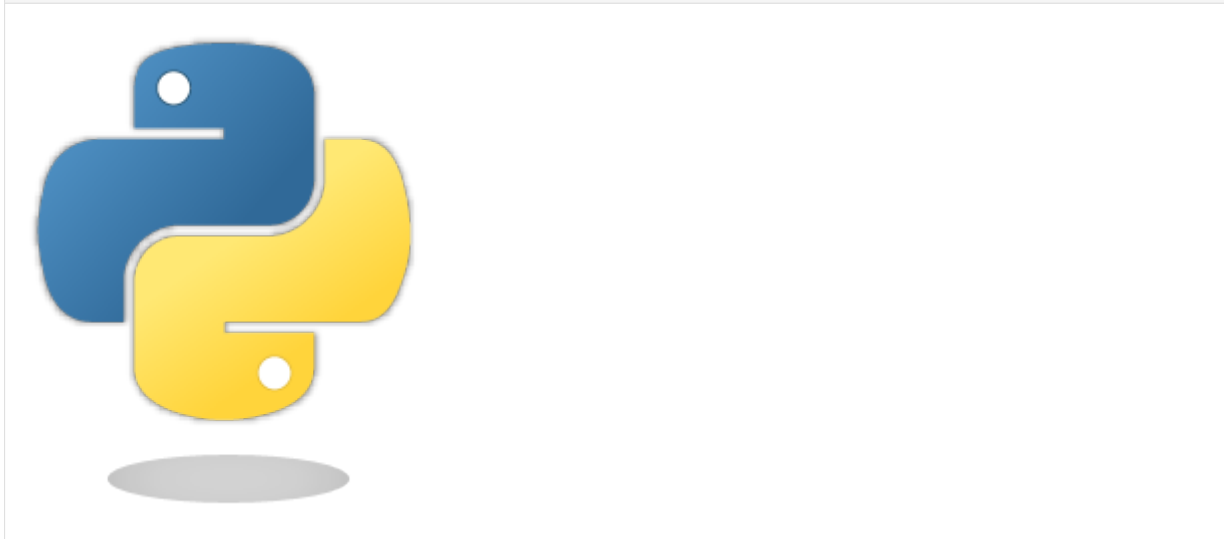
### 4.3.2 Image URLs

```
[10]: Image(url='https://www.python.org/static/img/python-logo-large.png')
```

```
[10]: <IPython.core.display.Image object>
```

```
[11]: Image(url='https://www.python.org/static/img/python-logo-large.png', embed=True)
```

[11]:



```
[12]: Image(url='https://jupyter.org/assets/nav_logo.svg')
```

```
[12]: <IPython.core.display.Image object>
```

### 4.3.3 Math

```
[13]: from IPython.display import Math
eq = Math(r'\int\limits_{-\infty}^{\infty} f(x) \delta(x - x_0) dx = f(x_0)')
eq
```

```
[13]: 
$$\int_{-\infty}^{\infty} f(x)\delta(x - x_0)dx = f(x_0)$$

```

```
[14]: display(eq)
```

$$\int_{-\infty}^{\infty} f(x)\delta(x - x_0)dx = f(x_0)$$

```
[15]: from IPython.display import Latex
      Latex(r'This is a \LaTeX{} equation: $a^2 + b^2 = c^2$')
```

```
[15]: This is a LATEX equation:  $a^2 + b^2 = c^2$ 
```

```
[16]: %%latex
      \begin{equation}
      \int\limits_{-\infty}^{\infty} f(x) \delta(x - x_0) dx = f(x_0)
      \end{equation}
```

$$\int_{-\infty}^{\infty} f(x)\delta(x - x_0)dx = f(x_0) \quad (3)$$

#### 4.3.4 Plots

The output formats for Matplotlib plots can be customized. You'll need separate settings for the Jupyter Notebook application and for nbsphinx.

If you want to use SVG images for Matplotlib plots, add this line to your IPython configuration file:

```
c.InlineBackend.figure_formats = {'svg'}
```

If you want SVG images, but also want nice plots when exporting to LaTeX/PDF, you can select:

```
c.InlineBackend.figure_formats = {'svg', 'pdf'}
```

If you want to use the default PNG plots or HiDPI plots using 'png2x' (a.k.a. 'retina'), make sure to set this:

```
c.InlineBackend.rc = {'figure.dpi': 96}
```

This is needed because the default 'figure.dpi' value of 72 is only valid for the Qt Console<sup>144</sup>.

If you are planning to store your SVG plots as part of your notebooks, you should also have a look at the 'svg.hashsalt' setting.

For more details on these and other settings, have a look at [Default Values for Matplotlib's "inline" Backend](#)<sup>145</sup>.

The configuration file `ipython_kernel_config.py` can be either in the directory where your notebook is located (see the `ipython_kernel_config.py` in this directory), or in your profile directory (typically `~/.ipython/profile_default/ipython_kernel_config.py`). To find out your IPython profile directory, use this command:

```
python3 -m IPython profile locate
```

A local `ipython_kernel_config.py` in the notebook directory also works on <https://mybinder.org/>. Alternatively, you can create a file with those settings in a file named `.ipython/profile_default/ipython_kernel_config.py` in your repository.

To get SVG and PDF plots for nbsphinx, use something like this in your `conf.py` file:

<sup>144</sup> <https://qtconsole.readthedocs.io/>

<sup>145</sup> <https://nbviewer.jupyter.org/github/mgeier/python-audio/blob/master/plotting/matplotlib-inline-defaults.ipynb>

```
nbsphinx_execute_arguments = [  
    "--InlineBackend.figure_formats={'svg', 'pdf'}",  
    "--InlineBackend.rc=figure.dpi=96",  
]
```

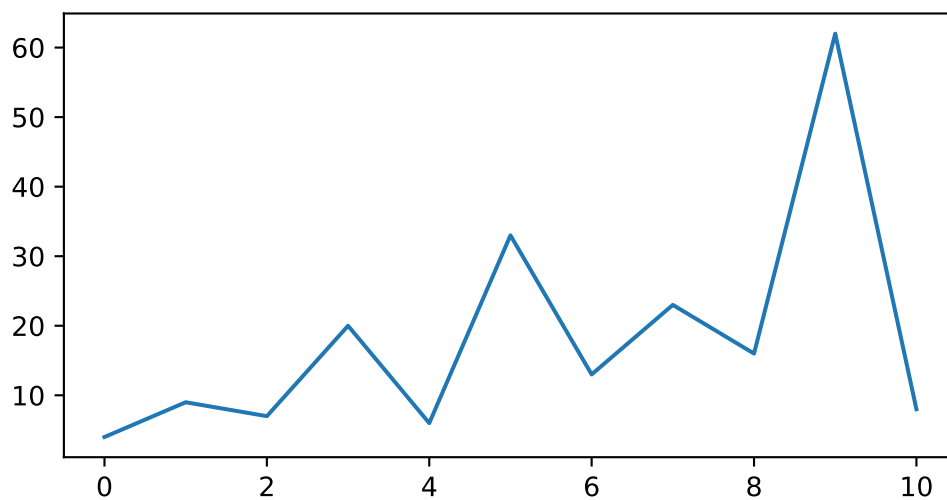
In the following example, nbsphinx should use an SVG image in the HTML output and a PDF image for LaTeX/PDF output.

```
[17]: import matplotlib.pyplot as plt
```

Matplotlib is building the font cache; this may take a moment.

```
[18]: fig, ax = plt.subplots(figsize=[6, 3])  
ax.plot([4, 9, 7, 20, 6, 33, 13, 23, 16, 62, 8]);
```

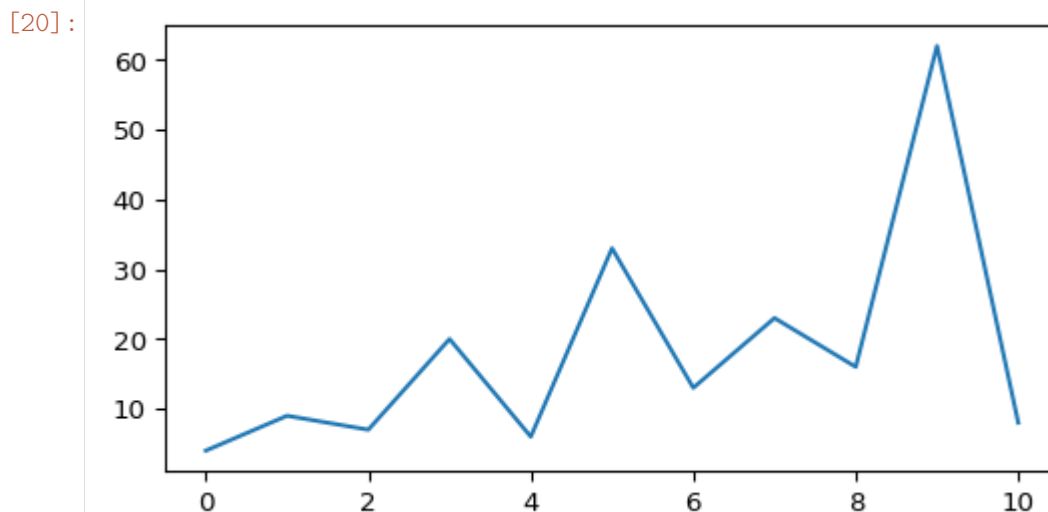
```
[18]: [<matplotlib.lines.Line2D at 0x7feda411a6d0>]
```



Alternatively, the figure format(s) can also be chosen directly in the notebook (which overrides the setting in nbsphinx\_execute\_arguments and in the IPython configuration):

```
[19]: %config InlineBackend.figure_formats = ['png']
```

```
[20]: fig
```

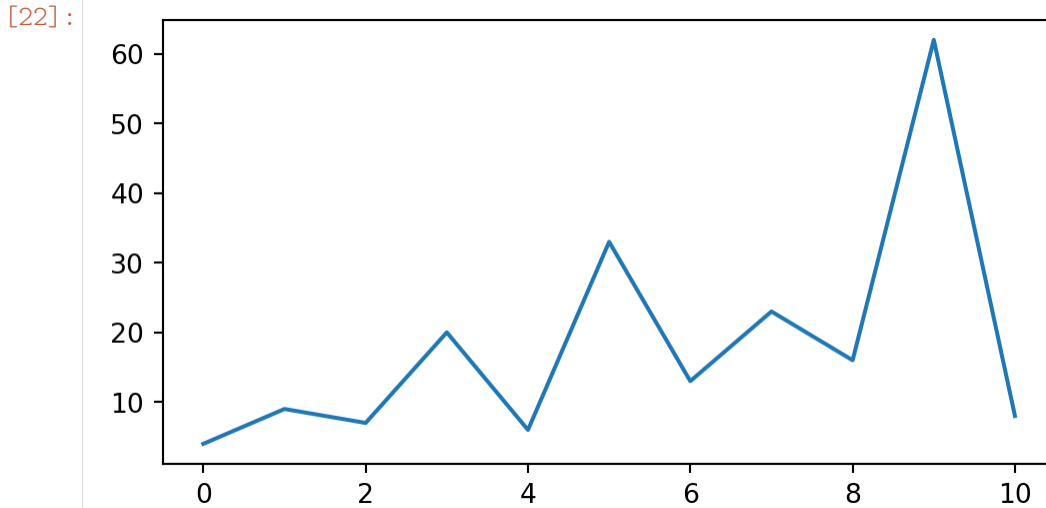




If you want to use PNG images, but with HiDPI resolution, use the special 'png2x' (a.k.a. 'retina') format (which also looks nice in the LaTeX output):

```
[21]: %config InlineBackend.figure_formats = ['png2x']
```

```
[22]: fig
```



### 4.3.5 Pandas Dataframes

Pandas dataframes<sup>146</sup> should be displayed as nicely formatted HTML tables (if you are using HTML output).

```
[23]: import numpy as np
import pandas as pd
```

```
[24]: df = pd.DataFrame(np.random.randint(0, 100, size=[5, 4]),
                      columns=['a', 'b', 'c', 'd'])
df
```

```
[24]:
```

	a	b	c	d
0	2	7	52	53
1	89	8	85	6
2	8	33	4	12
3	19	40	7	6
4	33	62	1	34

For LaTeX output, however, the plain text output is used by default.

To get nice LaTeX tables, a few settings have to be changed:

```
[25]: pd.set_option('display.latex.repr', True)
```

This is not enabled by default because of [Pandas issue #12182](#)<sup>147</sup>.

The generated LaTeX tables utilize the `booktabs` package, so you have to make sure that package is loaded in the preamble<sup>148</sup> with:

<sup>146</sup> [https://pandas.pydata.org/pandas-docs/stable/user\\_guide/dsintro.html#dataframe](https://pandas.pydata.org/pandas-docs/stable/user_guide/dsintro.html#dataframe)

<sup>147</sup> <https://github.com/pandas-dev/pandas/issues/12182>

<sup>148</sup> <https://www.sphinx-doc.org/en/master/latex.html>

```
\usepackage{booktabs}
```

In order to allow page breaks within tables, you should use:

```
[26]: pd.set_option('display.latex.longtable', True)
```

The `longtable` package is already used by Sphinx, so you don't have to manually load it in the preamble.

Finally, if you want to use LaTeX math expressions in your dataframe, you'll have to disable escaping:

```
[27]: pd.set_option('display.latex.escape', False)
```

The above settings should have no influence on the HTML output, but the LaTeX output should now look nicer:

```
[28]: df = pd.DataFrame(np.random.randint(0, 100, size=[10, 4]),
                       columns=[r'\alpha$', r'\beta$', r'\gamma$', r'\delta$'])
df
```

```
[28]:
```

	$\alpha$	$\beta$	$\gamma$	$\delta$
0	66	85	29	38
1	73	39	21	75
2	56	62	75	2
3	4	44	37	2
4	40	58	19	88
5	55	0	37	88
6	35	66	55	29
7	65	9	75	13
8	54	95	53	97
9	80	54	11	96

#### 4.3.6 YouTube Videos

```
[29]: from IPython.display import YouTubeVideo
YouTubeVideo('WAikxUGbomY')
```

[29]:



#### 4.3.7 Interactive Widgets (HTML only)

The basic widget infrastructure is provided by the `ipywidgets`<sup>149</sup> module. More advanced widgets are available in separate packages, see for example <https://jupyter.org/widgets>.

The JavaScript code which is needed to display Jupyter widgets is loaded automatically (using `RequireJS`). If you want to use non-default URLs or local files, you can use the `nbsphinx_widgets_path` (page 12) and `nbsphinx_requirejs_path` (page 11) settings.

```
[30]: import ipywidgets as w
```

```
[31]: slider = w.IntSlider()  
slider.value = 42  
slider
```

```
IntSlider(value=42)
```

A widget typically consists of a so-called “model” and a “view” into that model.

If you display a widget multiple times, all instances act as a “view” into the same “model”. That means that their state is synchronized. You can move either one of these sliders to try this out:

```
[32]: slider
```

```
IntSlider(value=42)
```

You can also link different widgets.

Widgets can be linked via the kernel (which of course only works while a kernel is running) or directly in the client (which even works in the rendered HTML pages).

Widgets can be linked uni- or bi-directionally.

Examples for all 4 combinations are shown here:

<sup>149</sup> <https://ipywidgets.readthedocs.io/>

```
[33]: link = w.IntSlider(description='link')
w.link((slider, 'value'), (link, 'value'))
jslink = w.IntSlider(description='jslink')
w.jslink((slider, 'value'), (jslink, 'value'))
dlink = w.IntSlider(description='dlink')
w.dlink((slider, 'value'), (dlink, 'value'))
jsdlink = w.IntSlider(description='jsdlink')
w.jsdlink((slider, 'value'), (jsdlink, 'value'))
w.VBox([link, jslink, dlink, jsdlink])

VBox(children=(IntSlider(value=42, description='link'), IntSlider(value=0,
→description='jslink'), IntSlider(va...
```

---

## Other Languages

The examples shown here are using Python, but the widget technology can also be used with different Jupyter kernels (i.e. with different programming languages).

---

### 4.3.7.1 Troubleshooting

To obtain more information if widgets are not displayed as expected, you will need to look at the error message in the web browser console.

To figure out how to open the web browser console, you may look at the web browser documentation:

Chrome: <https://developers.google.com/web/tools/chrome-devtools/open#console>

Firefox: [https://developer.mozilla.org/en-US/docs/Tools/Web\\_Console#opening\\_the\\_web\\_console](https://developer.mozilla.org/en-US/docs/Tools/Web_Console#opening_the_web_console)

The error is most probably linked to the JavaScript files not being loaded or loaded in the wrong order within the HTML file. To analyze the error, you can inspect the HTML file within the web browser (e.g.: right-click on the page and select *View Page Source*) and look at the <head> section of the page. That section should contain some JavaScript libraries. Those relevant for widgets are:

```
<!-- require.js is a mandatory dependency for jupyter-widgets -->
<script crossorigin="anonymous" integrity="sha256-Ae2Vz/4ePdIu6ZyI/
→5ZGsYnb+m0Jl0mKPjt6XZ9JJkA=" src="https://cdnjs.cloudflare.com/ajax/libs/
→require.js/2.3.4/require.min.js"></script>
<!-- jupyter-widgets JavaScript -->
<script type="text/javascript" src="https://unpkg.com/@jupyter-widgets/html-
→manager@~0.18.0/dist/embed-amd.js"></script>
<!-- JavaScript containing custom Jupyter widgets -->
<script src="../_static/embed-widgets.js"></script>
```

The two first elements are mandatory. The third one is required only if you designed your own widgets but did not publish them on npm.js.

If those libraries appear in a different order, the widgets won't be displayed.

Here is a list of possible solutions:

- If the widgets are **not displayed**, see #519<sup>150</sup>.
- If the widgets are **displayed multiple times**, see #378<sup>151</sup>.

<sup>150</sup> <https://github.com/spatialaudio/nbsphinx/issues/519>

<sup>151</sup> <https://github.com/spatialaudio/nbsphinx/issues/378>

### 4.3.8 Arbitrary JavaScript Output (HTML only)

```
[34]: %%javascript

var text = document.createTextNode("Hello, I was generated with JavaScript!");
// Content appended to "element" will be visible in the output area:
element.appendChild(text);

<IPython.core.display.Javascript object>
```

### 4.3.9 Unsupported Output Types

If a code cell produces data with an unsupported MIME type, the Jupyter Notebook doesn't generate any output. nbsphinx, however, shows a warning message.

```
[35]: display({
    'text/x-python': 'print("Hello, world!")',
    'text/x-haskell': 'main = putStrLn "Hello, world!"',
  }, raw=True)
```

Data type cannot be displayed: text/x-python, text/x-haskell

## 4.4 ANSI Colors

The standard output and standard error streams may contain ANSI escape sequences<sup>152</sup> to change the text and background colors.

```
[36]: print('BEWARE: \x1b[1;33;41mugly colors\x1b[m!', file=sys.stderr)
print(' AB\x1b[43mCD\x1b[35mEF\x1b[1mGH\x1b[4mIJ\x1b[7m'
      'KL\x1b[49mMN\x1b[39mOP\x1b[22mQR\x1b[24mST\x1b[27mUV')
```

ABCD EFGHIJKL MNOPQRST UV

BEWARE: ugly colors!

The following code showing the 8 basic ANSI colors is based on <https://tldp.org/HOWTO/Bash-Prompt-HOWTO/x329.html>. Each of the 8 colors has an “intense” variation, which is used for bold text.

```
[37]: text = ' XYZ '
formatstring = '\x1b[{}m' + text + '\x1b[m'

print(' ' * 6 + ' ' * len(text) +
      ''.join('{:~{}}'.format(bg, len(text)) for bg in range(40, 48)))
for fg in range(30, 38):
    for bold in False, True:
        fg_code = ('1;' if bold else '') + str(fg)
        print(' {:>4} '.format(fg_code) + formatstring.format(fg_code) +
              ''.join(formatstring.format(fg_code + ';' + str(bg))
                      for bg in range(40, 48)))
```

<sup>152</sup> [https://en.wikipedia.org/wiki/ANSI\\_escape\\_code](https://en.wikipedia.org/wiki/ANSI_escape_code)

		40	41	42	43	44	45	46	47
30	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
1;30	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
31	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
1;31	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
32	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
1;32	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
33	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
1;33	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
34	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
1;34	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
35	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
1;35	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
36	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
1;36	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
37	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
1;37	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ

ANSI also supports a set of 256 indexed colors. The following code showing all of them is based on <http://bitnote.com/index.php?post/2012/11/19/Using-ANSI-Color-Codes-to-Colorize-Your-Bash-Prompt-on-Linux><sup>153</sup>.

```
[38]: formatstring = '\x1b[38;5;{0};48;5;{0}mX\x1b[1mX\x1b[m'

print(' + ' + ''.join('{:2}'.format(i) for i in range(36)))
print(' 0 ' + ''.join(formatstring.format(i) for i in range(16)))
for i in range(7):
    i = i * 36 + 16
    print('{:3} '.format(i) + ''.join(formatstring.format(i + j)
                                     for j in range(36) if i + j < 256))
```

You can even use 24-bit RGB colors:

```
[39]: start = 255, 0, 0
end = 0, 0, 255
length = 79
out = []

for i in range(length):
    rgb = [start[c] + int(i * (end[c] - start[c]) / length) for c in range(3)]
    out.append('\x1b['
               '38;2;{rgb[2]};{rgb[1]};{rgb[0]};'
               '48;2;{rgb[0]};{rgb[1]};{rgb[2]}mX\x1b[m'.format(rgb=rgb))
```

(continues on next page)

<sup>153</sup> <https://web.archive.org/web/20190109005413/http://bitnote.com/index.php?post/2012/11/19/Using-ANSI-Color-Codes-to-Colorize-Your-Bash-Prompt-on-Linux>



## 5.2 Available Raw Cell Formats

The following examples show how different Jupyter cell formats are rendered by Sphinx.

### 5.2.1 None

By default (if no cell format is selected), the cell content is included (without any conversion) in both the HTML and LaTeX output. This is typically not useful at all.

"I'm a raw cell with no format."

### 5.2.2 reST

Raw cells in "reST" format are interpreted as reStructuredText and parsed by Sphinx. The result is visible in both HTML and LaTeX output.

"**I**m a *raw cell* in reST<sup>154</sup> format."

### 5.2.3 Markdown

Raw cells in "Markdown" format are interpreted as Markdown, and the result is included in both HTML and LaTeX output. Since the Jupyter Notebook also supports normal Markdown cells, this might not be useful *at all*.

"**I**m a *raw cell* in Markdown<sup>155</sup> format."

### 5.2.4 HTML

Raw cells in "HTML" format are only visible in HTML output. This option might not be very useful, since raw HTML code is also allowed within normal Markdown cells.

### 5.2.5 LaTeX

Raw cells in "LaTeX" format are only visible in LaTeX output.

**I**m a *raw cell* in  $\LaTeX$  format.

### 5.2.6 Python

Raw cells in "Python" format are not visible at all (nor executed in any way).

..... doc/raw-cells.ipynb ends here.

The following section was generated from doc/hidden-cells.ipynb .....

## 6 Hidden Cells

You can remove cells from the HTML/LaTeX output by adding this to the cell metadata:

```
"nbsphinx": "hidden"
```

<sup>154</sup> <https://www.sphinx-doc.org/rest.html>

<sup>155</sup> <https://daringfireball.net/projects/markdown/>



Hidden cells are still executed but removed afterwards.

For example, the following hidden cell defines the variable `answer`.

This is the cell after the hidden cell. Although the previous cell is not visible, its result is still available:

```
[2]: answer
[2]: 42
```

Don't overuse this, because it may make it harder to follow what's going on in your notebook.

Also Markdown cells can be hidden. The following cell is hidden.

This is the cell after the hidden cell.

..... doc/hidden-cells.ipynb ends here.

The following section was generated from doc/executing-notebooks.ipynb .....

## 7 Controlling Notebook Execution

Notebooks with no outputs are automatically executed during the Sphinx build process. If, however, there is at least one output cell present, the notebook is not evaluated and included as is.

The following notebooks show how this default behavior can be used and customized.

The following section was generated from doc/pre-executed.ipynb .....

### 7.1 Pre-Executing Notebooks

Automatically executing notebooks during the Sphinx build process is an important feature of `nbsphinx`. However, there are a few use cases where pre-executing a notebook and storing the outputs might be preferable. Storing any output will, by default, stop `nbsphinx` from executing the notebook.

#### 7.1.1 Long-Running Cells

If you are doing some very time-consuming computations, it might not be feasible to re-execute the notebook every time you build your Sphinx documentation.

So just do it once – when you happen to have the time – and then just keep the output.

```
[1]: import time
[2]: %time time.sleep(60 * 60)
6 * 7
CPU times: user 160 ms, sys: 56 ms, total: 216 ms
Wall time: 1h 1s
[2]: 42
```

### 7.1.2 Rare Libraries

You might have created results with a library that's hard to install and therefore you have only managed to install it on one very old computer in the basement, so you probably cannot run this whenever you build your Sphinx docs.

```
[3]: from a_very_rare_library import calculate_the_answer
```

```
[4]: calculate_the_answer()
```

```
[4]: 42
```

### 7.1.3 Exceptions

If an exception is raised during the Sphinx build process, it is stopped (the build process, not the exception!). If you want to show to your audience how an exception looks like, you have two choices:

1. Allow errors – either generally or on a per-notebook or per-cell basis – see *Ignoring Errors* (page 43) (*per cell* (page 45)).
2. Execute the notebook beforehand and save the results, like it's done in this example notebook:

```
[5]: 1 / 0
```

```
-----  
ZeroDivisionError                                Traceback (most recent call last)  
<ipython-input-5-b710d87c980c> in <module>()  
----> 1 1 / 0  
  
ZeroDivisionError: division by zero
```

### 7.1.4 Client-specific Outputs

When nbsphinx executes notebooks, it uses the nbconvert module to do so. Certain Jupyter clients might produce output that differs from what nbconvert would produce. To preserve those original outputs, the notebook has to be executed and saved before running Sphinx.

For example, the JupyterLab help system shows the help text as cell outputs, while executing with nbconvert doesn't produce any output.

```
[6]: sorted?
```

```
Signature: sorted(iterable, /, *, key=None, reverse=False)  
Docstring:  
Return a new list containing all items from the iterable in ascending order.  
  
A custom key function can be supplied to customize the sort order, and the  
reverse flag can be set to request the result in descending order.  
Type:          builtin_function_or_method
```

### 7.1.5 Interactive Input

If your code asks for user input, it probably doesn't work when executed by Sphinx/nbsphinx. You'll probably get an error like this:

```
StdinNotImplementedError: raw_input was called, but this frontend does not
↳support input requests.
```

In this case, you can run the notebook interactively, provide the desired inputs and then save the notebook including its cell outputs.

```
[7]: name = input('What... is your name?')
      quest = input('What... is your quest?')
      color = input('What... is your favorite color?')
```

```
What... is your name? Sir Lancelot of Camelot
What... is your quest? To seek the Holy Grail
What... is your favorite color? Blue
```

..... doc/pre-executed.ipynb ends here.

The following section was generated from doc/never-execute.ipynb .....

## 7.2 Explicitly Dis-/Enabling Notebook Execution

If you want to include a notebook without outputs and yet don't want nbsphinx to execute it for you, you can explicitly disable this feature.

You can do this globally by setting the following option in `conf.py`:

```
nbsphinx_execute = 'never'
```

Or on a per-notebook basis by adding this to the notebook's JSON metadata:

```
"nbsphinx": {
  "execute": "never"
},
```

There are three possible settings, "always", "auto" and "never". By default (= "auto"), notebooks with no outputs are executed and notebooks with at least one output are not. As always, per-notebook settings take precedence over the settings in `conf.py`.

This very notebook has its metadata set to "never", therefore the following cell is not executed:

```
[ ]: 6 * 7
```

..... doc/never-execute.ipynb ends here.

The following section was generated from doc/allow-errors.ipynb .....

## 7.3 Ignoring Errors

Normally, if an exception is raised while executing a notebook, the Sphinx build process is stopped immediately.

If a notebook contains errors on purpose (or if you are too lazy to fix them right now), you have four options:

1. Manually execute the notebook in question and save the results, see *the pre-executed example notebook* (page 41).

2. Allow errors in all notebooks by setting this option in `conf.py`:

```
nbsphinx_allow_errors = True
```

3. Allow errors on a per-notebook basis by adding this to the notebook's JSON metadata:

```
"nbsphinx": {  
  "allow_errors": true  
},
```

4. Allow errors on a per-cell basis using the `raises-exception` tag, see *Ignoring Errors on a Cell-by-Cell Basis* (page 45).

This very notebook is an example for the third option. The results of the following code cells are not stored within the notebook, therefore it is executed during the Sphinx build process. Since the above-mentioned `allow_errors` flag is set in this notebook's metadata, all cells are executed although most of them cause an exception.

```
[1]: nonsense  
  
-----  
NameError                                Traceback (most recent call last)  
<ipython-input-1-7dd4c0df649c> in <module>  
----> 1 nonsense  
  
NameError: name 'nonsense' is not defined
```

```
[2]: 42 / 0  
  
-----  
ZeroDivisionError                        Traceback (most recent call last)  
<ipython-input-1-52cebea8b64f> in <module>  
----> 1 42 / 0  
  
ZeroDivisionError: division by zero
```

```
[3]: print 'Hello, world!'  
  
File "<ipython-input-1-653b30cd70a8>", line 1  
  print 'Hello, world!'  
      ^  
SyntaxError: Missing parentheses in call to 'print'. Did you mean print('Hello, world!')?
```

```
[4]: 6 ~ 7  
  
File "<ipython-input-1-8300b2622db3>", line 1  
  6 ~ 7  
    ^  
SyntaxError: invalid syntax
```

```
[5]: 6 * 7
```

```
[5]: 42
```

..... doc/allow-errors.ipynb ends here.

The following section was generated from doc/allow-errors-per-cell.ipynb .....

## 7.4 Ignoring Errors on a Per-Cell Basis

Instead of ignoring errors for all notebooks or for some selected notebooks (see *the previous notebook* (page 43)), you can be more fine-grained and just allow errors on certain code cells by tagging them with the `raises-exception` tag.

```
[1]: 'no problem'
```

```
[1]: 'no problem'
```

The following code cell has the `raises-exception` tag.

```
[2]: problem
```

```
-----  
NameError                                Traceback (most recent call last)  
<ipython-input-1-526ab3a89ffc> in <module>  
----> 1 problem  
  
NameError: name 'problem' is not defined
```

The following code cell is executed even though the previous cell raised an exception.

```
[3]: 'no problem'
```

```
[3]: 'no problem'
```

---

### Note

The behavior of the `raises-exception` tag doesn't match its name. While it does *allow* exceptions, it does not check if an exception is actually raised!

This will hopefully be fixed at some point, see <https://github.com/jupyter/nbconvert/issues/730>.

..... doc/allow-errors-per-cell.ipynb ends here.

The following section was generated from doc/configuring-kernels.ipynb .....

## 7.5 Configuring the Kernels

### 7.5.1 Kernel Name

If we have multiple kernels installed, we can choose to override the kernel saved in the notebook using `nbsphinx_kernel_name` (page 11):

```
nbsphinx_kernel_name = 'python-upstream-dev'
```

which uses the kernel named `python-upstream-dev` instead of the kernel name stored in the notebook.

## 7.5.2 Kernel Arguments

We can also pass options to the kernel by setting `nbsphinx_execute_arguments` (page 10) in `conf.py`. These work the same way as `ipython_kernel_config.py`. For example, using

```
nbsphinx_execute_arguments = [  
    "--InlineBackend.rc=figure.dpi=96",  
]
```

to set *plot options* (page 31) is the same as writing:

```
c.InlineBackend.rc = {'figure.dpi': 96}
```

in `ipython_kernel_config.py` or using:

```
%config InlineBackend.rc={'figure.dpi': 96}
```

at the top of a notebook:

```
[1]: get_ipython().config.InlineBackend.rc  
[1]: DeferredConfigString('figure.dpi=96')
```

## 7.5.3 Environment Variables

The contents of `os.environ` after the execution of `conf.py` will be passed as environment variables to the kernel. As an example, `MY_DUMMY_VARIABLE` has been set in `conf.py` like this:

```
import os  
os.environ['MY_DUMMY_VARIABLE'] = 'Hello from conf.py!'
```

... and it can be checked in the notebook like this:

```
[2]: import os  
os.environ['MY_DUMMY_VARIABLE']  
[2]: 'Hello from conf.py!'
```

This is useful if we want to edit `PYTHONPATH` in order to compile the documentation without installing the project:

```
import os  
  
src = os.path.abspath('./src')  
os.environ['PYTHONPATH'] = src
```

If you are using <https://mybinder.org/> and you want to define environment variables, you should create a file `.binder/start` in your repository (see [Binder docs](#)<sup>156</sup>) containing definitions like this:

```
#!/bin/bash  
export MY_DUMMY_VARIABLE="Hello from .binder/start!"  
exec "$@"
```

..... doc/configuring-kernels.ipynb ends here.

<sup>156</sup> [https://mybinder.readthedocs.io/en/latest/using/config\\_files.html#start-run-code-before-the-user-sessions-starts](https://mybinder.readthedocs.io/en/latest/using/config_files.html#start-run-code-before-the-user-sessions-starts)

The following section was generated from `doc/timeout.ipynb` .....

## 7.6 Cell Execution Timeout

By default, code cells will be executed until they are finished, even if that takes a very long time. In some cases they might never finish.

If you would like to only use a finite amount of time per cell, you can choose a timeout length for all notebooks by setting the following option in `conf.py`:

```
nbsphinx_timeout = 60
```

Or change the timeout length on a per-notebook basis by adding this to the notebook's JSON metadata:

```
"nbsphinx": {
  "timeout": 60
},
```

The timeout is given in seconds, use `-1` to disable the timeout (which is the default).

Alternatively, you can manually execute the notebook in question and save the results, see [the pre-executed example notebook](#) (page 41).

..... `doc/timeout.ipynb` ends here.  
..... `doc/executing-notebooks.ipynb` ends here.

The following section was generated from `doc/prolog-and-epilog.ipynb` .....

## 8 Prolog and Epilog

When including notebooks in your Sphinx documentation, you can choose to add some generic content before and after each notebook. This can be done with the configuration values `nbsphinx_prolog` and `nbsphinx_epilog` in the file `conf.py`.

The prolog and epilog strings can hold arbitrary [reST](#)<sup>157</sup> markup. Particularly, the `only`<sup>158</sup> and `raw`<sup>159</sup> directives can be used to have different content for HTML and LaTeX output.

Those strings are also processed by the [Jinja2](#)<sup>160</sup> templating engine. This means you can run Python-like code within those strings. You have access to the current [Sphinx build environment](#)<sup>161</sup> via the variable `env`. Most notably, you can get the file name of the current notebook with

```
{{ env.doc2path(env.docname, base=None) }}
```

Have a look at the [Jinja2 template documentation](#)<sup>162</sup> for more information.

### Warning

If you use invalid syntax, you might get an error like this:

```
jinja2.exceptions.TemplateSyntaxError: expected token ':', got '{'
```

This is especially prone to happen when using raw LaTeX, with its abundance of braces. To avoid clashing braces you can try to insert additional spaces or LaTeX macros that don't have a visible effect, like e.g. `\strut{}`. For example, you can avoid three consecutive opening braces with something like that:

<sup>157</sup> <https://www.sphinx-doc.org/rest.html>

<sup>158</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/directives.html#directive-only>

<sup>159</sup> <https://docutils.sourceforge.io/docs/ref/rst/directives.html#raw-data-pass-through>

<sup>160</sup> <http://jinja.pocoo.org/>

<sup>161</sup> <https://www.sphinx-doc.org/en/master/extdev/envapi.html>

<sup>162</sup> <http://jinja.pocoo.org/docs/latest/templates/>

```
\texttt{\strut}{\{\{ env.doc2path(env.docname, base=None) \}\}}
```

NB: The three consecutive closing braces in this example are not problematic.

An alternative work-around would be to surround LaTeX braces with Jinja braces like this:

```
{\{ '{' }\}}
```

The string within will not be touched by Jinja.

Another special Jinja syntax is `{%}`, which is also often used in fancy TeX/LaTeX code. A work-around for this situation would be to use

```
{\{ '% ' }\}}
```

## 8.1 Examples

You can include a simple static string, using `reST`<sup>163</sup> markup if you like:

```
nbsphinx_epilog = """
----

Generated by nbsphinx_ from a Jupyter_ notebook.

.. _nbsphinx: https://nbsphinx.readthedocs.io/
.. _Jupyter: https://jupyter.org/
"""
```

Using some additional Jinja2 markup and the information from the `env` variable, you can create URLs that point to the current notebook file, but located on some other server:

```
nbsphinx_prolog = """
Go there: https://example.org/notebooks/{\{ env.doc2path(env.docname, base=None) \}\}

----
"""
```

You can also use separate content for HTML and LaTeX output, e.g.:

```
nbsphinx_prolog = r"""
{% set docname = env.doc2path(env.docname, base=None) %}

.. only:: html

    Go there: https://example.org/notebooks/{\{ docname \}\}

.. raw:: latex

    \nbsphinxstartnotebook{The following section was created from
    \texttt{\strut}{\{\{ docname \}\}}:}
"""

nbsphinx_epilog = r"""
.. raw:: latex
```

(continues on next page)

---

<sup>163</sup> <https://www.sphinx-doc.org/rest.html>



```
\nbsphinxstopnotebook{\hfill End of notebook.}
"""
```

Note the use of the `\nbsphinxstartnotebook` and `\nbsphinxstopnotebook` commands. Those make sure there is not too much space between the “prolog” and the beginning of the notebook and, respectively, between the end of the notebook and the “epilog”. They also avoid page breaks, in order for the “prolog”/“epilog” not to end up on the page before/after the notebook.

For a more involved example for different HTML and LaTeX versions, see the file `conf.py` of the `nbsphinx` documentation.

..... `doc/prolog-and-epilog.ipynb` ends here.

The following section was generated from `doc/custom-formats.pct.py` .....

## 9 Custom Notebook Formats

By default, Jupyter notebooks are stored in files with the suffix `.ipynb`, which use the JSON format for storage.

However, there are libraries available which allow storing notebooks in different formats, using different file suffixes.

To use a custom notebook format in `nbsphinx`, you can specify the `nbsphinx_custom_formats` option in your `conf.py` file. You have to provide the file extension and a conversion function that takes the contents of a file (as a string) and returns a Jupyter notebook object.

```
nbsphinx_custom_formats = {
    '.mysuffix': 'mylibrary.converter_function',
}
```

The converter function can be given as a string (recommended) or as a function object.

If a conversion function takes more than a single string argument, you can specify the function name plus a dictionary with keyword arguments which will be passed to the conversion function in addition to the file contents.

```
nbsphinx_custom_formats = {
    '.mysuffix': ['mylibrary.converter_function', {'some_arg': 42}],
}
```

You can of course use multiple formats by specifying multiple conversion functions.

### 9.1 Example: Jupytertext

One example for a library which provides a custom conversion function is `jupytertext`<sup>164</sup>, which allows storing the contents of Jupyter notebooks in Markdown and R-Markdown, as well as plain Julia, Python and R files.

Since its conversion function takes more than a single string argument, we have to pass a keyword argument, e.g.:

```
nbsphinx_custom_formats = {
    '.Rmd': ['jupytertext.reads', {'fmt': 'Rmd'}],
}
```

<sup>164</sup> <https://github.com/mwouts/jupytertext>

This very page is an example of a notebook stored in the `py:percent` format (see [docs<sup>165</sup>](#)):

```
[1]: !head -20 custom-formats.pct.py

# %% [markdown]
# # Custom Notebook Formats
#
# By default, Jupyter notebooks are stored in files with the suffix .ipynb,
# which use the JSON format for storage.
#
# However, there are libraries available which allow storing notebooks
# in different formats, using different file suffixes.
#
# To use a custom notebook format in nbsphinx, you can specify the
# nbsphinx_custom_formats option in your conf.py file.
# You have to provide the file extension
# and a conversion function that takes the contents of a file (as a string)
# and returns a Jupyter notebook object.
#
# ```python
# nbsphinx_custom_formats = {
#     '.mysuffix': 'mylibrary.converter_function',
# }
# ```
```

To select a suitable conversion function, we use the following setting in `conf.py`:

```
nbsphinx_custom_formats = {
    '.pct.py': ['jupytertext.reads', {'fmt': 'py:percent'}],
}
```

Another example is [this gallery example page](#) (page 63).

..... doc/custom-formats.pct.py ends here.

The following section was generated from doc/subdir/a-notebook-in-a-subdir.ipynb .....

## 10 Notebooks in Sub-Directories

You can organize your notebooks in subdirectories and `nbsphinx` will take care that relative links to other notebooks, images and other files still work.



Let's see if links to local images work:

```
[1]: from IPython.display import Image
Image(filename='../images/notebook_icon.png')
```

<sup>165</sup> <https://jupytertext.readthedocs.io/en/latest/formats.html#the-percent-format>

[1]:



### Warning

There may be problems with images in output cells if your source directory contains symbolic links, see [issue #49](#)<sup>166</sup>.

A link to a notebook in the same sub-directory: [link](#) (page 56).

A link to a notebook in the parent directory: [link](#) (page 18).

A link to a local file: [link](#).

A random equation:

$$F_n = F_{n-1} + F_{n-2} \tag{08.15}$$

## 10.1 A Sub-Section

This is just for testing inter-notebook links, see [this section](#) (page 26).

..... doc/subdir/a-notebook-in-a-subdir.ipynb ends here.

The following section was generated from doc/subdir/gallery.ipynb .....

## 11 Creating Thumbnail Galleries

Inspired by [Sphinx-Gallery](#)<sup>167</sup>, you can create thumbnail galleries from a list of Jupyter notebooks (or other Sphinx source files).

nbsphinx does *not* provide any gallery styles, but you can easily use the styles from Sphinx-Gallery by installing it:

```
python3 -m pip install sphinx-gallery
```

... and loading the styles in your `conf.py` with:

```
extensions = [
    'nbsphinx',
    'sphinx_gallery.load_style',
    # more extensions, if needed ...
]
```

You'll need Sphinx-Gallery version 0.6 or higher.

However, you can also create your own CSS styles if you prefer (then you don't need to install Sphinx-Gallery). You can load your CSS files with `html_css_files`<sup>168</sup>.

<sup>166</sup> <https://github.com/spatialaudio/nbsphinx/issues/49>

<sup>167</sup> <https://sphinx-gallery.github.io/>

<sup>168</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_css\\_files](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_css_files)

You can create *Thumbnail Galleries in reST Files* (page 62) and you can create galleries by adding the "nbsphinx-gallery" cell tag or metadata to notebooks, which is used just like the "nbsphinx-toctree" (page 56) cell tag/metadata.

For possible options, see the *toctree* (page 56) notebook.

---

#### Note

In LaTeX output this behaves just like *toctree*, i.e. no thumbnail gallery is shown, but the linked files are included in the document.

Like with *toctree* you should avoid adding content after a gallery (except other toctrees and galleries) because this content would appear in the LaTeX output *after* the content of all included source files, which is probably not what you want.

---

The following cell has the "nbsphinx-gallery" tag, which creates a thumbnail gallery. The *first* section title in that cell (if available) is used as "caption" (unless it's given in the metadata).

The notebooks in the following gallery describe different ways how to select which images are used as thumbnails.

The following section was generated from `doc/gallery/cell-tag.ipynb` .....

### 11.1 Using a Cell Tag to Select a Thumbnail

You can select any code cell (with appropriate output) by tagging it with the `nbsphinx-thumbnail` tag.

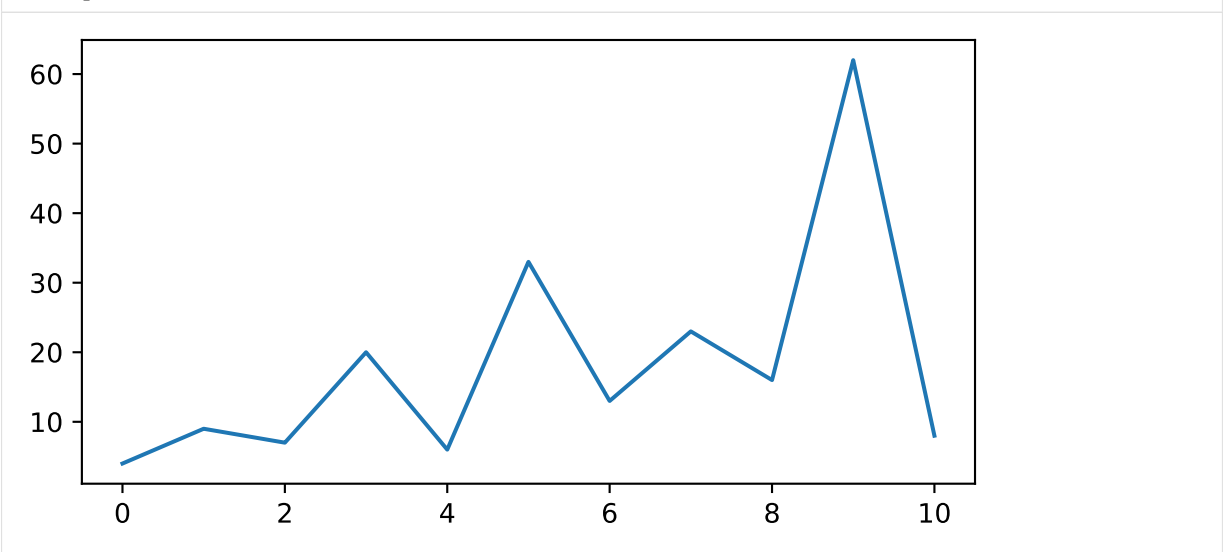
If there are multiple outputs in the selected cell, the last one is used. See *Choosing from Multiple Outputs* (page 54) for how to select a specific output. If you want to show a tooltip, have a look at *Using Cell Metadata to Select a Thumbnail* (page 53).

```
[1]: import matplotlib.pyplot as plt
```

The following cell has the `nbsphinx-thumbnail` tag:

```
[2]: fig, ax = plt.subplots(figsize=[6, 3])
ax.plot([4, 9, 7, 20, 6, 33, 13, 23, 16, 62, 8])
```

```
[2]: [<matplotlib.lines.Line2D at 0x7f72b1513850>]
```



..... doc/gallery/cell-tag.ipynb ends here.

The following section was generated from doc/gallery/cell-metadata.ipynb .....

## 11.2 Using Cell Metadata to Select a Thumbnail

If the *nbsphinx-thumbnail* (page 52) cell tag is not enough, you can use cell metadata to specify more options.

The last cell in this notebook has this metadata:

```
{
  "nbsphinx-thumbnail": {
    "tooltip": "This tooltip message was defined in cell metadata"
  }
}
```

If there are multiple outputs in the selected cell, the last one is used. See *Choosing from Multiple Outputs* (page 54) for how to select a specific output.

```
[1]: import matplotlib.pyplot as plt
import numpy as np
```

```
[2]: plt.rcParams['image.cmap'] = 'coolwarm'
plt.rcParams['image.origin'] = 'lower'
```

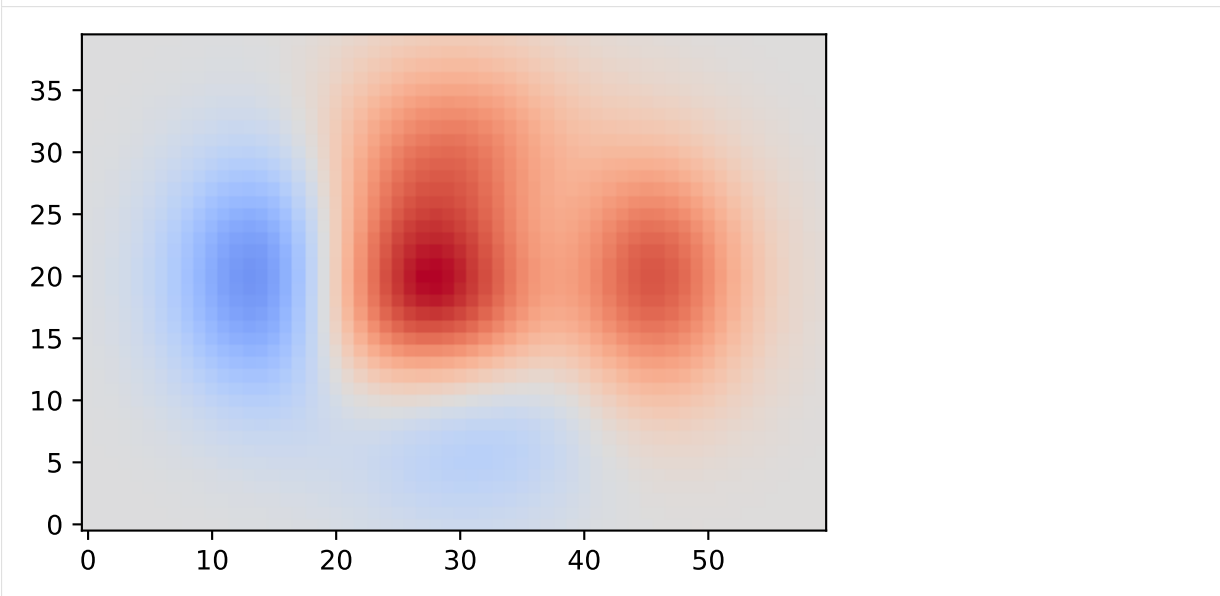
Some example data stolen from [https://matplotlib.org/examples/pylab\\_examples/pcolor\\_demo.html](https://matplotlib.org/examples/pylab_examples/pcolor_demo.html):

```
[3]: x, y = np.meshgrid(np.arange(-3, 3, 0.1), np.arange(-2, 2, 0.1))
z = (1 - x / 2 + x ** 5 + y ** 3) * np.exp(-x ** 2 - y ** 2)
```

```
[4]: zmax = np.max(np.abs(z))
```

```
[5]: fig, ax = plt.subplots(figsize=[5, 3.5])
ax.imshow(z, vmin=-zmax, vmax=zmax)
```

```
[5]: <matplotlib.image.AxesImage at 0x7fae540b5710>
```



The following section was generated from doc/gallery/multiple-outputs.ipynb .....

### 11.3 Choosing from Multiple Outputs

By default, the last output of the selected cell is used as a thumbnail. If that's what you want, you can simply use the `nbsphinx-thumbnail` (page 52) cell tag.

If you want to specify one of multiple outputs, you can add a (zero-based) "output-index" to your "nbsphinx-thumbnail" cell metadata.

The following cell has this metadata, selecting the third output to be used as thumbnail in *the gallery* (page 51).

```
{
  "nbsphinx-thumbnail": {
    "output-index": 2
  }
}
```

```
[1]: from IPython.display import Image

display(Image(url='https://jupyter.org/assets/nav_logo.svg'))
print('Hello!')
display(Image(filename='../images/notebook_icon.png'))
display(Image(url='https://www.python.org/static/img/python-logo-large.png',
→embed=True))
```

<IPython.core.display.Image object>

Hello!



..... doc/gallery/multiple-outputs.ipynb ends here.

The following section was generated from `doc/gallery/no-thumbnail.ipynb` .....

## 11.4 A Notebook without Thumbnail

This notebook doesn't contain any thumbnail metadata.

It should be displayed with the default thumbnail image in the *gallery* (page 51).

..... `doc/gallery/no-thumbnail.ipynb` ends here.

The following section was generated from `doc/gallery/thumbnail-from-conf-py.ipynb` .....

## 11.5 Specifying Thumbnails in `conf.py`

This notebook doesn't contain any thumbnail metadata.

But in the file `conf.py`, a thumbnail is specified (via the `nbsphinx_thumbnails` (page 12) option), which will be used in the *gallery* (page 51).

The keys in the `nbsphinx_thumbnails` dictionary can contain wildcards, which behave very similarly to the `html_sidebars`<sup>169</sup> option.

The thumbnail files can be local image files somewhere in the source directory, but you'll need to create at least one *link* (page 27) to them in order to copy them to the HTML output directory.

You can also use files from the `_static` directory (which contains all files in your `html_static_path`<sup>170</sup>).

If you want, you can also use files from the `_images` directory, which contains all notebook outputs.

To demonstrate this feature, we are creating an image file here:

```
[1]: %matplotlib agg
```

```
Matplotlib is building the font cache; this may take a moment.
```

```
[2]: import matplotlib.pyplot as plt
```

```
[3]: fig, ax = plt.subplots()
      ax.plot([4, 8, 15, 16, 23, 42])
      fig.savefig('a-local-file.png')
```

Please note that the previous cell doesn't have any outputs, but it has generated a file named `a-local-file.png` in the notebook's directory.

We have to create a link to this file (which is a good idea anyway): `a-local-file.png`.

Now we can use this file in our `conf.py` like this:

```
nbsphinx_thumbnails = {
    'gallery/thumbnail-from-conf-py': 'gallery/a-local-file.png',
}
```

Please note that the notebook name does *not* contain the `.ipynb` suffix.

..... `doc/gallery/thumbnail-from-conf-py.ipynb` ends here.  
..... `doc/subdir/gallery.ipynb` ends here.

<sup>169</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_sidebars](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_sidebars)

<sup>170</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_static\\_path](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_static_path)

## 12 Using toctree In A Notebook

In Sphinx-based documentation, there is typically a file called `index.rst` which contains one or more `toctree`<sup>171</sup> directives. Those can be used to pull in further source files (which themselves can contain further `toctree` directives).

With `nbsphinx` it is possible to get a similar effect within a Jupyter notebook using the `"nbsphinx-toctree"` cell tag or cell metadata. Markdown cells with `"nbsphinx-toctree"` tag/metadata are not converted like "normal" Markdown cells. Instead, they are only scanned for links to other notebooks (or `*.rst` files and other Sphinx source files) and those links are added to a `toctree` directive. External links can also be used, but they will not be visible in the LaTeX output.

If there is a section title in the selected cell, it is used as `toctree` caption (but it also works without a title).

---

### Note

All other content of such a cell is *ignored!*

---

If you are satisfied with the default settings, you can simply use `"nbsphinx-toctree"` as a cell tag. Alternatively, you can store `"nbsphinx-toctree"` cell metadata. Use ...

```
{
  "nbsphinx-toctree": {}
}
```

... for the default settings, ...

```
{
  "nbsphinx-toctree": {
    "maxdepth": 2
  }
}
```

... for setting the `:maxdepth:` option, or...

```
{
  "nbsphinx-toctree": {
    "hidden": true
  }
}
```

... for setting the `:hidden:` option.

Of course, multiple options can be used at the same time, e.g.

```
{
  "nbsphinx-toctree": {
    "maxdepth": 3,
    "numbered": true
  }
}
```

---

<sup>171</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/directives.html#directive-toctree>



For more options, have a look at the [Sphinx documentation](#)<sup>172</sup>. All options can be used – except `:glob:`, which can only be used in *rst files* (page 59) and in *raw reST cells* (page 40).

---

#### Note

In HTML output, a `toctree` cell generates an in-line table of contents (containing links) at its position in the notebook, whereas in the LaTeX output, a new (sub-)section with the actual content is inserted at its position. All content below the `toctree` cell will appear after the table of contents/inserted section, respectively. If you want to use the LaTeX output, it is recommended that you don't add further cells below a `toctree` cell, otherwise their content may appear at unexpected places. Multiple `toctree` cells in a row should be fine, though.

---

The following cell is tagged with "nbsphinx-toctree" and contains a link to the notebook [yet-another.ipynb](#) (page 57) and an external link (which will only be visible in the HTML output). It also contains a section title which will be used as `toctree` caption (which also will only be visible in the HTML output).

The following section was generated from `doc/yet-another.ipynb` .....

### 12.1 Yet Another Notebook

This notebook is only here to show how (sub-)toctrees can be created with Markdown cell metadata. See [there](#) (page 56).

..... `doc/yet-another.ipynb` ends here.  
..... `doc/subdir/toctree.ipynb` ends here.

The following section was generated from `doc/custom-css.ipynb` .....

## 13 Custom CSS

If you are not satisfied with the CSS styles provided by `nbsphinx` and by your Sphinx theme, don't worry, you can add your own styles easily.

### 13.1 For All Pages

Just create your own CSS file, e.g. `my-own-style.css`, and put it into the `_static/` sub-directory of your source directory.

You'll also have to set the config values `html_static_path`<sup>173</sup> and `html_css_files`<sup>174</sup> in your `conf.py`, e.g. like this:

```
html_static_path = ['_static']
html_css_files = ['my-own-style.css']
```

---

<sup>172</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/directives.html#directive-toctree>

<sup>173</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_static\\_path](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_static_path)

<sup>174</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html\\_css\\_files](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-html_css_files)

## 13.2 For All RST files

If you want your style to only apply to \*.rst files (and not Jupyter notebooks or other source files), you can use `rst_prolog`<sup>175</sup> with the `raw`<sup>176</sup> directive in your `conf.py` like this:

```
rst_prolog = """
.. raw:: html

    <style>
      h1 {
        color: fuchsia;
      }
    </style>
"""
```

## 13.3 For All Notebooks

Similarly, if you want your style to only apply to notebooks, you can use `nbsphinx_prolog` (page 47) like this:

```
nbsphinx_prolog = """
.. raw:: html

    <style>
      h1 {
        color: chartreuse;
      }
    </style>
"""
```

## 13.4 For a Single Notebook

For styles that should affect only the current notebook, you can simply insert `<style>` tags into Markdown cells like this:

```
<style>
  .ninput .prompt,
  .noutput .prompt {
    display: none;
  }
</style>
```

This CSS example removes the input and output prompts from code cells, see the following cell:

```
[1]: 6 * 7
```

```
[1]: 42
```

..... doc/custom-css.ipynb ends here.

<sup>175</sup> [https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-rst\\_prolog](https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-rst_prolog)

<sup>176</sup> <https://docutils.sourceforge.io/docs/ref/rst/directives.html#raw-data-pass-through>

## 14 Normal reStructuredText Files

This is a normal RST file.

---

**Note:** Those still work!

---

### 14.1 Links to Notebooks (and Other Sphinx Source Files)

Links to Sphinx source files can be created like normal [Sphinx hyperlinks](#)<sup>177</sup>, just using a relative path to the local file: *link* (page 50).

```
using a relative path to the local file: link_.  
  
.. \_link: subdir/a-notebook-in-a-subdir.ipynb
```

If the link text has a space (or some other strange character) in it, you have to surround it with backticks: *a notebook link* (page 50).

```
surround it with backticks: `a notebook link`_.  
  
.. \_a notebook link: subdir/a-notebook-in-a-subdir.ipynb
```

You can also use an [anonymous hyperlink target](#)<sup>178</sup>, like this: *link* (page 50). If you have multiple of those, their order matters!

```
like this: link___.  
  
__ subdir/a-notebook-in-a-subdir.ipynb
```

Finally, you can use [Embedded URIs](#)<sup>179</sup>, like this *link* (page 50).

```
like this `link <subdir/a-notebook-in-a-subdir.ipynb>`_.
```

---

**Note:** These links should also work on Github and in other rendered reStructuredText pages.

---

Links to subsections are also possible by adding a hash sign (#) and the section title to any of the above-mentioned link variants. You have to replace spaces in the section titles by hyphens. For example, see this *subsection* (page 51).

```
For example, see this subsection_.  
  
.. \_subsection: subdir/a-notebook-in-a-subdir.ipynb#A-Sub-Section
```

---

<sup>177</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/basics.html#external-links>

<sup>178</sup> <https://docutils.sourceforge.io/docs/ref/rst/restructuredtext.html#anonymous-hyperlinks>

<sup>179</sup> <https://docutils.sourceforge.io/docs/ref/rst/restructuredtext.html#embedded-uris-and-aliases>

## 14.2 Links to Notebooks, Ye Olde Way

In addition to the way shown above, you can also create links to notebooks (and other Sphinx source files) with `:ref:`<sup>180</sup>. This has some disadvantages:

- It is arguably a bit more clunky.
- Because `:ref:` is a Sphinx feature, the links don't work on Github and other rendered reStructuredText pages that use plain old docutils.

It also has one important advantage:

- The link text can automatically be taken from the actual section title.

A link with automatic title looks like this: *Notebooks in Sub-Directories* (page 50).

```
:ref:`/subdir/a-notebook-in-a-subdir.ipynb`
```

But you can also provide *your own link title* (page 50).

```
:ref:`your own link title </subdir/a-notebook-in-a-subdir.ipynb>`
```

However, if you want to use your own title, you are probably better off using the method described above in *Links to Notebooks (and Other Sphinx Source Files)* (page 59).

Links to subsections are also possible, e.g. *A Sub-Section* (page 51) (the subsection title is used as link text) and *alternative text* (page 51).

These links were created with:

```
:ref:`/subdir/a-notebook-in-a-subdir.ipynb#A-Sub-Section`  
:ref:`alternative text </subdir/a-notebook-in-a-subdir.ipynb#A-Sub-Section>`
```

---

### Note:

- The paths have to be relative to the top source directory and they have to start with a slash (/).
  - Spaces in the section title have to be replaced by hyphens!
- 

## 14.3 Sphinx Directives for Info/Warning Boxes

### Warning

This is an experimental feature! Its usage may change in the future or it might disappear completely, so don't use it for now.

With a bit of luck, it will be possible (some time in the future) to create info/warning boxes in Markdown cells, see <https://github.com/jupyter/notebook/issues/1292>. If this ever happens, `nbsphinx` will provide directives for creating such boxes. For now, there are two directives available: `nbinfo` and `nbwarning`. This is how an info box looks like:

---

### Note

This is an info box.

It may include nested formatting, even another info/warning box:

---

<sup>180</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/roles.html#role-ref>

**Warning:** You should probably not use nested boxes!

## 14.4 Domain Objects

`example_python_function(foo)`

This is just for testing domain object links.

**Parameters** `foo` (*str*) – Example string parameter

**See also:**

[Links to Domain Objects](#) (page 27)

## 14.5 References

There are different ways of handling references, for example you could use the [standard Sphinx citations](#)<sup>181</sup>, but it might be more practical to use the [sphinxcontrib.bibtex](#)<sup>182</sup> extension.

After installing the [sphinxcontrib.bibtex](#)<sup>183</sup> extension, you have to enable it in your `conf.py` and select the BibTeX file(s) you want to use:

```
extensions = [  
    'nbsphinx',  
    'sphinxcontrib.bibtex',  
    # Probably more extensions here ...  
]  
  
bibtex_bibfiles = ['my-references.bib']
```

Afterwards all the references defined in the bibliography file(s) can be used throughout the Jupyter notebooks and other source files as detailed in the following.

### 14.5.1 Citations

You can create citations like `[[PGH11]]`:

```
:cite: `perez2011python`
```

You can create similar citations in Jupyter notebooks with a special HTML syntax, see the section about [citations in Markdown cells](#) (page 21).

You can create a list of references in any reStructuredText file (or *reST cell* (page 40) in a notebook) like this:

```
.. bibliography::
```

Have a look at the documentation for all the available options.

The list of references may look something like this (in HTML output):

<sup>181</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/basics.html#citations>

<sup>182</sup> <https://sphinxcontrib-bibtex.readthedocs.io/>

<sup>183</sup> <https://sphinxcontrib-bibtex.readthedocs.io/>

However, in the LaTeX/PDF output the list of references will not appear here, but at the end of the document. For a possible work-around, see <https://github.com/mcmtroffaes/sphinxcontrib-bibtex/issues/156>.

### 14.5.2 Footnote citations

With a `sphinxcontrib.bibtex`<sup>186</sup> version of `>= 2.0.0` it is possible to create footnote bibliographies with footnote citations like<sup>187</sup>.

```
:footcite:`perez2011python`
```

Also footnote citations can be used within Jupyter notebooks with a special HTML syntax, see the section about *footnote citations in Markdown cells* (page 21). Footnote citations are restricted to their own source file and the assembly of the bibliography is (analogously to normal citations) invoked with the

```
.. footbibliography::
```

directive. For example, a footnote bibliography might look like this (in HTML output):

In the LaTeX/PDF output, there is no list of references appearing right here. Instead, the footnote citations are placed into the footnotes of their respective pages.

### 14.6 Thumbnail Galleries

With `nbsphinx` you can create thumbnail galleries in notebook files as described in *Creating Thumbnail Galleries* (page 51).

If you like, you can also create such galleries in reST files using the `nbgallery` directive.

It takes the same parameters as the `toctree`<sup>189</sup> directive.

---

**Note:** The notes regarding LaTeX in *Creating Thumbnail Galleries* (page 51) and *Using toctree In A Notebook* (page 56) also apply here!

---

The following example gallery was created using:

```
.. nbgallery::
   :caption: This is a thumbnail gallery:
   :name: rst-gallery
   :glob:
   :reversed:

   gallery/*-rst
```

---

<sup>186</sup> <https://sphinxcontrib-bibtex.readthedocs.io/>

<sup>187</sup> Fernando Pérez, Brian E. Granger, and John D. Hunter. Python: an ecosystem for scientific computing. *Computing in Science Engineering*, 13(2):13–21, 2011. doi:10.1109/MCSE.2010.119<sup>188</sup>.

<sup>188</sup> <https://doi.org/10.1109/MCSE.2010.119>

<sup>189</sup> <https://www.sphinx-doc.org/en/master/usage/restructuredtext/directives.html#directive-toctree>

The following section was generated from `doc/gallery/uno-rst.ipynb` .....

### 14.6.1 Dummy Notebook 1 for Gallery

This is a dummy file just to fill *the gallery in the reST file* (page 62).

The thumbnail image is assigned in `conf.py`.

..... `doc/gallery/uno-rst.ipynb` ends here.

The following section was generated from `doc/gallery/due-rst.pct.py` .....

### 14.6.2 Dummy Notebook 2 for Gallery

This is a dummy file just to fill *the gallery in the reST file* (page 62).

The thumbnail image is assigned in `conf.py`.

The source file is, for no particular reason, a Python script adhering to the `py:percent` format. It is parsed with the help of Jupyter<sup>190</sup>, see *Custom Notebook Formats* (page 49).

```
[1]: from pathlib import Path
```

```
[2]: filename = 'due-rst.pct.py'

print(Path(filename).read_text())

# %% [markdown]
# # Dummy Notebook 2 for Gallery
#
# This is a dummy file just to fill
# [the gallery in the reST file](../a-normal-rst-file.rst#thumbnail-galleries).
#
# The thumbnail image is assigned in [conf.py](../conf.py).

# %% [markdown]
# The source file is, for no particular reason,
# a Python script adhering to the `py:percent` format.
# It is parsed with the help of [Jupyter](https://jupyter.readthedocs.io/),
# see [Custom Notebook Formats](../custom-formats.ipynb).

# %%
from pathlib import Path

# %%
filename = 'due-rst.pct.py'

print(Path(filename).read_text())
```

..... `doc/gallery/due-rst.pct.py` ends here.

The following section was generated from `doc/links.ipynb` .....

## 15 External Links

### nbconvert

---

<sup>190</sup> <https://jupyter.readthedocs.io/>

The official conversion tool of the Jupyter project. It can be used to convert notebooks to HTML, LaTeX and many other formats.

Its `--execute` flag can be used to automatically execute notebooks before conversion.

<https://nbconvert.readthedocs.io/>

<https://github.com/jupyter/nbconvert>

### **RunNotebook (notebook\_sphinxext.py)**

Notebooks can be included in `*.rst` files with a custom notebook directive. Uses `nbconvert` to execute notebooks and to convert the result to HTML.

No LaTeX support.

<https://github.com/ngoldbaum/RunNotebook>

There are some forks:

- [https://bitbucket.org/yt\\_analysis/yt-doc/src/default/extensions/notebook\\_sphinxext.py](https://bitbucket.org/yt_analysis/yt-doc/src/default/extensions/notebook_sphinxext.py) (not available anymore)
- [https://github.com/matthew-brett/perrin-academy/blob/master/sphinxext/notebook\\_sphinxext.py](https://github.com/matthew-brett/perrin-academy/blob/master/sphinxext/notebook_sphinxext.py)

### **nbsite**

Build a tested, sphinx-based website from notebooks.

<https://nbsite.holoviz.org/>

### **ipyublish**

A workflow for creating and editing publication ready scientific reports and presentations, from one or more Jupyter Notebooks, without leaving the browser!

<https://ipyublish.readthedocs.io/>

<https://github.com/chrisjsewell/ipyublish>

### **jupyterbook**

Jupyter Book is an open source project for building beautiful, publication-quality books and documents from computational material.

<https://jupyterbook.org/>

<https://github.com/executablebooks/jupyter-book>

Previous tagline: “Create an online book with Jupyter Notebooks and Jekyll”: <https://legacy.jupyterbook.org/>

### **MyST-NB**

A collection of tools for working with Jupyter Notebooks in Sphinx.

The primary tool this package provides is a Sphinx parser for `ipynb` files. This allows you to directly convert Jupyter Notebooks into Sphinx documents. It relies heavily on the `MyST` parser<sup>191</sup>.

<https://myst-nb.readthedocs.io/>

<https://github.com/executablebooks/MyST-NB>

### **notebook-to-pdf**

This Jupyter notebook extension allows you to save your notebook as a PDF.

Three new features compared to the official “save as PDF” extension:

1. produce a PDF with the smallest number of page breaks,

---

<sup>191</sup> <https://github.com/executablebooks/MyST-Parser>



2. the original notebook is attached to the PDF; and
3. this extension does not require LaTeX.

<https://github.com/betatim/notebook-as-pdf>

### **nbinteract**

Create interactive webpages from Jupyter Notebooks

<https://www.nbinteract.com/>

<https://github.com/SamLau95/nbinteract>

### **nb\_pdf\_template**

An extended nbconvert template for LaTeX output.

[https://github.com/t-makaro/nb\\_pdf\\_template](https://github.com/t-makaro/nb_pdf_template)

### **nb2plots**

Notebook to reStructuredText converter which uses a modified version of the matplotlib plot directive.

<https://github.com/matthew-brett/nb2plots>

### **brole**

A Sphinx role for IPython notebooks

<https://github.com/matthew-brett/brole>

### **Sphinx-Gallery**

<https://sphinx-gallery.readthedocs.io/>

### **sphinx-nbexamples**

<https://sphinx-nbexamples.readthedocs.io/>

<https://github.com/Chilipp/sphinx-nbexamples>

### **nbsphinx-link**

<https://github.com/vidartf/nbsphinx-link>

Uses nbsphinx, but supports notebooks outside the Sphinx source directory.

See <https://github.com/spatialaudio/nbsphinx/pull/33> for some limitations.

### **bookbook**

Uses nbconvert to create a sequence of HTML or a concatenated LaTeX file from a sequence of notebooks.

<https://github.com/takluyver/bookbook>

### **jupyter-sphinx**

Jupyter Sphinx is a Sphinx extension that executes embedded code in a Jupyter kernel, and embeds outputs of that code in the output document. It has support for rich output such as images, Latex math and even javascript widgets.

<https://jupyter-sphinx.readthedocs.io/>

<https://github.com/jupyter/jupyter-sphinx>

### **DocOnce**

<http://hplgit.github.io/doconce/doc/web/index.html>

### **Converting Notebooks to reStructuredText**

[https://github.com/perrette/dimarray/blob/master/docs/scripts/nbconvert\\_to\\_rst.py](https://github.com/perrette/dimarray/blob/master/docs/scripts/nbconvert_to_rst.py)

<https://gist.github.com/hadim/16e29b5848672e2e497c> (not available anymore)

<https://sphinx-ipython.readthedocs.io/>

### Converting reStructuredText to Notebooks

<https://github.com/nthiery/rst-to-ipython>

<https://github.com/QuantEcon/sphinxcontrib-jupyter>

### Converting Notebooks to HTML for Blog Posts

[http://dongweiming.github.io/divingintoipython\\_nikola/posts/nbconvert.html](http://dongweiming.github.io/divingintoipython_nikola/posts/nbconvert.html)

[https://github.com/getpelican/pelican-plugins/blob/master/liquid\\_tags/notebook.py](https://github.com/getpelican/pelican-plugins/blob/master/liquid_tags/notebook.py)

### Further Posts and Issues

<https://github.com/ipython/ipython/issues/4936>

<https://mail.scipy.org/pipermail/ipython-user/2013-December/013490.html> (not available anymore)

..... doc/links.ipynb ends here.

## 16 Contributing

If you find bugs, errors, omissions or other things that need improvement, please create an issue or a pull request at <https://github.com/spatialaudio/nbsphinx/>. Contributions are always welcome!

### 16.1 Development Installation

Instead of pip-installing the latest release from PyPI<sup>192</sup>, you should get the newest development version (a.k.a. “master”) with Git:

```
git clone https://github.com/spatialaudio/nbsphinx.git
cd nbsphinx
python3 -m pip install -e .
```

... where `-e` stands for `--editable`.

When installing this way, you can quickly try other Git branches (in this example the branch is called “another-branch”):

```
git checkout another-branch
```

If you want to go back to the “master” branch, use:

```
git checkout master
```

To get the latest changes from Github, use:

```
git pull --ff-only
```

---

<sup>192</sup> <https://pypi.org/project/nbsphinx/>

## 16.2 Building the Documentation

If you make changes to the documentation, you should create the HTML pages locally using Sphinx and check if they look OK.

Initially, you might need to install a few packages that are needed to build the documentation:

```
python3 -m pip install -r doc/requirements.txt
```

To (re-)build the HTML files, use:

```
python3 setup.py build_sphinx
```

If you want to check the LaTeX output, use:

```
python3 setup.py build_sphinx -b latex
```

Again, you'll probably have to use `python` instead of `python3`. The generated files will be available in the directories `build/sphinx/html/` and `build/sphinx/latex/`, respectively.

## 16.3 Testing

Unfortunately, the currently available automated tests are very limited. Contributions to improve the testing situation are of course also welcome!

The `nbsphinx` documentation also serves as a test case. However, the resulting HTML/LaTeX/PDF files have to be inspected manually to check whether they look as expected.

Sphinx's warnings can help spot problems, therefore it is recommended to use the `-W` flag to turn Sphinx warnings into errors while testing:

```
python3 setup.py build_sphinx -W
```

This flag is also used for continuous integration on Travis-CI (see the file `.travis.yml`) and CircleCI (see the file `.circleci/config.yml`).

Sphinx has a `linkcheck` builder that can check whether all URLs used in the documentation are still valid. This is also part of the continuous integration setup on CircleCI.

## 17 Version History

### Version 0.8.4 – 2021-04-29 – PyPI<sup>193</sup> – diff<sup>194</sup>

- Support for `mathjax3_config` (for Sphinx  $\geq 4$ )
- Force loading MathJax on HTML pages generated from notebooks (can be disabled with `nbsphinx_assume_equations = False`)

### Version 0.8.3 – 2021-04-09 – PyPI<sup>195</sup> – diff<sup>196</sup>

- Increase `line_length_limit` (for `docutils` 0.17+)

### Version 0.8.2 – 2021-02-28 – PyPI<sup>197</sup> – diff<sup>198</sup>

<sup>193</sup> <https://pypi.org/project/nbsphinx/0.8.4/>

<sup>194</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.8.3...0.8.4>

<sup>195</sup> <https://pypi.org/project/nbsphinx/0.8.3/>

<sup>196</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.8.2...0.8.3>

<sup>197</sup> <https://pypi.org/project/nbsphinx/0.8.2/>

<sup>198</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.8.1...0.8.2>

- Add support for data-footcite HTML attribute
- Disable automatic highlighting in notebooks, setting `highlight_language` is no longer needed

**Version 0.8.1 – 2021-01-18 – PyPI<sup>199</sup> – diff<sup>200</sup>**

- Minor fixes and documentation update

**Version 0.8.0 – 2020-10-20 – PyPI<sup>201</sup> – diff<sup>202</sup>**

- Don't overwrite Pygments background in notebook code cells. To get rid of those ugly greenish code blocks, remove `pygments_style = 'sphinx'` from your `conf.py`.
- Switch documentation to `insipid`<sup>203</sup> theme by default
- Require Python 3.6+

**Version 0.7.1 – 2020-06-16 – PyPI<sup>204</sup> – diff<sup>205</sup>**

- Avoid links on scaled images

**Version 0.7.0 – 2020-05-08 – PyPI<sup>206</sup> – diff<sup>207</sup>**

- Warnings can be suppressed with `suppress_warnings`.
- `<img>` tags are handled in Markdown cells; the `alt`, `width`, `height` and `class` attributes are supported.
- CSS: prompts protrude into left margin if `nbsphinx_prompt_width` is too small. If you want to hide the prompts, use `custom CSS`<sup>208</sup>.

**Version 0.6.1 – 2020-04-18 – PyPI<sup>209</sup> – diff<sup>210</sup>**

- `.ipynb_checkpoints` is automatically added to `exclude_patterns`

**Version 0.6.0 – 2020-04-03 – PyPI<sup>211</sup> – diff<sup>212</sup>**

- Thumbnail galleries (inspired by <https://sphinx-gallery.github.io/>)
- `nbsphinx-toctree` as cell tag
- Keyword arguments in `nbsphinx_custom_formats`
- Python 2 support has been dropped

**Version 0.5.1 – 2020-01-28 – PyPI<sup>213</sup> – diff<sup>214</sup>**

- This will be the last release supporting Python 2.x!
- Support for <https://github.com/choldgraf/sphinx-copybutton>
- Executed notebooks are now saved in the HTML output directory

---

<sup>199</sup> <https://pypi.org/project/nbsphinx/0.8.1/>  
<sup>200</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.8.0...0.8.1>  
<sup>201</sup> <https://pypi.org/project/nbsphinx/0.8.0/>  
<sup>202</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.7.1...0.8.0>  
<sup>203</sup> <https://insipid-sphinx-theme.readthedocs.io/>  
<sup>204</sup> <https://pypi.org/project/nbsphinx/0.7.1/>  
<sup>205</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.7.0...0.7.1>  
<sup>206</sup> <https://pypi.org/project/nbsphinx/0.7.0/>  
<sup>207</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.6.1...0.7.0>  
<sup>208</sup> <https://nbsphinx.readthedocs.io/en/0.7.0/custom-css.html>  
<sup>209</sup> <https://pypi.org/project/nbsphinx/0.6.1/>  
<sup>210</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.6.0...0.6.1>  
<sup>211</sup> <https://pypi.org/project/nbsphinx/0.6.0/>  
<sup>212</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.5.1...0.6.0>  
<sup>213</sup> <https://pypi.org/project/nbsphinx/0.5.1/>  
<sup>214</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.5.0...0.5.1>

**Version 0.5.0 – 2019-11-20 – PyPI<sup>Page 69, 215</sup> – diff<sup>Page 69, 216</sup>**

- Automatic support for Jupyter widgets, customizable with `nbsphinx_widgets_path` (and `nbsphinx_widgets_options`)

**Version 0.4.3 – 2019-09-30 – PyPI<sup>217</sup> – diff<sup>218</sup>**

- Add option `nbsphinx_requirejs_path` (and `nbsphinx_requirejs_options`)

**Version 0.4.2 – 2019-01-15 – PyPI<sup>219</sup> – diff<sup>220</sup>**

- Re-establish Python 2 compatibility (but the clock is ticking ...)

**Version 0.4.1 – 2018-12-16 – PyPI<sup>221</sup> – diff<sup>222</sup>**

- Fix issue #266

**Version 0.4.0 – 2018-12-14 – PyPI<sup>223</sup> – diff<sup>224</sup>**

- Support for “data-cite” HTML tags in Markdown cells
- Add option `nbsphinx_custom_formats`
- LaTeX macros `\nbsphinxstartnotebook` and `\nbsphinxstopnotebook`
- Support for cell attachments
- Add options `nbsphinx_input_prompt` and `nbsphinx_output_prompt`
- Re-design LaTeX output of code cells, fix image sizes

**Version 0.3.5 – 2018-09-10 – PyPI<sup>225</sup> – diff<sup>226</sup>**

- Disable `nbconvert` version 5.4 to avoid issue #878<sup>227</sup>

**Version 0.3.4 – 2018-07-28 – PyPI<sup>228</sup> – diff<sup>229</sup>**

- Fix issue #196 and other minor changes

**Version 0.3.3 – 2018-04-25 – PyPI<sup>230</sup> – diff<sup>231</sup>**

- Locally linked files are only copied for Jupyter notebooks (and not anymore for other Sphinx source files)

**Version 0.3.2 – 2018-03-28 – PyPI<sup>232</sup> – diff<sup>233</sup>**

- Links to local files are rewritten for all Sphinx source files (not only Jupyter notebooks)

**Version 0.3.1 – 2018-01-17 – PyPI<sup>234</sup> – diff<sup>235</sup>**

- Enable notebook translations (NB: The use of reST strings is temporary!)

---

<sup>215</sup> <https://pypi.org/project/nbsphinx/0.5.0/>

<sup>216</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.4.3...0.5.0>

<sup>217</sup> <https://pypi.org/project/nbsphinx/0.4.3/>

<sup>218</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.4.2...0.4.3>

<sup>219</sup> <https://pypi.org/project/nbsphinx/0.4.2/>

<sup>220</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.4.1...0.4.2>

<sup>221</sup> <https://pypi.org/project/nbsphinx/0.4.1/>

<sup>222</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.4.0...0.4.1>

<sup>223</sup> <https://pypi.org/project/nbsphinx/0.4.0/>

<sup>224</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.3.5...0.4.0>

<sup>225</sup> <https://pypi.org/project/nbsphinx/0.3.5/>

<sup>226</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.3.4...0.3.5>

<sup>227</sup> <https://github.com/jupyter/nbconvert/issues/878>

<sup>228</sup> <https://pypi.org/project/nbsphinx/0.3.4/>

<sup>229</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.3.3...0.3.4>

<sup>230</sup> <https://pypi.org/project/nbsphinx/0.3.3/>

<sup>231</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.3.2...0.3.3>

<sup>232</sup> <https://pypi.org/project/nbsphinx/0.3.2/>

<sup>233</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.3.1...0.3.2>

<sup>234</sup> <https://pypi.org/project/nbsphinx/0.3.1/>

<sup>235</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.3.0...0.3.1>

**Version 0.3.0 – 2018-01-02 – PyPI<sup>Page 70, 236</sup> – diff<sup>Page 70, 237</sup>**

- Add options `nbsphinx_prolog` and `nbsphinx_epilog`
- Links from `*.rst` files to notebooks have to start with a slash

**Version 0.2.18 – 2017-12-03 – PyPI<sup>238</sup> – diff<sup>239</sup>**

- Fix issue #148

**Version 0.2.17 – 2017-11-12 – PyPI<sup>240</sup> – diff<sup>241</sup>**

- Fix issue #146

**Version 0.2.16 – 2017-11-07 – PyPI<sup>242</sup> – diff<sup>243</sup>**

- Fix issue #142

**Version 0.2.15 – 2017-11-03 – PyPI<sup>244</sup> – diff<sup>245</sup>**

- Links to subsections are now possible in all source files

**Version 0.2.14 – 2017-06-09 – PyPI<sup>246</sup> – diff<sup>247</sup>**

- Add option `nbsphinx_kernel_name`

**Version 0.2.13 – 2017-01-25 – PyPI<sup>248</sup> – diff<sup>249</sup>**

- Minor fixes

**Version 0.2.12 – 2016-12-19 – PyPI<sup>250</sup> – diff<sup>251</sup>**

- Basic support for widgets
- CSS is now “responsive”, some new CSS classes

**Version 0.2.11 – 2016-11-19 – PyPI<sup>252</sup> – diff<sup>253</sup>**

- Minor fixes

**Version 0.2.10 – 2016-10-16 – PyPI<sup>254</sup> – diff<sup>255</sup>**

- Enable JavaScript output cells

**Version 0.2.9 – 2016-07-26 – PyPI<sup>256</sup> – diff<sup>257</sup>**

- Add option `nbsphinx_prompt_width`

**Version 0.2.8 – 2016-05-20 – PyPI<sup>258</sup> – diff<sup>259</sup>**

---

<sup>236</sup> <https://pypi.org/project/nbsphinx/0.3.0/>  
<sup>237</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.18...0.3.0>  
<sup>238</sup> <https://pypi.org/project/nbsphinx/0.2.18/>  
<sup>239</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.17...0.2.18>  
<sup>240</sup> <https://pypi.org/project/nbsphinx/0.2.17/>  
<sup>241</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.16...0.2.17>  
<sup>242</sup> <https://pypi.org/project/nbsphinx/0.2.16/>  
<sup>243</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.15...0.2.16>  
<sup>244</sup> <https://pypi.org/project/nbsphinx/0.2.15/>  
<sup>245</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.14...0.2.15>  
<sup>246</sup> <https://pypi.org/project/nbsphinx/0.2.14/>  
<sup>247</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.13...0.2.14>  
<sup>248</sup> <https://pypi.org/project/nbsphinx/0.2.13/>  
<sup>249</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.12...0.2.13>  
<sup>250</sup> <https://pypi.org/project/nbsphinx/0.2.12/>  
<sup>251</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.11...0.2.12>  
<sup>252</sup> <https://pypi.org/project/nbsphinx/0.2.11/>  
<sup>253</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.10...0.2.11>  
<sup>254</sup> <https://pypi.org/project/nbsphinx/0.2.10/>  
<sup>255</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.9...0.2.10>  
<sup>256</sup> <https://pypi.org/project/nbsphinx/0.2.9/>  
<sup>257</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.8...0.2.9>  
<sup>258</sup> <https://pypi.org/project/nbsphinx/0.2.8/>  
<sup>259</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.7...0.2.8>

- Add options `nbsphinx_execute` and `nbsphinx_execute_arguments`
- Separate “display priority” for HTML and LaTeX

**Version 0.2.7 – 2016-05-04 – PyPI<sup>260</sup> – diff<sup>261</sup>**

- Special CSS tuning for `sphinx_rtd_theme`
- Replace `info/warning <div>` elements with `nbinfo/nbwarning`

**Version 0.2.6 – 2016-04-12 – PyPI<sup>262</sup> – diff<sup>263</sup>**

- Support for LaTeX math environments in Markdown cells
- Add options `nbsphinx_timeout` and `nbsphinx_codecell_lexer`

**Version 0.2.5 – 2016-03-15 – PyPI<sup>264</sup> – diff<sup>265</sup>**

- Add option `nbsphinx_allow_errors` to globally ignore exceptions
- Separate class `nbsphinx.Exporter`

**Version 0.2.4 – 2016-02-12 – PyPI<sup>266</sup> – diff<sup>267</sup>**

- Support for “nbsphinx-toctree” cell metadata

**Version 0.2.3 – 2016-01-22 – PyPI<sup>268</sup> – diff<sup>269</sup>**

- Links from notebooks to local files can now be used

**Version 0.2.2 – 2016-01-06 – PyPI<sup>270</sup> – diff<sup>271</sup>**

- Support for links to sub-sections in other notebooks

**Version 0.2.1 – 2016-01-04 – PyPI<sup>272</sup> – diff<sup>273</sup>**

- No need to mention `source_suffix` and `source_parsers` in `conf.py`

**Version 0.2.0 – 2015-12-27 – PyPI<sup>274</sup> – diff<sup>275</sup>**

- Add support for `allow_errors` and hidden metadata
- Add custom reST template
- Add `nbinput` and `nboutput` directives with HTML+CSS and LaTeX formatting
- Turn `nbsphinx` into a Sphinx extension

**Version 0.1.0 – 2015-11-29 Initial release**

---

<sup>260</sup> <https://pypi.org/project/nbsphinx/0.2.7/>  
<sup>261</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.6...0.2.7>  
<sup>262</sup> <https://pypi.org/project/nbsphinx/0.2.6/>  
<sup>263</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.5...0.2.6>  
<sup>264</sup> <https://pypi.org/project/nbsphinx/0.2.5/>  
<sup>265</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.4...0.2.5>  
<sup>266</sup> <https://pypi.org/project/nbsphinx/0.2.4/>  
<sup>267</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.3...0.2.4>  
<sup>268</sup> <https://pypi.org/project/nbsphinx/0.2.3/>  
<sup>269</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.2...0.2.3>  
<sup>270</sup> <https://pypi.org/project/nbsphinx/0.2.2/>  
<sup>271</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.1...0.2.2>  
<sup>272</sup> <https://pypi.org/project/nbsphinx/0.2.1/>  
<sup>273</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.2.0...0.2.1>  
<sup>274</sup> <https://pypi.org/project/nbsphinx/0.2.0/>  
<sup>275</sup> <https://github.com/spatialaudio/nbsphinx/compare/0.1.0...0.2.0>

## References

- [KRKP+16] Thomas Kluyver, Benjamin Ragan-Kelley, Fernando Pérez, Brian Granger, Matthias Bussonnier, Jonathan Frederic, Kyle Kelley, Jessica Hamrick, Jason Grout, Sylvain Corlay, Paul Ivanov, Damián Avila, Safia Abdalla, Carol Willing, and Jupyter Development Team. Jupyter Notebooks—a publishing format for reproducible computational workflows. In Fernando Loizides and Birgit Schmidt, editors, *Positioning and Power in Academic Publishing: Players, Agents and Agendas*, pages 87–90. IOS Press, 2016. doi:10.3233/978-1-61499-649-1-87<sup>184</sup>.
- [PGH11] Fernando Pérez, Brian E. Granger, and John D. Hunter. Python: an ecosystem for scientific computing. *Computing in Science Engineering*, 13(2):13–21, 2011. doi:10.1109/MCSE.2010.119<sup>185</sup>.

---

<sup>184</sup> <https://doi.org/10.3233/978-1-61499-649-1-87>

<sup>185</sup> <https://doi.org/10.1109/MCSE.2010.119>